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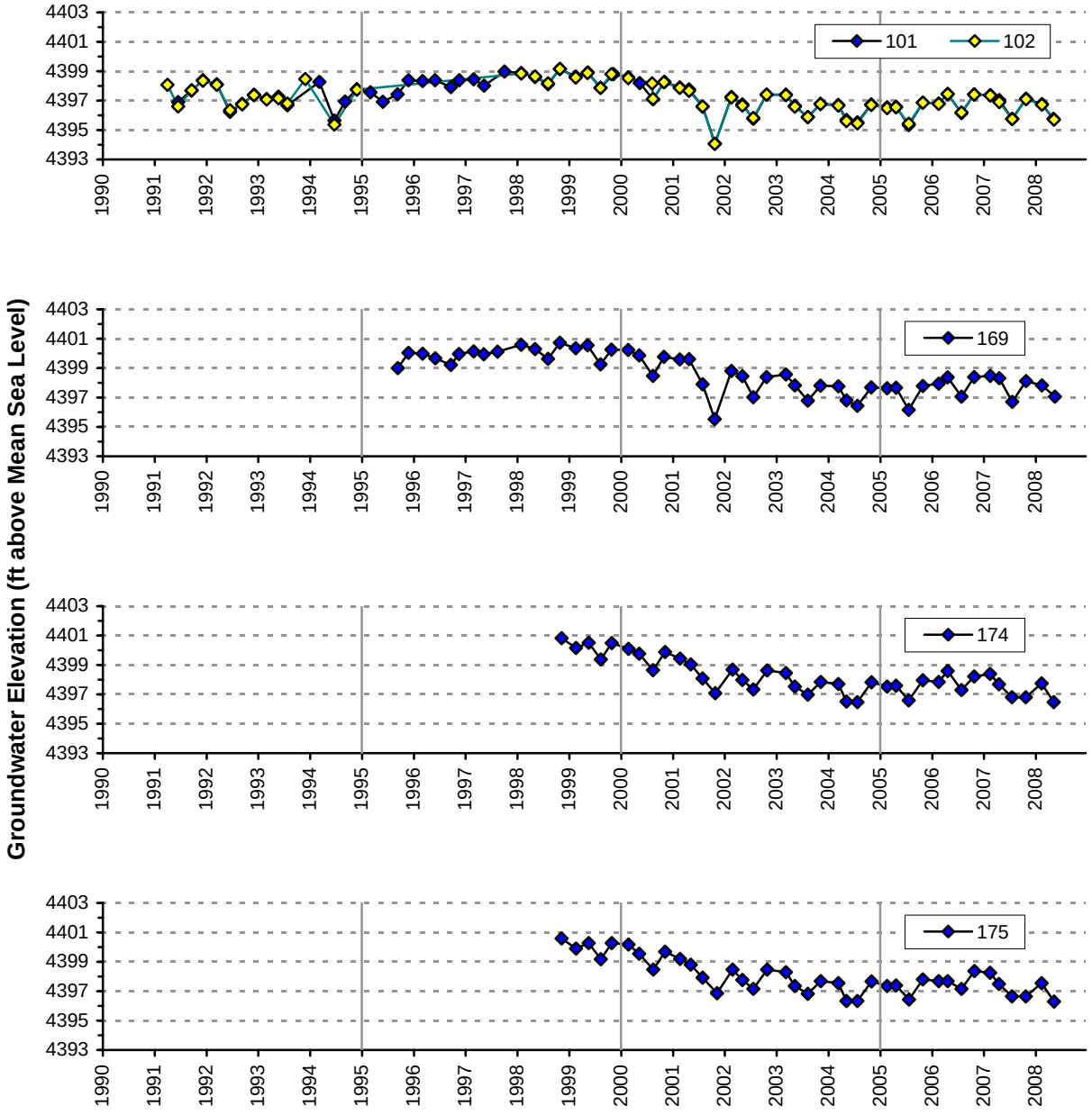
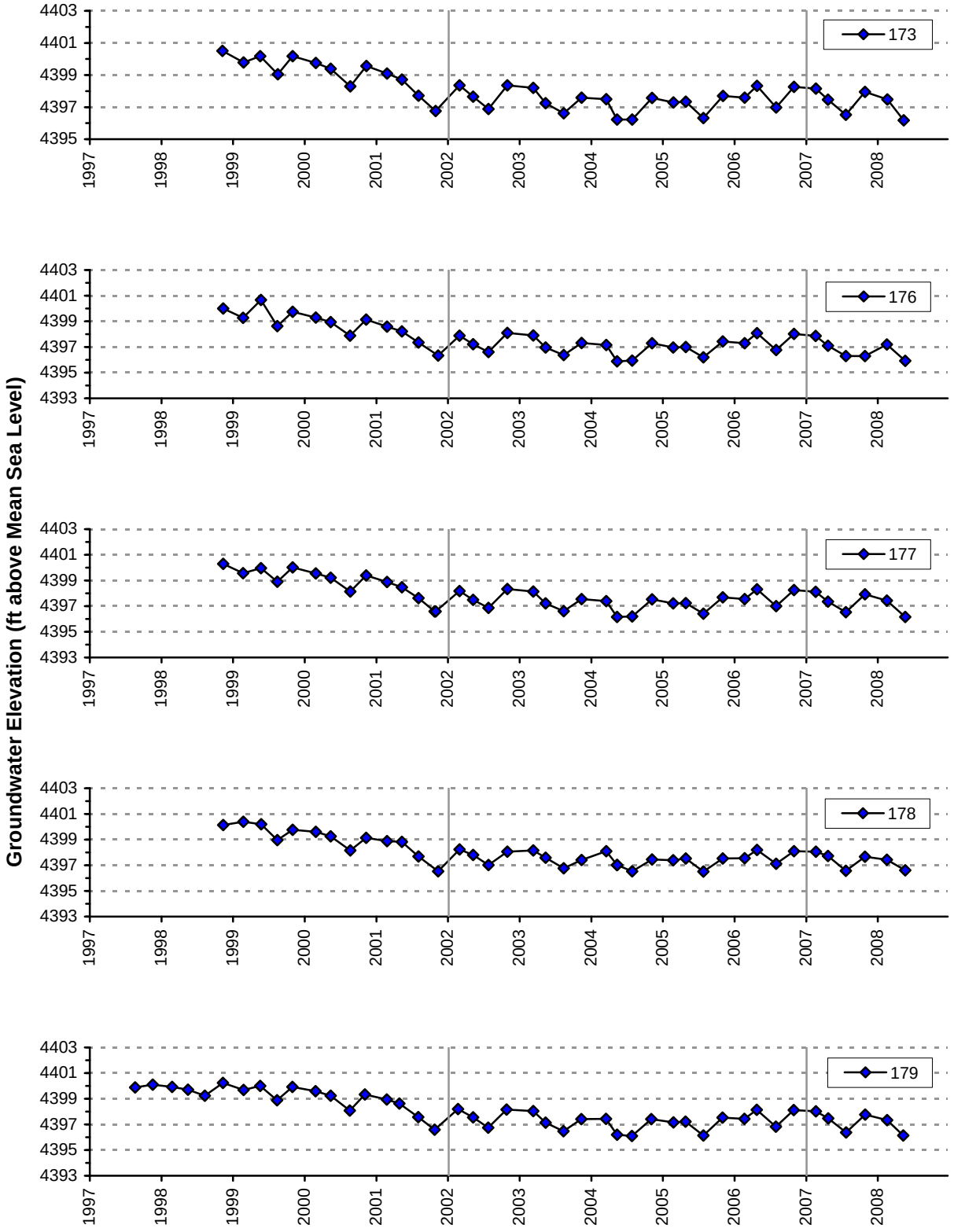
APPENDIX A

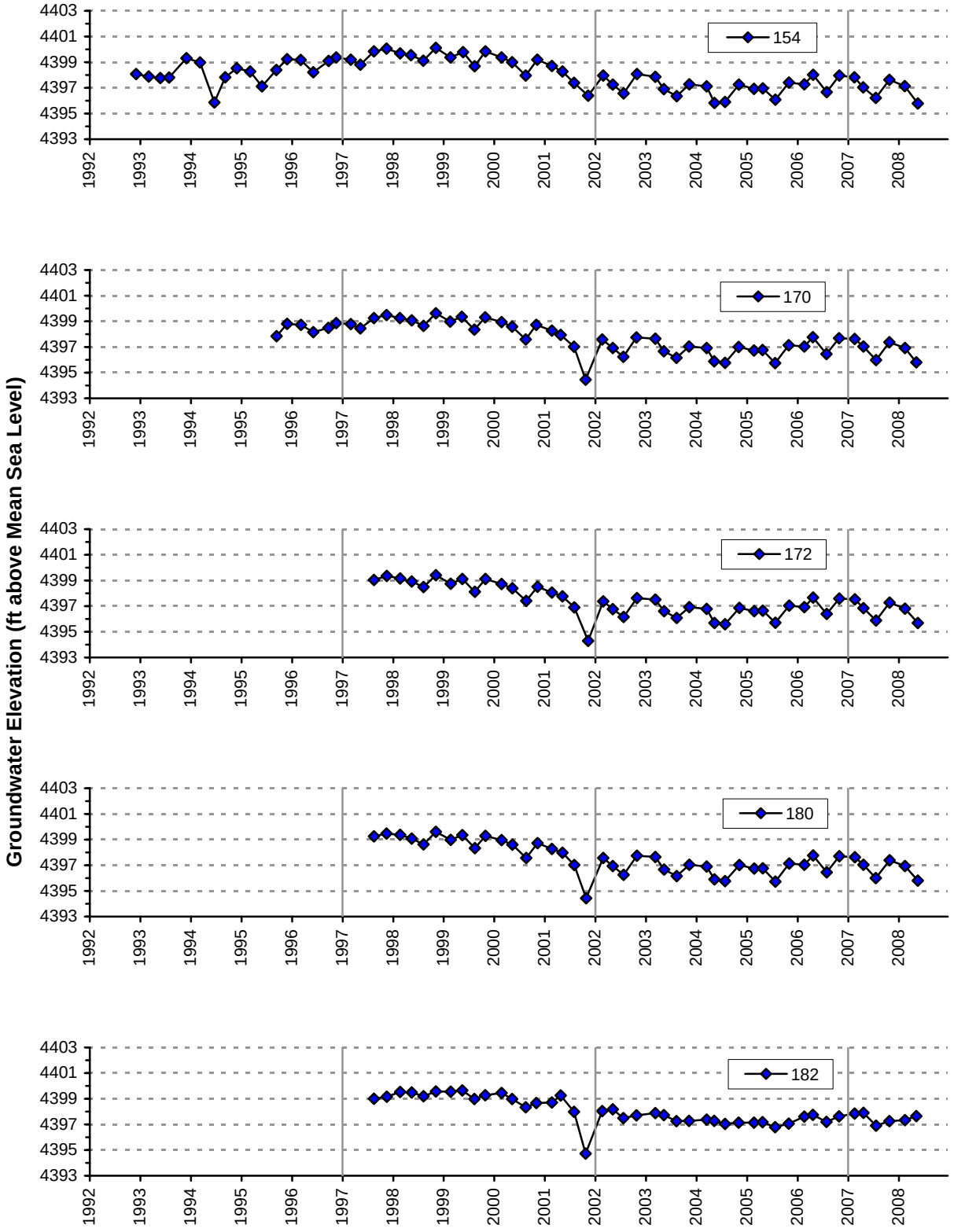
Groundwater Hydrographs -- Southwestern and Western Upgradient Wells



Groundwater Hydrographs -- Western Ponds (1)



Groundwater Hydrographs -- Western Ponds (2)



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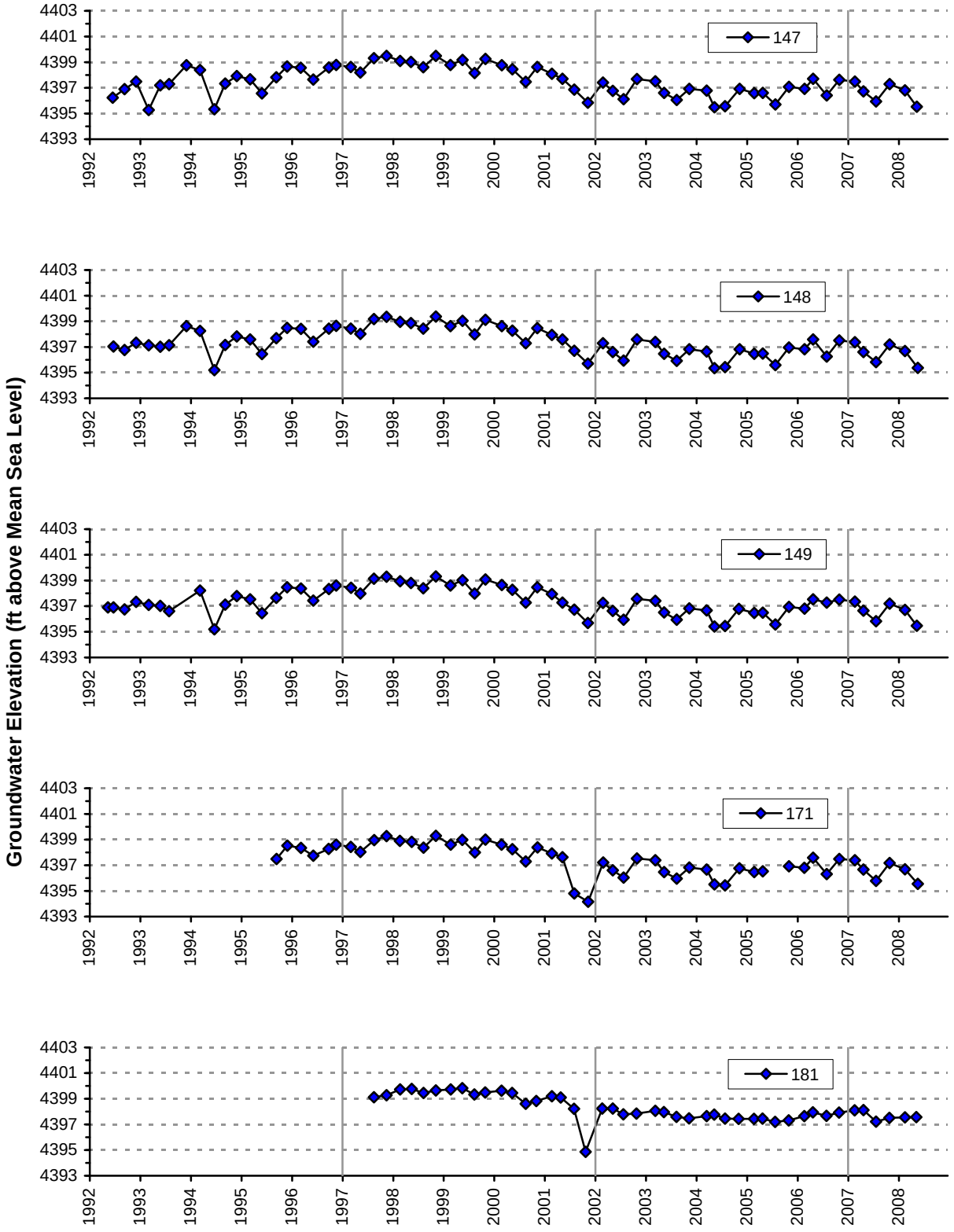
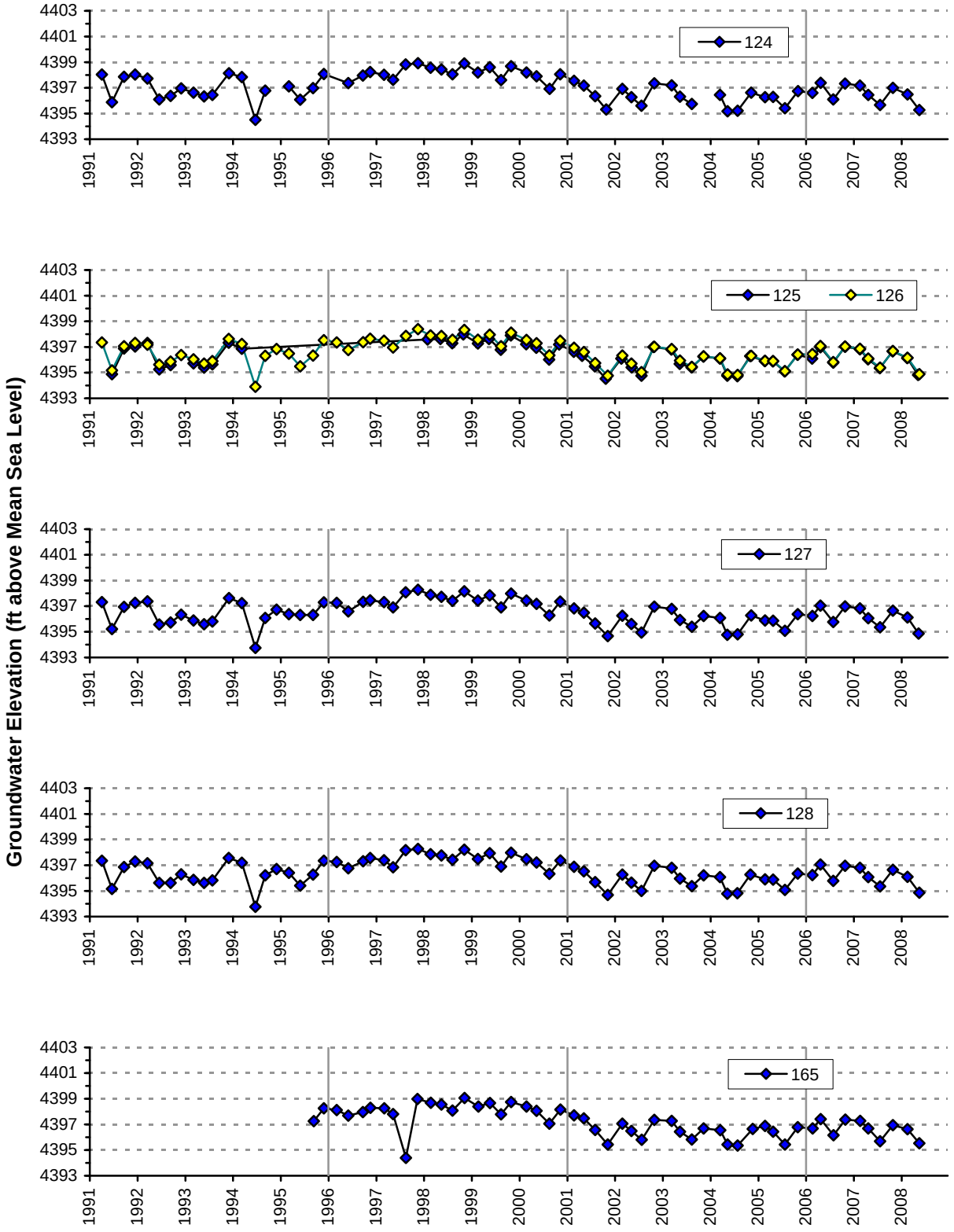
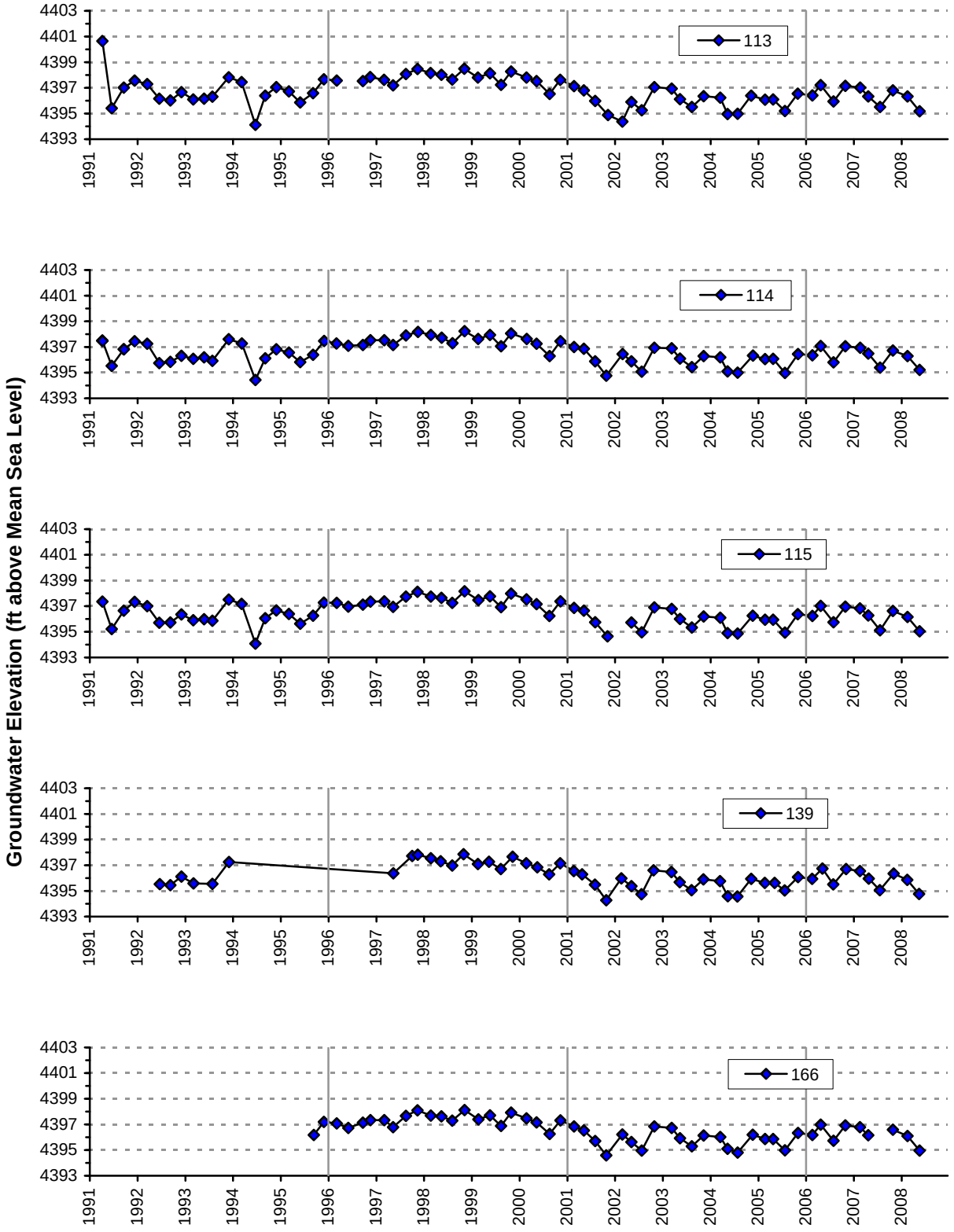


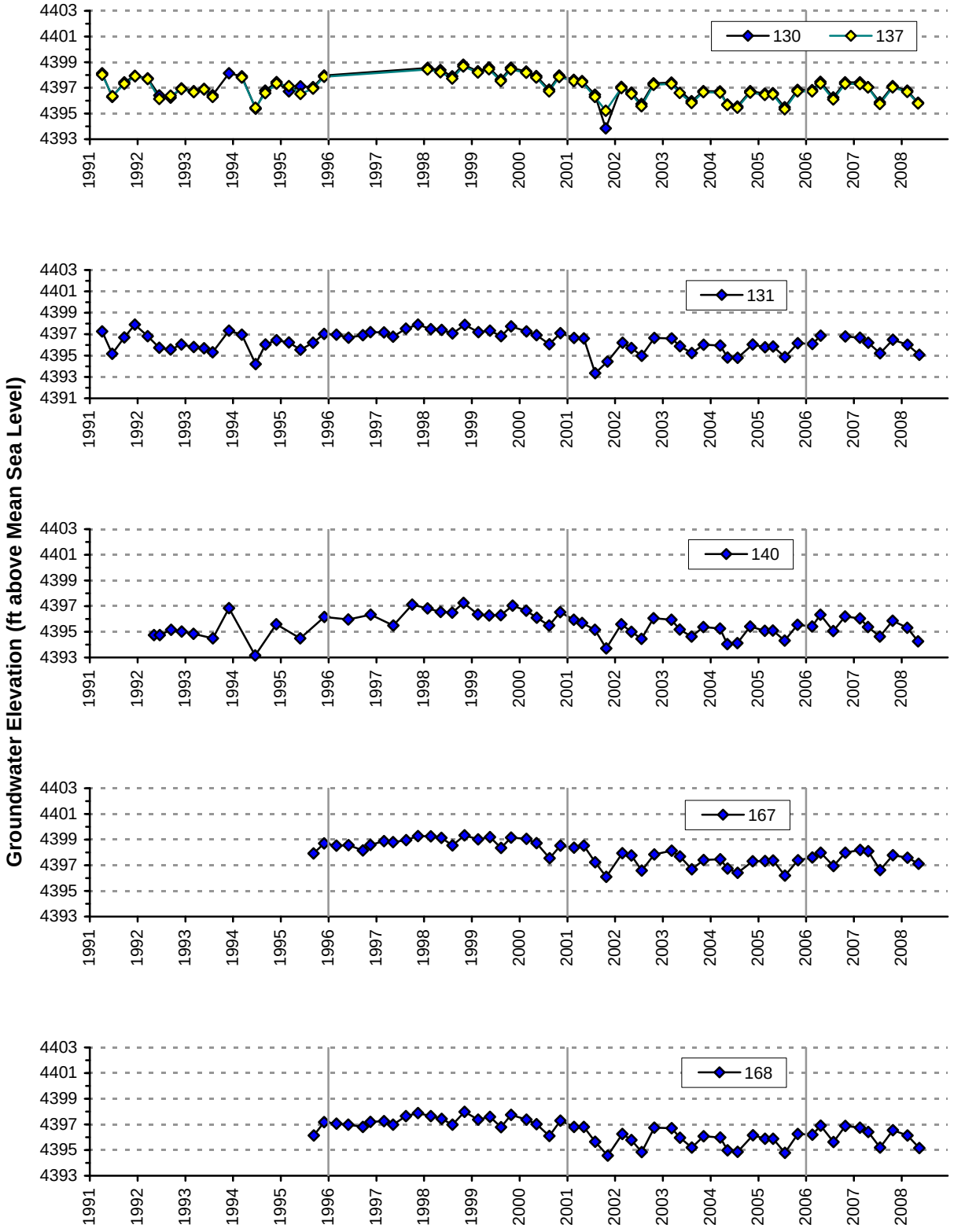
Groundwater Hydrographs -- Western Ponds (4)



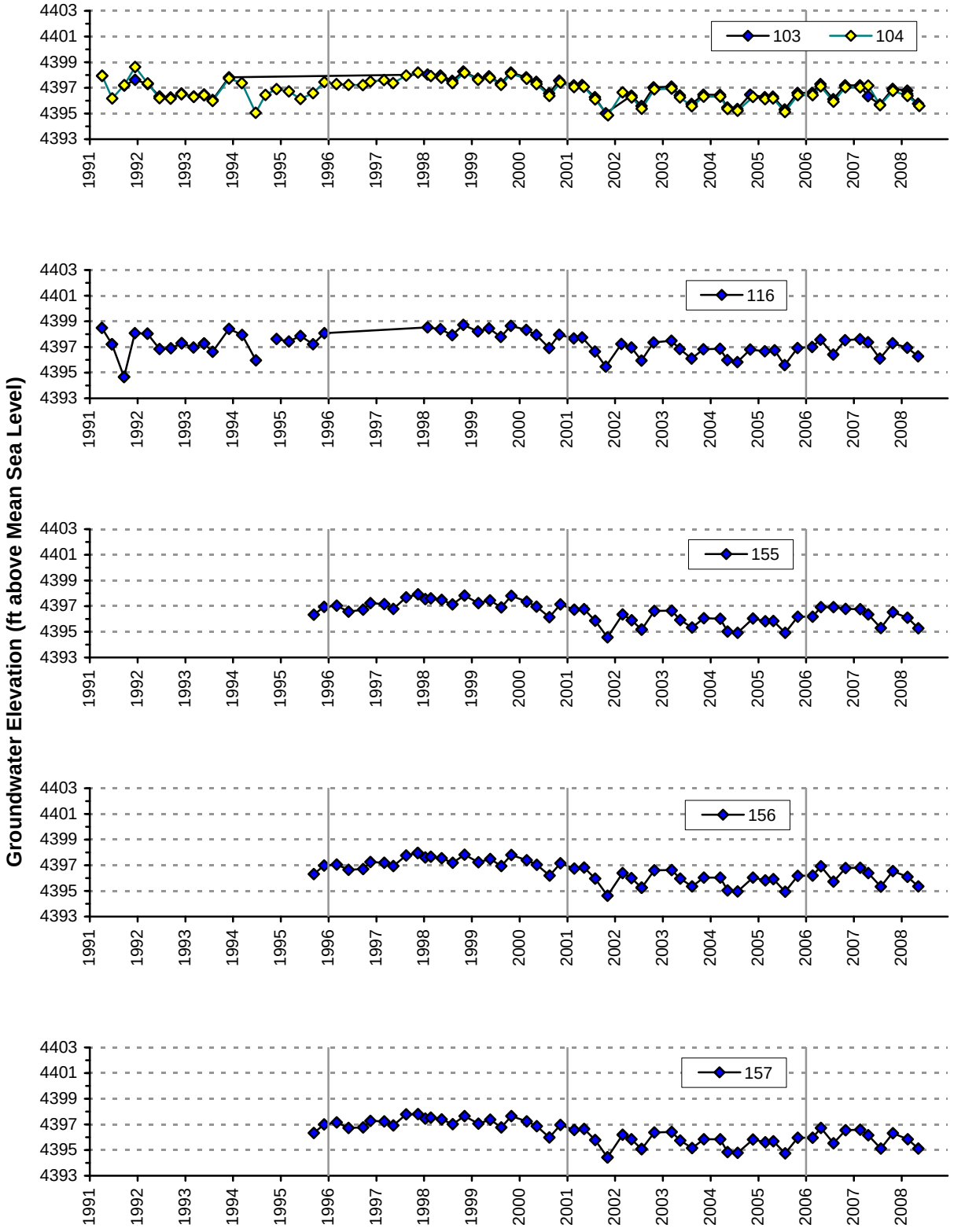
Groundwater Hydrographs -- Western Ponds (5)



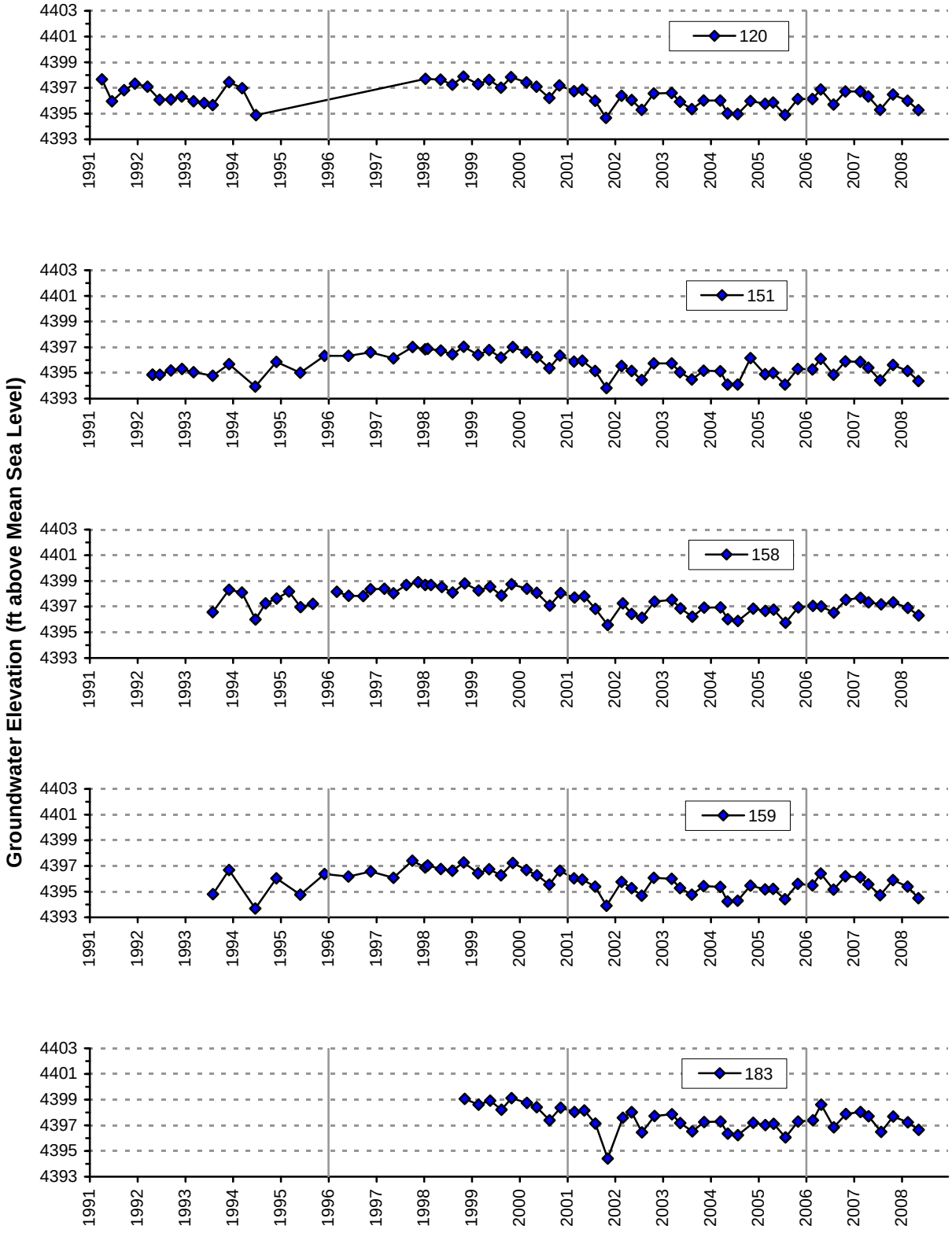
Groundwater Hydrographs -- Western Ponds (6)



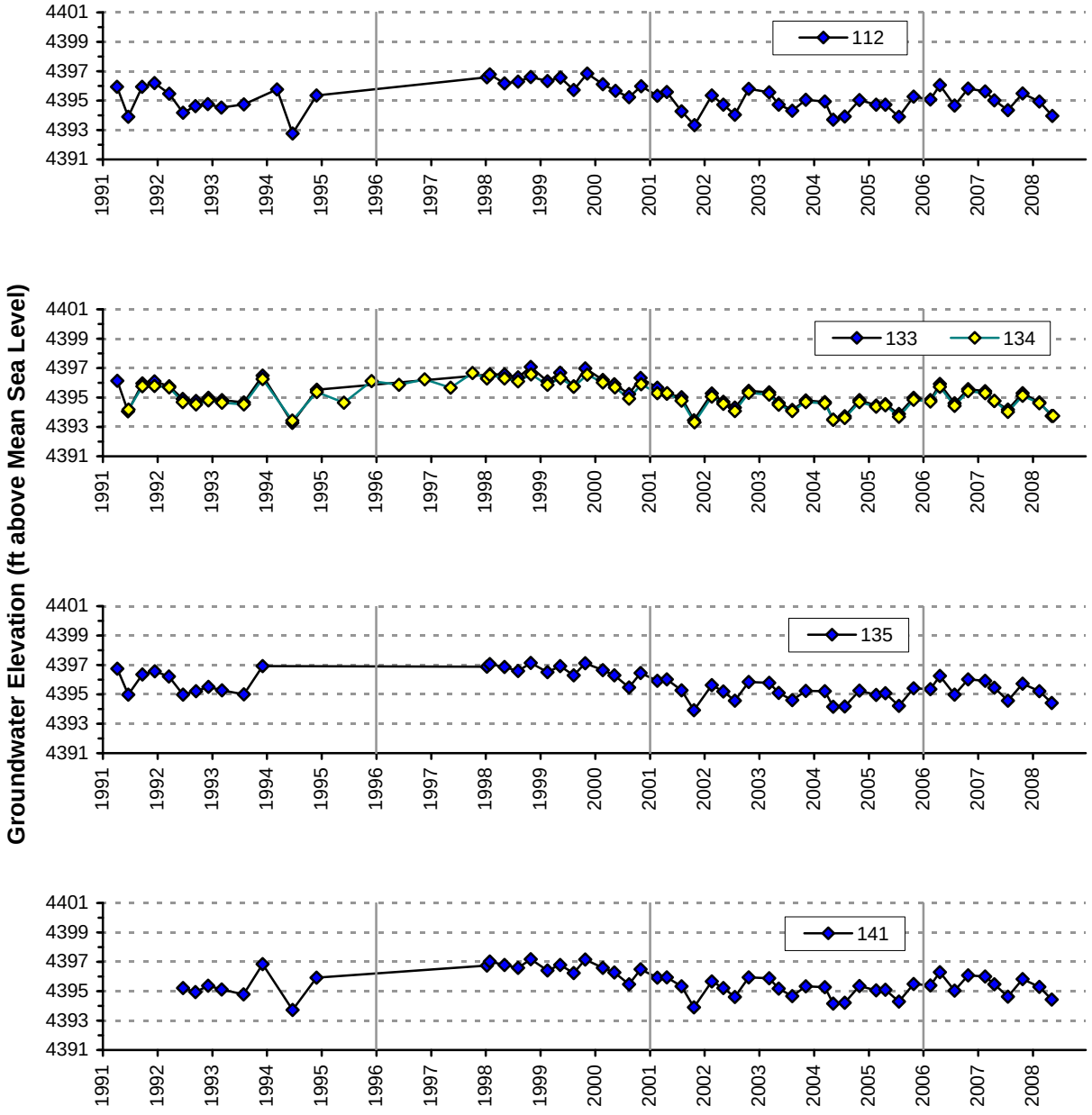
Groundwater Hydrographs -- Western Ponds (7)



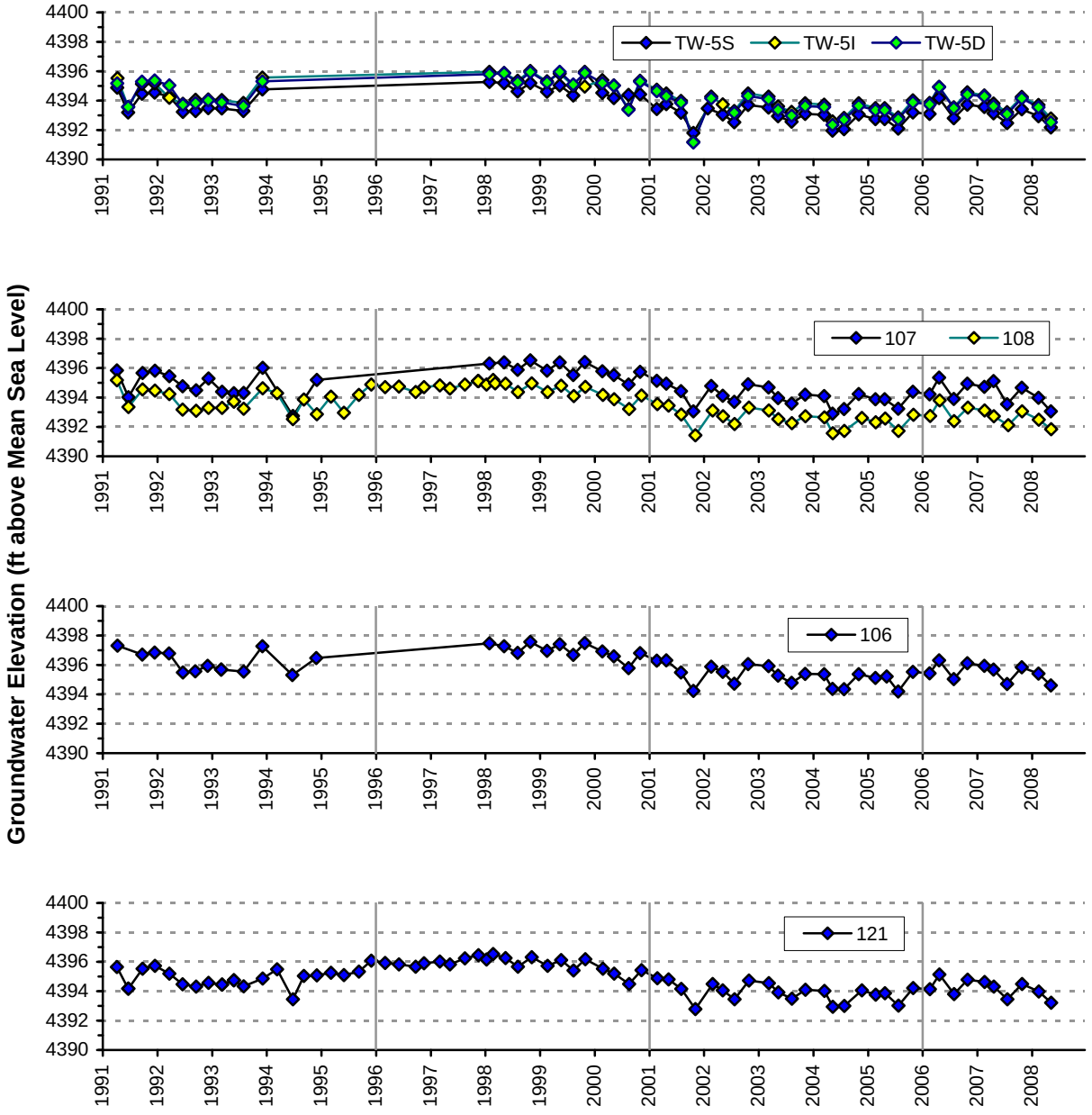
Groundwater Hydrographs -- Western Ponds (8)



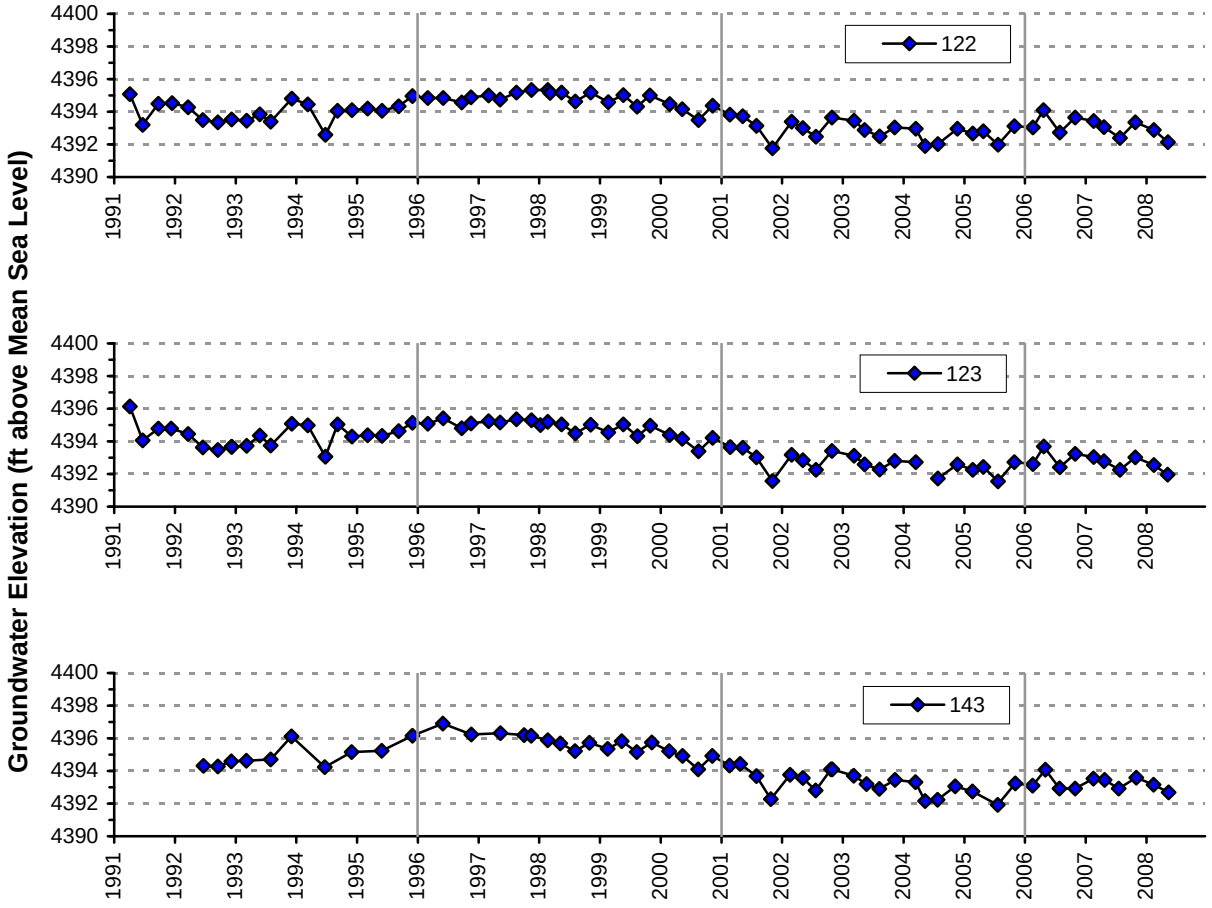
Groundwater Hydrographs -- Western Ponds (9)



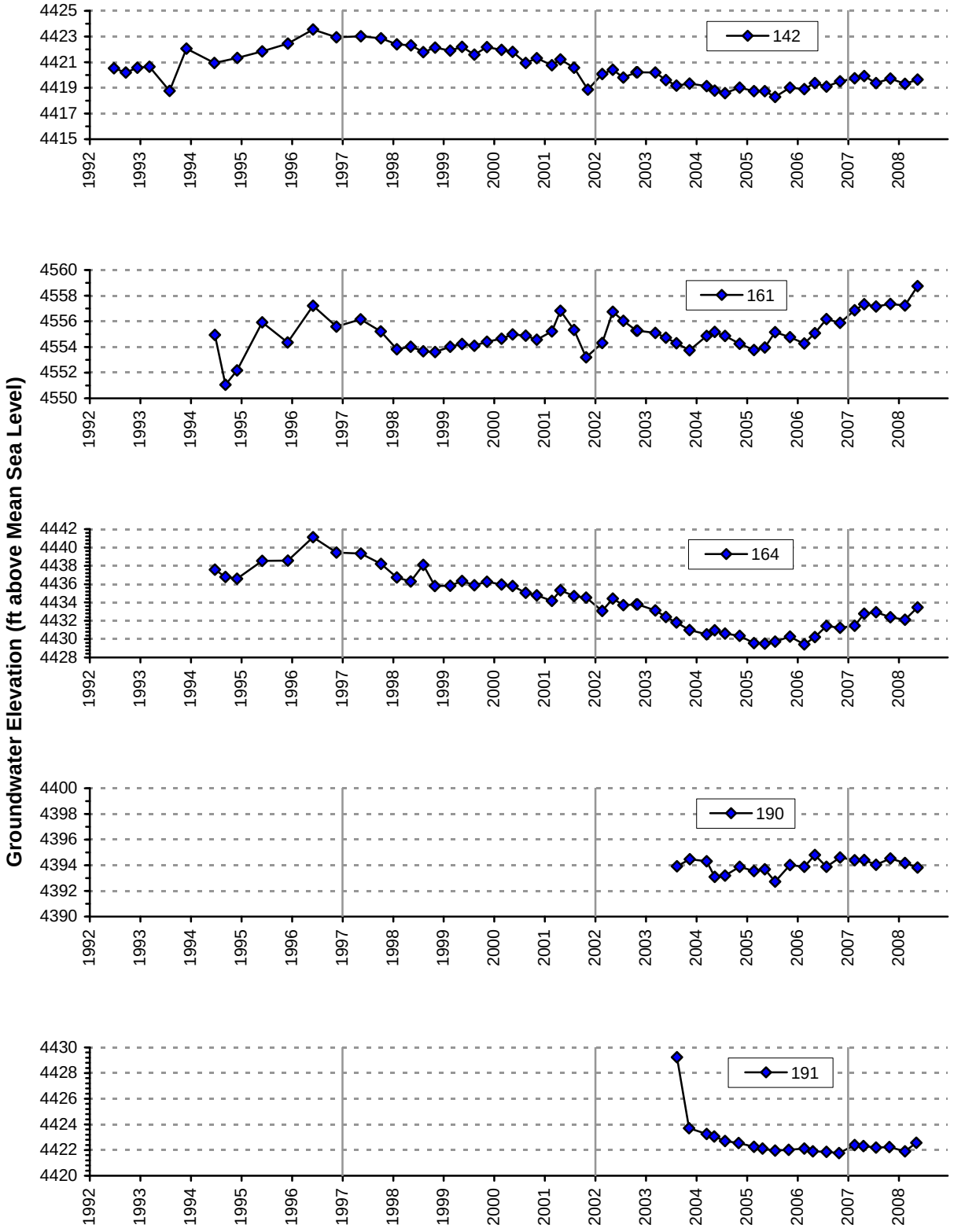
Groundwater Hydrographs -- Central Plant Area (1)



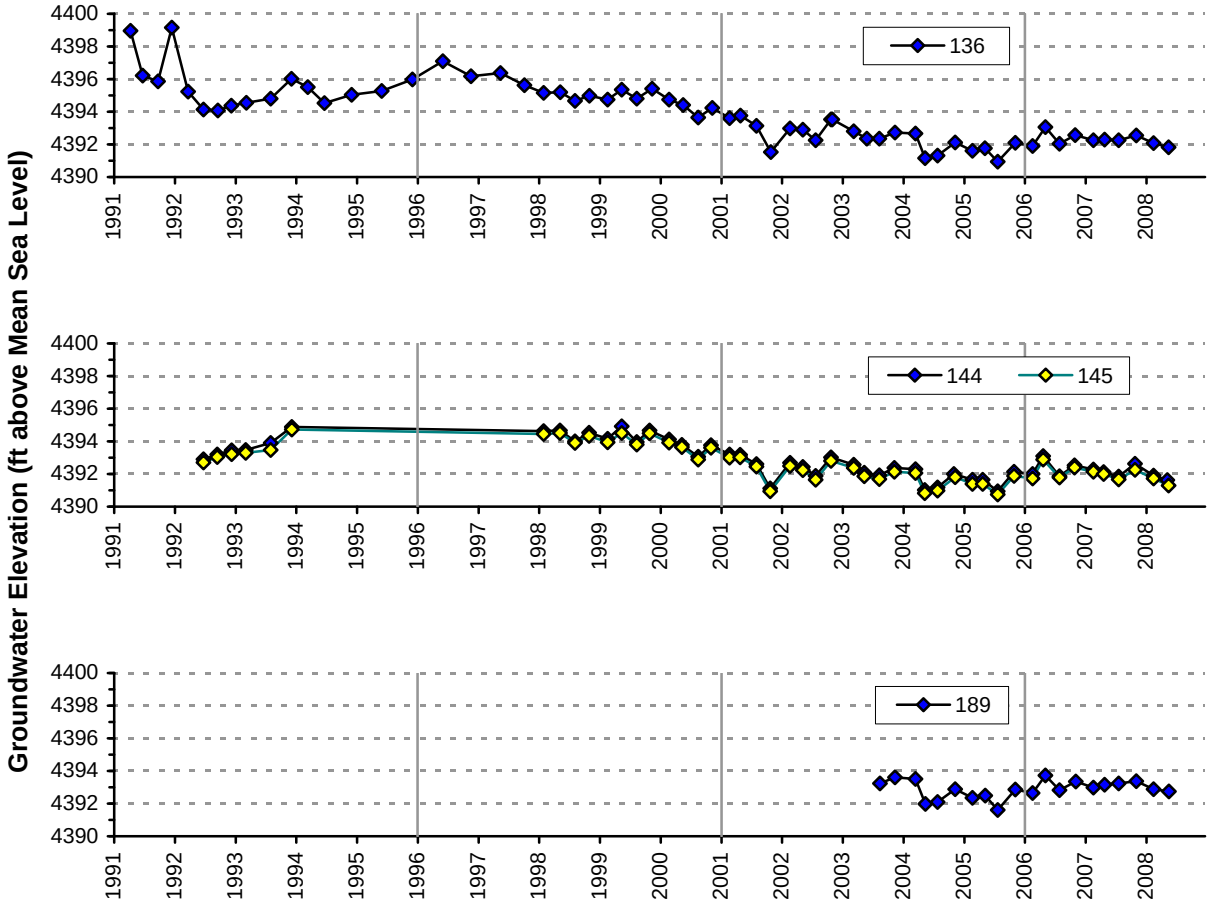
Groundwater Hydrographs -- Central Plant Area (2)



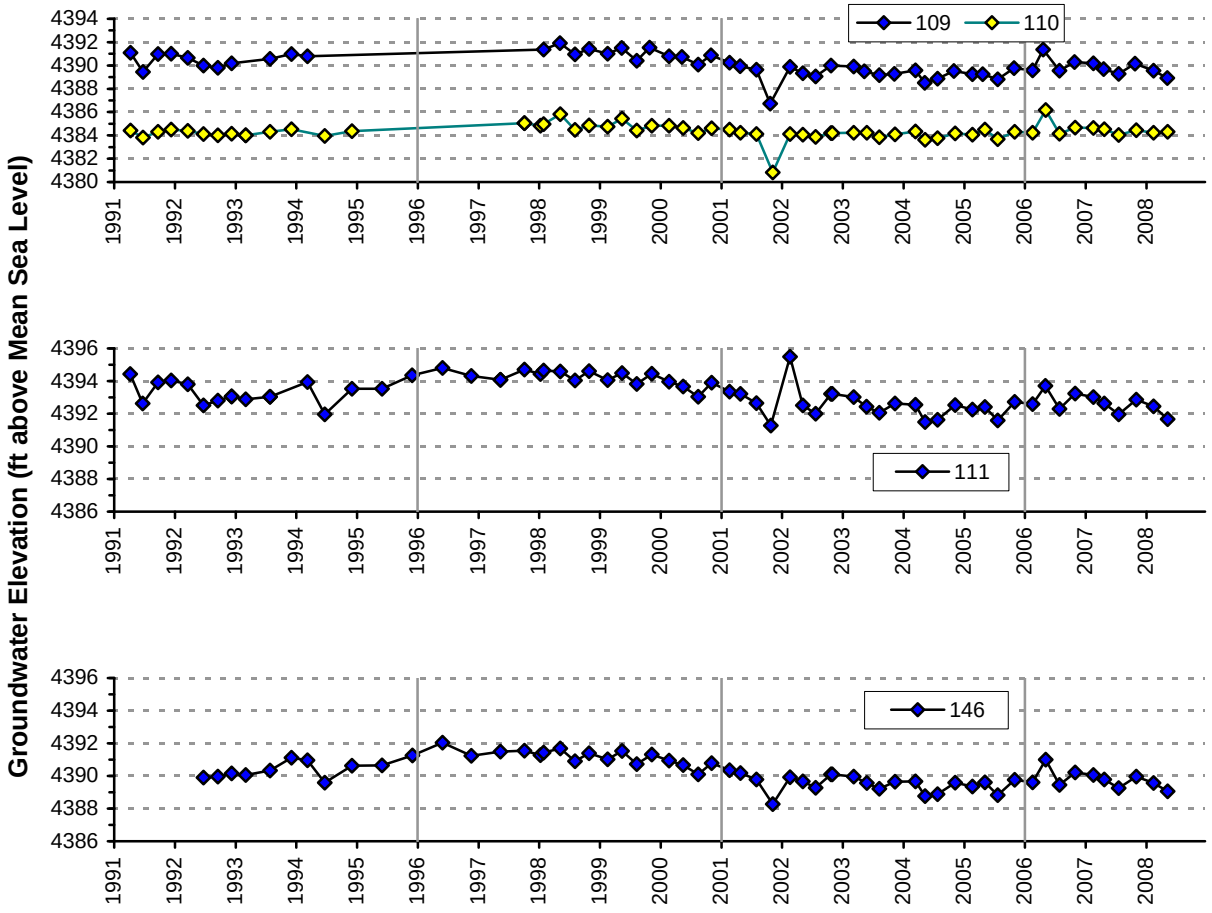
Groundwater Hydrographs -- Joint Fenceline Area (1)



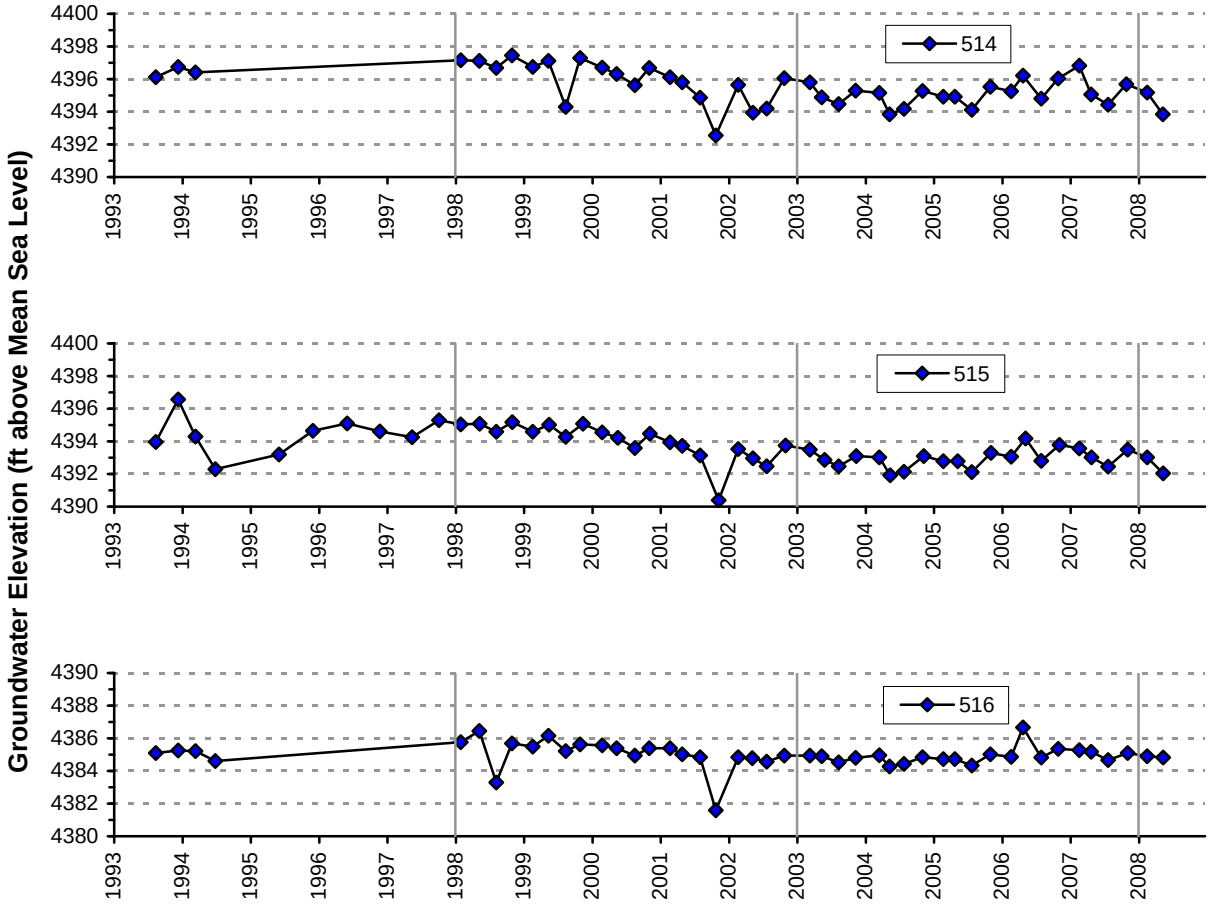
Groundwater Hydrographs -- Joint Fenceline Area (2)



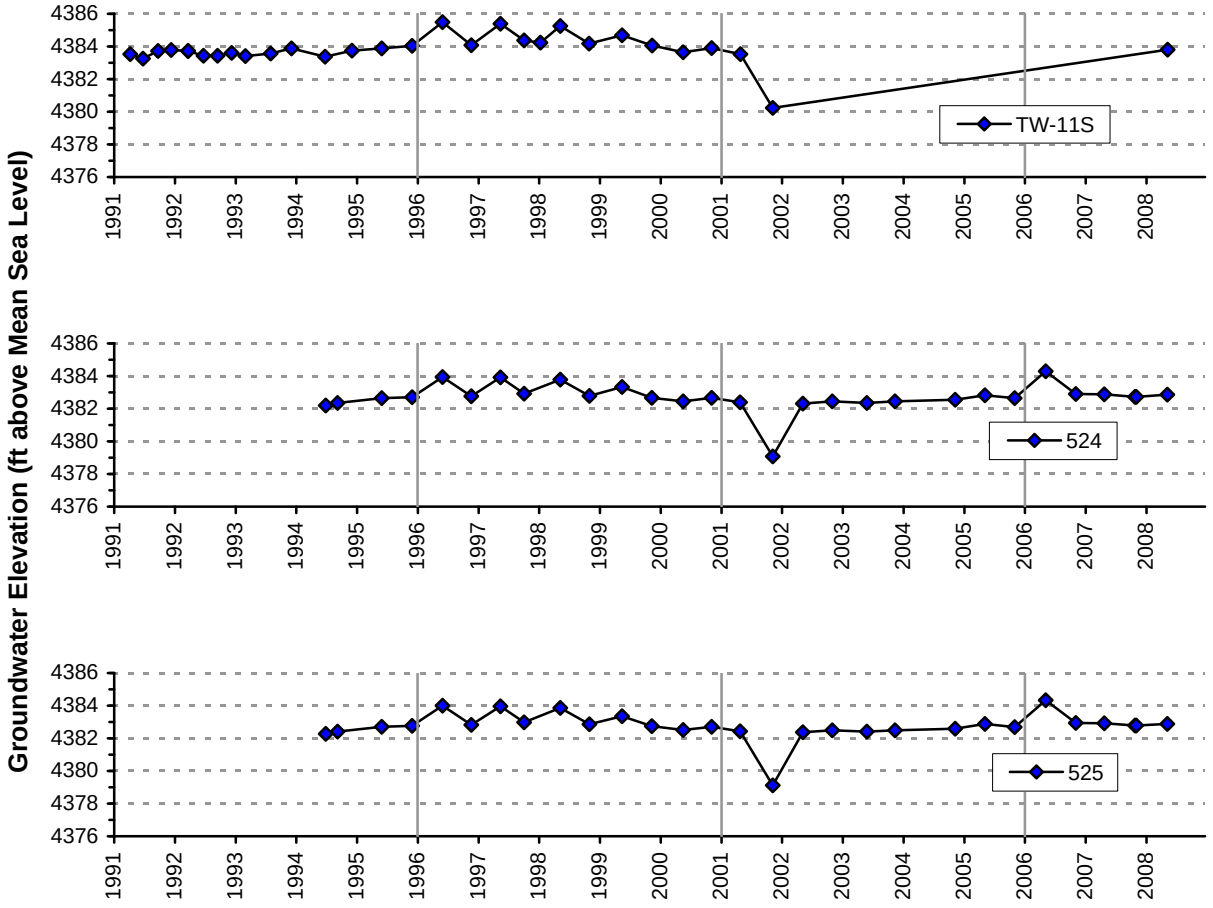
Groundwater Hydrographs -- North FMC Plant Site Property Line



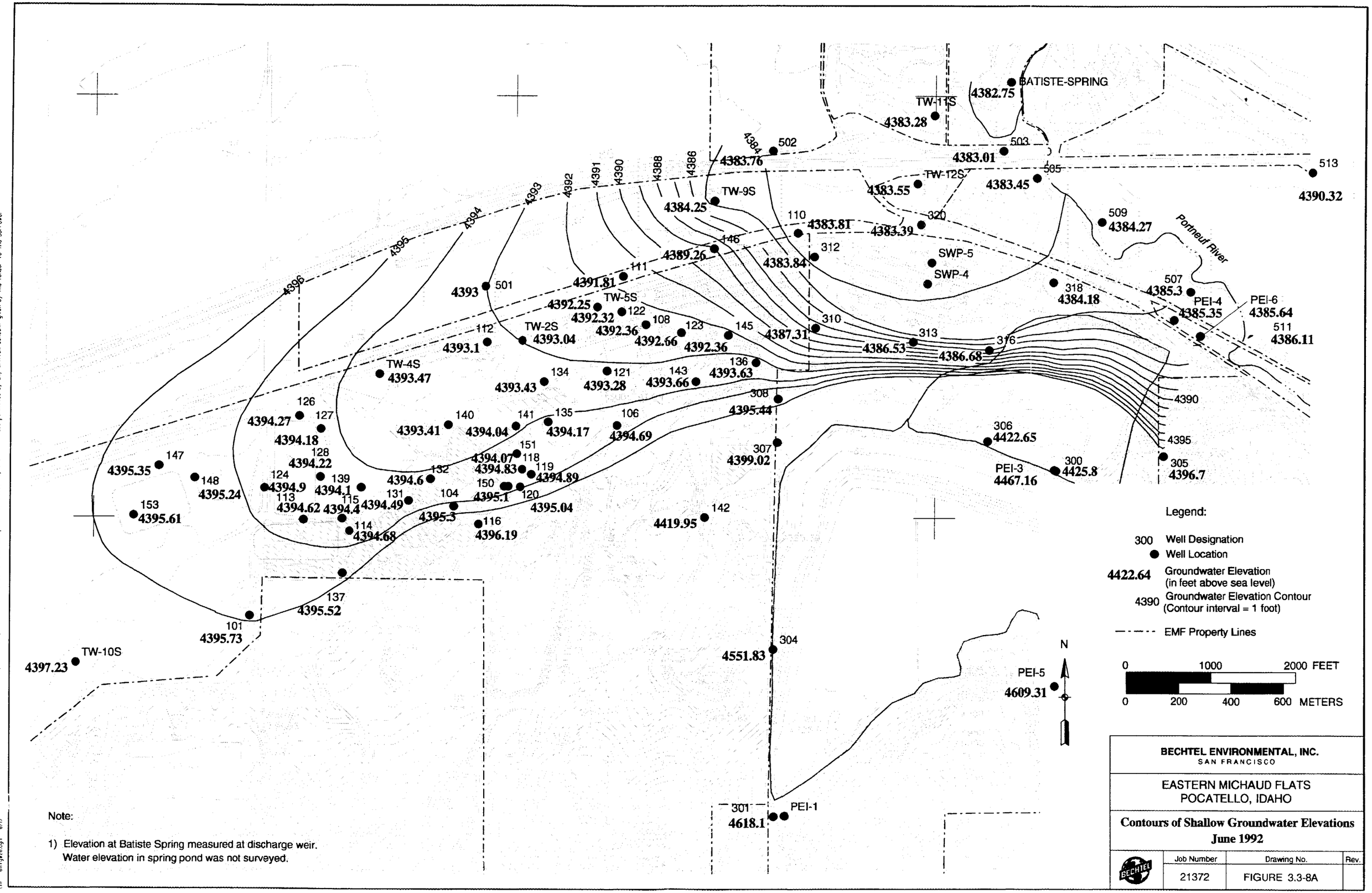
Groundwater Hydrographs -- Area North of Interstate 86 (1)



Groundwater Hydrographs -- Area North of I-86 (2)



APPENDIX B



Note:

1) Elevation at Batiste Spring measured at discharge weir. Water elevation in spring pond was not surveyed.

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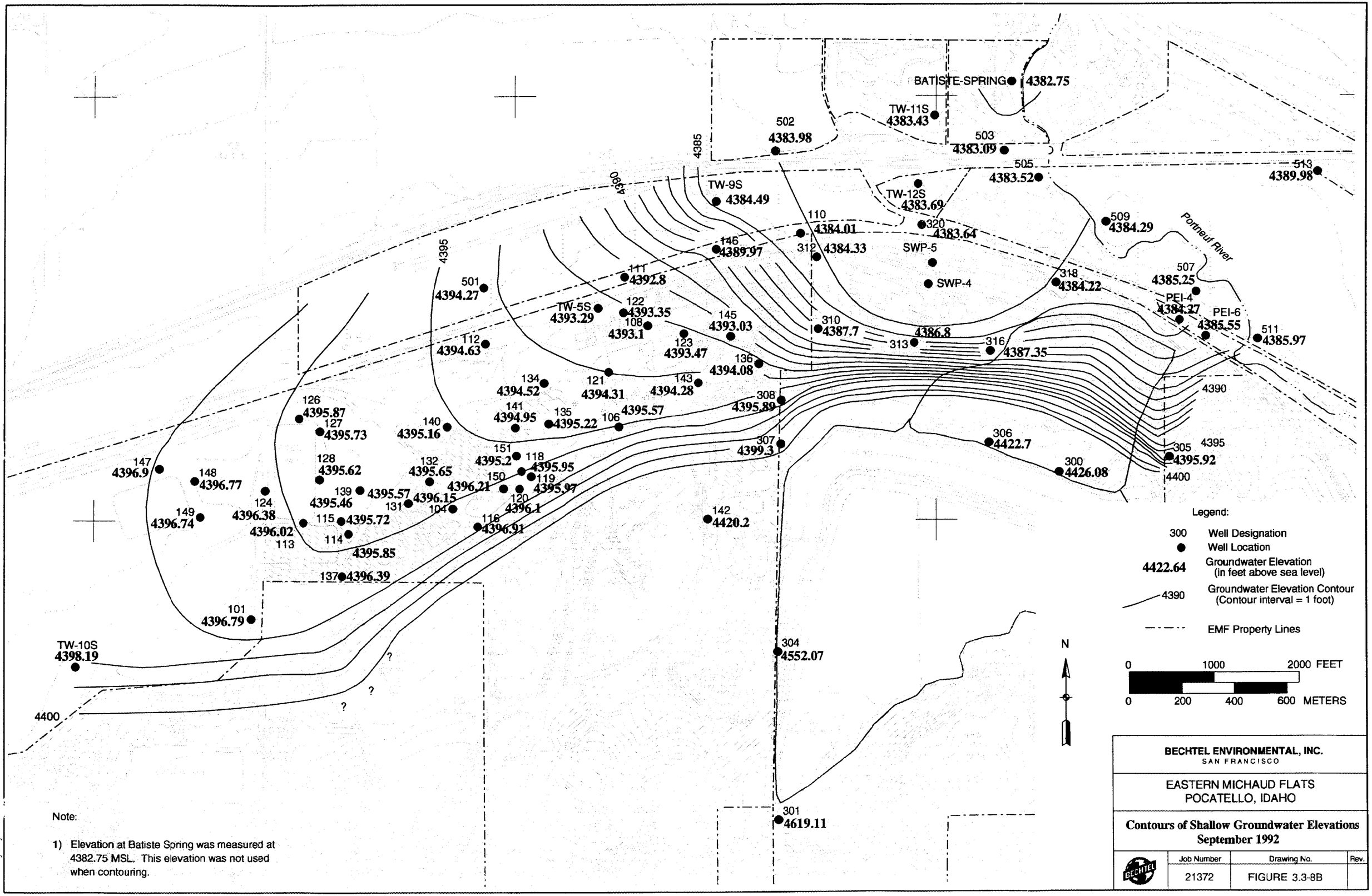

Note:

1) Elevation at Batiste Spring was measured at 4382.75 MSL. This elevation was not used when contouring.

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations September 1992

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-8B	

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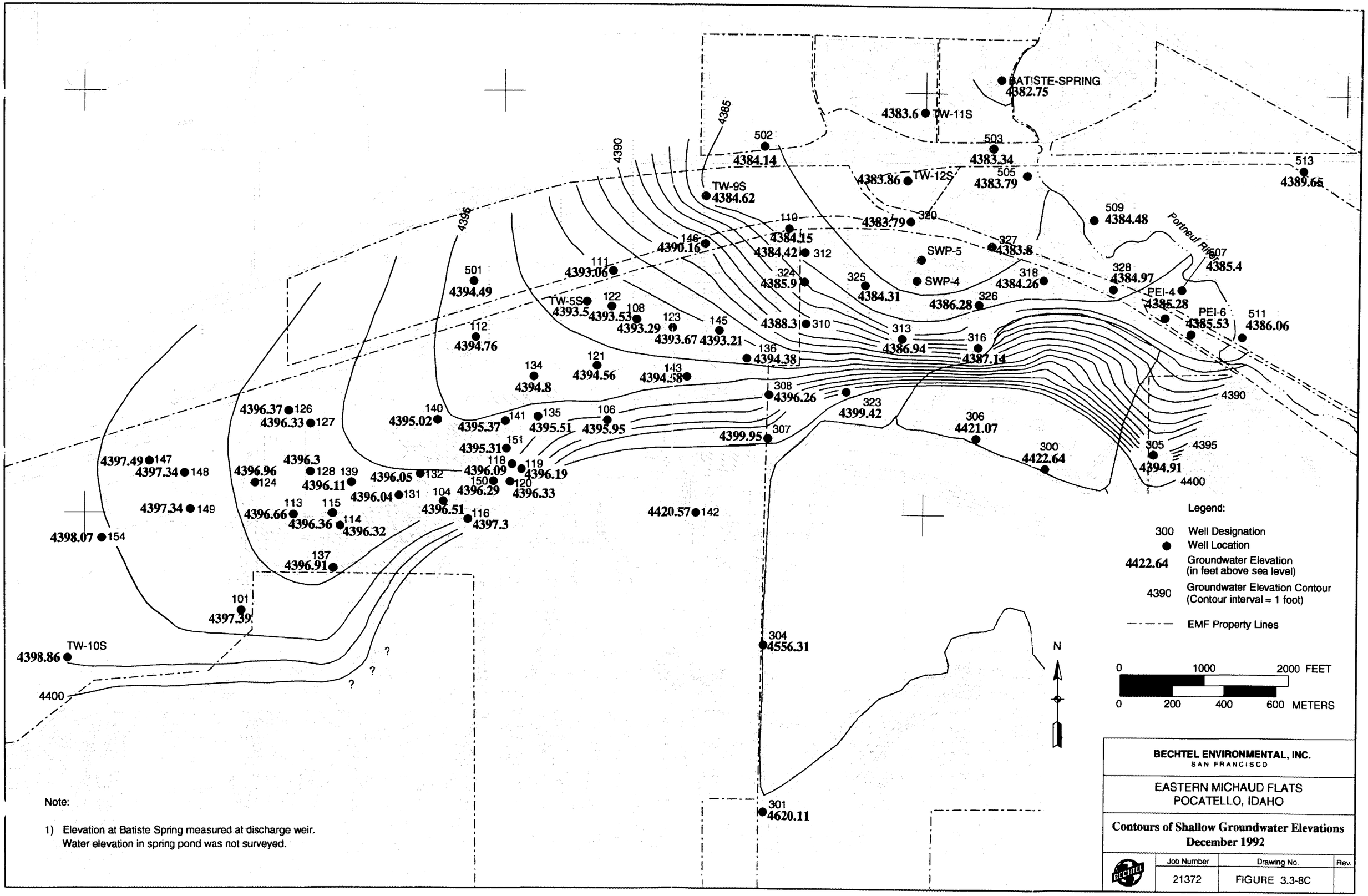
EMF emfgw23.dgn 6.



Note:

1) Elevation at Batiste Spring measured at discharge weir. Water elevation in spring pond was not surveyed.

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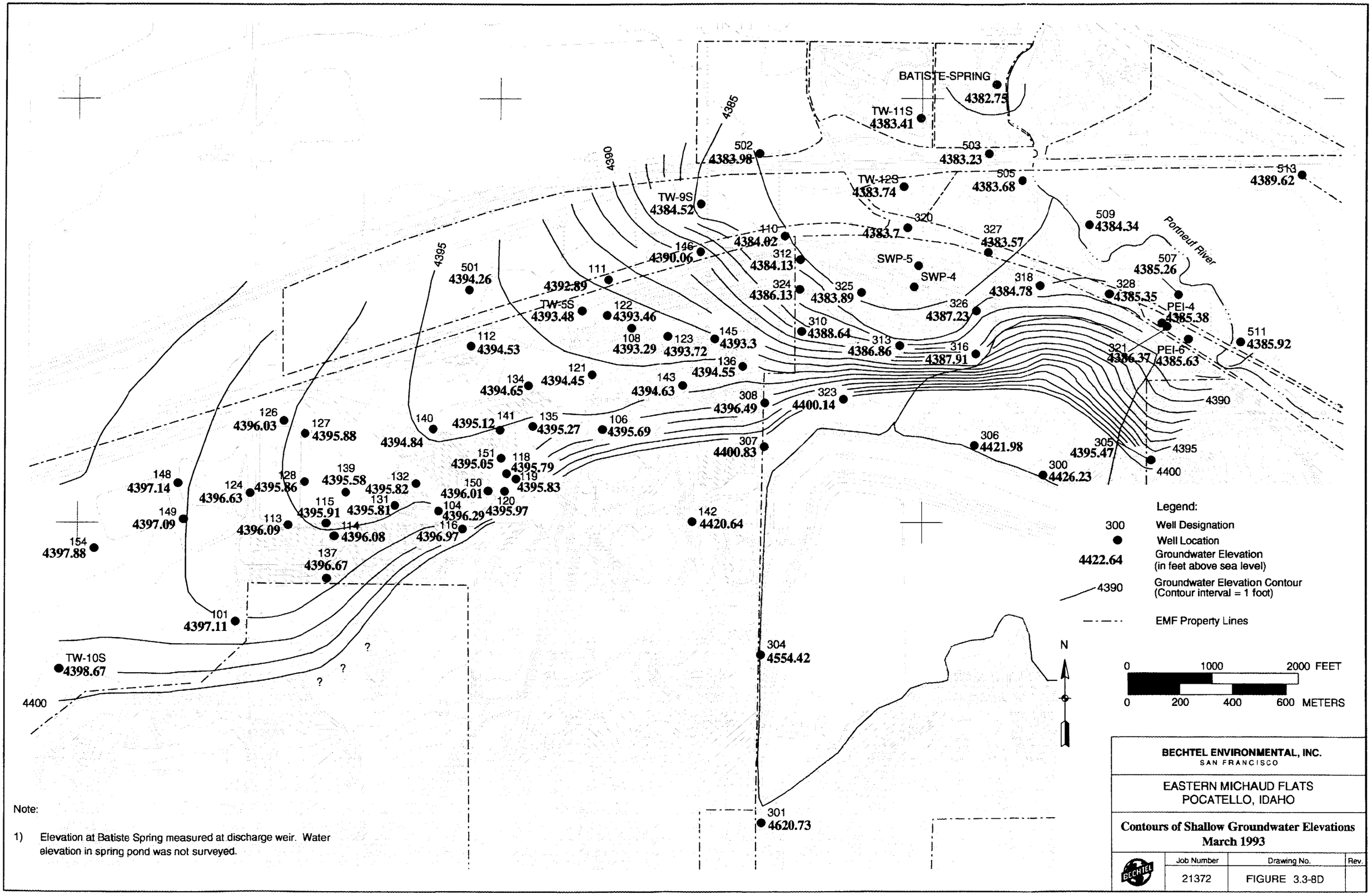
EMF EMF6V212.DGN 4 REV5/26/95MF



Note:

1) Elevation at Batiste Spring measured at discharge weir. Water elevation in spring pond was not surveyed.

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations March 1993

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-8D	

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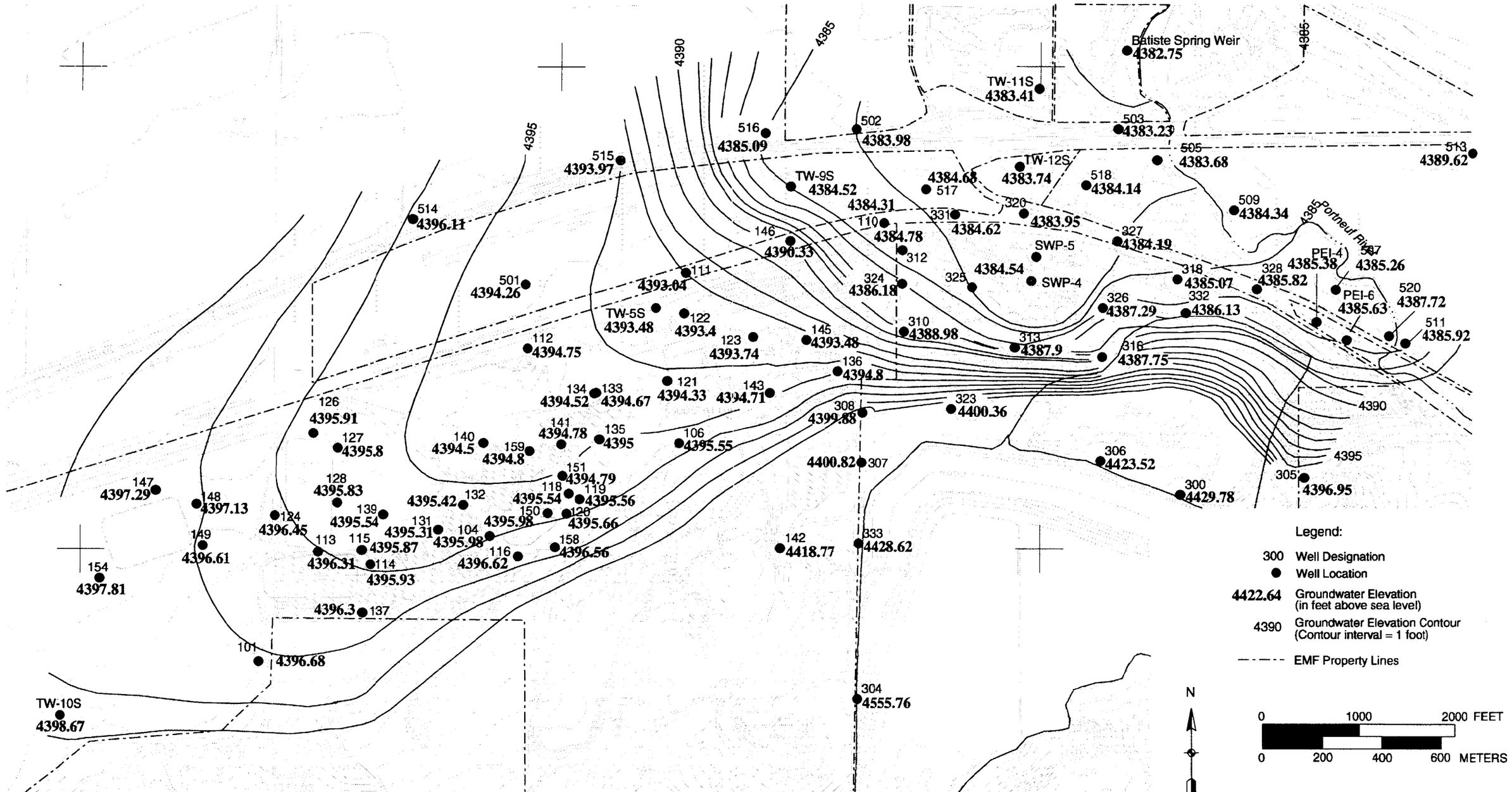
EMF emfgw33.dgn 1/1. 5/26/95erf



Note:

1) Elevation at Batiste Spring measured at discharge weir. Water elevation at spring pond was not surveyed.

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SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations
August 1993

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-8E	

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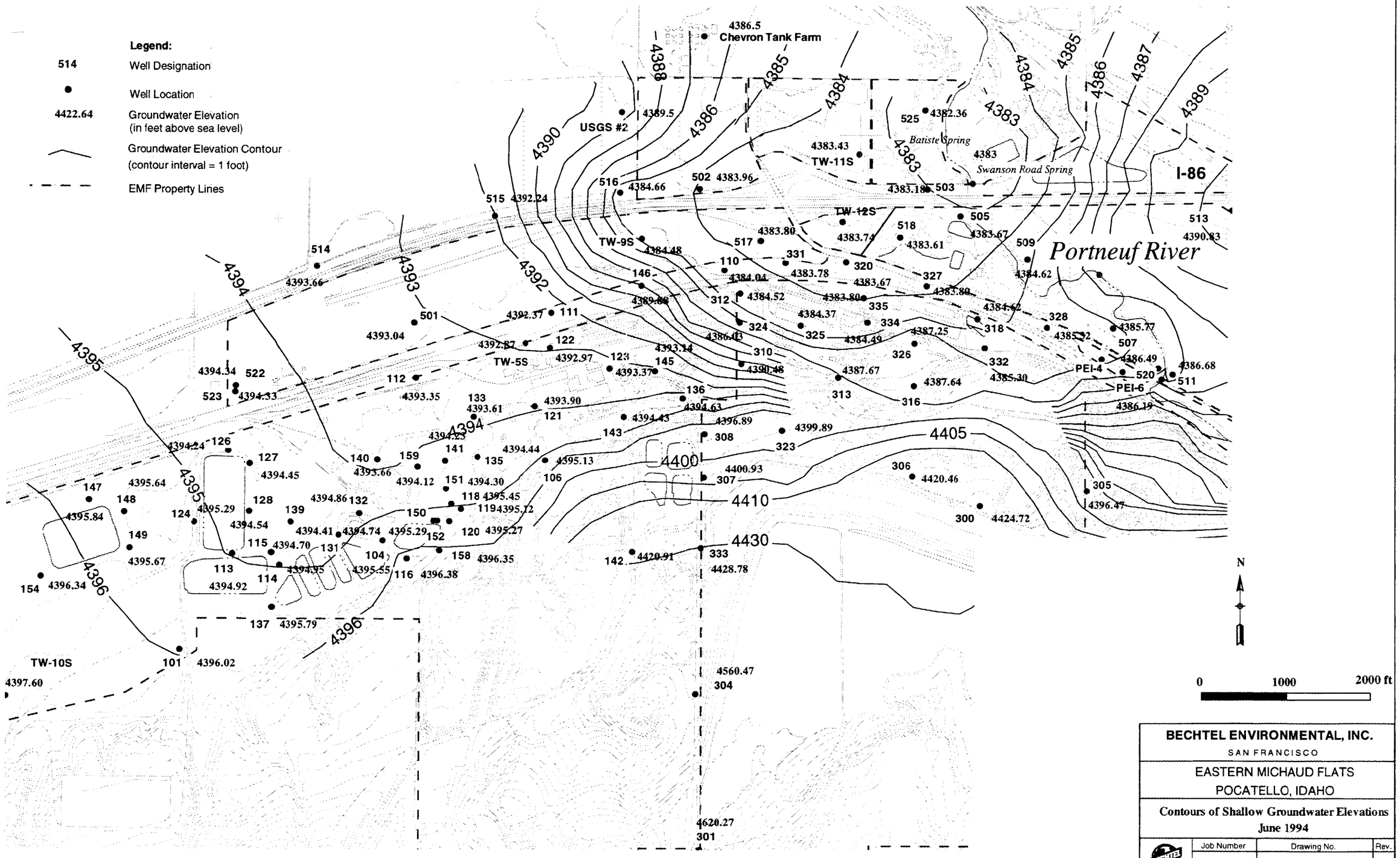

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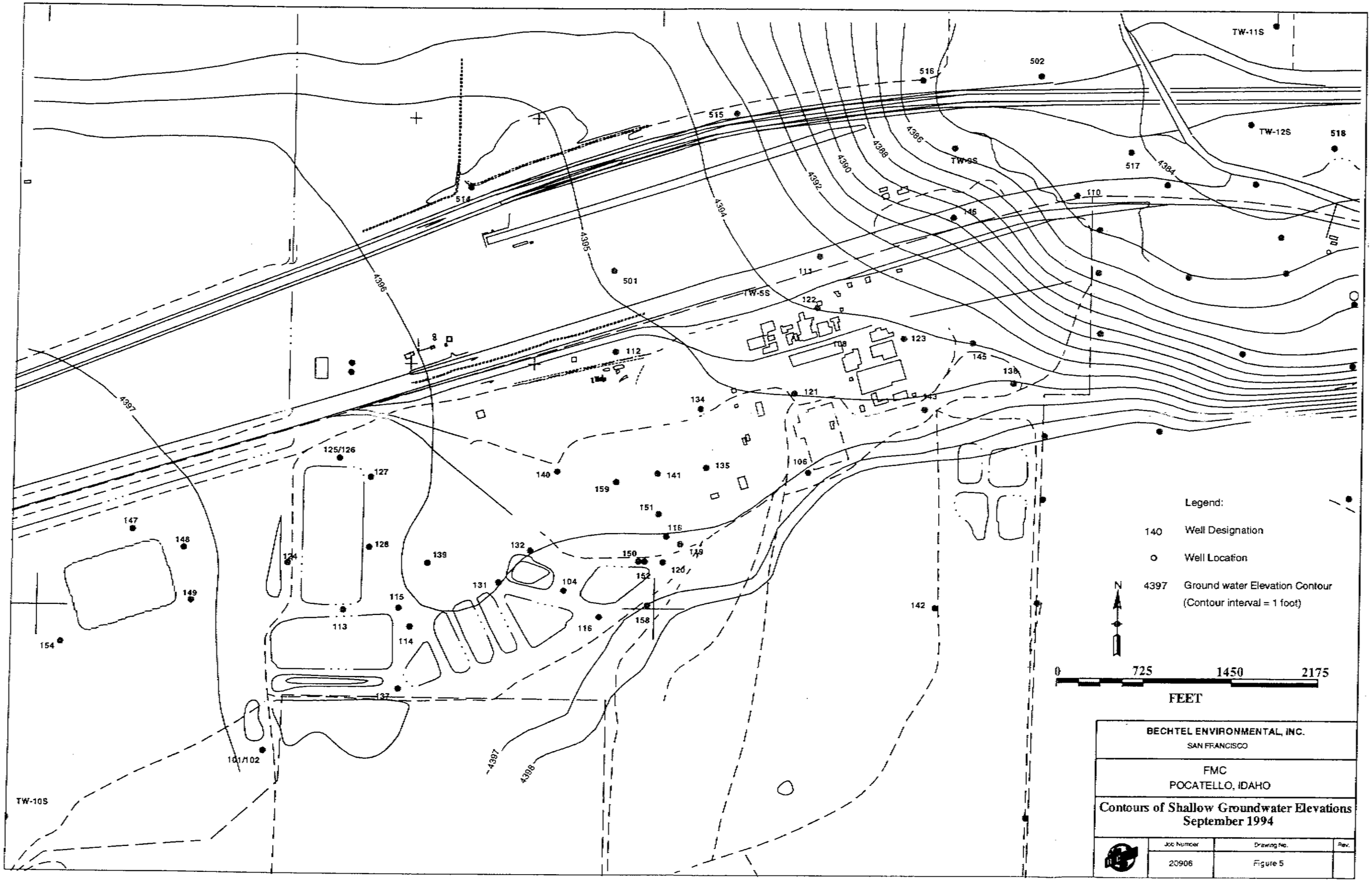
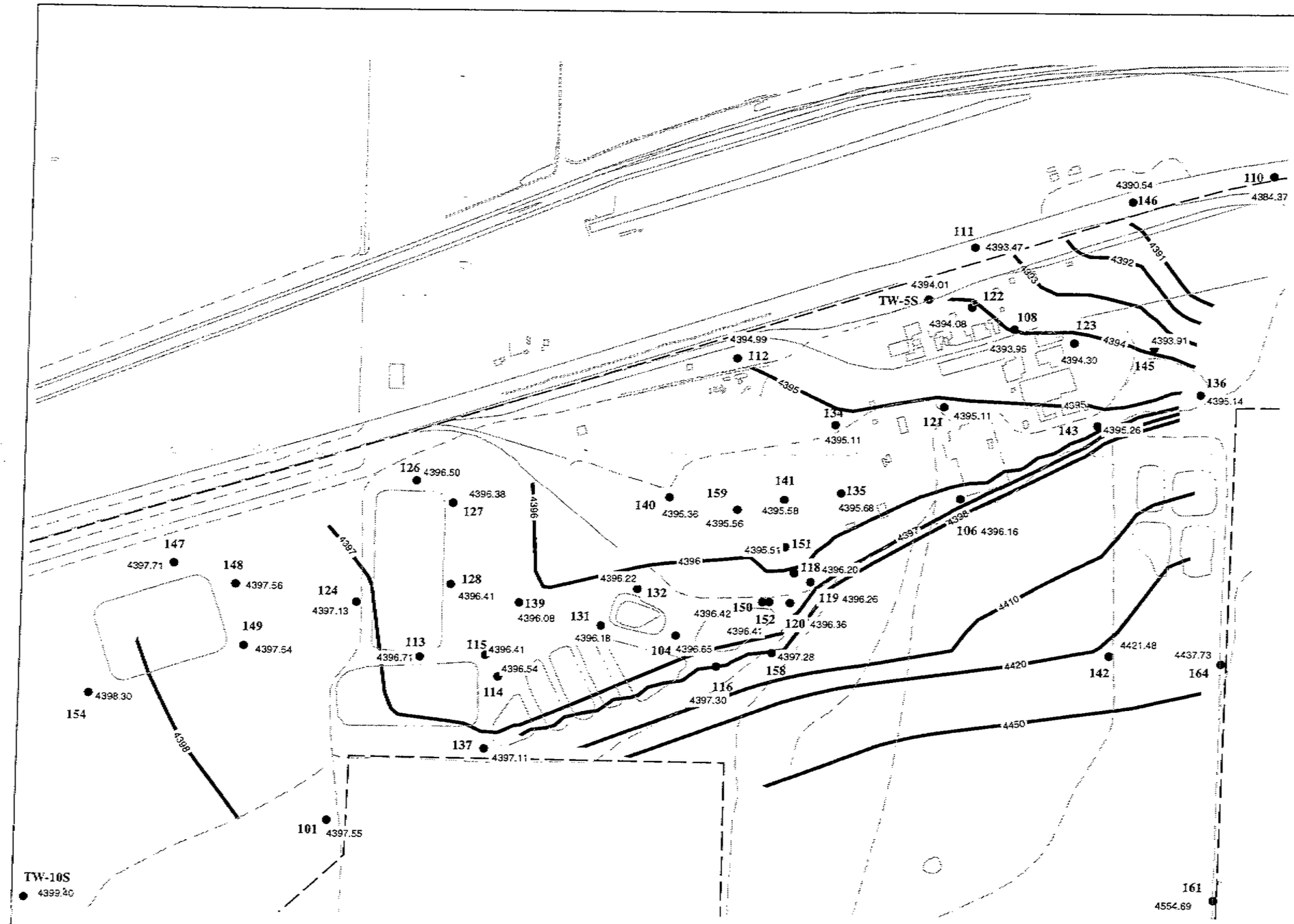
EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations
June 1994

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-8F	


TW-11S
502
516
515
TW-12S
518
517
4384
4386
4388
4390
4392
4394
TW-9S
110
146
514
4395
501
4396
113
TW-5S
122
123
108
145
136
112
121
143
134
4397
125/126
127
140
159
141
135
106
151
147
148
116
128
124
139
132
150
119
120
152
149
131
104
115
113
114
158
116
142
154
137
101/102
4397
4398
TW-10S
Legend:
140 Well Designation
Well Location
4397 Ground water Elevation Contour
(Contour interval = 1 foot)
N
0
725
1450
2175
FEET
BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO
FMC
POCATELLO, IDAHO
Contours of Shallow Groundwater Elevations
September 1994
Job Number
Drawing No.
Rev.
20906
Figure 5



Legend:

4391 Groundwater Elevation Contour with Elevation in Feet MSL (contour interval variable)

Property Boundary

134 Monitoring Well Location and Designation
4393.43 Groundwater Elevation (ft MSL)

0 1000 2000

Approximate Scale in Feet

N

BECHTEL ENVIRONMENTAL, INC.
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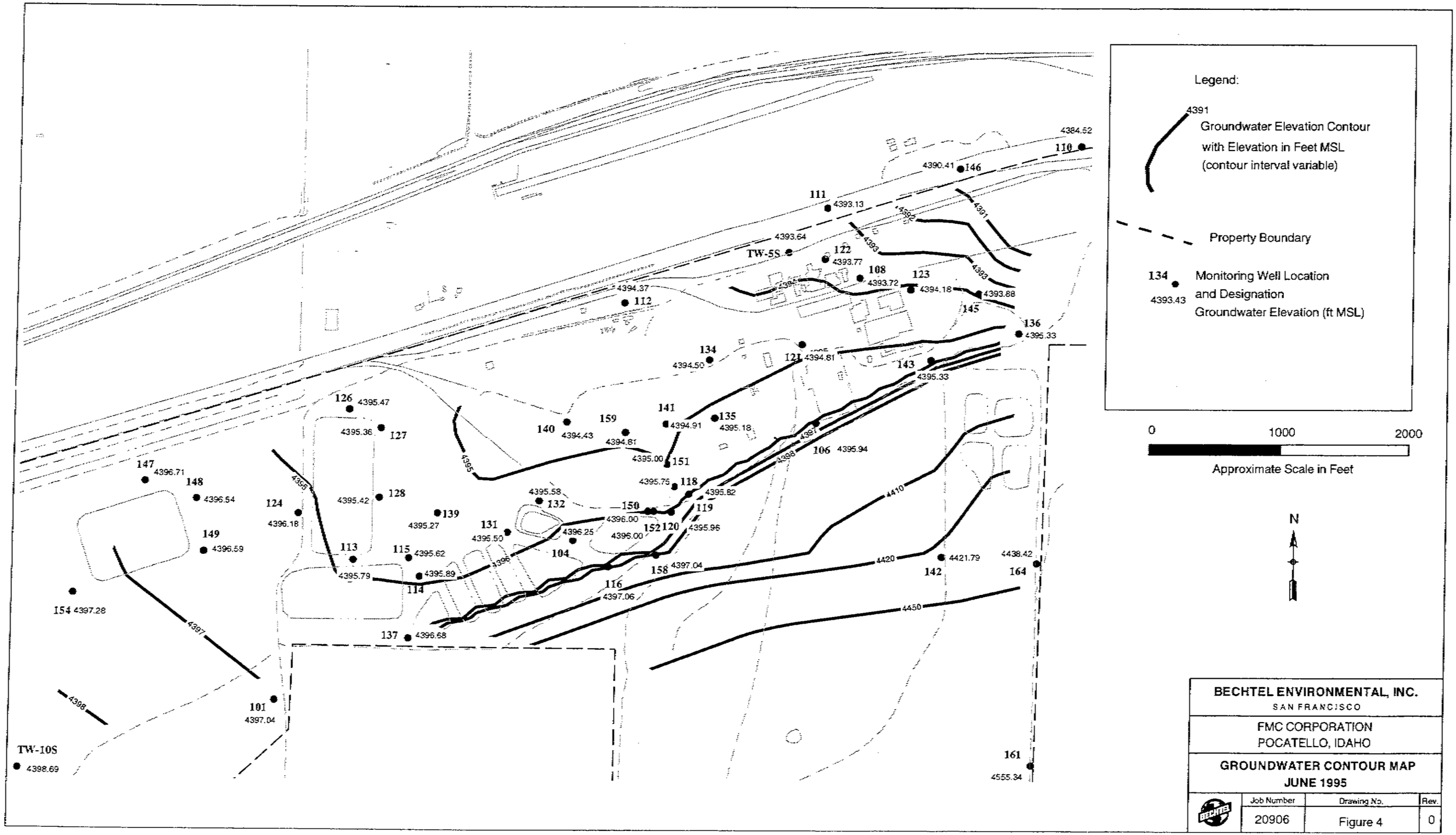
FMC CORPORATION
POCATELLO, IDAHO

GROUNDWATER CONTOUR MAP
MARCH 1995

Job Number	Drawing No.	Rev.
20906	Figure 3	0



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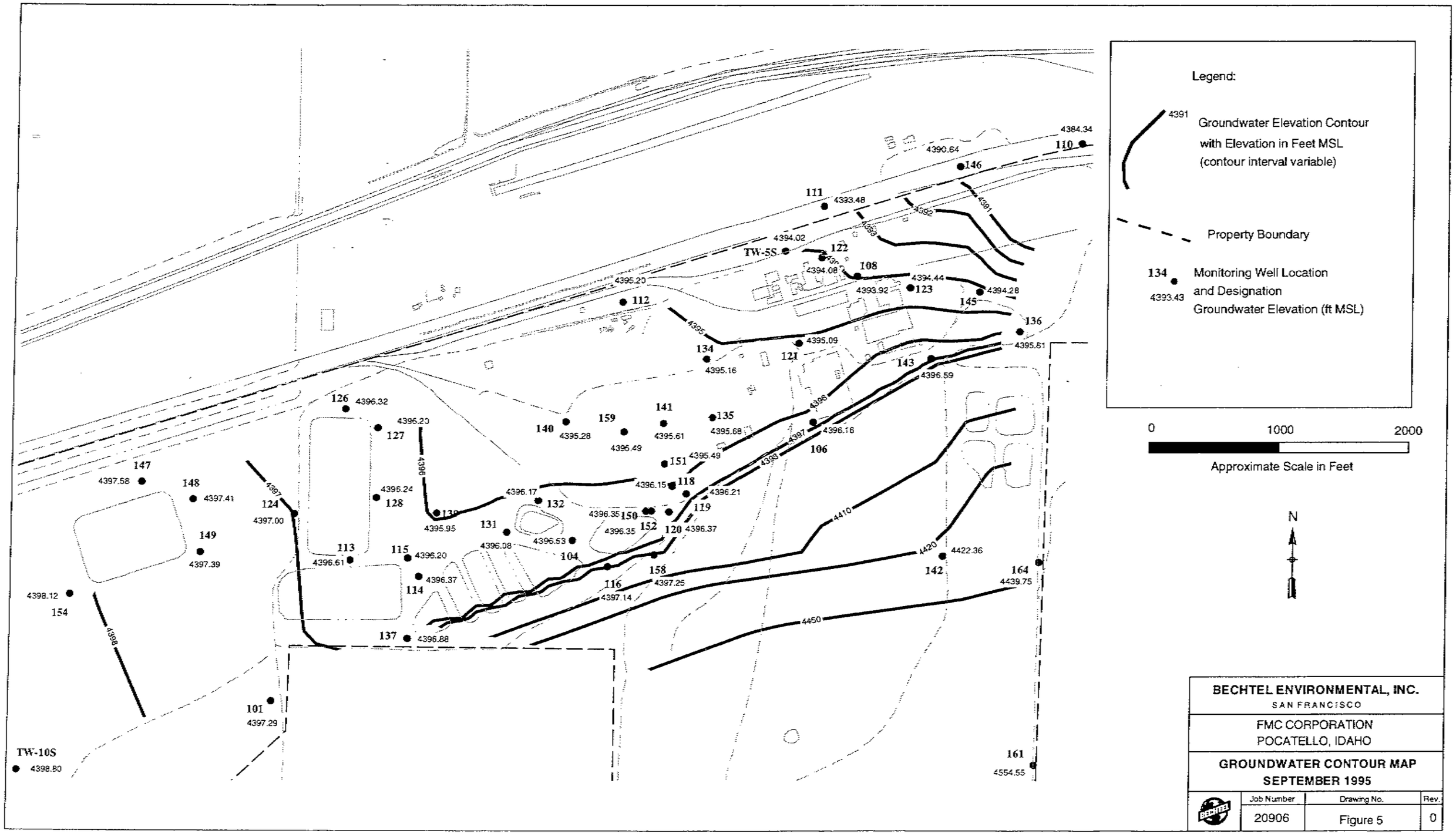
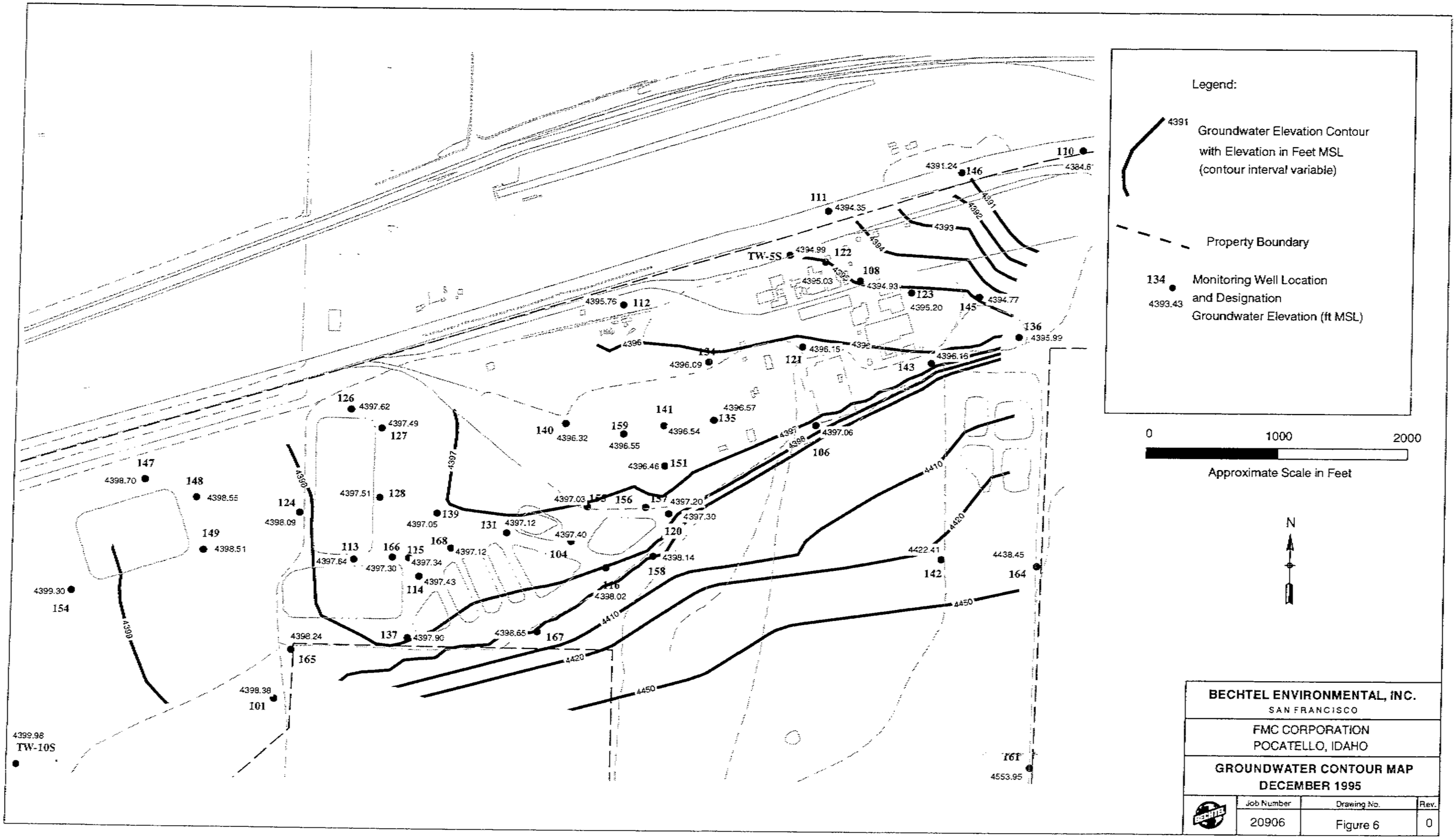
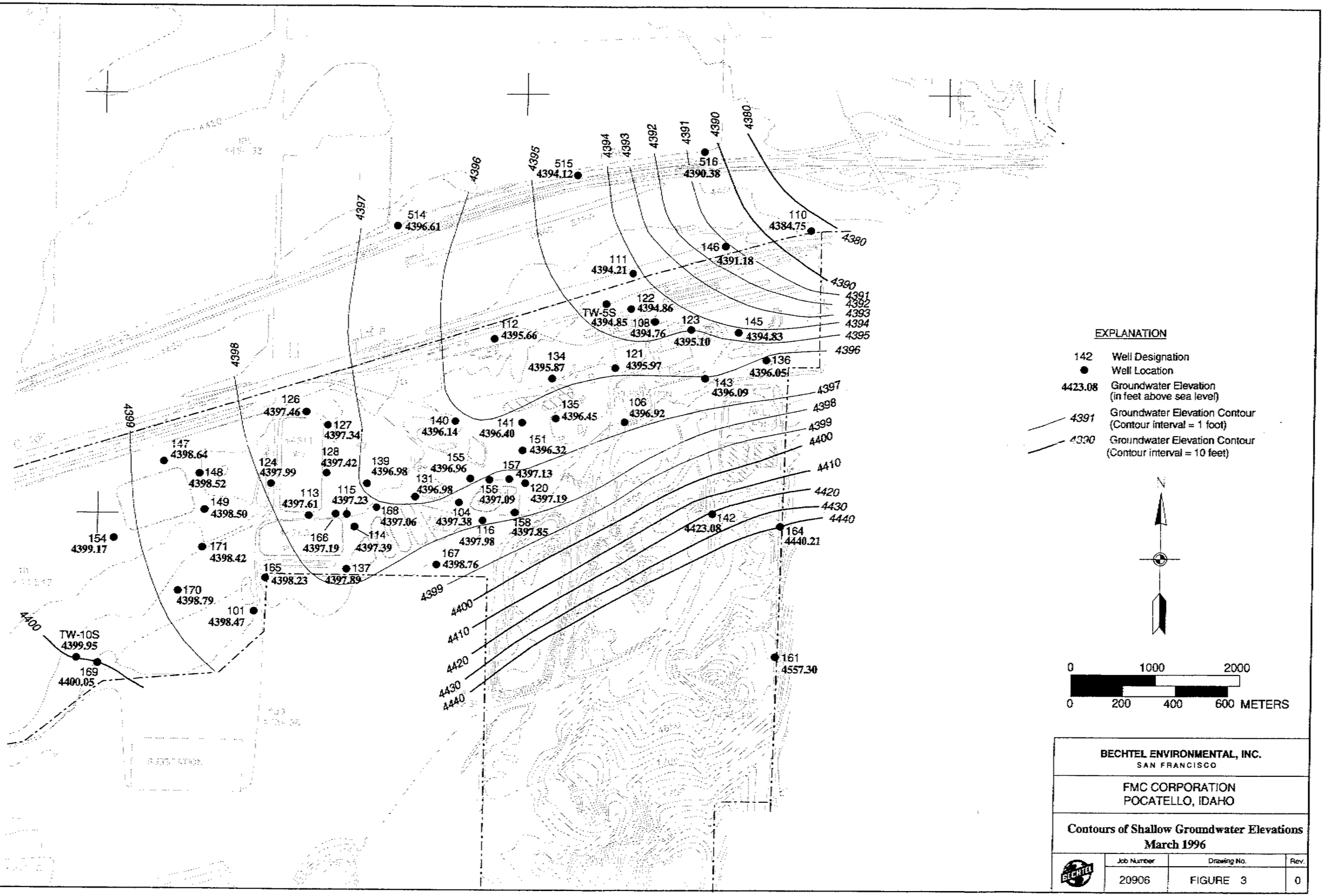
POCATELLO, IDAHO

GROUNDWATER CONTOUR MAP
JUNE 1995

Job Number	Drawing No.	Rev.
20906	Figure 4	0


Legend:
4391
Groundwater Elevation Contour with Elevation in Feet MSL (contour interval variable)
Property Boundary
134
4393.43
Monitoring Well Location and Designation Groundwater Elevation (ft MSL)
0
1000
2000
Approximate Scale in Feet
N
BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO
FMC CORPORATION
POCATELLO, IDAHO
GROUNDWATER CONTOUR MAP
SEPTEMBER 1995
Job Number
20906
Drawing No.
Figure 5
Rev.
0
TW-5S
TW-10S
4398.80
4384.34
110
4390.64
146
111
4393.48
4394.02
122
4394.08
108
4394.44
123
4393.92
4394.28
145
136
4395.81
112
4395.20
134
4395.16
121
4395.09
143
4396.59
126
4396.32
127
4396.20
140
4395.28
159
4395.49
141
4395.61
135
4395.68
106
4396.16
151
4395.49
118
4396.15
119
4396.21
147
4397.58
148
4397.41
124
4397.00
128
4396.24
130
4395.95
132
4396.17
131
4396.08
150
4396.35
152
4396.35
120
4396.37
149
4397.39
113
4396.61
115
4396.20
114
4396.37
104
4396.53
116
4397.14
158
4397.25
142
4422.36
164
4439.75
154
4398.12
137
4396.88
101
4397.29
161
4554.55
4391
4392
4393
4394
4395
4396
4397
4398
4410
4420
4450


Legend:
4391
Groundwater Elevation Contour with Elevation in Feet MSL (contour interval variable)
Property Boundary
134
4393.43
Monitoring Well Location and Designation
Groundwater Elevation (ft MSL)
0
1000
2000
Approximate Scale in Feet
N
BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO
FMC CORPORATION
POCATELLO, IDAHO
GROUNDWATER CONTOUR MAP
DECEMBER 1995
Job Number
20906
Drawing No.
Figure 6
Rev.
0
TW-5S
TW-10S
110
4384.6
146
4391.24
111
4394.35
122
4394.99
108
4395.03
4394.93
123
4395.20
145
4394.77
136
4395.99
112
4395.76
134
4396.09
121
4396.15
143
4396.16
126
4397.62
127
4397.49
140
4396.32
159
4396.55
141
4396.54
135
4396.57
106
4397.06
151
4396.46
147
4398.70
148
4398.55
124
4398.09
128
4397.51
139
4397.05
149
4398.51
113
4397.64
166
4397.30
115
4397.34
168
4397.12
114
4397.43
131
4397.12
104
4397.40
153
4397.03
156
157
4397.20
4397.30
120
4398.14
158
116
4398.02
142
4422.41
164
4438.45
154
4399.30
137
4397.90
4398.65
167
165
4398.24
101
4398.38
161
4553.95
4399.98
4391
4392
4393
4394
4395
4396
4397
4398
4360
4369
4410
4420
4450



BECHTEL ENVIRONMENTAL, INC.
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FMC CORPORATION
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations
March 1996

Job Number	Drawing No.	Rev.
20906	FIGURE 3	0

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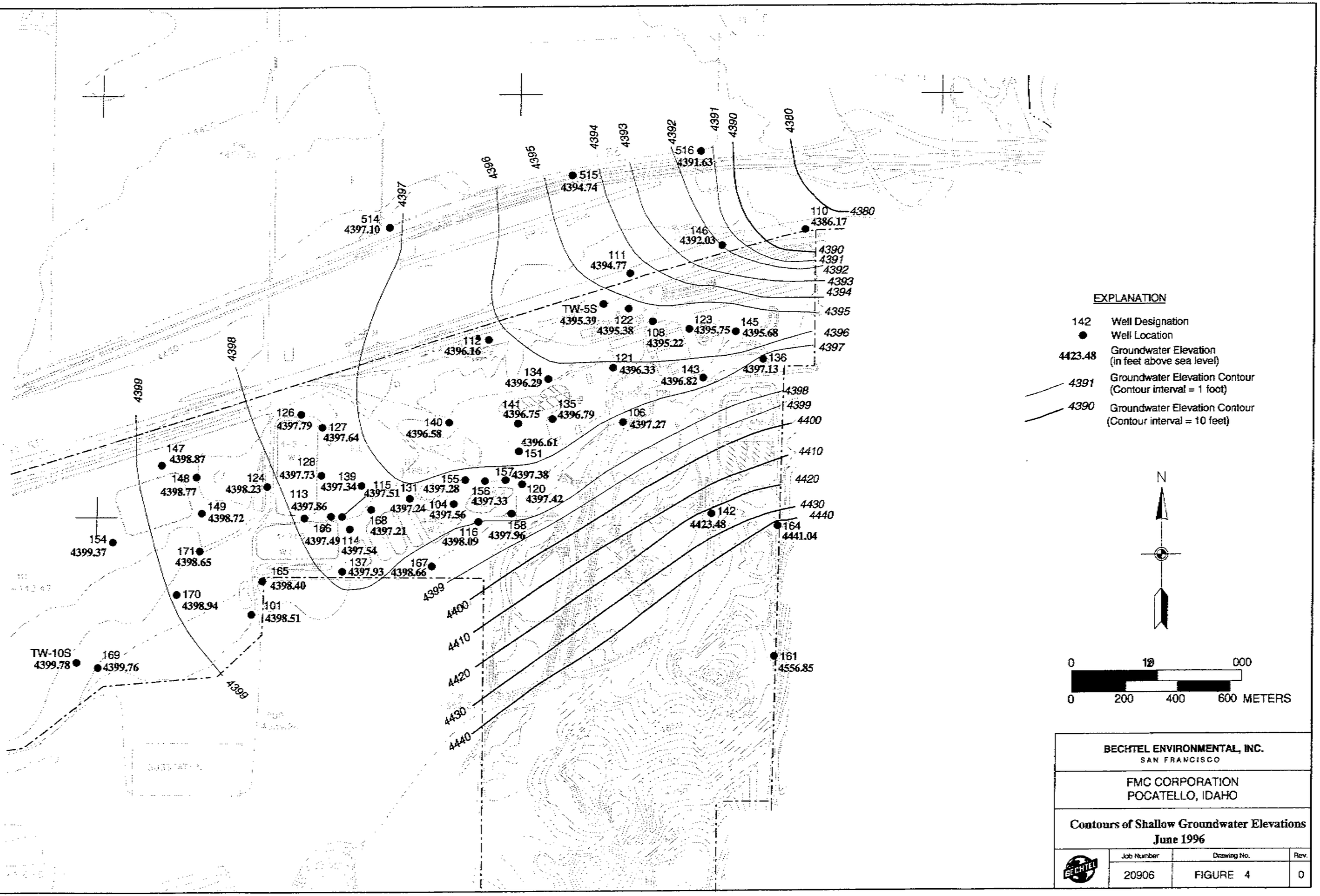

BECHTEL ENVIRONMENTAL, INC.
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FMC CORPORATION
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations
June 1996

Job Number	Drawing No.	Rev.
20906	FIGURE 4	0

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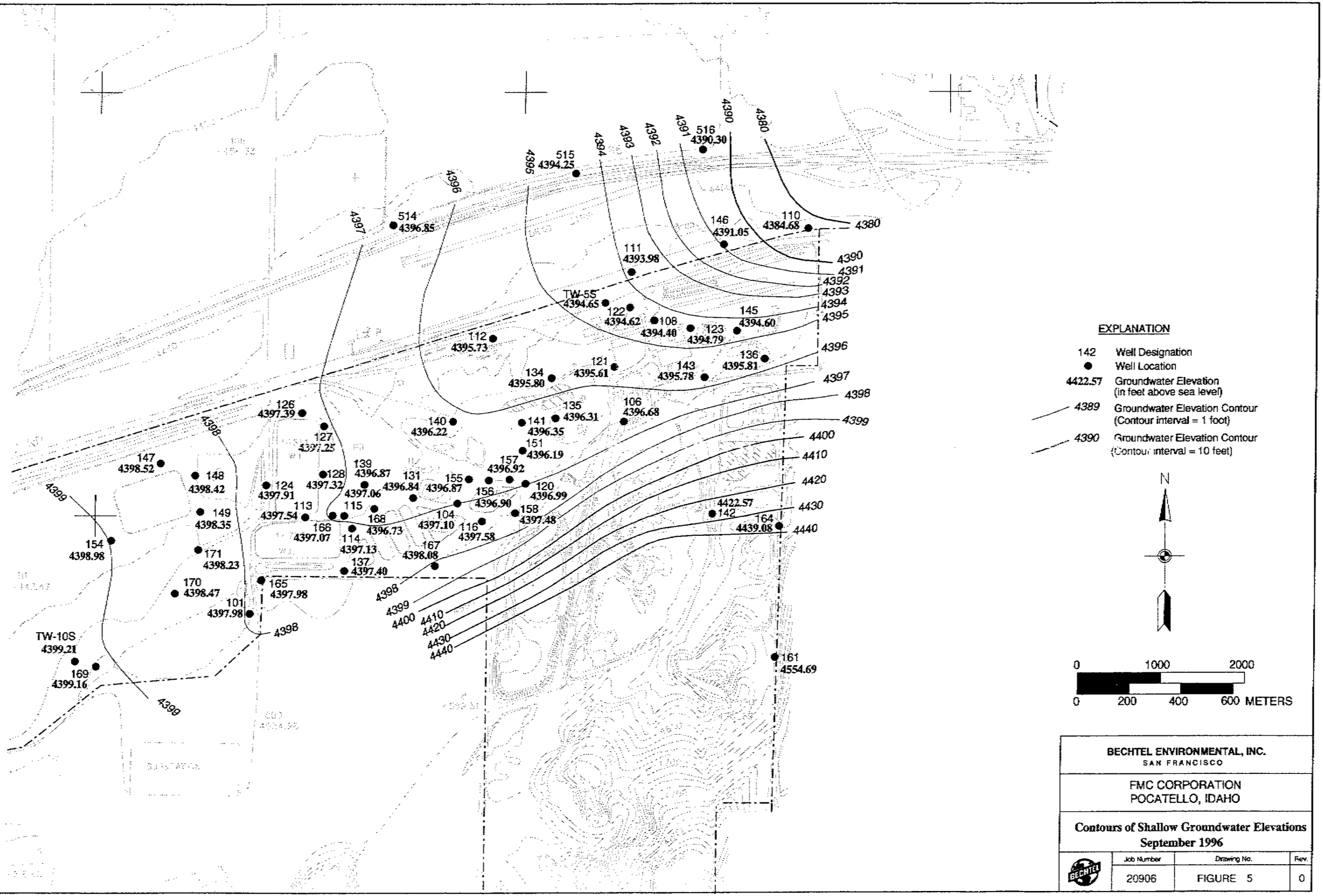

BECHTEL ENVIRONMENTAL, INC.
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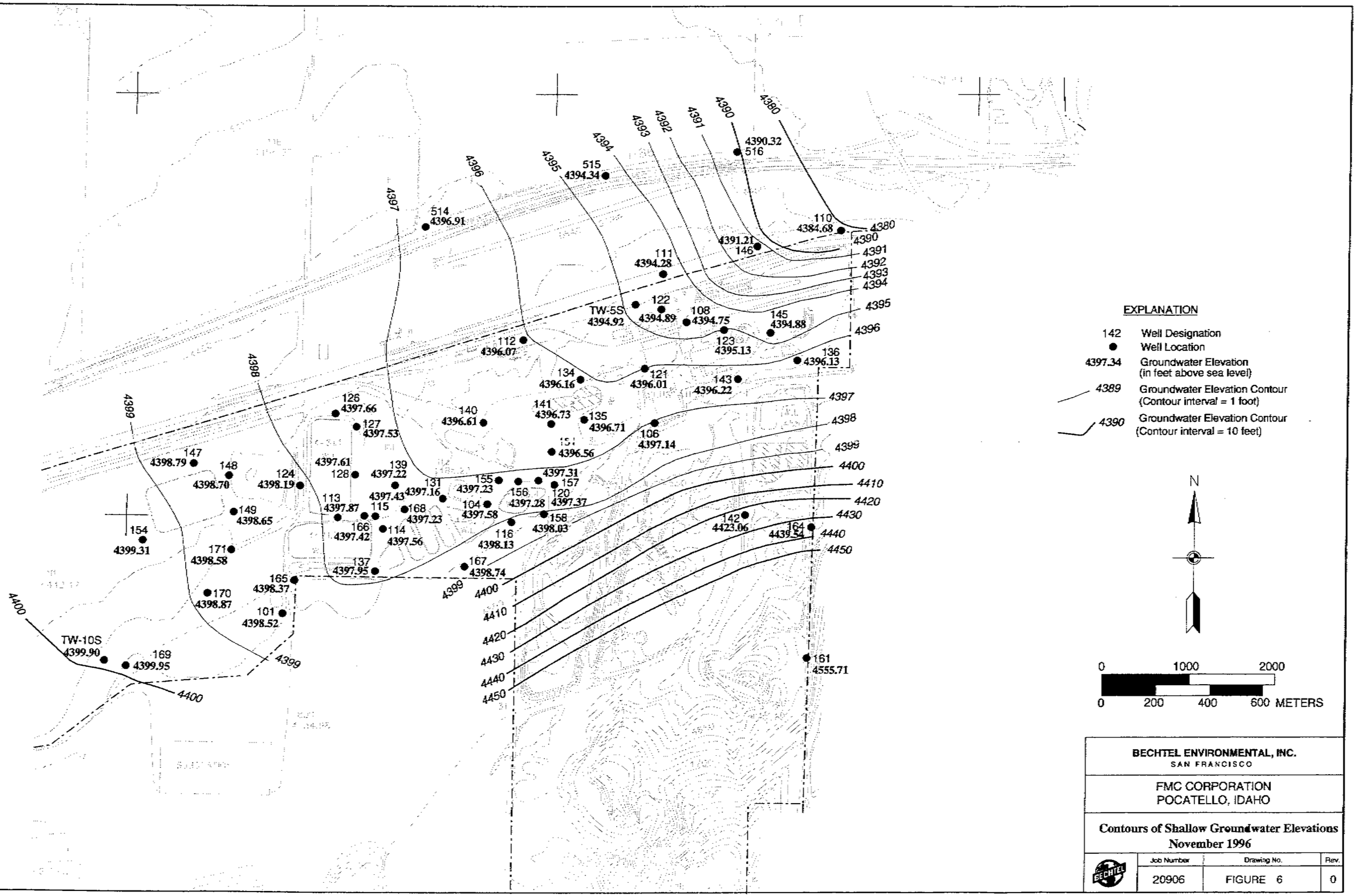
POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations
September 1996

Job Number	Drawing No.	Rev.
20906	FIGURE 5	0



BECHTEL ENVIRONMENTAL, INC.
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POCATELLO, IDAHO

Contours of Shallow Groundwater Elevations November 1996

Job Number	Drawing No.	Rev.
20906	FIGURE 6	0

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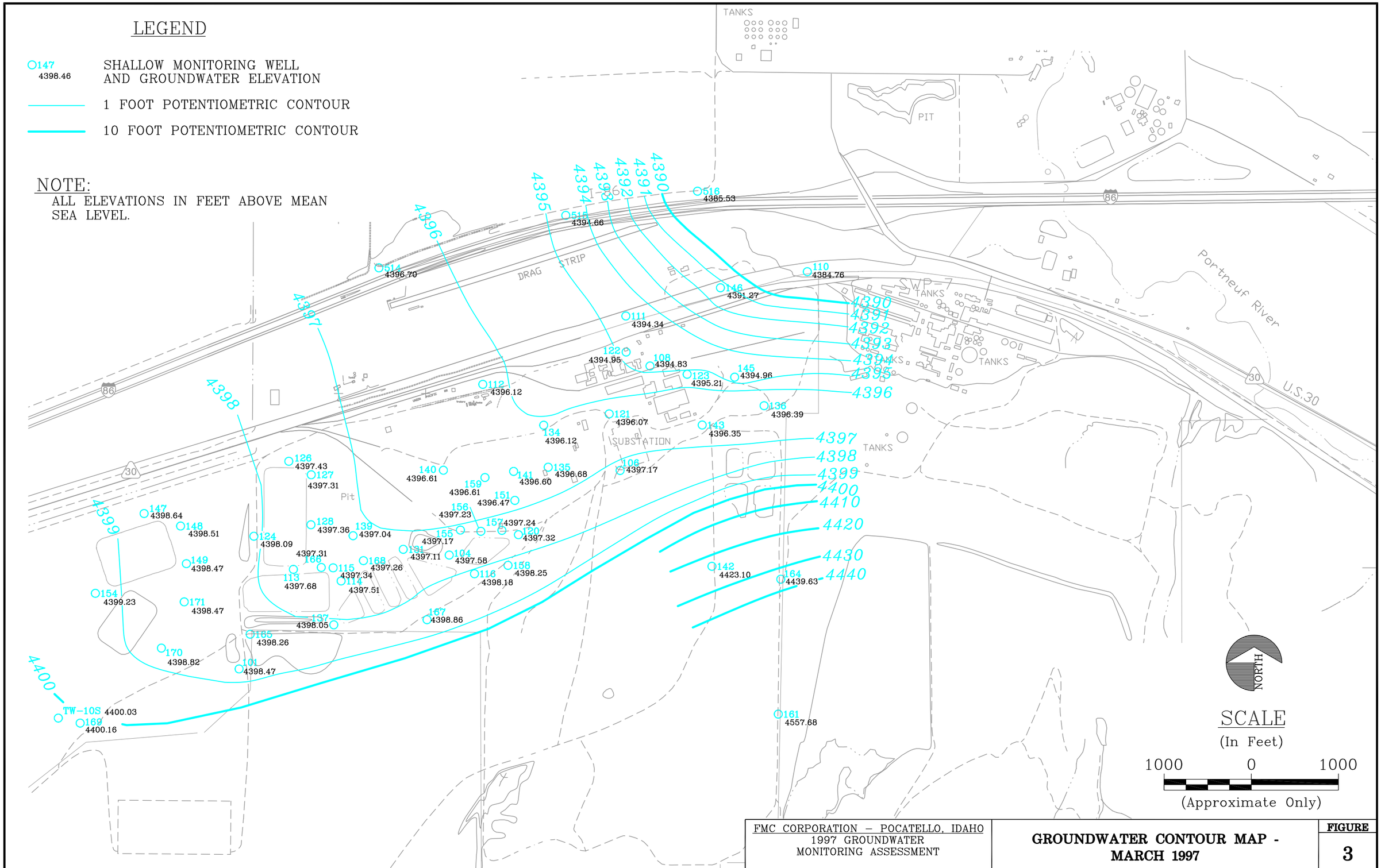


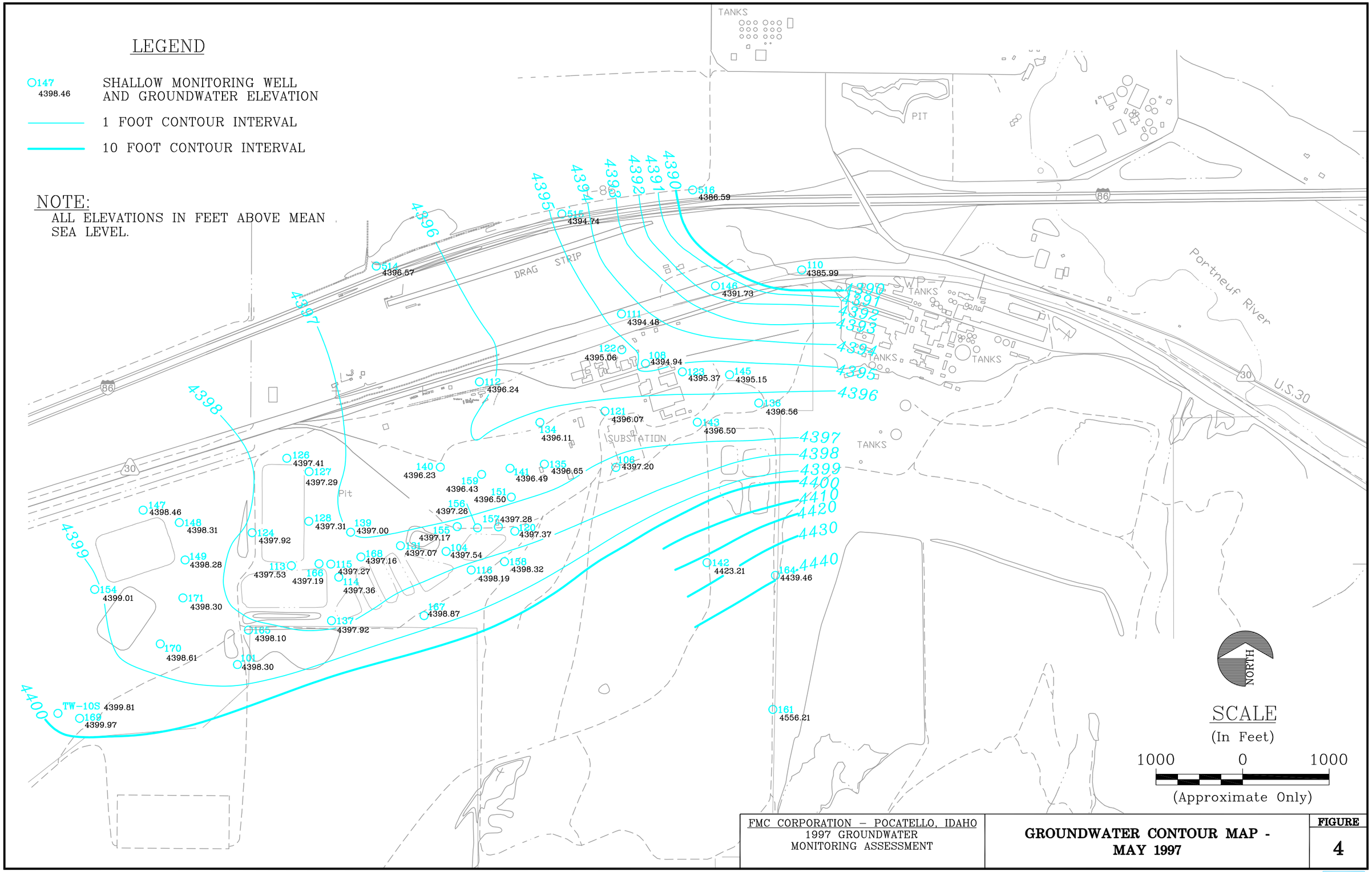
FMC CORPORATION – POCATELLO, IDAHO
1997 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MARCH 1997

FIGURE
3

UPDATE TIME: 3:15PM
045\0072\065\0072\HEL\040698\I:\STORAGE\07298A03.DWG

Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



FMC CORPORATION – POCATELLO, IDAHO 1997 GROUNDWATER MONITORING ASSESSMENT	**GROUNDWATER CONTOUR MAP - MAY 1997**	**FIGURE** **4**

UPDATE TIME: 3:20PM
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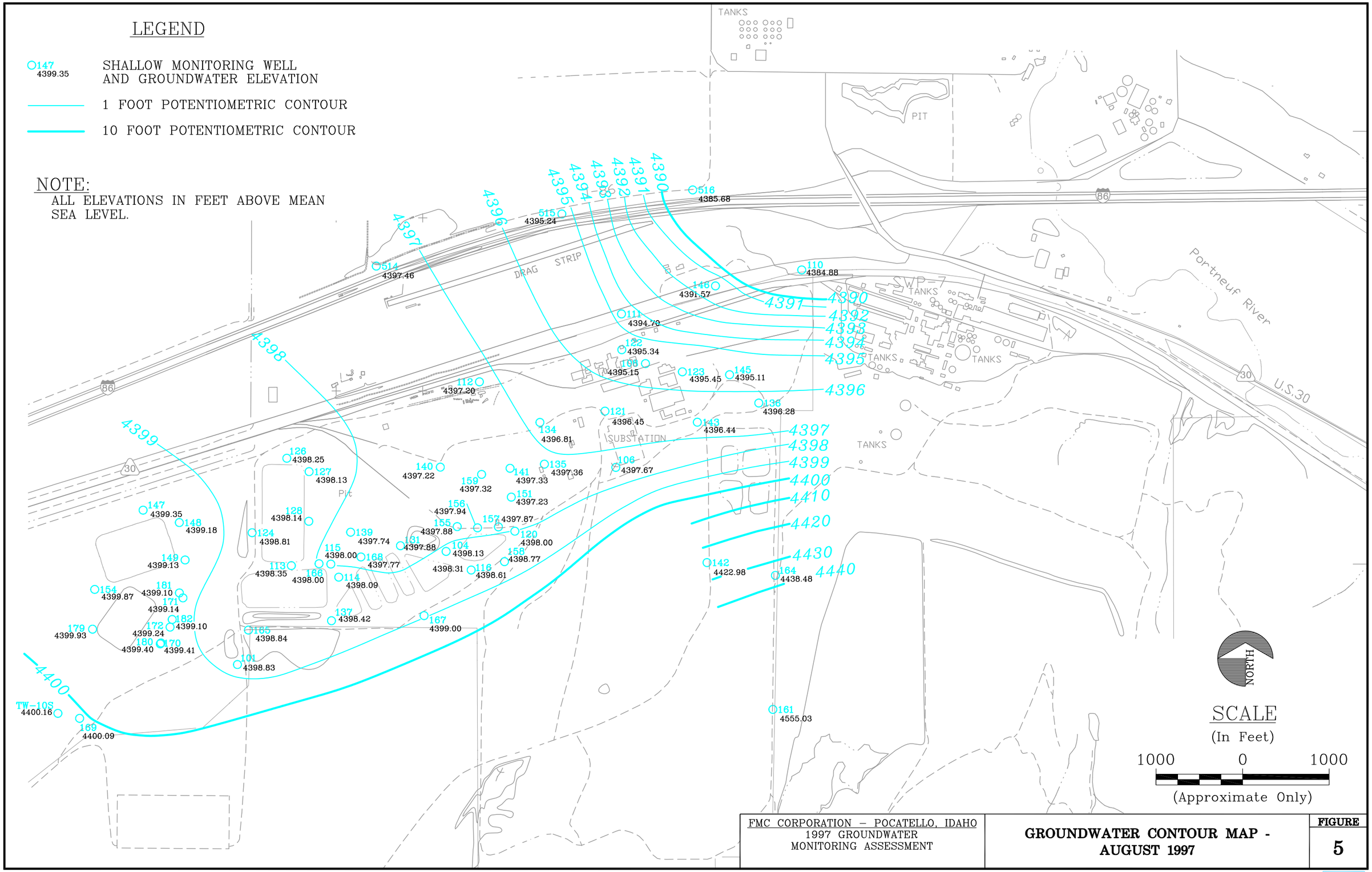


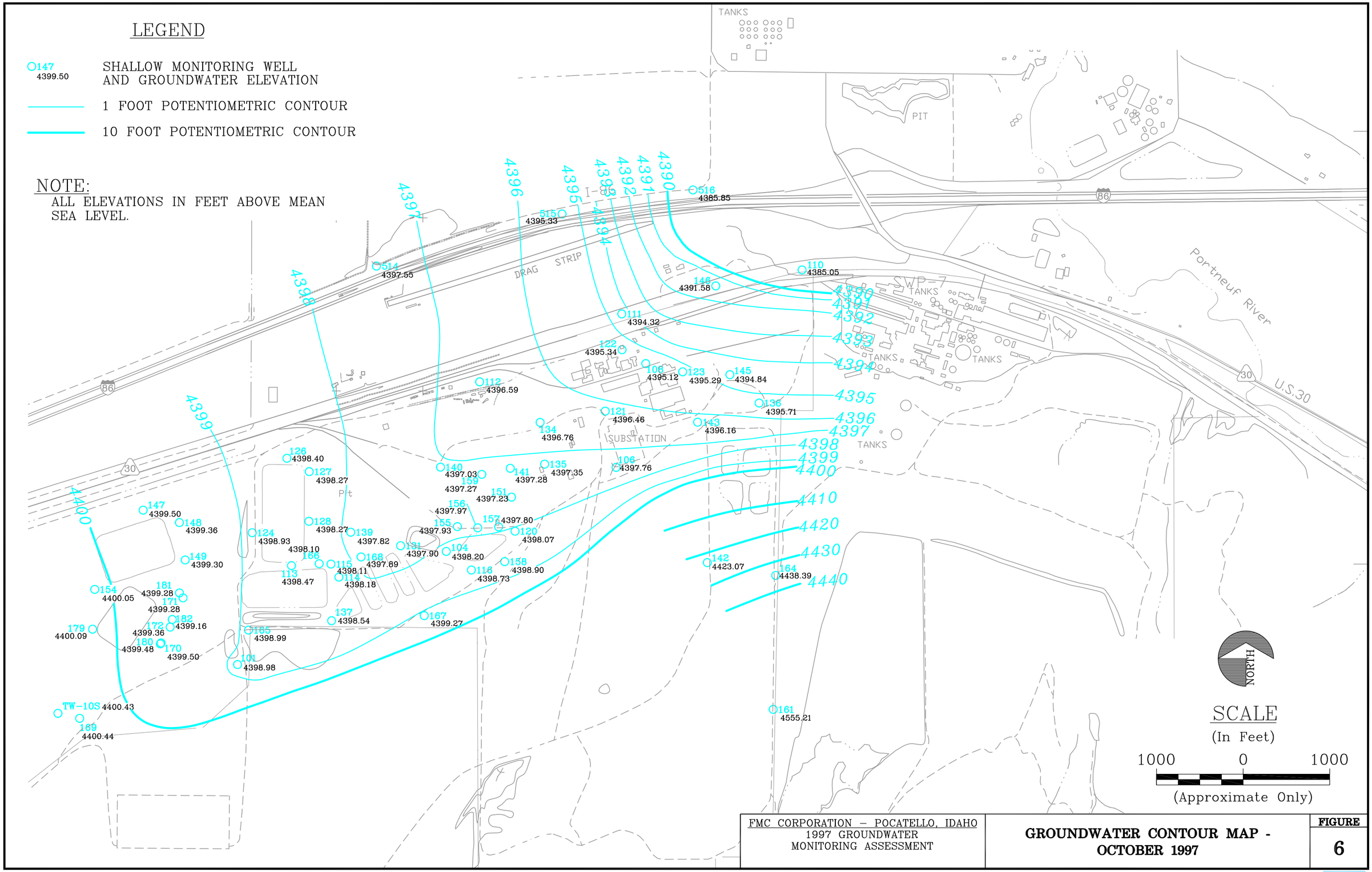
FMC CORPORATION – POCATELLO, IDAHO
1997 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 1997

FIGURE
5

UPDATE TIME: 3:45PM
045\ 0072\065\0072\HEL\040698\I:\STORAGE\07298A05.DWG

Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



FMC CORPORATION – POCATELLO, IDAHO
1997 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - OCTOBER 1997

FIGURE
6

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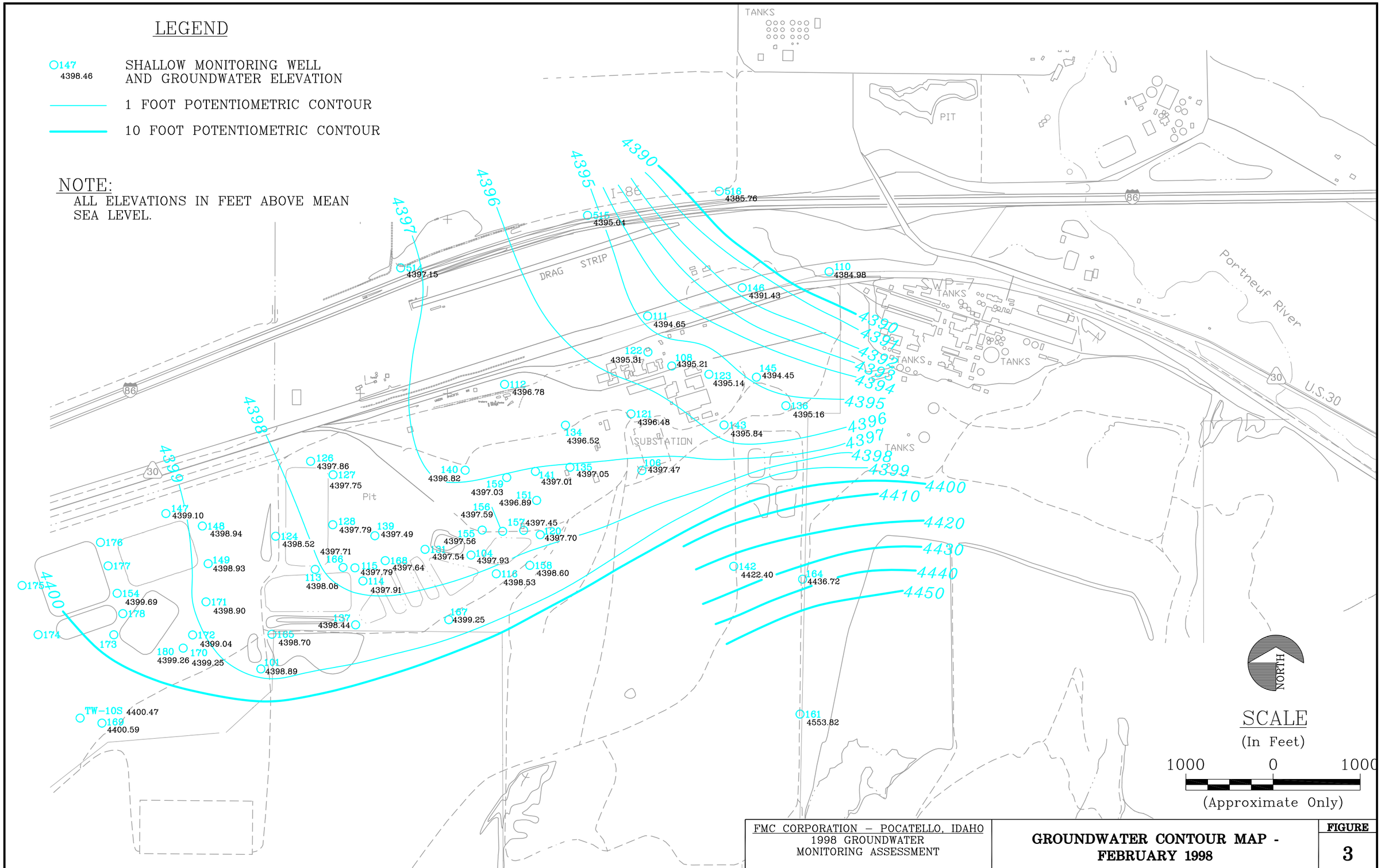
Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



FMC CORPORATION – POCATELLO, IDAHO
1998 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 1998

FIGURE
3

UPDATE TIME: 10:01AM
045\0072\065\0127\HEL\020499\I:\STORAGE\07299A01.DWG

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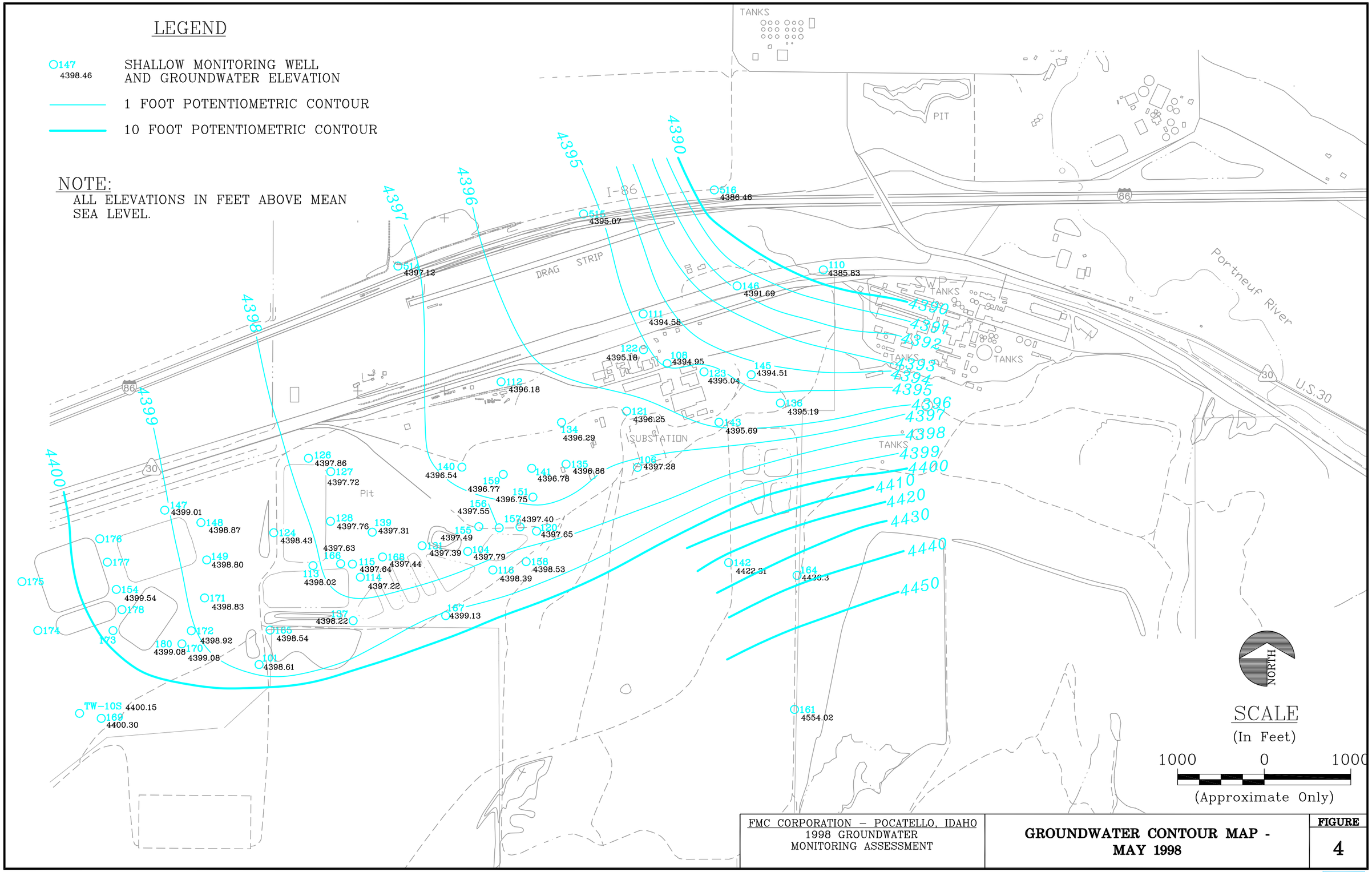

FMC CORPORATION – POCATELLO, IDAHO 1998 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - MAY 1998	FIGURE 4

UPDATE TIME: 10:05AM
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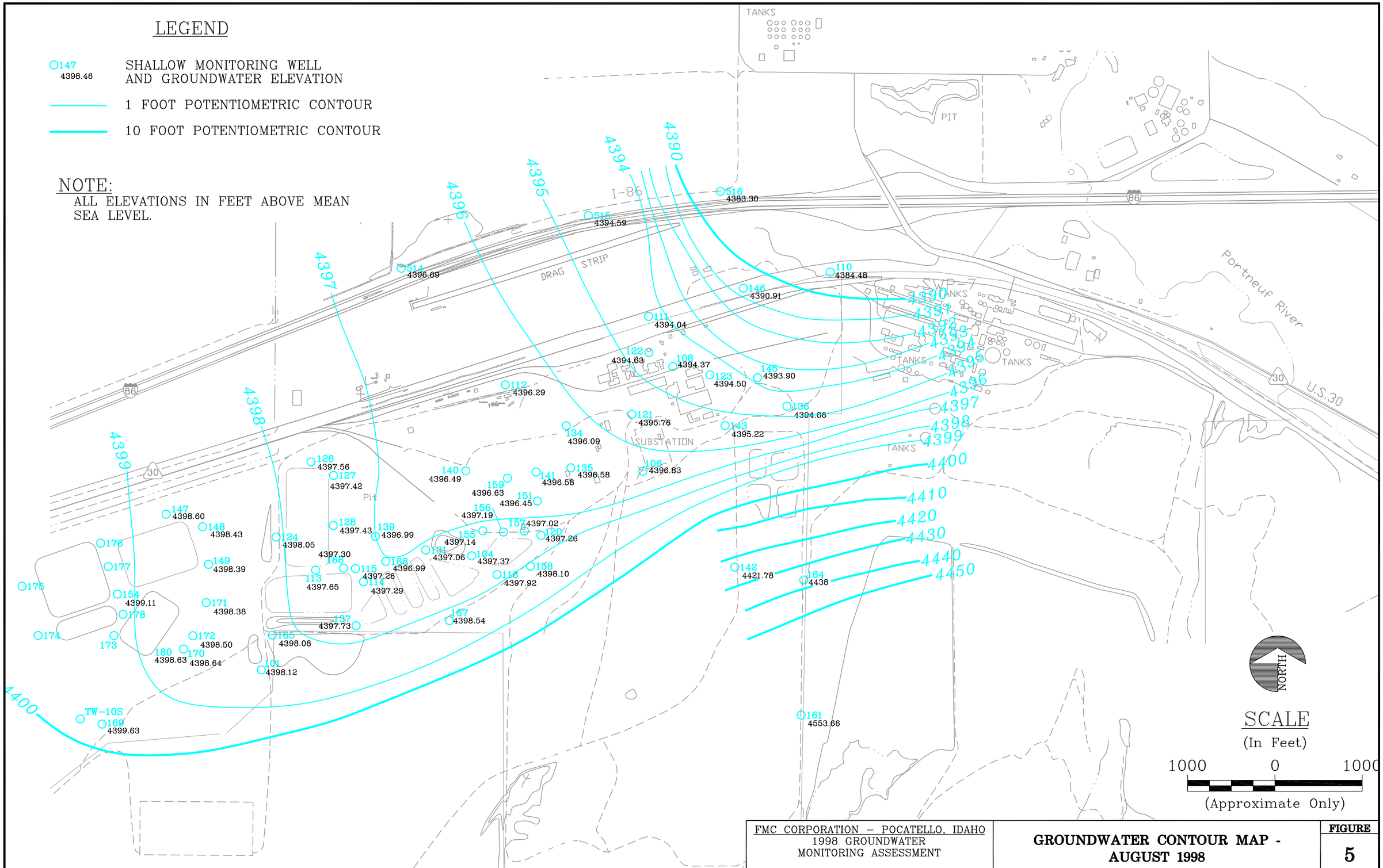
Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



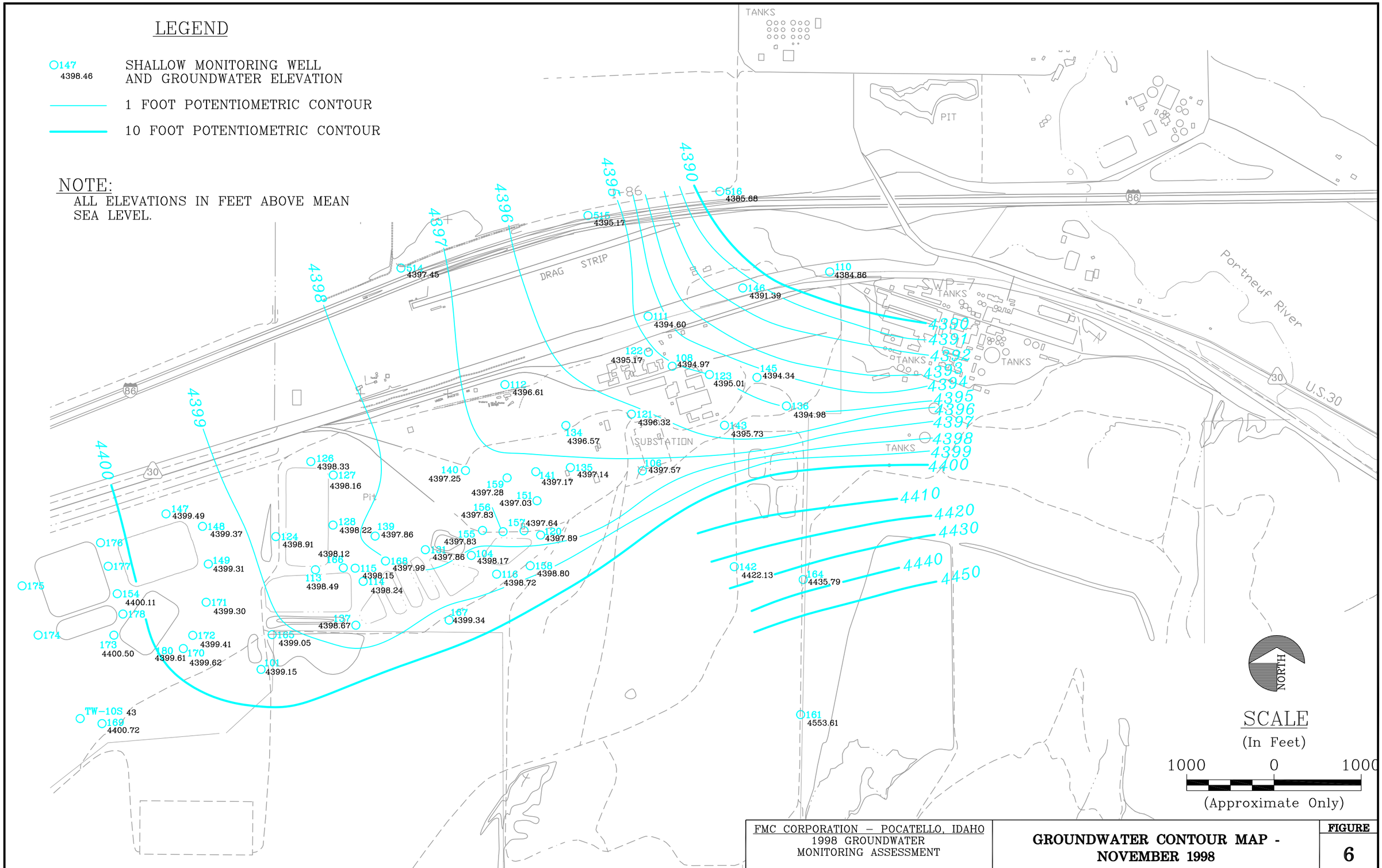
FMC CORPORATION – POCATELLO, IDAHO
1998 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 1998

FIGURE
5

UPDATE TIME: 10:06AM
045\0072\065\0127\HEL\020499\I:\STORAGE\07299a03.dwg

Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



FMC CORPORATION – POCATELLO, IDAHO 1998 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - NOVEMBER 1998	FIGURE 6

UPDATE TIME: 10:10AM
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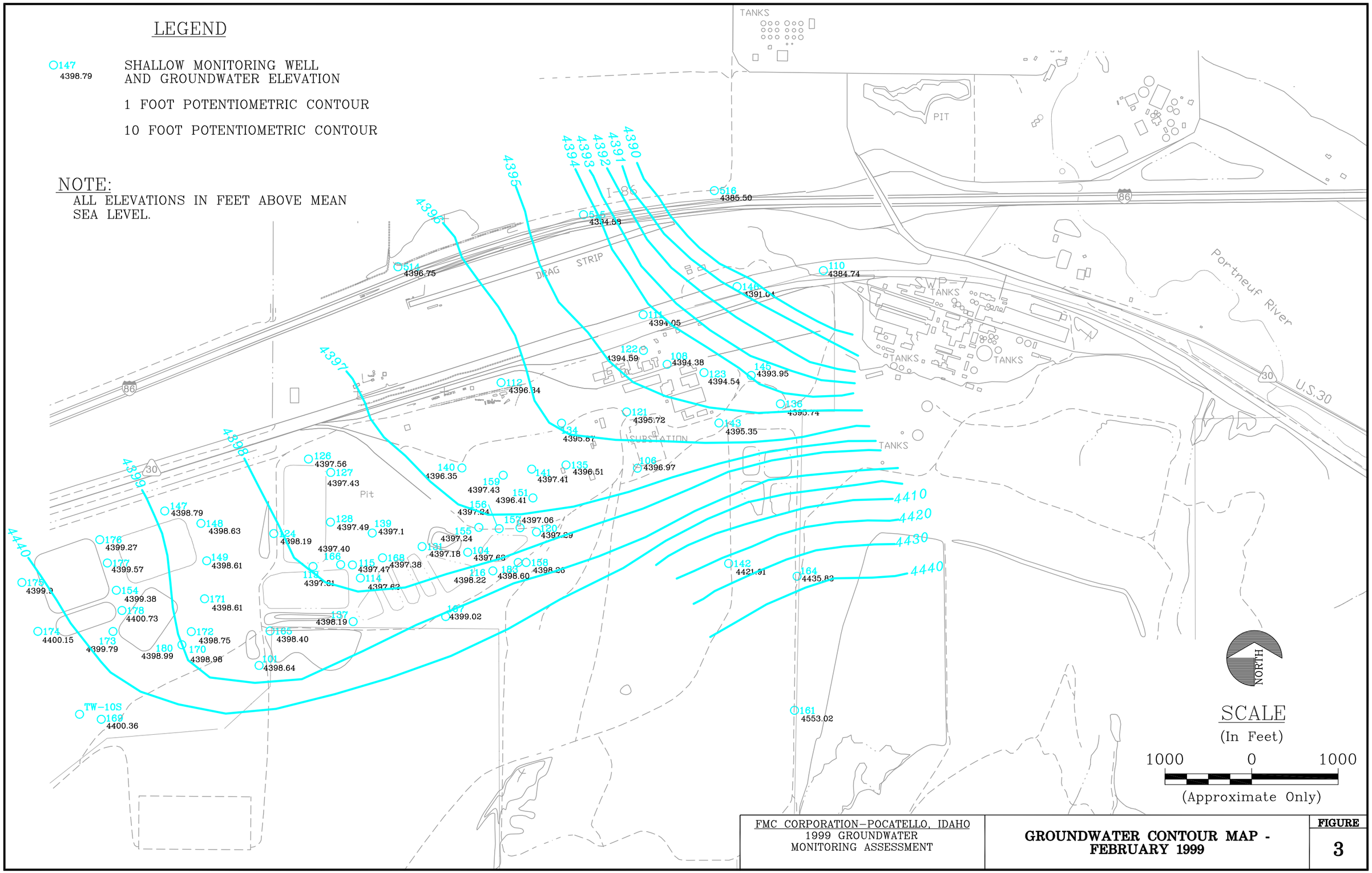
Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



FMC CORPORATION–POCATELLO, IDAHO
1999 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 1999

FIGURE
3

UPDATE TIME: 2:42PM
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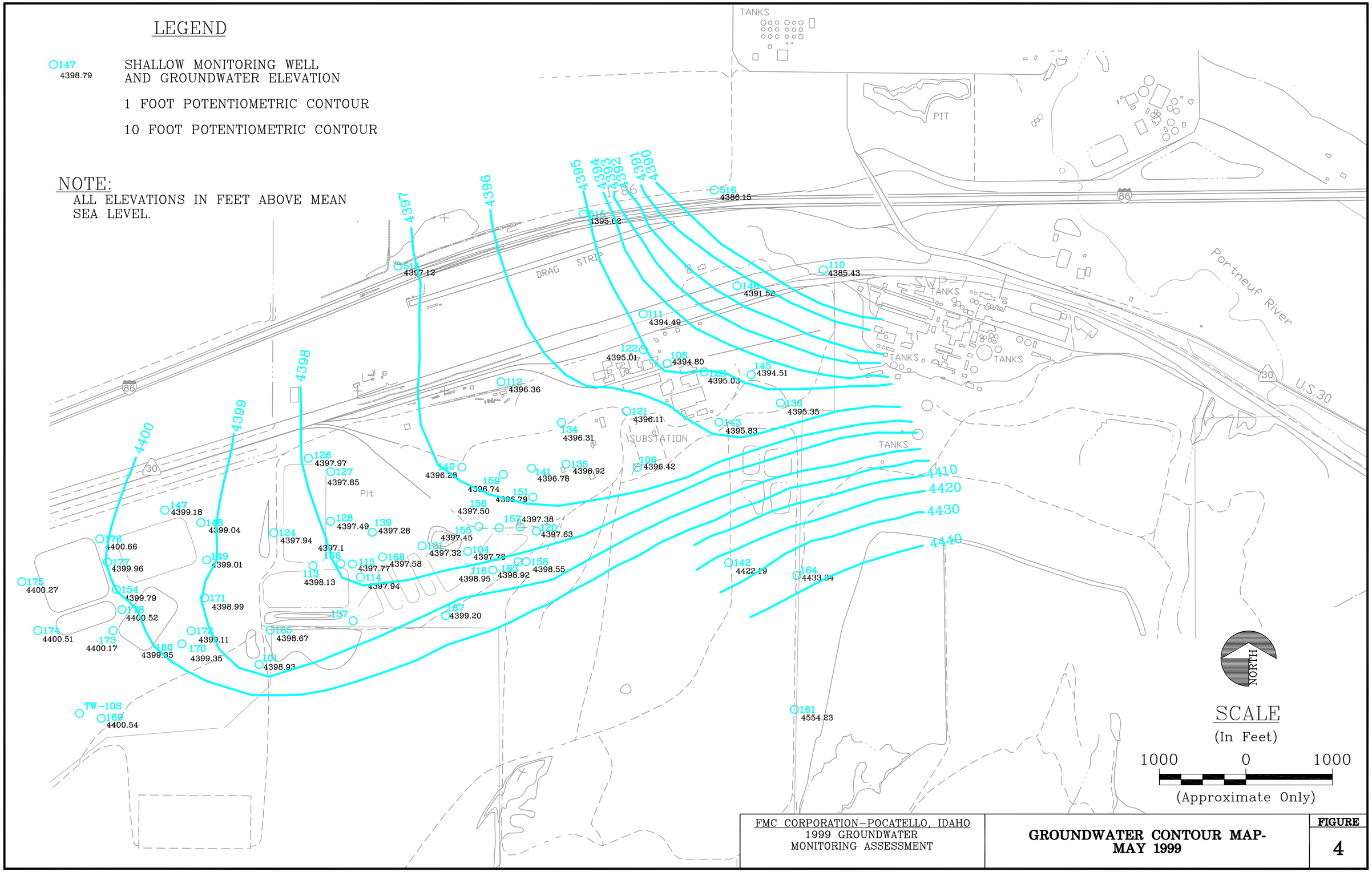
Hydromatrix, Inc.



FMC CORPORATION–POCATELLO, IDAHO
1999 GROUNDWATER
MONITORING ASSESSMENT

**GROUNDWATER CONTOUR MAP-
MAY 1999**

FIGURE
4

UPDATE TIME: 2:29PM
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Hydromatrix, Inc.

LEGEND

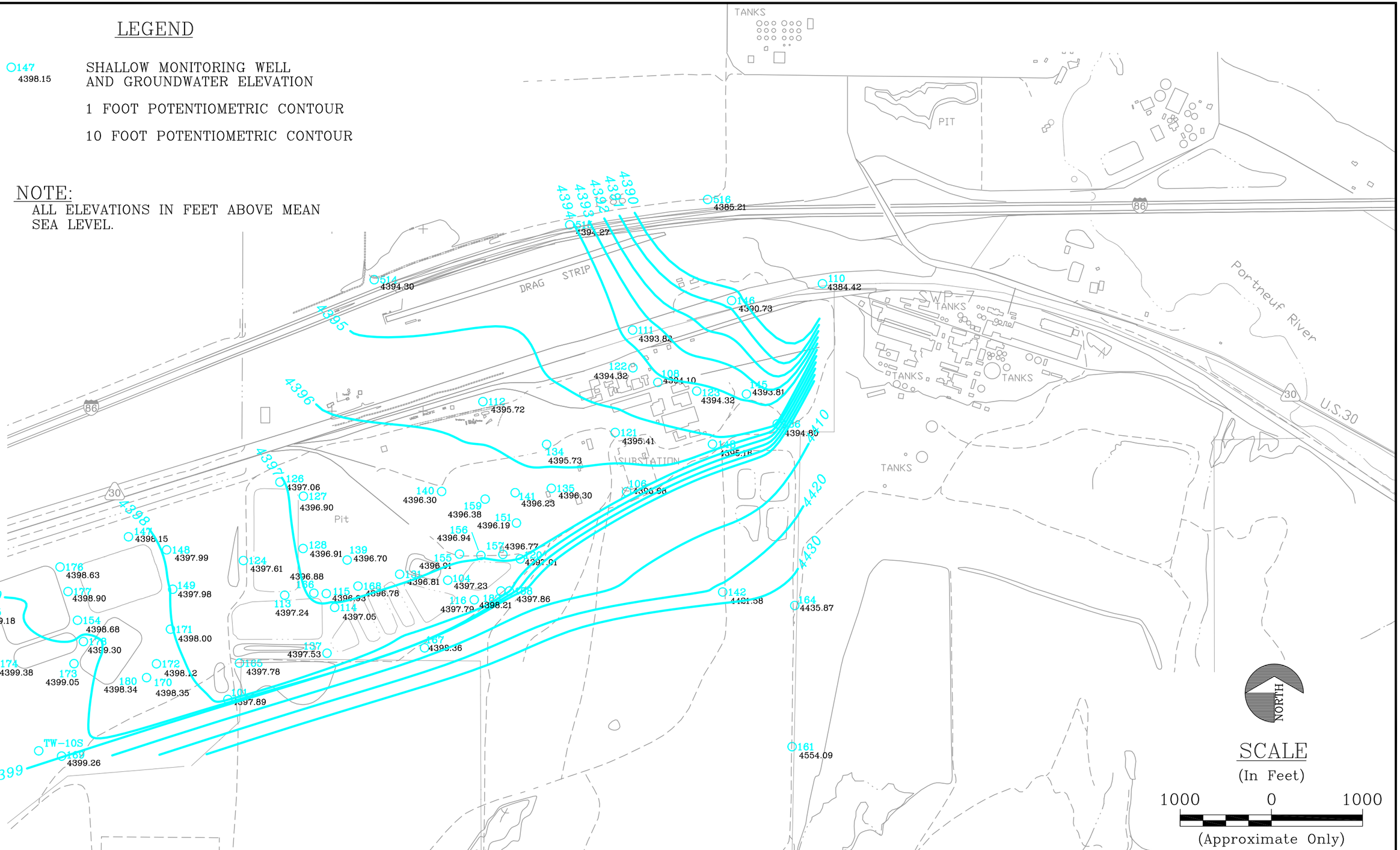
147 4398.15 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

1 FOOT POTENTIOMETRIC CONTOUR

10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO 1999 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - AUGUST 1999	FIGURE 5

UPDATE TIME: 2:23PM
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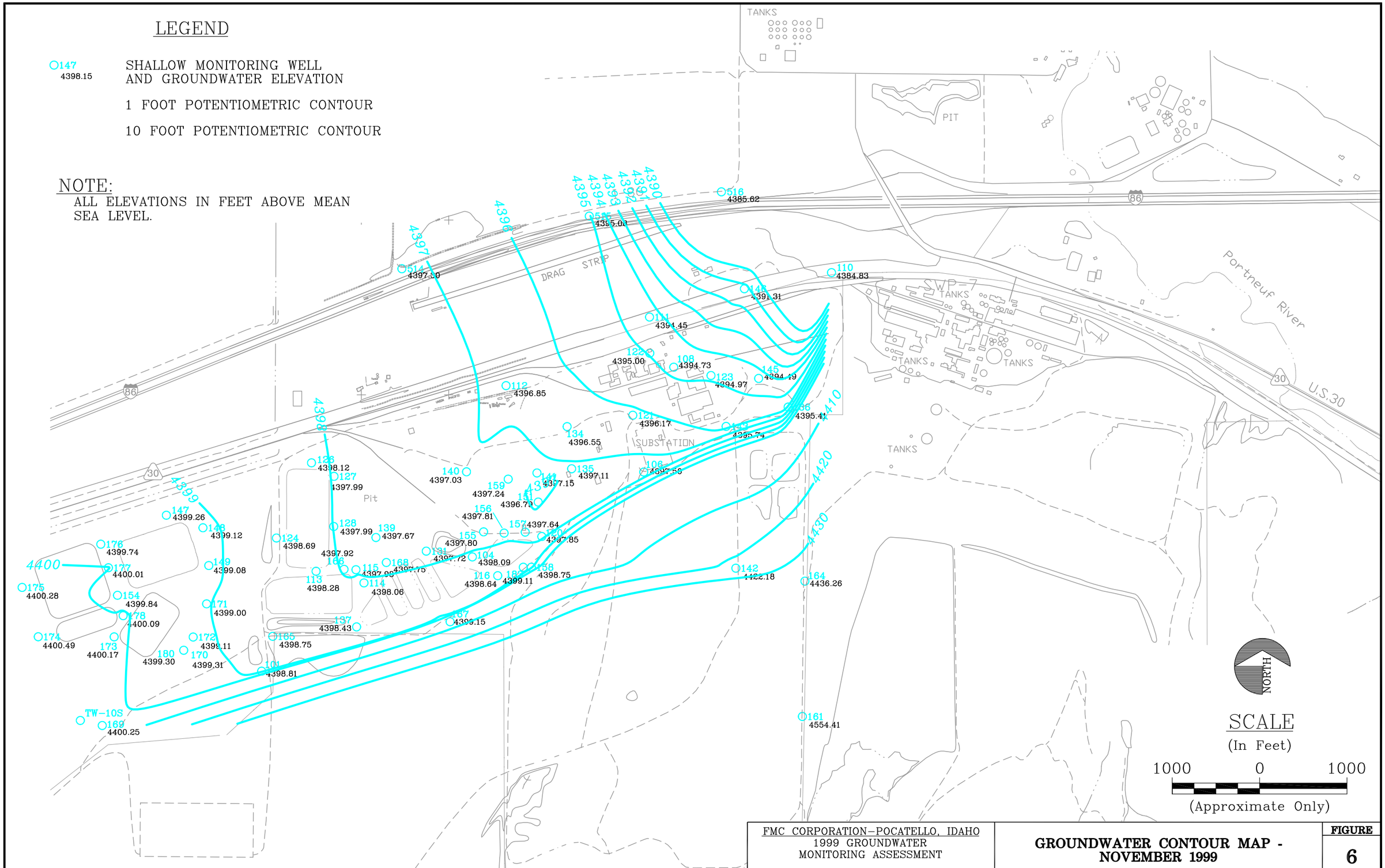
Hydromatrix, Inc.



FMC CORPORATION–POCATELLO, IDAHO
1999 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 1999

FIGURE
6

UPDATE TIME: 2:21PM
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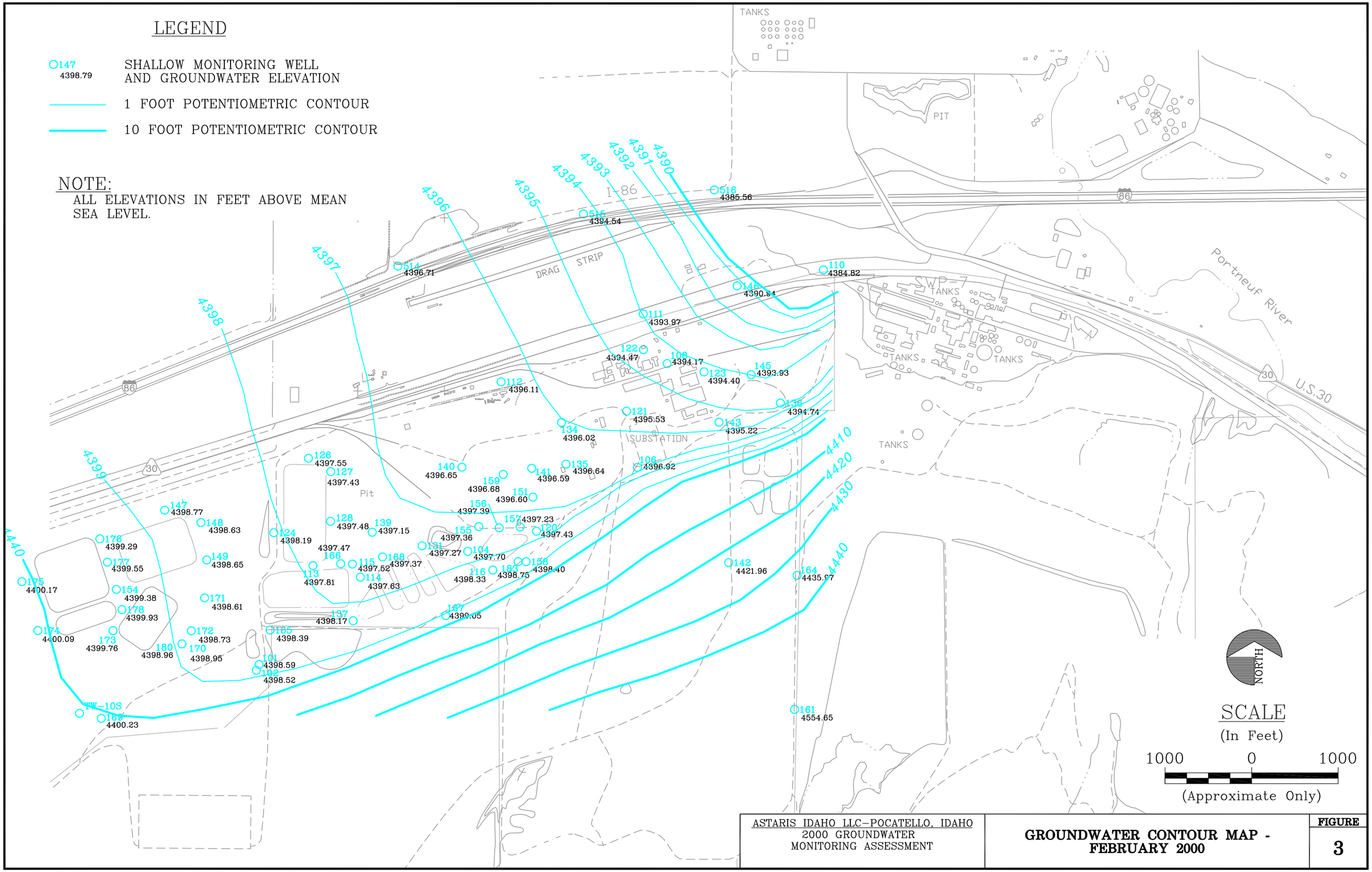
Hydromedia, Inc.



ASTARIS IDAHO LLC–POCATELLO, IDAHO
2000 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 2000

FIGURE
3

UPDATE TIME: 3:24PM
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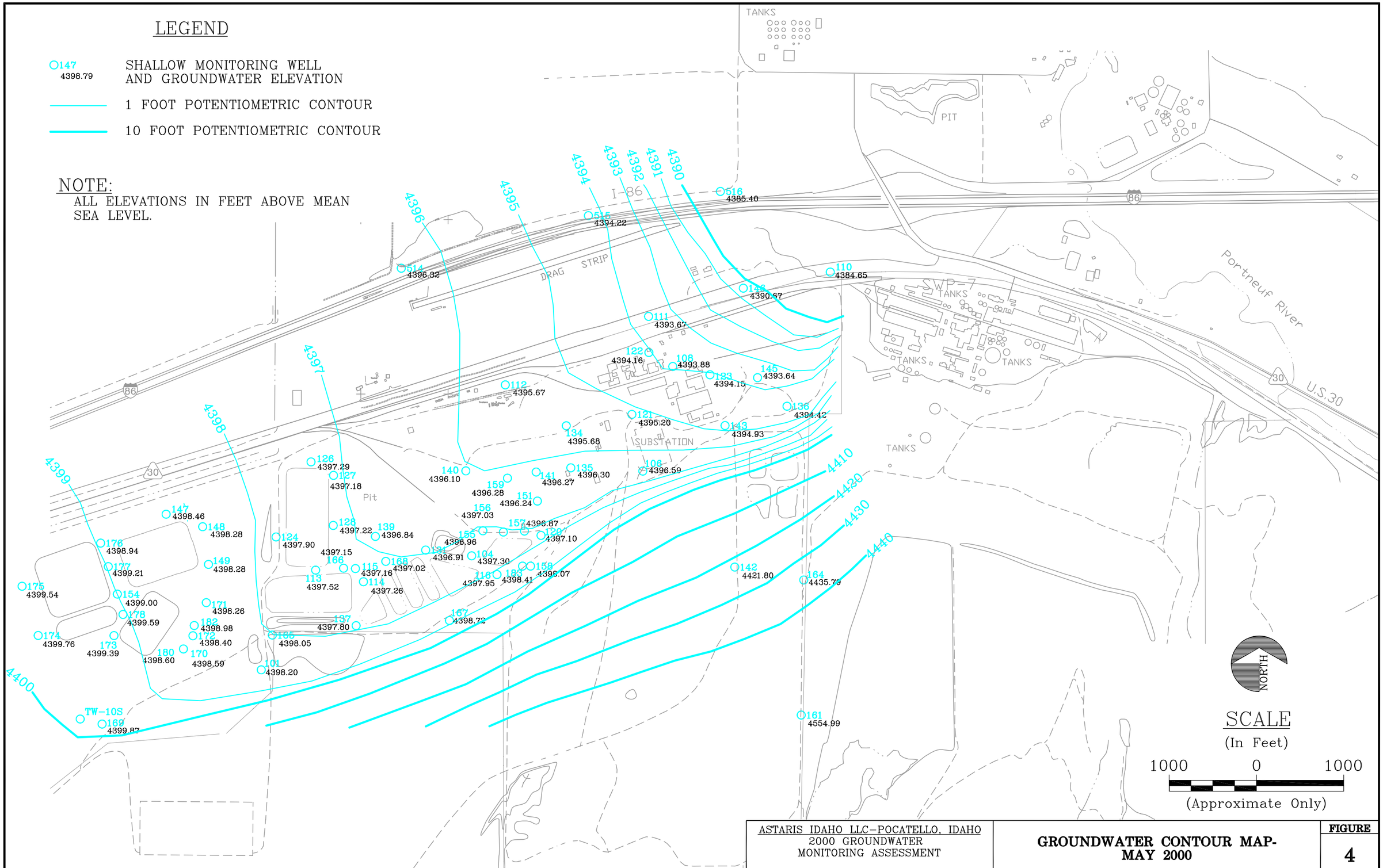
Hydromatrix, Inc.



ASTARIS IDAHO LLC–POCATELLO, IDAHO 2000 GROUNDWATER MONITORING ASSESSMENT	**GROUNDWATER CONTOUR MAP- MAY 2000**	**FIGURE** **4**

UPDATE TIME: 3:25PM
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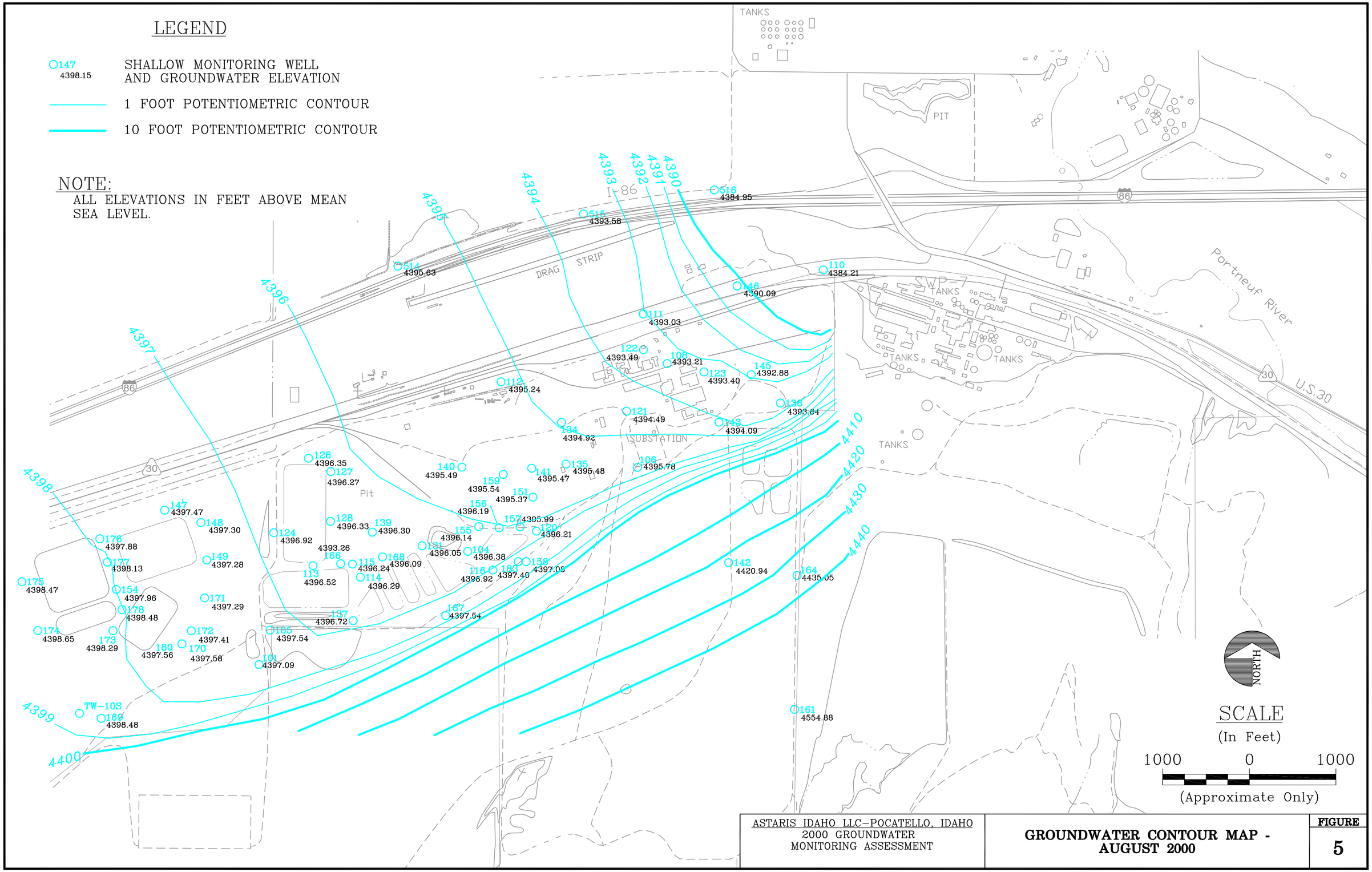

ASTARIS IDAHO LLC–POCATELLO, IDAHO
2000 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 2000

FIGURE
5

UPDATE TIME: 4:31PM
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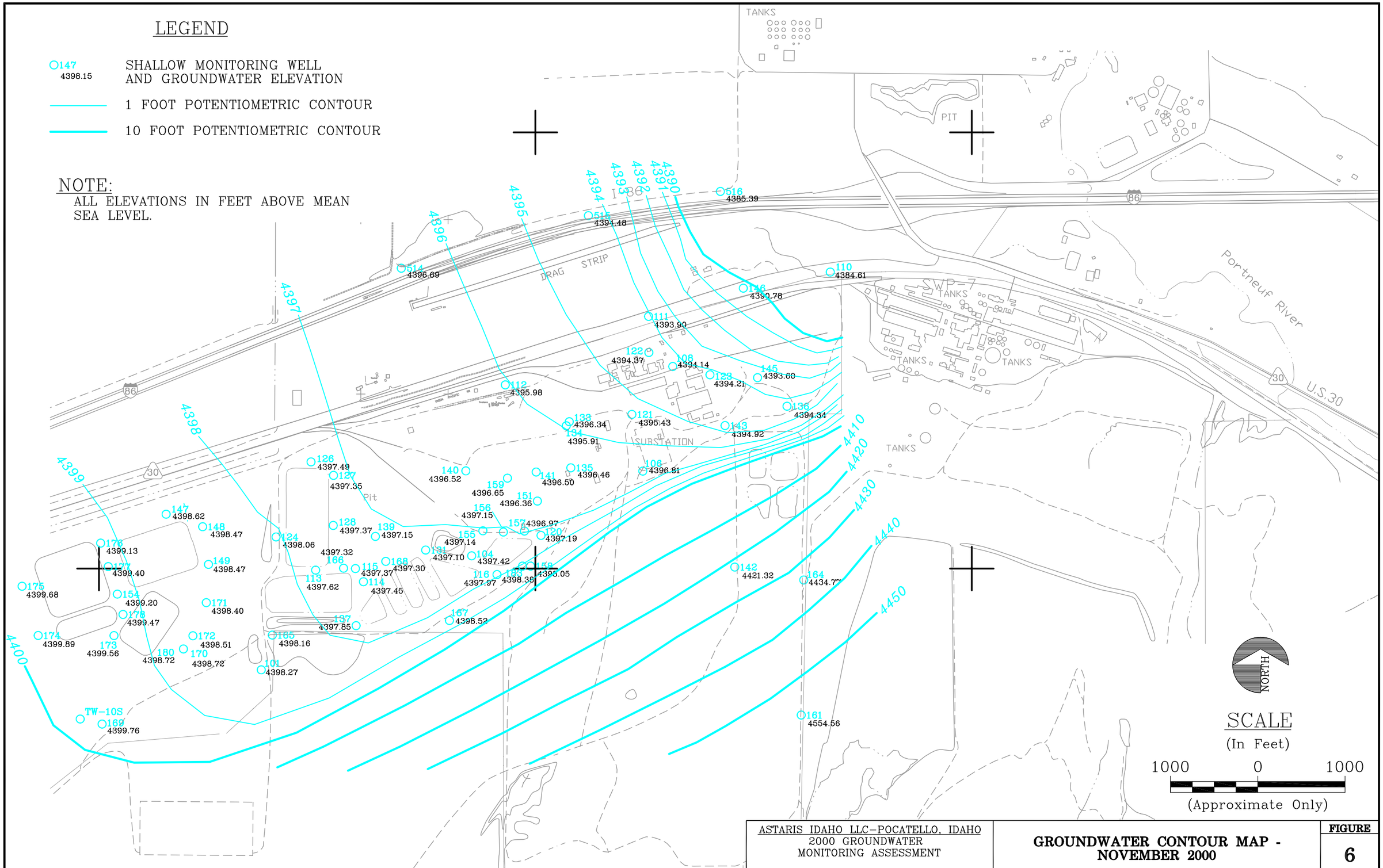
Hydromatrix, Inc.



ASTARIS IDAHO LLC–POCATELLO, IDAHO
2000 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 2000

FIGURE
6

UPDATE TIME: 3:31PM
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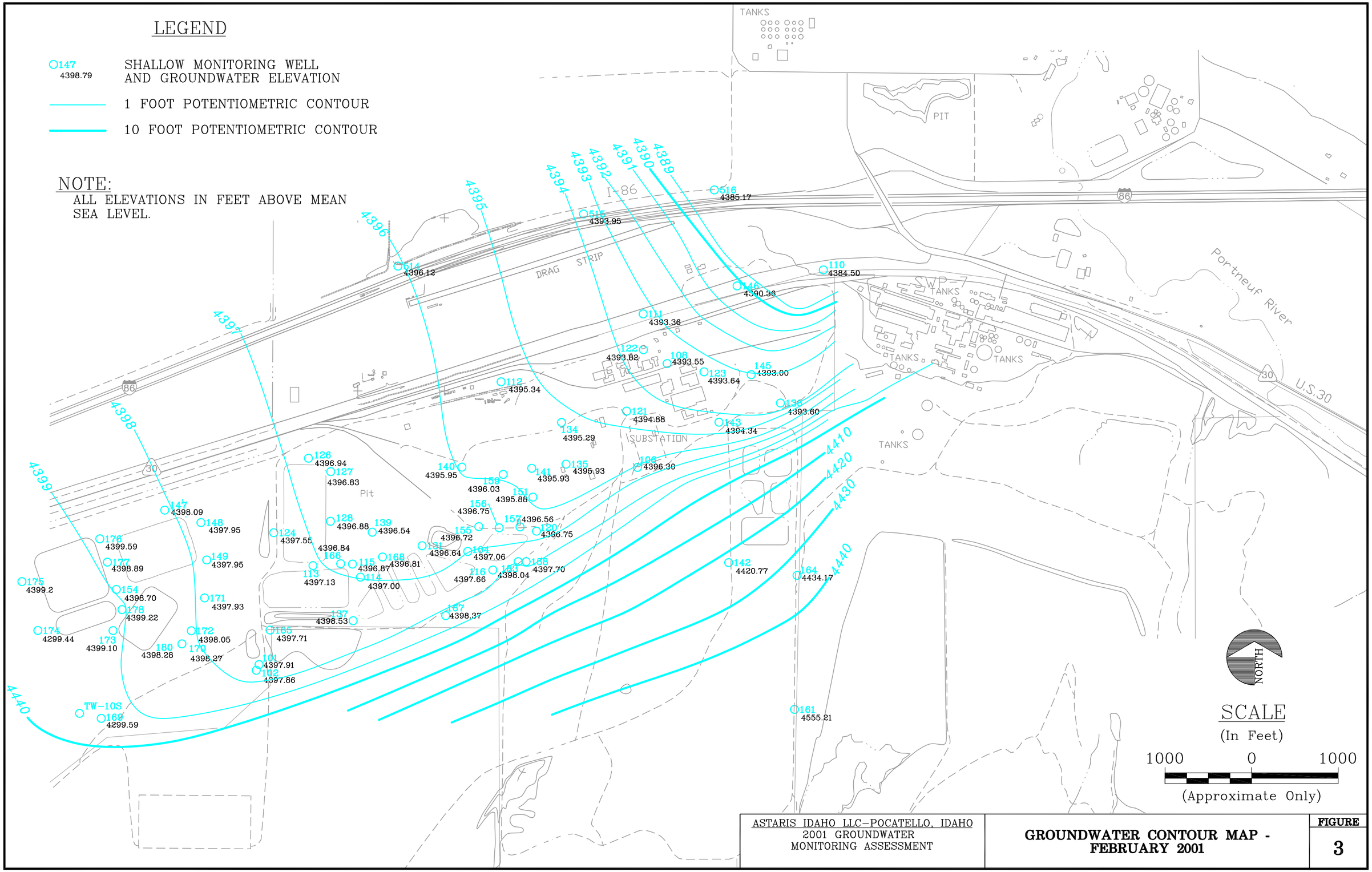
Hydromatrix, Inc.



ASTARIS IDAHO LLC–POCATELLO, IDAHO 2001 GROUNDWATER MONITORING ASSESSMENT	**GROUNDWATER CONTOUR MAP - FEBRUARY 2001**	**FIGURE** **3**

UPDATE TIME: 2:06PM
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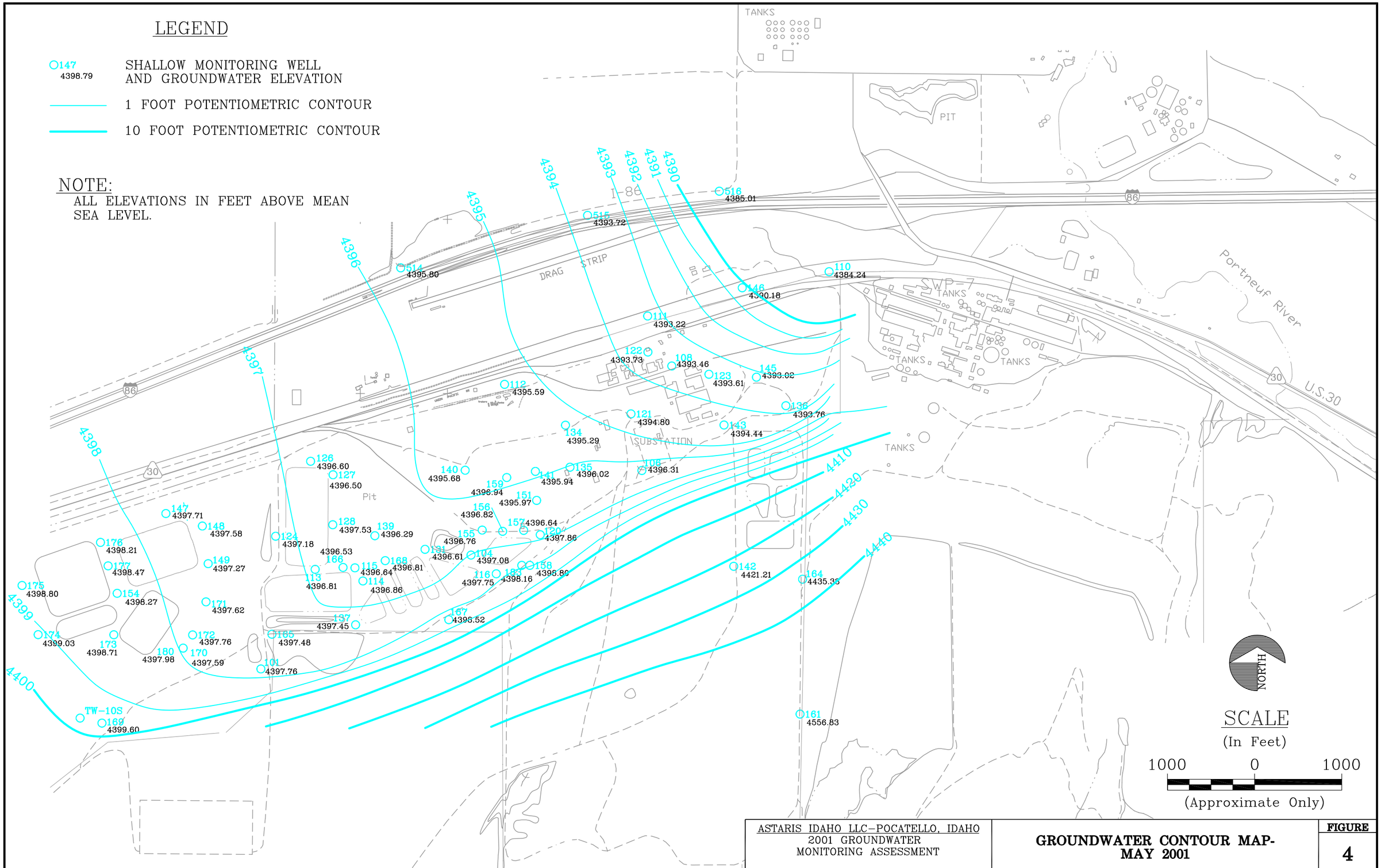

ASTARIS IDAHO LLC–POCATELLO, IDAHO
2001 GROUNDWATER
MONITORING ASSESSMENT

**GROUNDWATER CONTOUR MAP-
MAY 2001**

FIGURE
4

UPDATE TIME: 4:23PM
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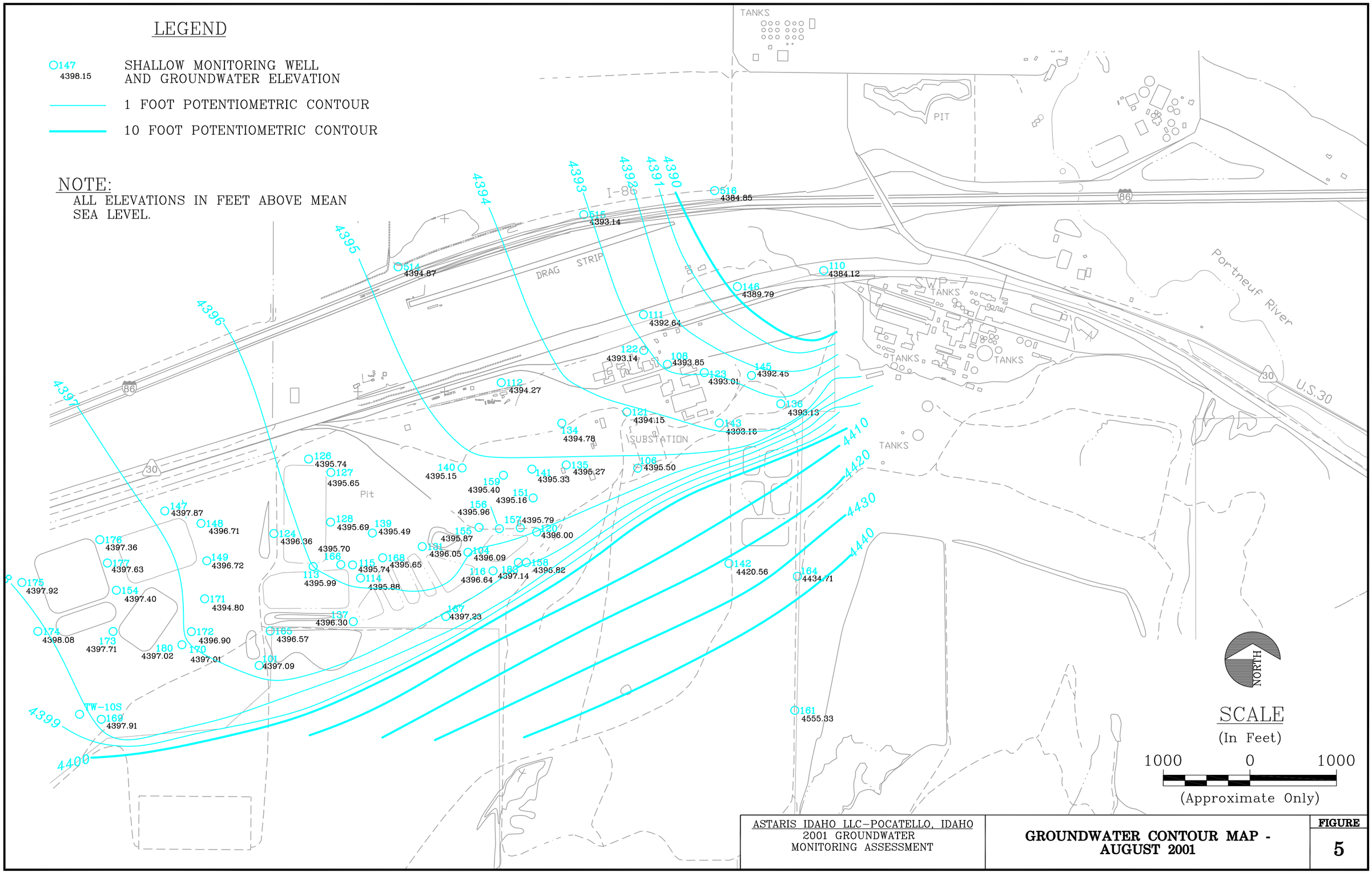
Hydromatrix, Inc.



ASTARIS IDAHO LLC–POCATELLO, IDAHO
2001 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 2001

FIGURE
5

UPDATE TIME: 2:55PM
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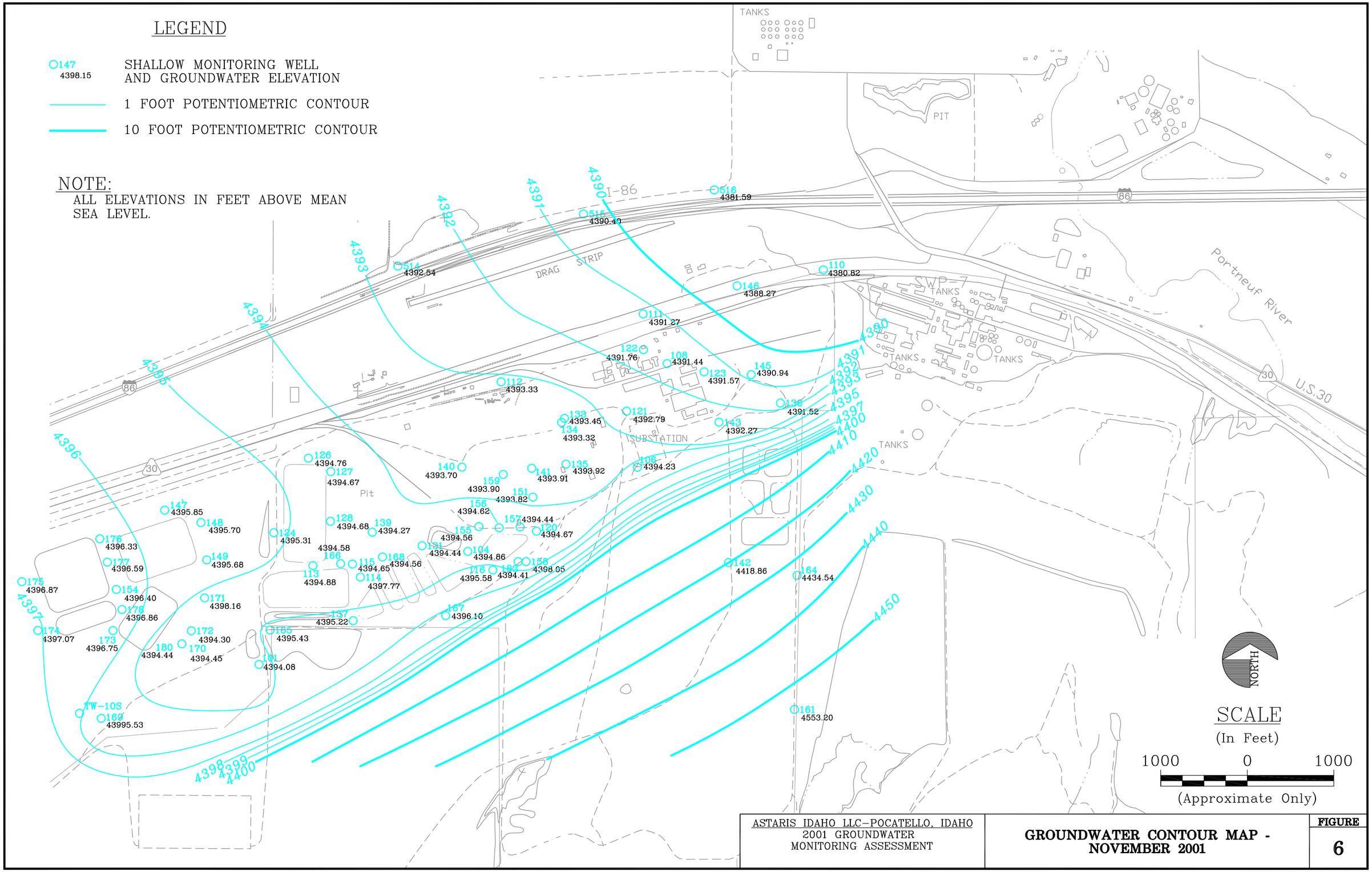

ASTARIS IDAHO LLC–POCATELLO, IDAHO
2001 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 2001

FIGURE
6

UPDATE TIME: 1:13PM
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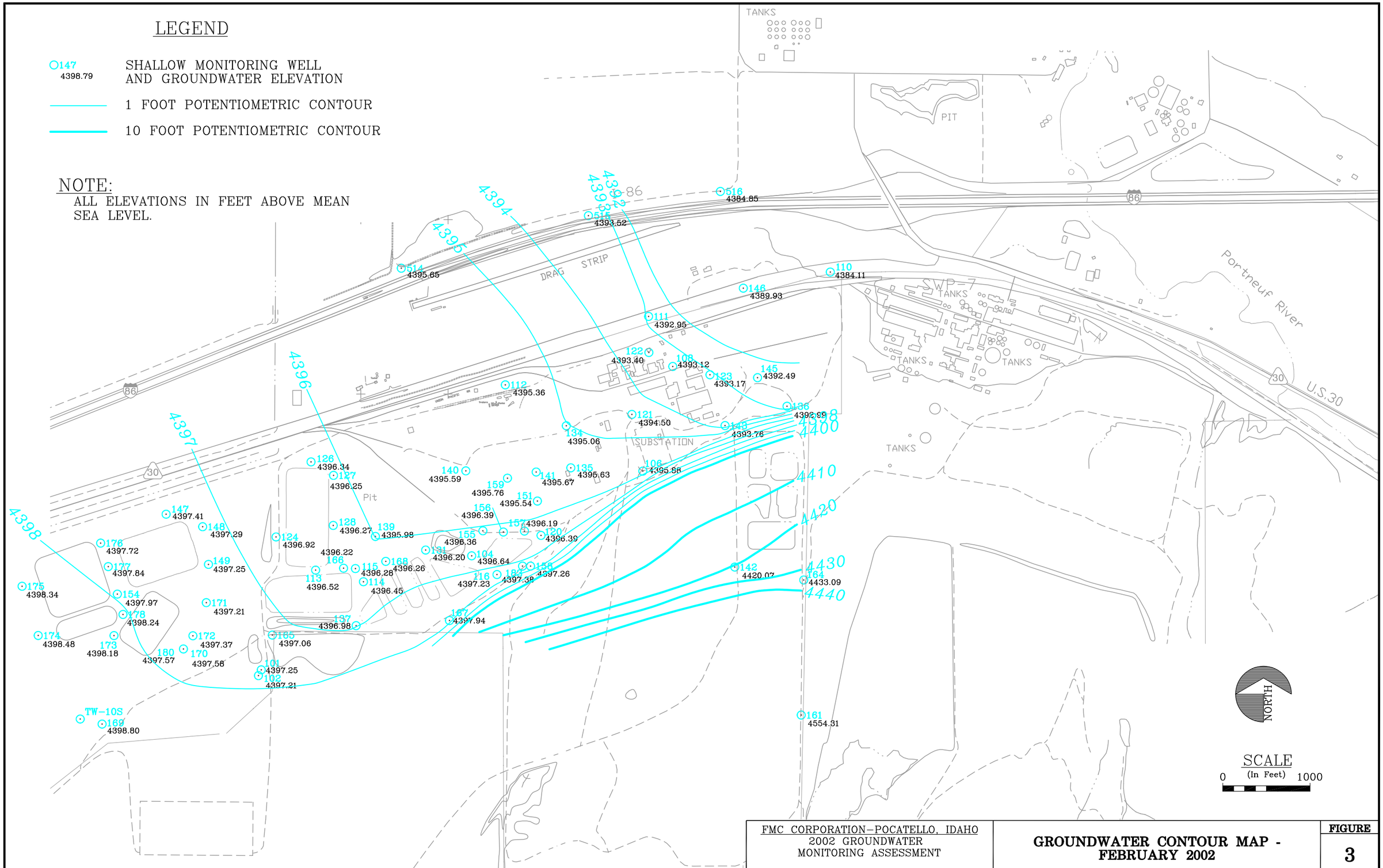
Hydromatrix, Inc.



FMC CORPORATION–POCATELLO, IDAHO
2002 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 2002

FIGURE
3

UPDATE TIME: 5:01PM
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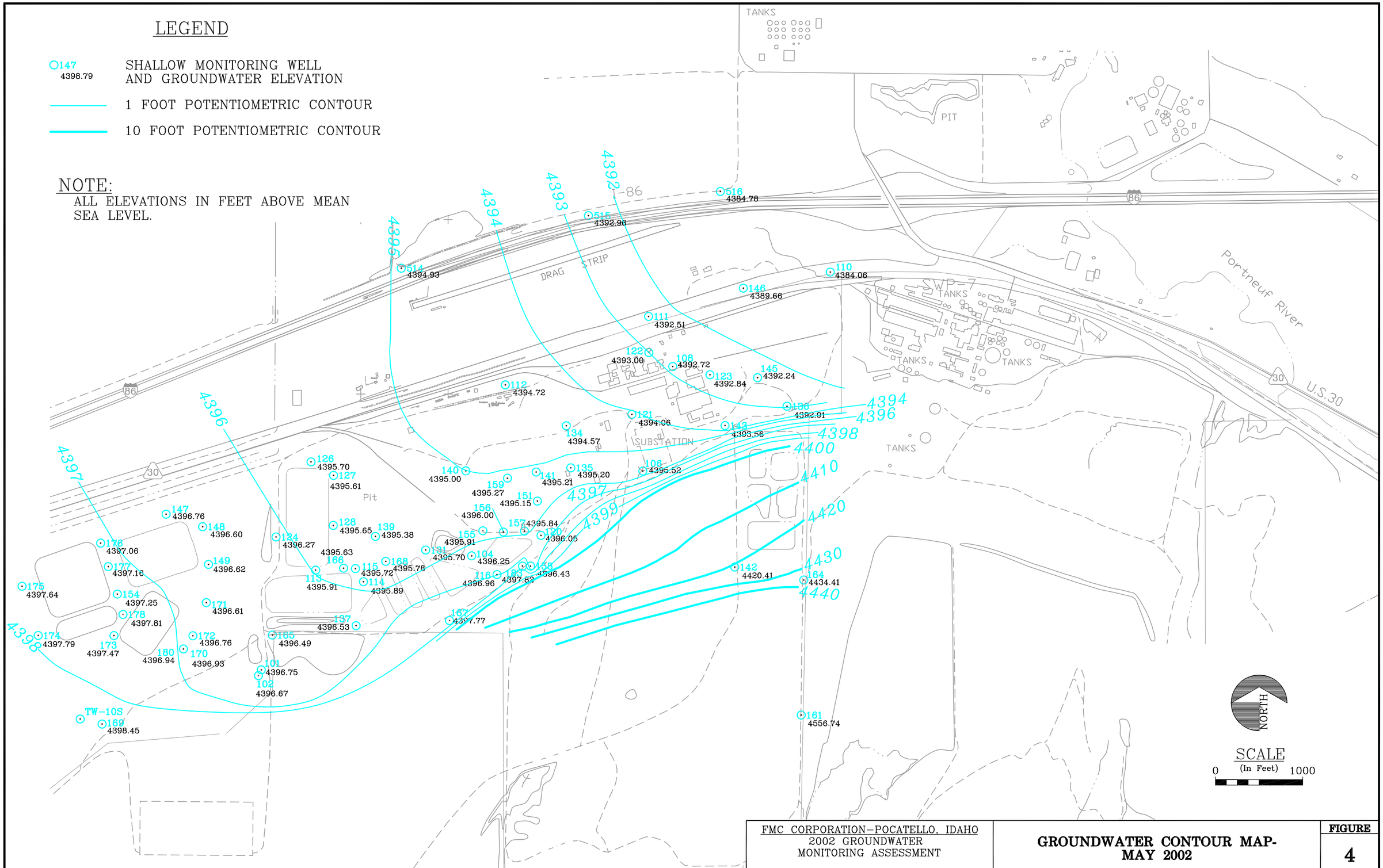
Hydromatrix, Inc.



FMC CORPORATION–POCATELLO, IDAHO
2002 GROUNDWATER
MONITORING ASSESSMENT

**GROUNDWATER CONTOUR MAP-
MAY 2002**

FIGURE
4

UPDATE TIME: 5:42PM
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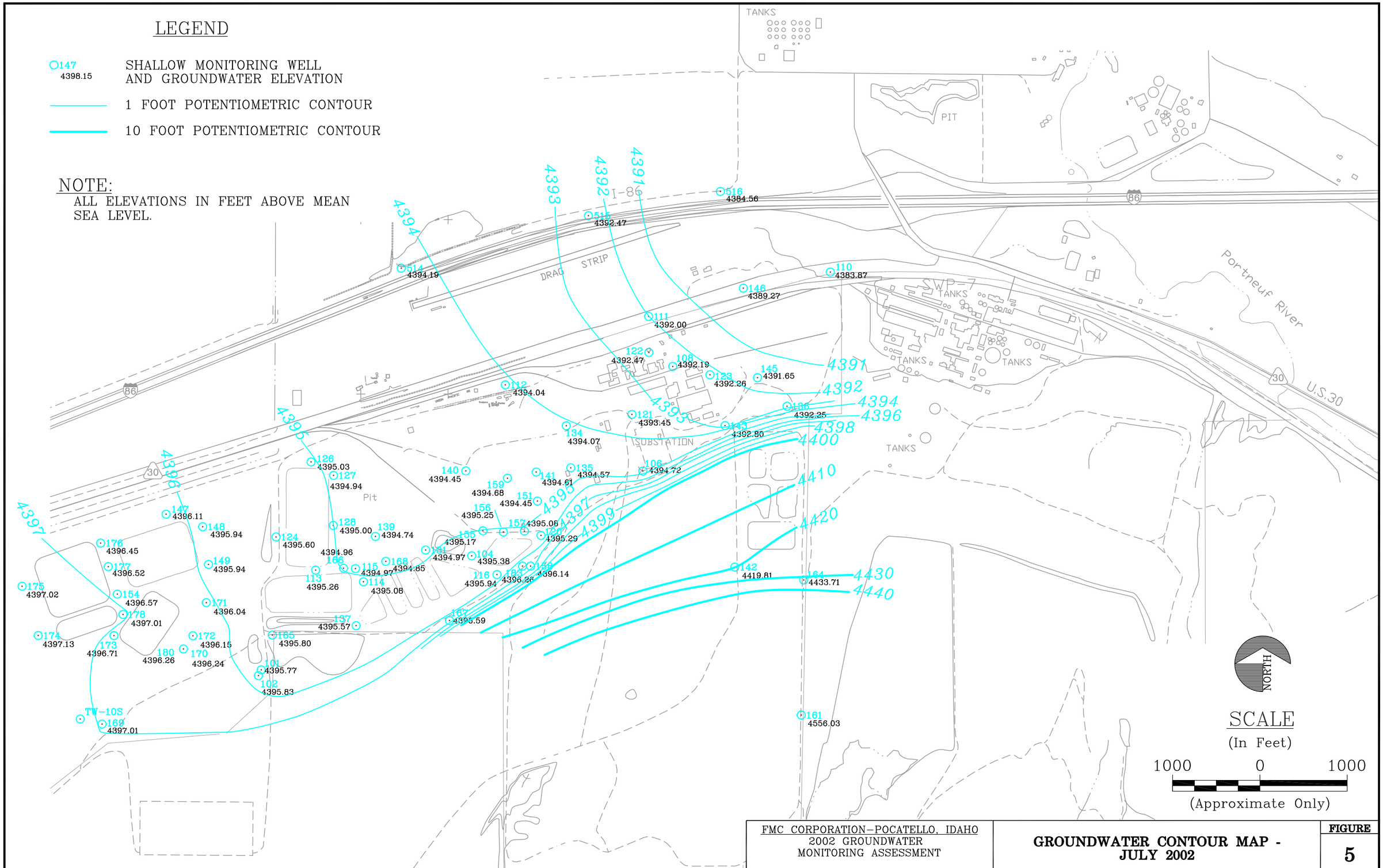

FMC CORPORATION–POCATELLO, IDAHO
2002 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - JULY 2002

FIGURE
5

UPDATE TIME: 5:47PM
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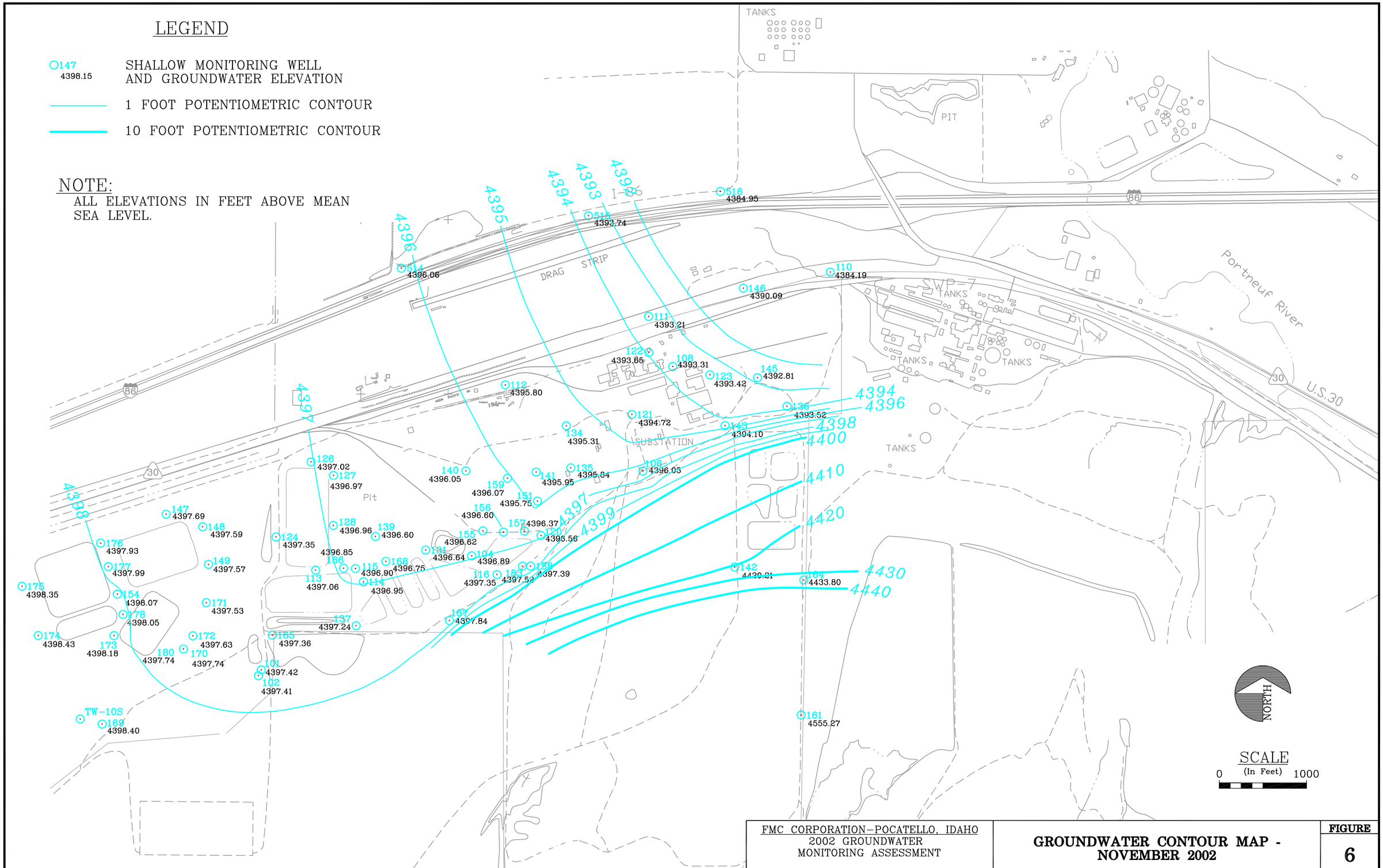

FMC CORPORATION–POCATELLO, IDAHO
2002 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 2002

FIGURE
6

UPDATE TIME: 5:53PM
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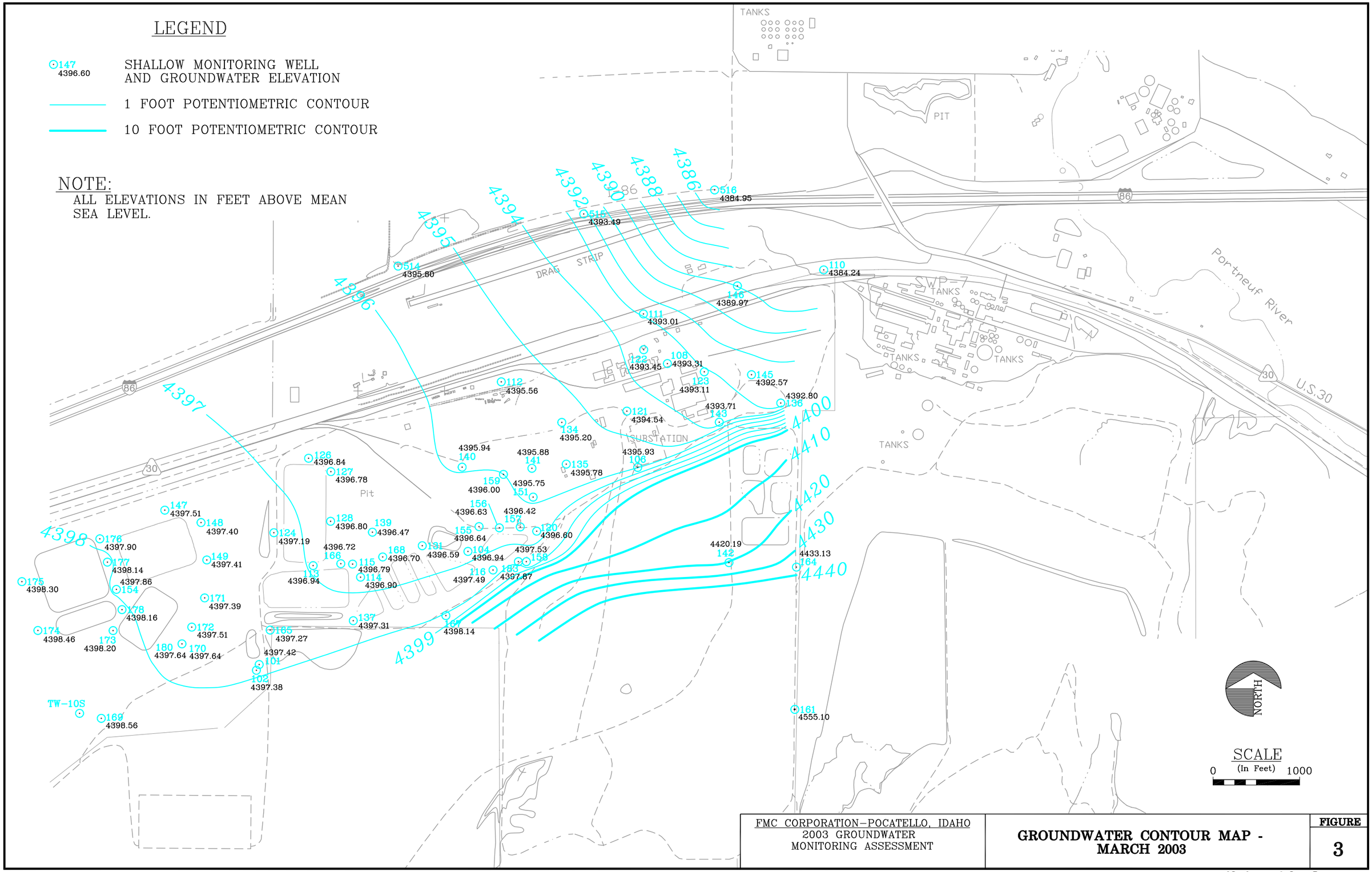
Hydromatrix, Inc.



FMC CORPORATION–POCATELLO, IDAHO
2003 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MARCH 2003

FIGURE
3

UPDATE TIME: 4:04PM
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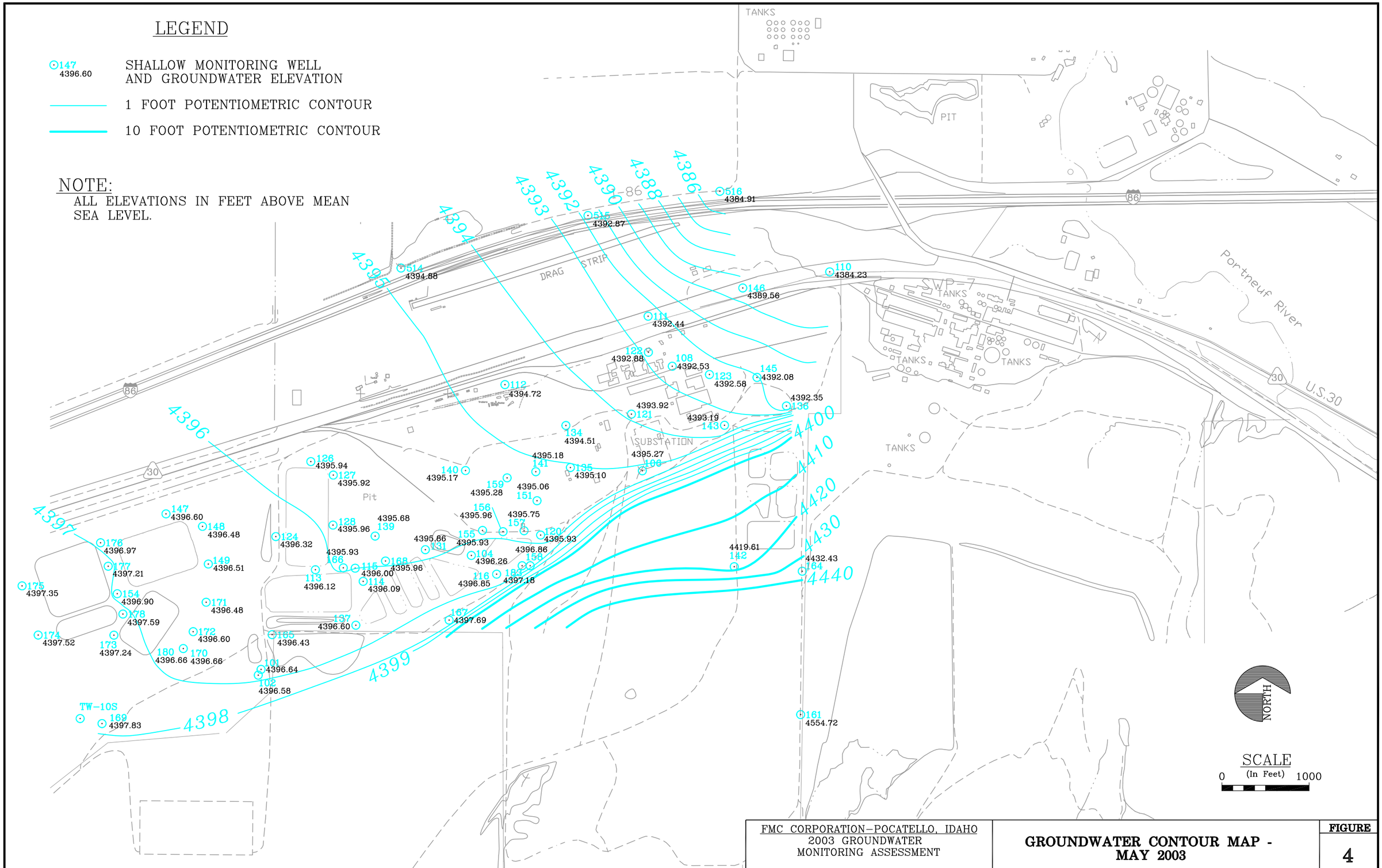
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2003 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MAY 2003

FIGURE
4

UPDATE TIME: 8:51AM
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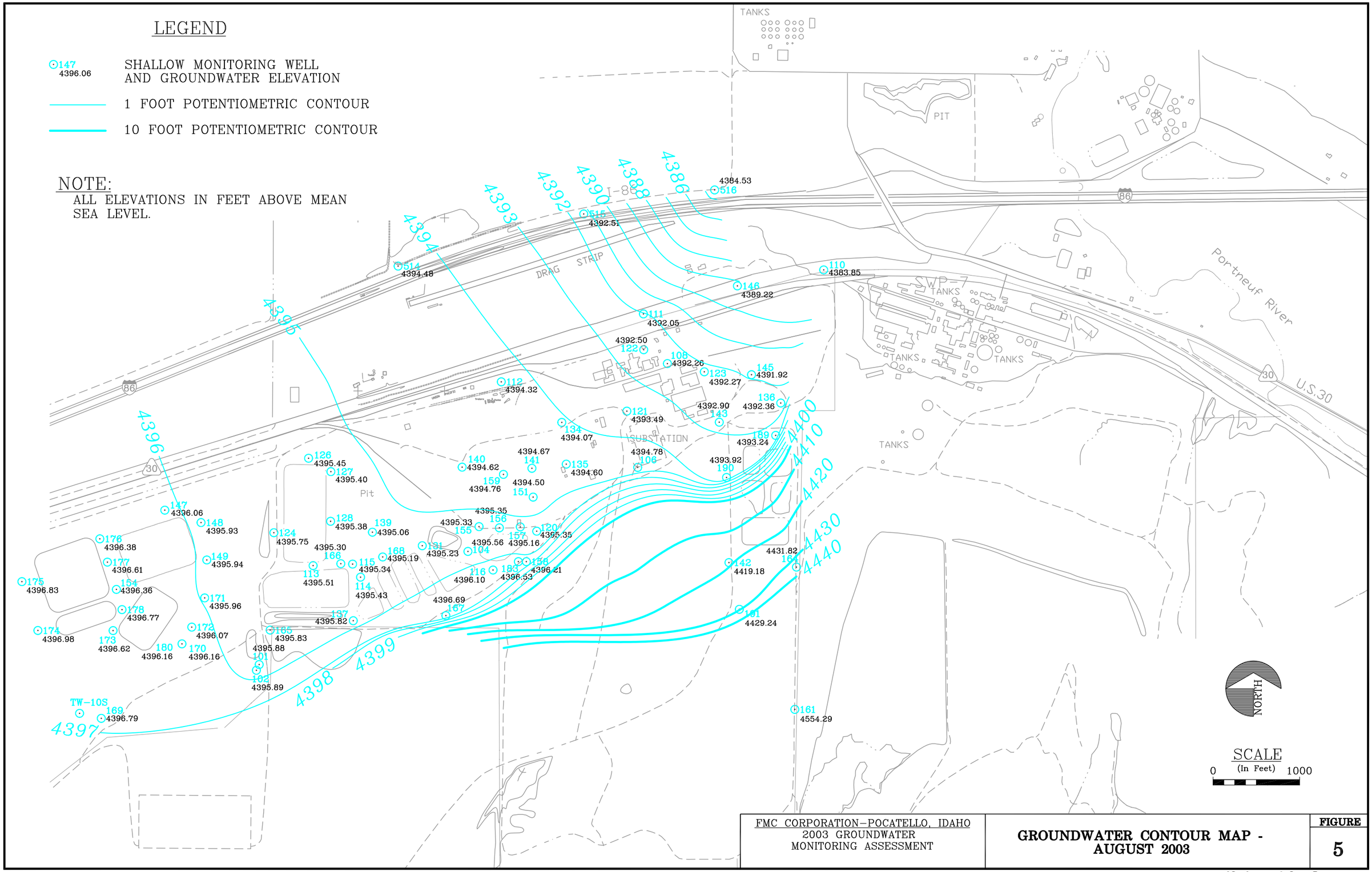
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2003 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 2003

FIGURE
5

UPDATE TIME: 8:54AM
0072\HEL\020304\I:\Land Projects\1303b201\dwg\1303b201h017.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers

LEGEND

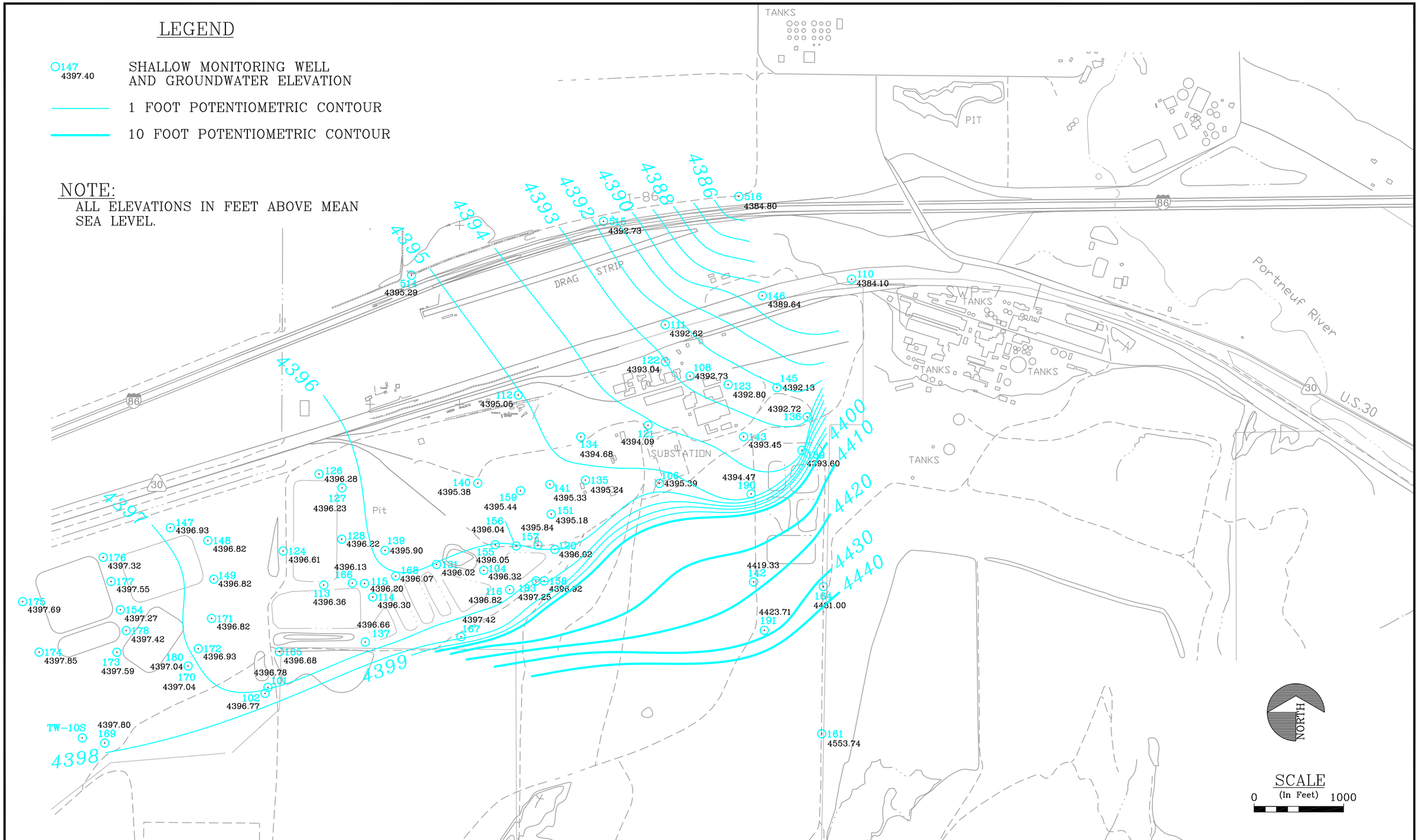
147 4397.40 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

1 FOOT POTENTIOMETRIC CONTOUR

10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO 2003 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - NOVEMBER 2003	FIGURE 6

UPDATE TIME: 8:56AM
0072\HEL\020304\I:\Land Projects\1303b201\dwg\1303b201h014.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers

LEGEND

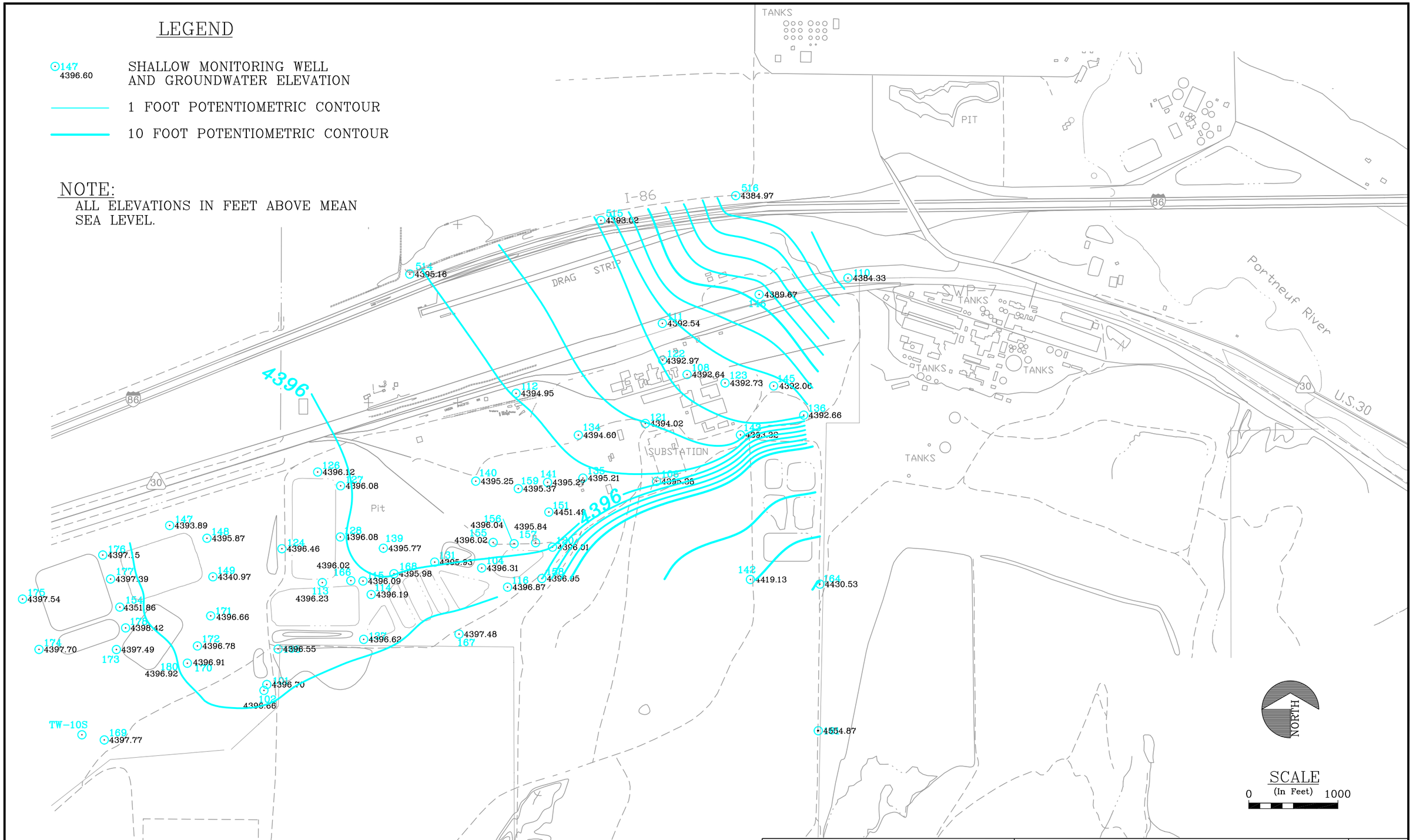
147 4396.60 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

1 FOOT POTENTIOMETRIC CONTOUR

10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO 2004 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - MARCH 2004	FIGURE 3

UPDATE TIME: 3:45PM
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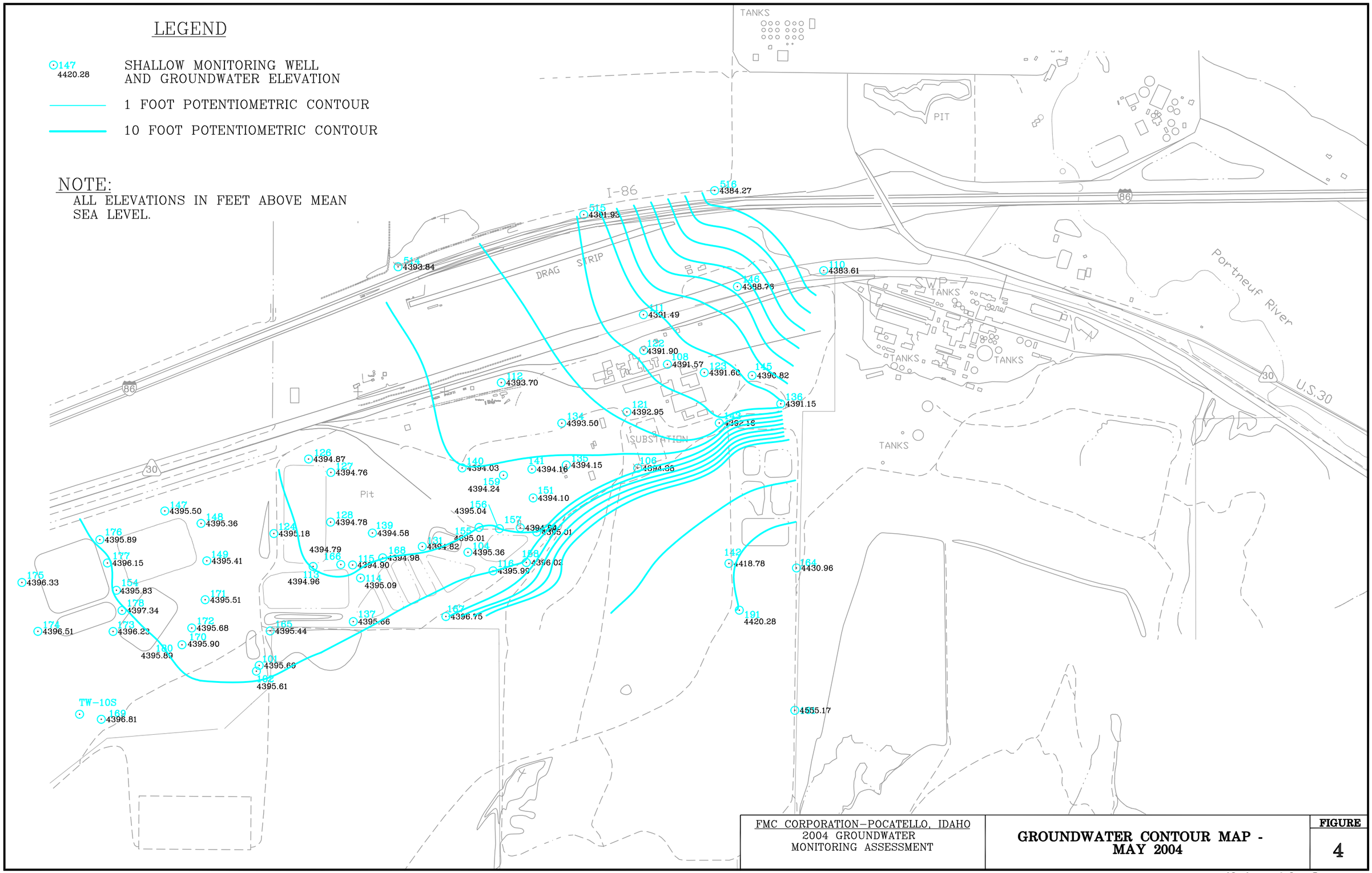
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2004 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MAY 2004

FIGURE
4

UPDATE TIME: 4:12PM
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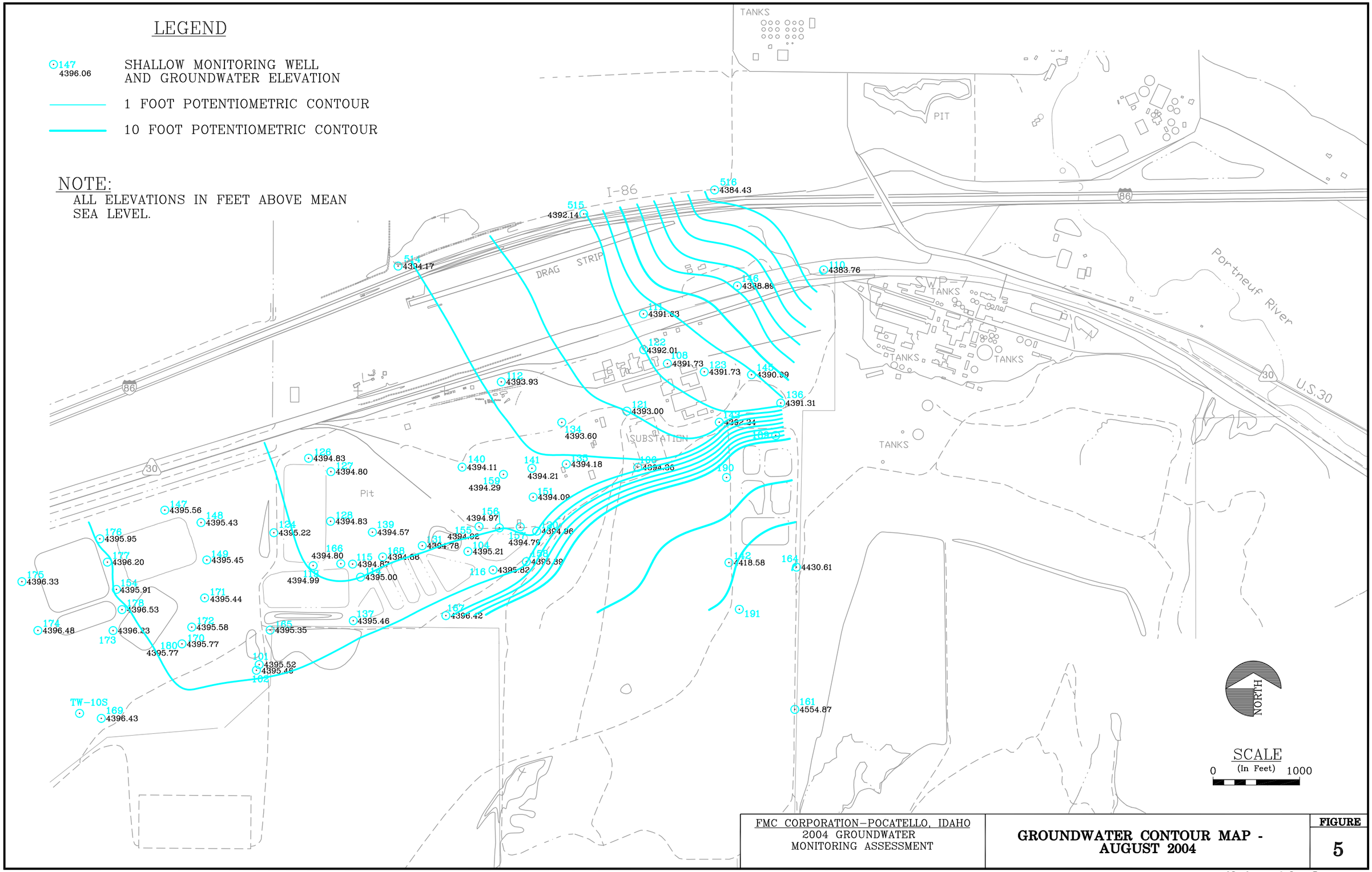
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2004 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 2004

FIGURE
5

UPDATE TIME: 8:37AM
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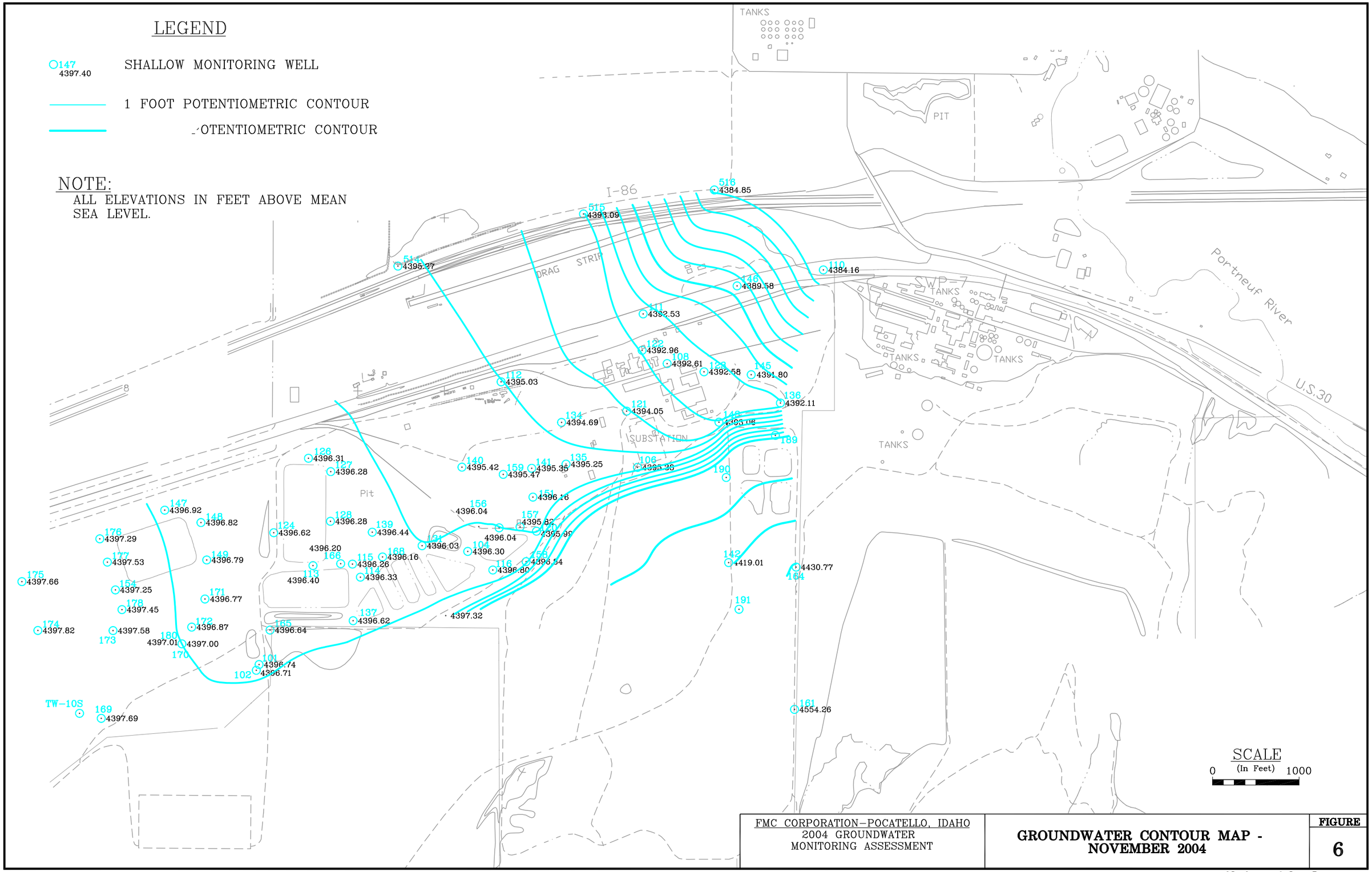
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2004 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 2004

FIGURE
6

UPDATE TIME: 4:20PM
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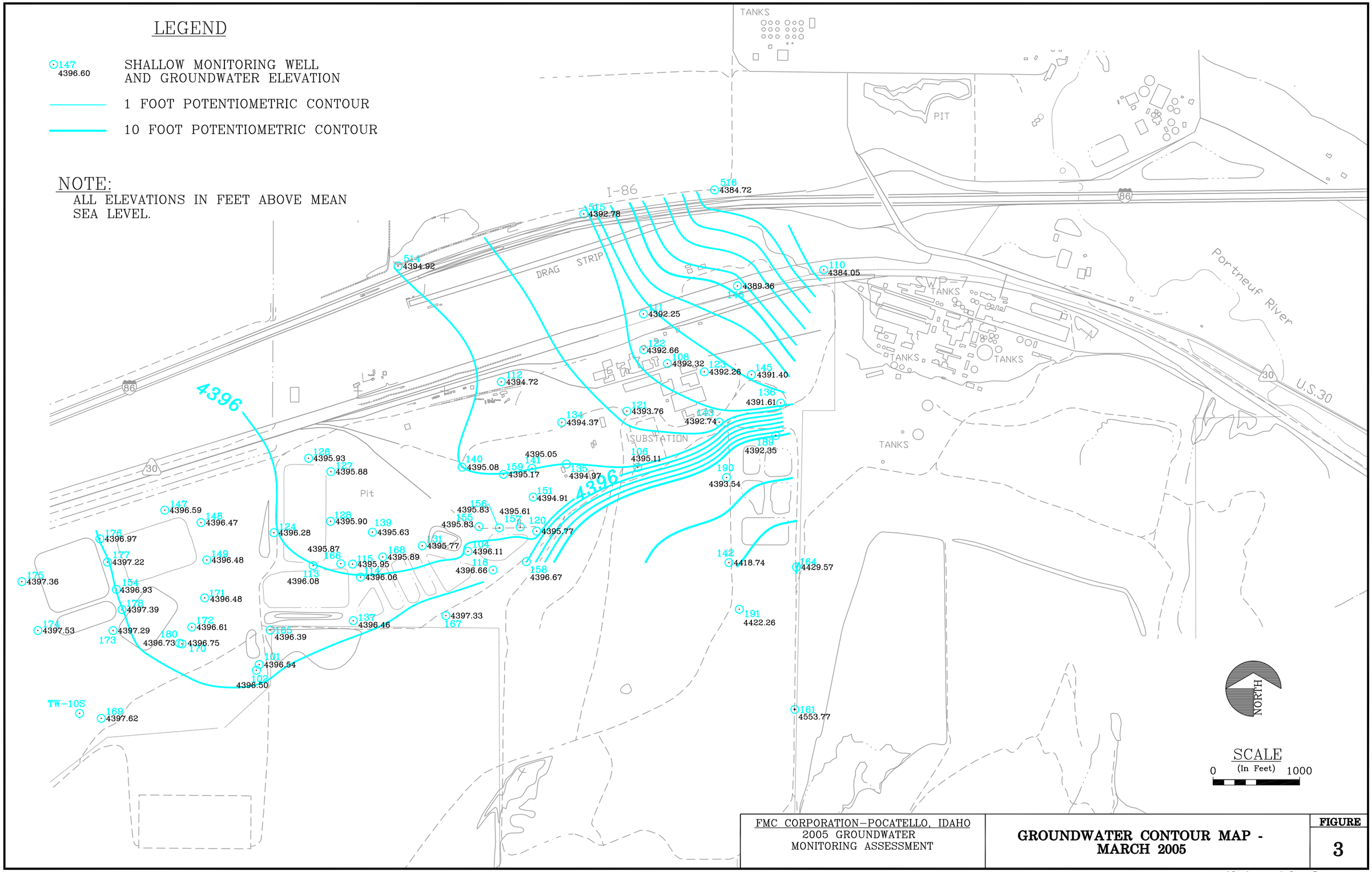
Hydrometrics, Inc.
Consulting Scientists and Engineers



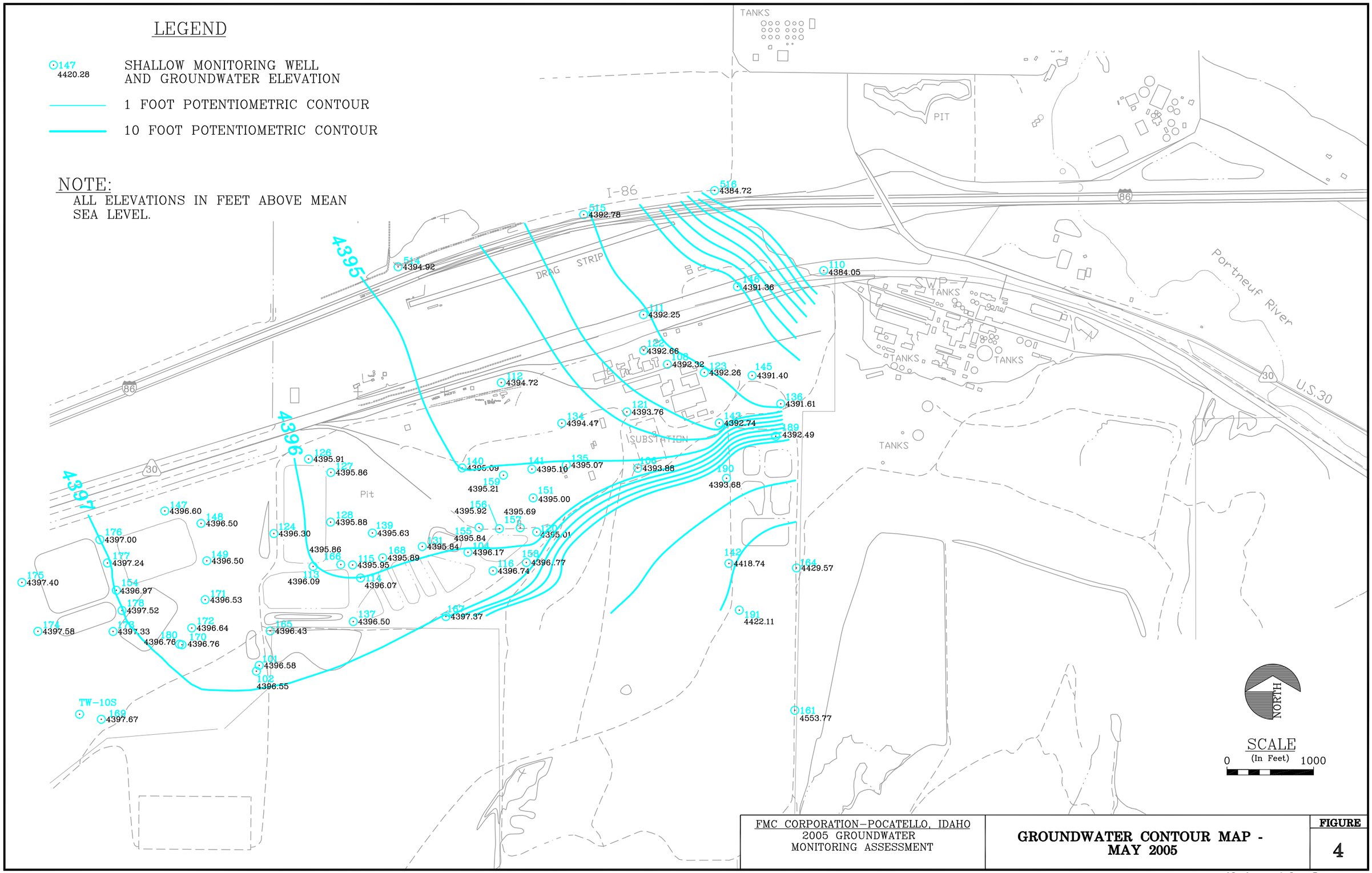
FMC CORPORATION–POCATELLO, IDAHO
2005 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MARCH 2005

FIGURE
3

UPDATE TIME: 11:11AM
0072\HEL\022706\I:\Land Projects\1303b201\dwg\1303b201h024.dwg

Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2005 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MAY 2005

FIGURE
4

UPDATE TIME: 11:06AM
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Hydrometrics, Inc.
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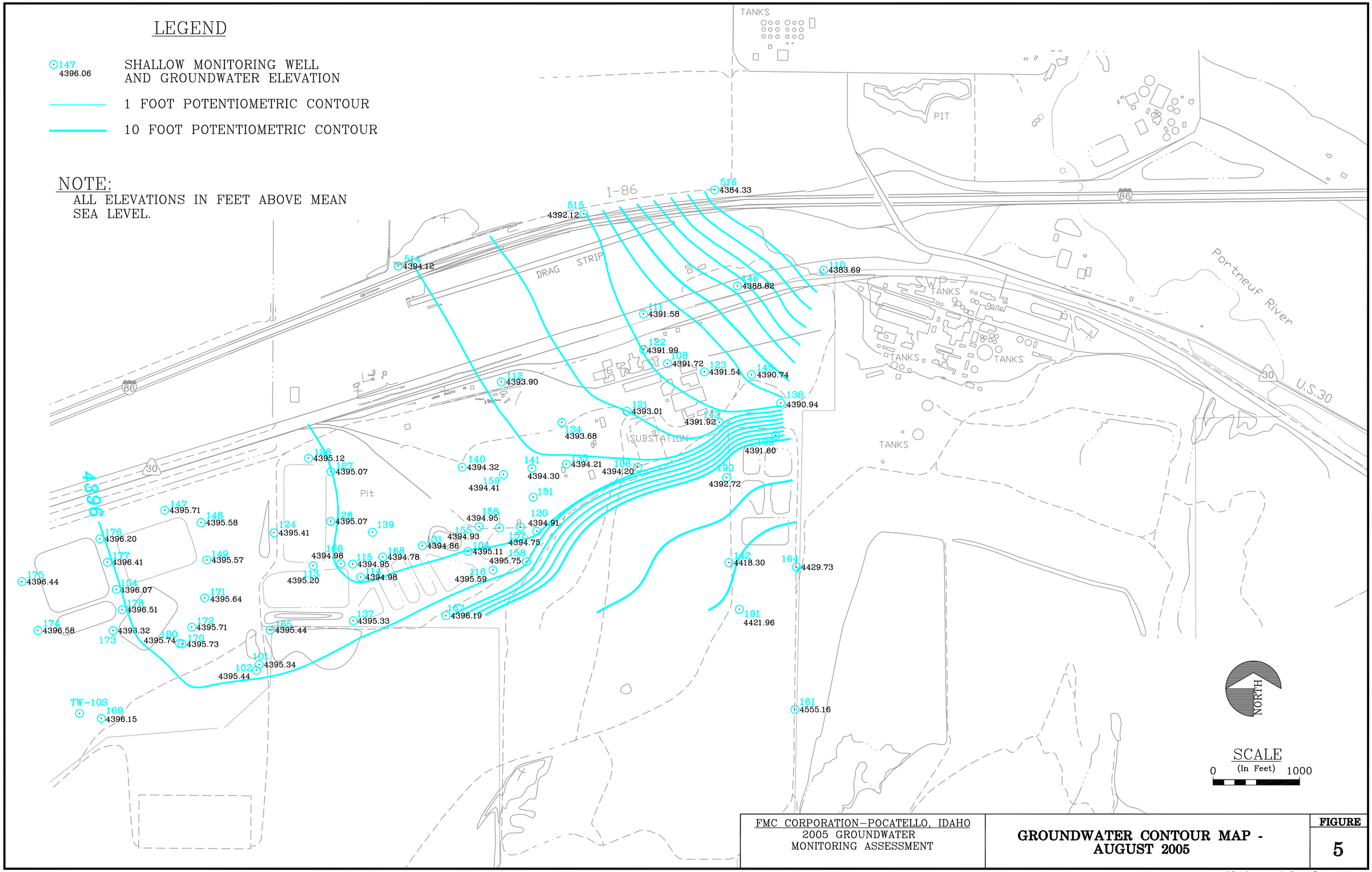

FMC CORPORATION–POCATELLO, IDAHO
2005 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 2005

FIGURE
5

UPDATE TIME: 3:30PM
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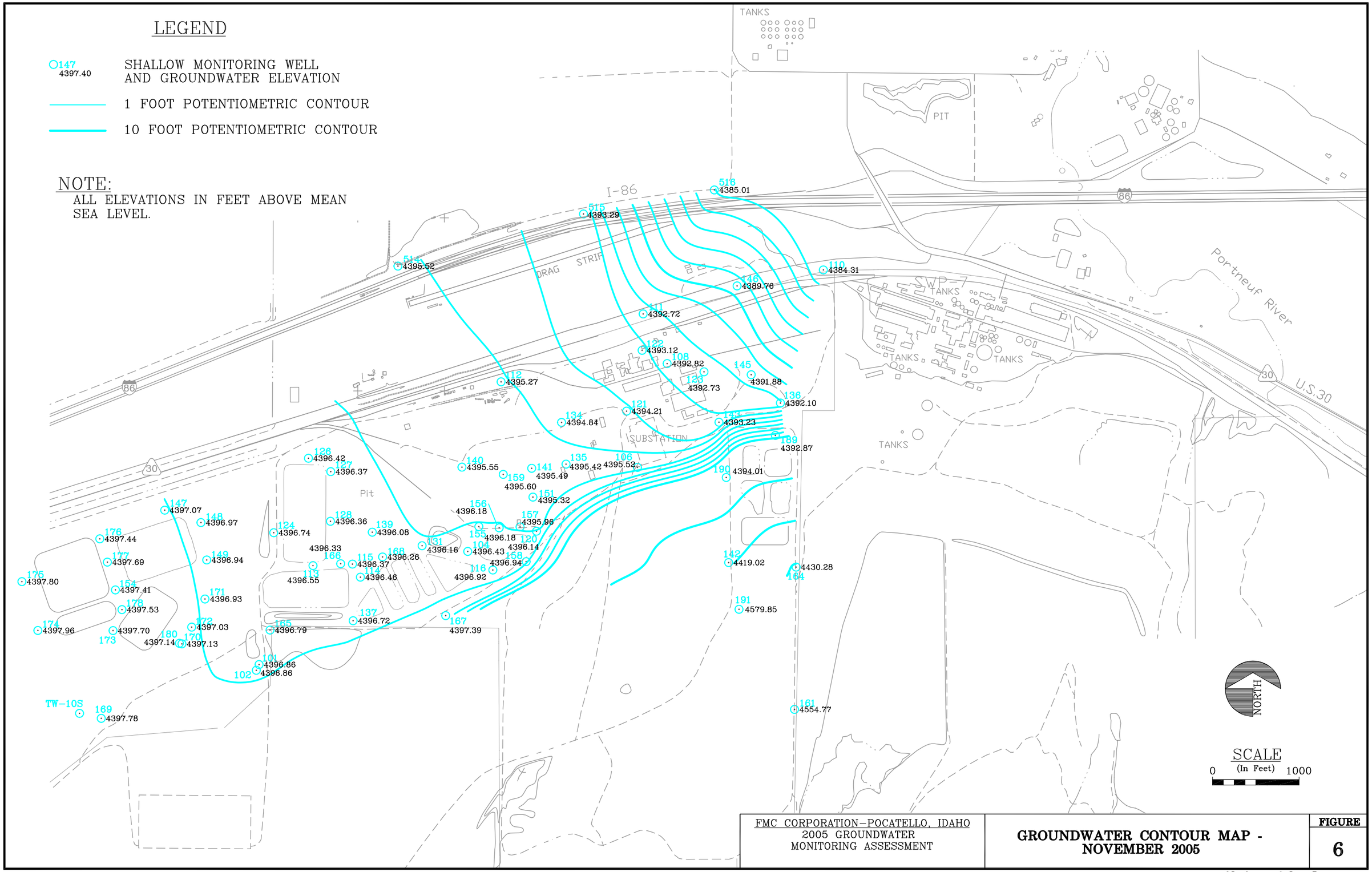
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2005 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 2005

FIGURE
6

UPDATE TIME: 3:40PM
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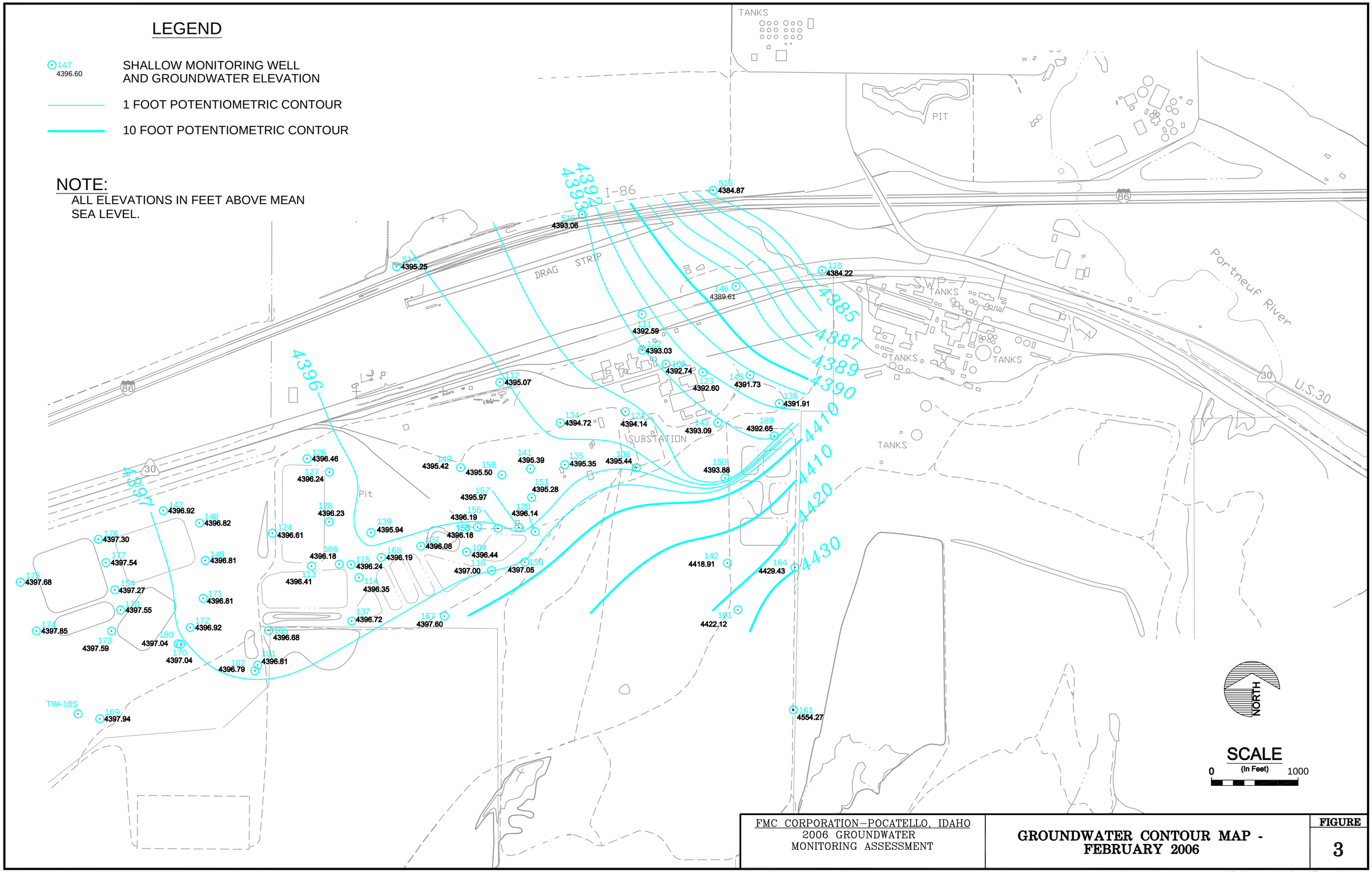
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2006 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 2006

FIGURE
3

UPDATE TIME: 8:26AM
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Hydrometrics, Inc.
Consulting Scientists and Engineers

LEGEND

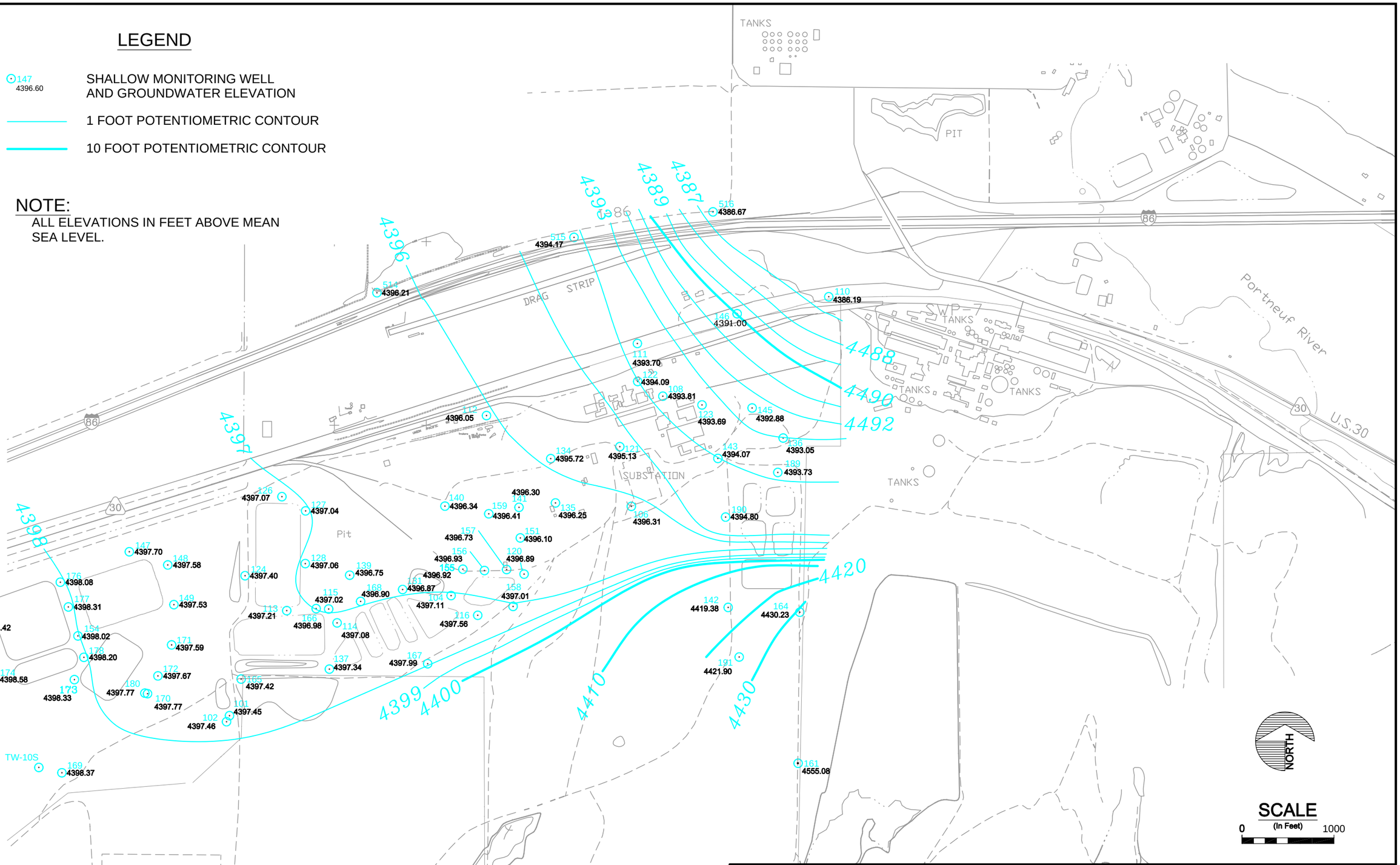
147 / 4396.60 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

1 FOOT POTENTIOMETRIC CONTOUR

10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO 2006 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - MAY 2006	FIGURE 4

UPDATE TIME: 12:00AM
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Hydrometrics, Inc.
Consulting Scientists and Engineers

LEGEND

147 4396.60 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

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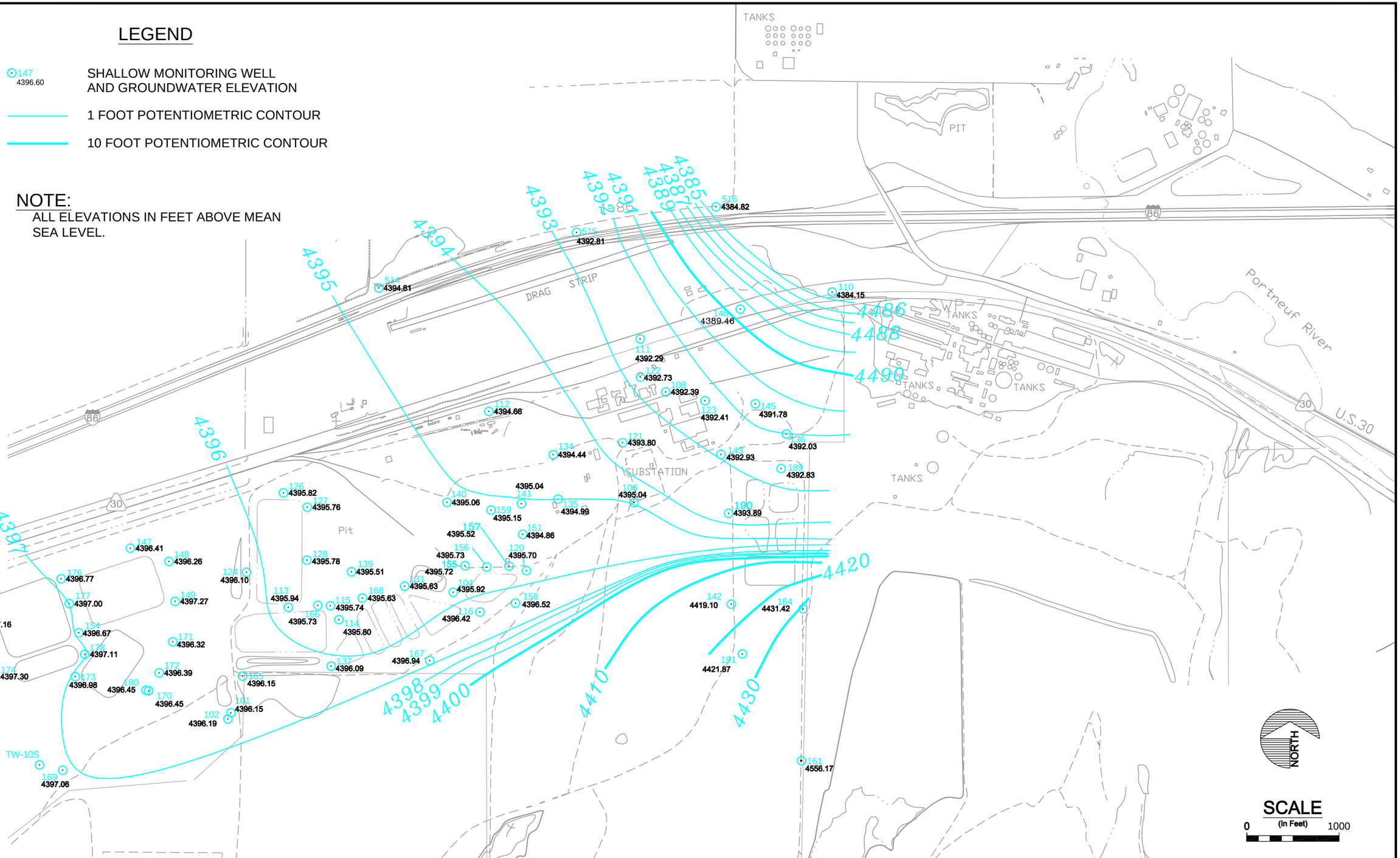
10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO 2006 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - AUGUST 2006	FIGURE 5

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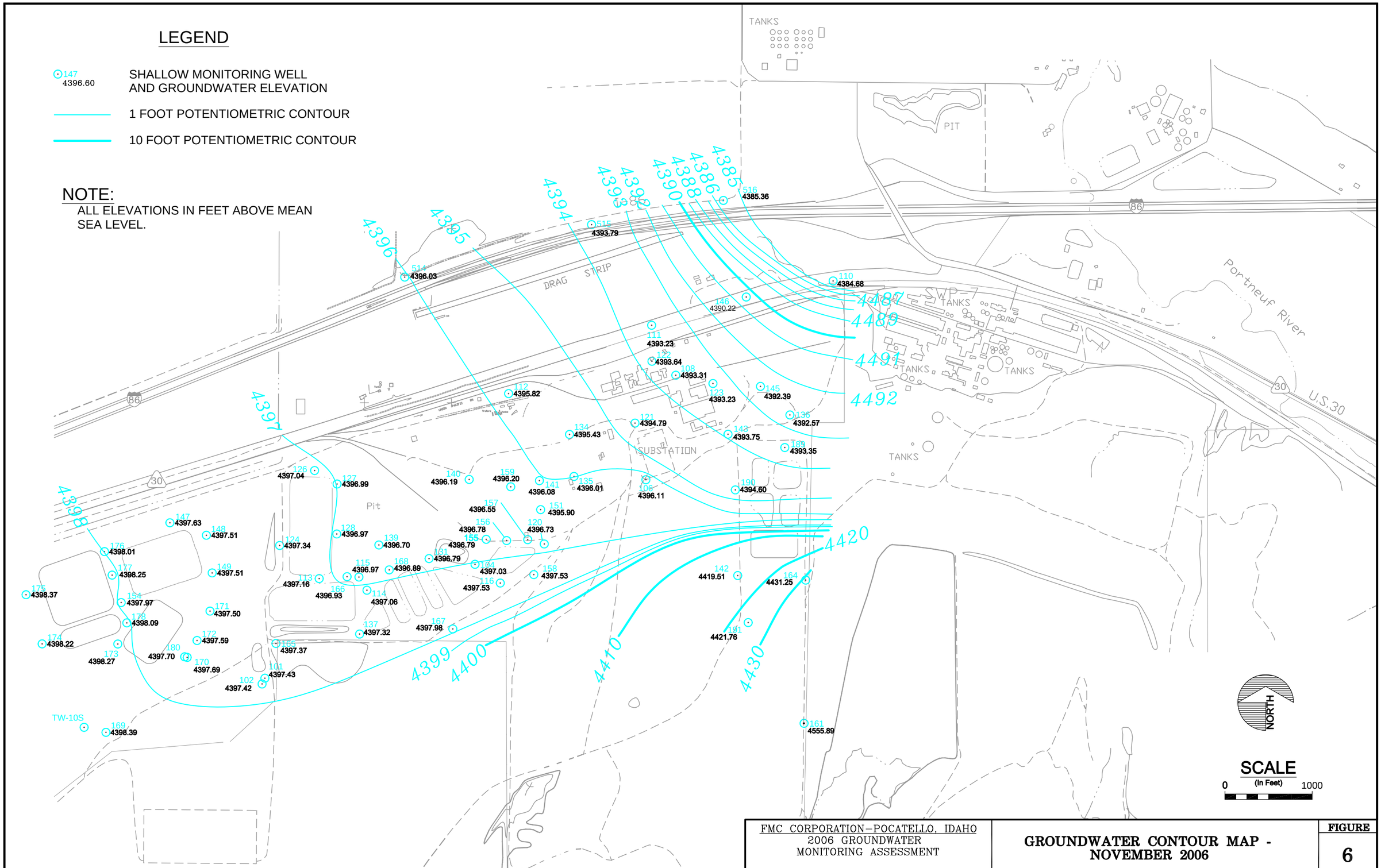
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2006 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - NOVEMBER 2006

FIGURE
6

UPDATE TIME: 3:08PM
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Hydrometrics, Inc.
Consulting Scientists and Engineers

LEGEND

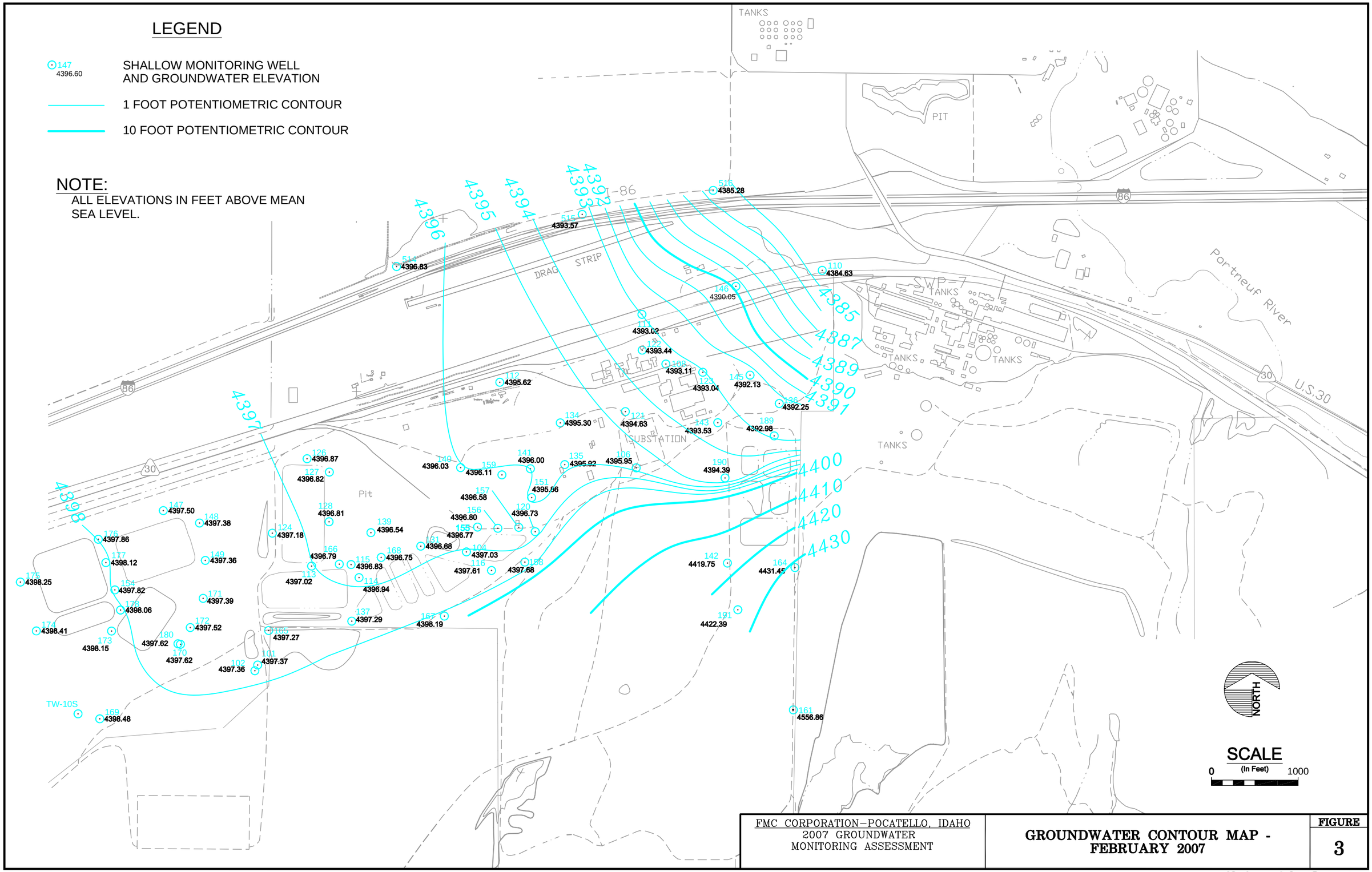
147 4396.60 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

1 FOOT POTENTIOMETRIC CONTOUR

10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO
2007 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 2007

FIGURE 3

UPDATE TIME: 7:47AM
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Hydrometrics, Inc.
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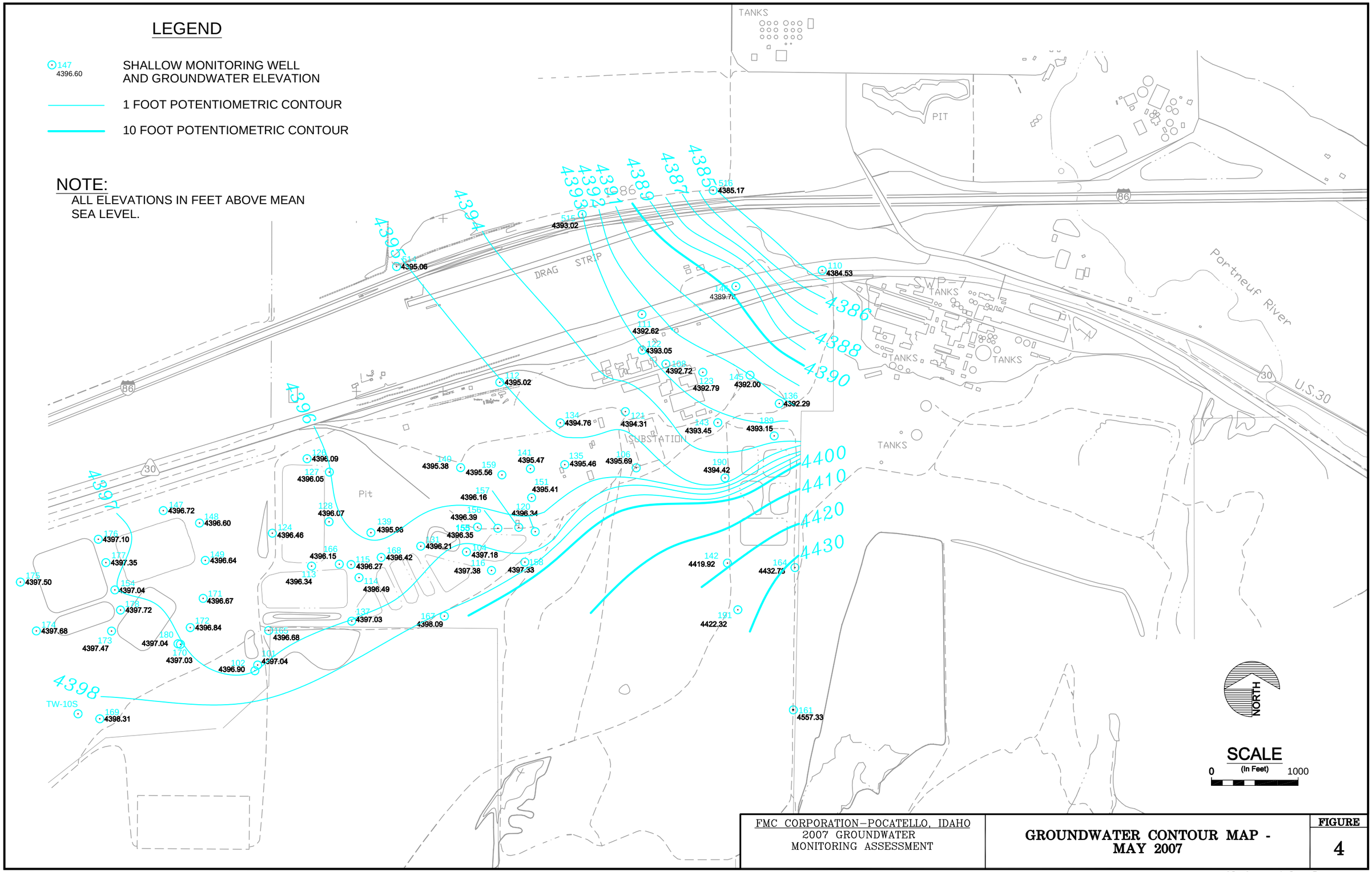

FMC CORPORATION–POCATELLO, IDAHO
2007 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - MAY 2007

FIGURE
4

UPDATE TIME: 7:48AM
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Hydrometrics, Inc.
Consulting Scientists and Engineers

LEGEND

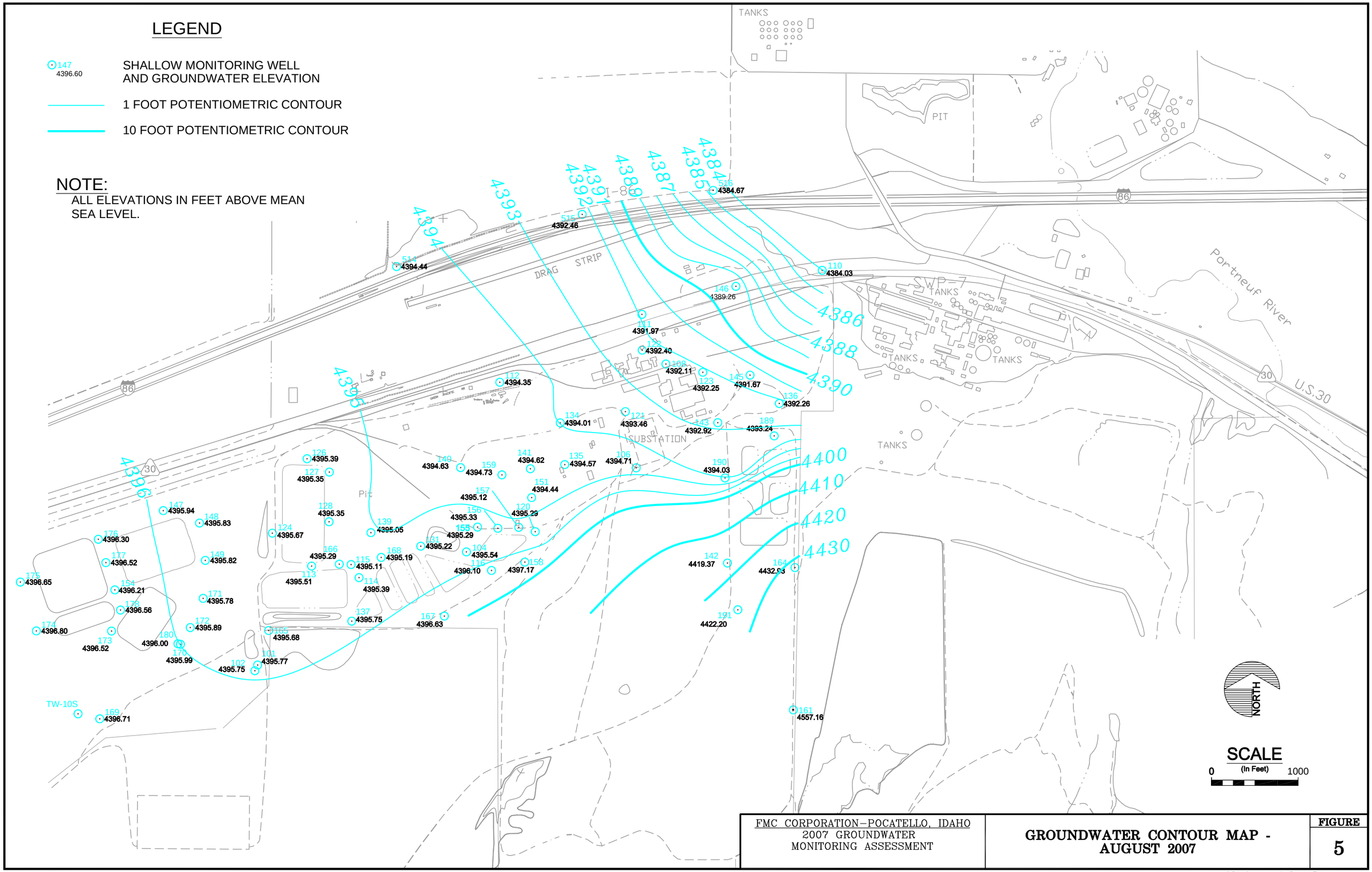
147
4396.60 — SHALLOW MONITORING WELL AND GROUNDWATER ELEVATION

1 FOOT POTENTIOMETRIC CONTOUR

10 FOOT POTENTIOMETRIC CONTOUR

NOTE:

ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.



FMC CORPORATION–POCATELLO, IDAHO
2007 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - AUGUST 2007

FIGURE
5

UPDATE TIME: 7:49AM
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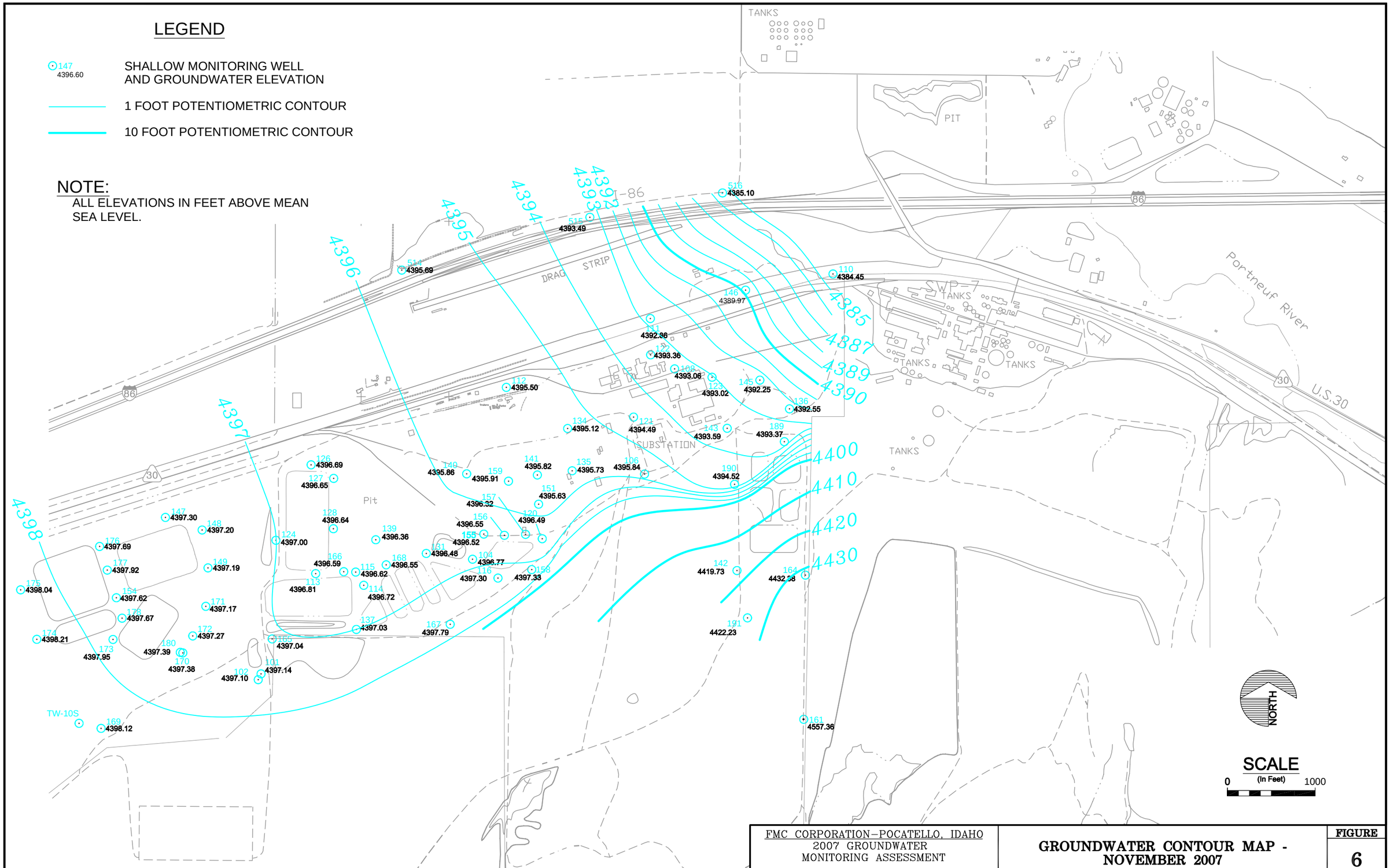
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO 2007 GROUNDWATER MONITORING ASSESSMENT	GROUNDWATER CONTOUR MAP - NOVEMBER 2007	FIGURE 6

UPDATE TIME: 7:49AM
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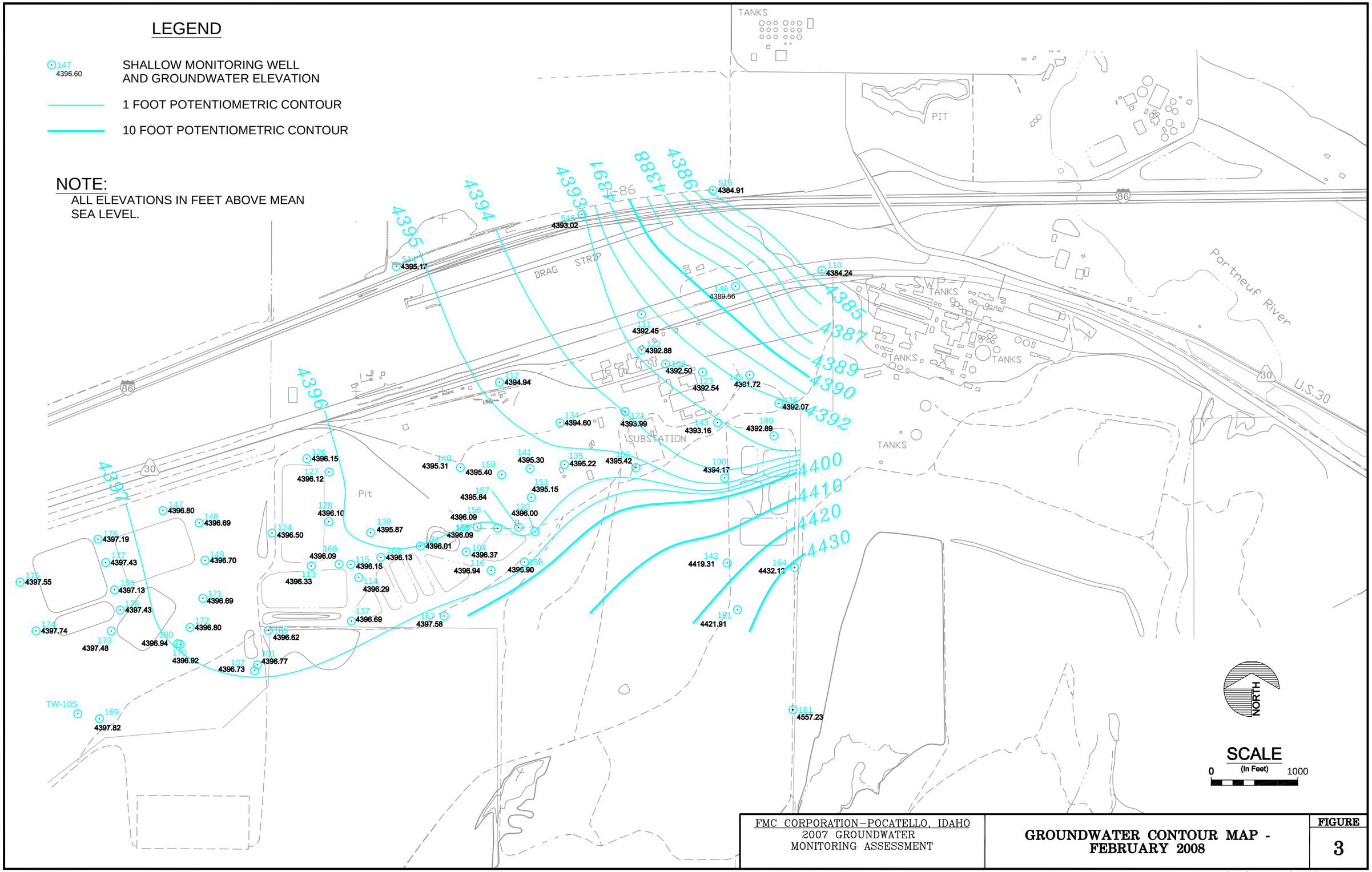
Hydrometrics, Inc.
Consulting Scientists and Engineers



FMC CORPORATION–POCATELLO, IDAHO
2007 GROUNDWATER
MONITORING ASSESSMENT

GROUNDWATER CONTOUR MAP - FEBRUARY 2008

FIGURE
3

UPDATE TIME: 7:47AM
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Consulting Scientists and Engineers

APPENDIX C

Eastern Michaud Flats Site
Corporate Superfund Offices

FMC Corporation
J.R. Simplot Co

December 1, 1993

Mr. Bill Adams
M/S HW-113
U. S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Eastern Michaud Flats RI/FS
Proposed Groundwater Monitoring Reductions

Dear Mr. Adams:

FMC Corporation (FMC) and J. R. Simplot Company (Simplot) have conducted five complete quarterly rounds of groundwater sampling since the start of the EMF site RI/FS field program in April 1992. At this time, FMC and Simplot would like to propose reductions in the ongoing monitoring program. We believe the proposed program will continue to fulfill the Companies' commitment to protect groundwater quality and to meet all regulatory obligations.

The Companies may propose additional reductions at a later date, particularly if FMC is successful in obtaining EPA approval of reductions to the facility's RCRA groundwater monitoring program and/or when the Companies are able to demonstrate groundwater quality stabilization or improvement resulting from cessation of activities at Simplot's East Overflow Pond and FMC's Pond 8S. Proposed reductions are described below.

BACKGROUND

FMC and Simplot have conducted quarterly groundwater monitoring at the EMF site in support of the CERCLA RI/FS since April 1992. Groundwater monitoring has also been conducted by FMC since 1990 to comply with RCRA requirements. In addition, both FMC and Simplot have conducted groundwater sampling and analysis at various wells within and outside their plant boundaries for more than 20 years. The current monitoring well network consists of 120 wells: 58 wells within the FMC facility boundaries, 31 wells within the Simplot facility boundaries, and 31 wells in "offsite" areas beyond the facility boundaries and generally north of the facilities.

The locations of the wells in the EMF groundwater monitoring network are shown in Figure 1. The rationale for the selection of these well locations, as well as for the depths of the wells, was provided in the EMF Site Remedial Investigation/Feasibility Study Work Plan (BEI, June 1992). Wells within the two facility boundaries were generally located up or downgradient of potential sources of contamination (e.g., ponds); offsite wells were generally located downgradient or crossgradient of the two facilities. The monitoring network includes a number of monitoring wells, particularly FMC RCRA monitoring wells, and water supply wells installed prior to the April 1992 start of the RI/FS field program.

Quarterly samples from the wells have routinely been analyzed for 22 metals, five nutrient parameters, four radiochemical parameters, and major cations and anions. The rationale for the selection of these parameters was also presented in the EMF Site Remedial Investigation/Feasibility Study Work Plan (BEI, June 1992). Parameters were generally selected because they are trace constituents of phosphate ore, the primary feed material for both the FMC and Simplot facilities or because they are common constituents of natural groundwaters.

The chemical data resulting from the five quarterly groundwater sampling events conducted since April 1992 (six events including the June 1993 sampling of FMC RCRA wells) indicate that several parameters are present in groundwater beneath one or both of the facilities at levels above "representative" groundwater levels (i.e., levels which would be anticipated were there no impact from either of the facilities). Concentrations of many other parameters are, however, consistently within two standard deviations (2XSD) of the parameters' mean representative groundwater concentrations. Mean representative concentrations plus two standard deviations are provided in Table 1; these concentrations were derived from 16 EMF wells up or crossgradient of the FMC and Simplot plants and deemed unimpacted by plant operations (wells 101, 102, 106, 120, 130, 147, 301, 305, 510-513, PEI-1, PEI-6 TW-10S and Idaho Power).

Based on results of the past five quarters of groundwater sampling conducted as part of the EMF RI/FS, it is concluded that sufficient data have been obtained for the completion of the RI/FS. Therefore, FMC and Simplot propose to reduce the number of parameters for which future EMF groundwater samples are analyzed, the number of wells monitored, and the frequency of monitoring. Parameters and wells retained as part of the ongoing monitoring program should be adequate for detecting any meaningful changes in EMF site groundwater quality and for making decisions about potential alternatives for groundwater remediation at the site.

Sufficient groundwater data have already been collected for completion of the Remedial Investigation site characterization. Furthermore, data collected to date show little significant variation with time.

FUTURE GROUNDWATER MONITORING PROGRAM OBJECTIVES

The intensive groundwater monitoring campaign conducted at the EMF site over the past two years, combined with previously-collected groundwater data, provide a clear description of EMF groundwater quality. The objective of the groundwater monitoring program proposed in this letter is to ensure that the description of groundwater quality developed to date is unchanged. To accomplish this objective, we propose ongoing sampling of wells which demarcate the boundaries of site groundwater impacts and/or gauge groundwater quality and flow direction at the site. The proposed program will also include all wells needed to comply with pre-established regulatory obligations (e.g., RCRA).

In addition to wells needed to confirm the current understanding of EMF site groundwater quality, a safety network of off-site wells will continue to be sampled to address any community interests or concerns. While groundwater quality beyond the facilities' property boundaries is safe for drinking water, the Companies recognize that community members may want assurances that supplies continue to be safe and that impacts continue to be contained within the facilities' boundaries.

The Companies are committed to the long-term protection of groundwater quality and will ensure that public and private drinking water supplies are protected from any facility-related contamination. This commitment includes providing alternate water supplies at the Companies' expense if supplies are deemed unusable due to facility-related impacts.

PROPOSED ANALYTICAL PARAMETERS

The Companies propose ongoing analysis of groundwater samples for **arsenic, manganese, selenium, fluoride, nitrate, orthophosphate, potassium, sulfate and gross alpha**. (See Table 2.) The proposed parameters are consistently detected (i.e., detected in three to five rounds of sampling) in one or more wells downgradient of suspected sources of contamination at one or both of the facilities at levels in excess of representative groundwater mean concentrations plus two standard deviations. They are the most widespread and/or most mobile constituents detected at above-representative levels in groundwater beneath the EMF site.

In addition, Simplot will continue to collect and analyze samples from well 318 for all trace metals with the exception of aluminum, antimony, barium, lead, mercury, molybdenum and silver which have never been detected in samples from 318 in excess of 2XSD of their mean concentrations in representative groundwater. (See discussion below.) Because the pond is no longer in use, Simplot does not anticipate exceedances by any of the other metals in the future. Once data have been collected which demonstrate that these exceedances are no longer occurring, further reductions in analytical parameters for this well will be proposed.

Field measurements of pH, temperature, and specific conductance will continue to be made on all samples.

Current parameters not included in the list of future analytes were eliminated because they (1) have not been detected, (2) have not been detected in excess of representative groundwater mean concentrations plus two standard deviations (2XSD), (3) have been detected only sporadically (i.e., detected in only one or two out of five rounds of sampling and in only a few wells) in excess of representative means plus 2XSD, (4) have been detected in excess of representative means plus 2XSD, but do not appear to be attributable to FMC or Simplot operations, or (5) are generally detected along with one or more other analytes which are more widespread and/or are generally of greater concern. The specific rationale for exclusion of each parameter is provided below.

Antimony, lead, molybdenum and **silver** are not included on the proposed analytical list because they have, without exception, been detected at levels within 2XSD of their mean concentrations in representative groundwater. (See Tables 3 through 5.)

Thallium and **zinc** are not included on the proposed analytical list because they, too, have not been detected in excess of 2XSD of their mean concentrations in representative groundwater except in Well 318. (See Tables 3 through 5.) As indicated above, Simplot will continue to analyze samples from Well 318 for most trace metals, thallium and zinc included, until data have been collected that indicate representative groundwater exceedances are no longer occurring.

Barium, although it has been detected at levels in excess of 2XSD of its mean concentration in representative groundwater, is not included on the proposed analytical list because it has been detected only sporadically and is a natural constituent of soils and groundwater that has been detected at levels

comparable to those found in what appear to be otherwise unimpacted wells. (See Tables 3 through 5.) Its presence is, therefore, not believed to be attributable to FMC or Simplot operations.

Mercury, is not included on the proposed analytical list because it has been detected only sporadically in excess of 2XSD of its mean concentration in representative groundwater. (See Tables 3 through 5.) Specifically, it has been detected in excess of representative levels only 13 of a possible 511 times in samples from only 8 wells. The only well in which it has been detected consistently (i.e., more than twice) is Well 144, a deep well constructed in volcanic lithology. The presence of mercury in this well is, therefore, not believed attributable to the EMF facilities.

Aluminum and iron have been detected sporadically in excess of 2XSD of their mean concentrations in representative groundwater but in turbid, silt-containing samples. (See Tables 3, 6, 7 and 8.) Because these metals are common silt constituents, their presence is not believed attributable to FMC or Simplot operations. These metals are, therefore, not included on the proposed analytical list.

Copper is not on the proposed analytical parameter list because it has been detected in excess of representative levels in only two Simplot wells (one time in Well 312; three times in Well 318), one time only in each of only three FMC wells (131, 136, and 145), and three times in only one offsite well, the Lindley well. (See Tables 3, 6, 7 and 8.) Elevated levels of copper in the Lindley well do not appear to be attributable to EMF operations either and may be due to well construction materials.

Beryllium is not on the proposed analytical parameter list because it has only been detected at or below representative levels in FMC and offsite wells and only sporadically above these levels in Simplot wells with the exception of Well 318. (See Tables 3 through 5.) Specifically, beryllium has been detected in excess of representative levels one time only in each of wells 311, PEI-3 and PEI-5.

Cadmium and **chromium** are not included on the proposed analytical parameter list because they have been detected only sporadically above representative levels. Cadmium has only been consistently detected in excess of representative levels in samples from Wells 143 and 318. Chromium has exceeded representative levels only one time in each of three FMC wells (150, 152 and 153 and has always been within representative levels offsite. (See Tables 3, 4, 5, 6 and 8.)

Boron, cobalt, lithium, nickel and **vanadium**, although detected in excess of their representative groundwater levels, are not included on the proposed analytical list because they are not as frequently detected in excess of these levels as the metals which are included on the proposed analyte list (i.e., arsenic, manganese and selenium), because they are generally considered less mobile than those included on the proposed list, and because they are generally considered metals of lesser concern than those included on the proposed list (e.g., there are no federal drinking water standards for these metals, whereas there are such standards [Maximum Contaminant Levels] for arsenic, manganese and selenium). (See Tables 6 through 8.)

Cobalt has always been within representative levels in Simplot's wells with the exception of Well 318. Cobalt's presence above representative groundwater levels in FMC wells appears to be largely limited to groundwater originating from the deeper zone of the Bannock Range. Cobalt concentrations in otherwise unimpacted FMC wells which tap deeper Bannock Range waters are higher than those observed in FMC wells which tap shallower groundwater more representative of both Bannock Range and Michaud Flats.

Ammonia is not on the proposed analytical list because it is limited in areal extent and/or the areas in which it is elevated generally coincide with those in which nitrate, orthophosphate or total phosphorus is elevated. Because orthophosphate and **total phosphorus** data are generally well correlated, only one of the two parameters, orthophosphate, is proposed for ongoing analysis.

Although all of the major cations and anions exceed representative groundwater levels in samples from a number of FMC and Simplot wells, potassium and sulfate are the only major ions proposed for ongoing analysis, because observed potassium and sulfate levels exceed representative groundwater levels to a greater degree than any of the other ions making them better indicators of impacts from EMF site operations. They are also less attenuated (i.e., more mobile) than the other ions in that they are observed at elevated levels further from their presumed source(s).

Gross beta measurements correlate well with potassium levels because of the natural abundance of potassium-40, a naturally-occurring beta emitter. Therefore, gross beta measurements are not included in the proposed analytical program.

PROPOSED MONITORING WELL NETWORK

FMC and Simplot propose ongoing monitoring of selected upgradient wells, wells downgradient of each of the major potential sources of groundwater contamination, and selected wells along or downgradient of the facility boundaries. Ongoing monitoring of selected offsite wells is also proposed to ensure that offsite groundwater constituent levels remain at or below levels observed to date.

Despite reductions in the groundwater monitoring network, water level measurements will made in all monitoring wells in the current network at the time of each sampling event to identify any changes in groundwater flow patterns over time.

J. R. Simplot Facility. Groundwater data collected to date suggest that groundwater impacts beneath the Simplot facility are largely attributable to two potential sources: the gypsum stack and the now inactive East Overflow Pond. Therefore, ongoing monitoring of the following wells is proposed:

Background Wells: 301 (southwest corner, upgradient, of the Simplot facility)

Gypsum Stack: 300, 306, 307, 323 (downgradient of upper portion of gypsum stack)

East Overflow Pond: 318 (downgradient)

Facility Boundaries 305, 310, 321, 325, 327, 328, well pair 319/320, well pair 330/331, and PEI-4.

Monitoring wells 304, 308, 309, 312/329, 313, 315, 316, 317, 324, 326, 332, 333, and PEI-6 were used during the RI to characterize groundwater quality within the interior area of the facility or at the facility's eastern or western boundaries. Because these wells are within the facility and are redundant for monitoring groundwater impacted by plant operations, there is no need to continue monitoring of these wells.

FMC Facility. Groundwater data collected to date suggest that groundwater impacts observed beneath the FMC facility are largely attributable to the following potential sources: Pond 8S, subsurface waste materials resulting from the use of former ponds, the old calciner ponds, and the slag pit and slag pit sump. Therefore, ongoing monitoring of the following wells is proposed:

RCRA Wells: 101, 104, 108, 113, 114, 115, 116, 121, 122, 123, 124, 126, 127, 128, 130, 131, 132, 137, 147, 148, 149, 150, 152, 154, 158. FMC is obligated to sample these wells to comply with RCRA groundwater monitoring requirements. These wells are located up and downgradient of designated waste management units (WMU's). Some of these wells also monitor releases from some of the former units listed below.

Background: 101 (part of RCRA monitoring network), 102 and 106.

Pond 8S: 117, 141, 151, 159 (in addition to RCRA wells designated for monitoring of this unit).

Former Ponds 1S - 3S: 133, 134.

Former Ponds 4S, 6S, 7S, 9S: 140.

Former Ponds 5S, 10S: well pair 133/134, 141.

Former Ponds 1E - 7E: These ponds were located where WMU's 3, 8 and 11 are currently located. Therefore, the RCRA wells which monitor these three WMU's also monitor any releases associated with the former ponds.

Former Kiln Scrubber Pond: 123 (part of RCRA monitoring network)

Slag Pit/Slag Pit Sump: 121 (upgradient and part of RCRA monitoring network), well pair 107/108 (downgradient; 108 part of RCRA monitoring network).

Calciner Ponds 1C - 4C/Historical Calciner Ponds/Calciner Sediment and Fines Area: 136, 142, 143.

Facility Boundaries: well pair 109/110, 111, 112, 146.

The TW-3, 5 and 10 series monitoring wells, wells 103, 118, 135 and 139, and well pair 144/145 were used during the RI to characterize groundwater quality within the interior area of the facility or at facility boundaries. Because these wells do not monitor specific source areas, do not appear to have been impacted by plant operations and/or are adequately represented by other wells retained in the network, there is no need to continue monitoring of these wells.

Wells 129 and 130 are completed at nearly the same depth; it is, therefore, not necessary to monitor both. Because well 129 has a 6-inch diameter casing and well 130 has a 4-inch casing, it is proposed that well 129 be plugged and abandoned. Sampling of well 130 rather than 129 will reduce the volume of purge water and time needed to sample the well. Furthermore, well 130 is part of the FMC RCRA monitoring network.

Off-Site. Ongoing monitoring of selected offsite wells will be conducted to ensure that offsite groundwater constituent levels remain at or below levels observed to date. The Companies propose continued sampling of the following wells: TW-9S, TW-11S, TW-11I, TW-12S, 502 through 505, and 508, 515 through 519, the Old and New Pilot House wells, the Frontier well and Batiste Springs.

Monitoring wells 500/501, 506/507, 509, 510/511, 512/513, 514, 520, the Chevron Tank Farm well and the Rowlands creamery well were used during the RI to assess the extent of groundwater impacts. Because groundwater flow measurements and chemical data suggest these wells are not in the path of groundwater flow from the two facilities, they are not included in the proposed ongoing monitoring network.

The Idaho Power well, located upgradient of FMC, is also excluded from the proposed ongoing monitoring program because it was not designed for monitoring and because of the existence of other wells (e.g., 101 and 102) which provide background or upgradient data.

4.0 GROUNDWATER MONITORING FREQUENCY

With the exception of constituent levels in well 318 downgradient of Simplot's East Overflow Pond, little to no significant variations in EMF groundwater constituent concentrations have been observed since the start of the RI/FS in April 1992. The East Overflow Pond was used intermittently during the monitoring period, and is no longer in operation; therefore, significant fluctuations in well 318 constituent concentrations are no longer expected.

Seasonal recharge of groundwater occurs primarily during the spring (April and May), when snowmelt occurs and when the region receives a significant portion of its limited rainfall (average precipitation is about 11 inches per year). Monitoring in early June will provide data related to the effects of this annual recharge event. In most years, little recharge from precipitation occurs during the remainder of the year, and conditions are relatively stable.

Therefore, a second round of monitoring data in early December will provide groundwater data representative of the remainder of the year. Plant operations are continuous throughout the year, and any effect they would have on the groundwater would be essentially constant.

For these reasons, FMC and Simplot propose reduction of the EMF groundwater monitoring program from a quarterly frequency to a semi-annual frequency.

CONCLUSION

A program consisting of fewer wells and a reduced frequency as described above will provide adequate data for monitoring of groundwater flow direction and quality. We would like to initiate the reduced groundwater monitoring program described above by eliminating the March 1994 sampling event and beginning the reduced program in June 1994, with the second sampling round in December 1994.

Please contact Art Day of Bechtel (415/768-2066) or one of us should you have any questions about the changes in the EMF groundwater monitoring program described above.

Sincerely yours,

Earl C. Mapes
J. R. Simplot Company

Ron R. Hosking
FMC Corporation
Phosphorus Chemicals Division

cc: Mike Thomas, ID Dept. of Health and Welfare, Div. of Envir. Qual.
Gordon Brown, ID Dept. of Health and Welfare, Pocatello Field Office
Gary Fenwick, Shoshone-Bannock Tribes
Andy Hafferty, Ecology and Environment
David Croxton, U. S. Environmental Protection Agency

Table 1

REPRESENTATIVE EMF GROUNDWATER CONSTITUENT LEVELS

Parameter	Mean	Range (2 S.D.)(a)	Parameter	Mean	Range (2 S.D.)(a)
INORGANICS-METALS (in mg/l)			***NUTRIENTS (in mg/l)***		
Aluminum	0.18	ND to 0.68	Ammonia (NH3 as N)	0.2	ND to 0.8
Antimony	0.120	0.04 to 0.2	Nitrate (NO3 as N)	2.1	ND to 4.5
Arsenic	0.013	ND to 0.032	Orthophosphate (PO4 as P)	0.37	ND to 1.8
Barium	0.120	0.02 to 0.22	Phosphorus, total	0.67	ND to 3.1
Beryllium	0.002	0.0007 to 0.003	Fluoride	0.4	0.03 to 0.7
Boron	0.17	ND to 0.36	***COMMON IONS (in mg/l)***		
Cadmium	0.003	0.001 to 0.006	Alkalinity, bicarbonate	195	75 to 315
Chromium	0.0050	ND to 0.012	Alkalinity, carbonate	1	ND to 5
Cobalt	0.018	0.002 to 0.033	Calcium	72.6	40 to 105
Copper	0.007	ND to 0.022	Chloride	87.2	ND to 177
Iron	0.21	ND to 1.1	Magnesium	26.5	11 to 42
Lead	0.002	ND to 0.006	Potassium	8.3	4 to 13
Lithium	0.031	ND to 0.062	Sodium	35.2	7 to 64
Manganese	0.015	ND to 0.078	Sulfate	46	14 to 79
Mercury	0.0006	ND to 0.0013	***PHYSICAL PARAMETERS***		
Molybdenum	0.03	ND to 0.07	Specific conductance, at 25°C (in µmhos)	720	387 to 1052
Nickel	0.01	0.01 to 0.01	pH(b)		6.9 to 9.4
Selenium	0.003	ND to 0.007	Temperature (in °C)	14.7	11.4 to 17.9
Silver	0.004	0.002 to 0.006	Total dissolved solids (in mg/l)	461	175 to 746
Thallium	0.040	0.04 to 0.04	Redox(c)		
Vanadium	0.024	ND to 0.124			
Zinc	0.059	ND to 0.397			

(a) S.D. = Standard Deviation. Range is mean ± two times Standard Deviation.

(b) Range is actual values rather than two times Standard Deviation.

(c) Single Measurement–No statistics calculated

ND = Below Detection Limit.

Table 2
PROPOSED ANALYTICAL PARAMETER LIST

Current Parameters	Proposed Parameters		
	FMC	Simplot	Offsite
Metals			
Aluminum			
Antimony			
Arsenic	x	x	x
Barium			
Beryllium		x(1)	
Boron		x(1)	
Cadmium		x(1)	
Chromium		x(1)	
Cobalt		x(1)	
Copper		x(1)	
Iron		x(1)	
Lead			
Lithium		x(1)	
Manganese	x	x	x
Mercury			
Molybdenum			
Nickel		x(1)	
Selenium	x	x	x
Silver			
Thallium		x(1)	
Vanadium		x(1)	
Zinc		x(1)	
Nutrients			
Ammonia			
Fluoride	x	x	x
Nitrate	x	x	x
Phosphorus (total)			
Orthophosphate	x	x	x
Major Cations/Anions			
Calcium			
Chloride			
Magnesium			
Potassium	x	x	x
Sodium			
Sulfate	x	x	x
Total Dissolved Solids			
Field Measurements			
Specific Conductance	x	x	x
Temperature	x	x	x
pH	x	x	x
Radiochemical			
Gross alpha	x	x	x
Gross beta			
Ra-226			
Ra-228			

(1) JRS Well 318 only.

Table 3

CONSTITUENTS AT OR BELOW REPRESENTATIVE LEVELS IN GROUNDWATER BENEATH THE SIMPLOT FACILITY

	ALL MONITORING WELLS WITHIN SIMPLOT FACILITY EXCEPT 318				MONITORING WELL 318 WITHIN SIMPLOT FACILITY				REPRESENTATIVE LEVELS	
	Number of Samples Analyzed: 106				Number of Samples Analyzed: 4				REPRESENTATIVE WELLS 16 WELLS	
Parameter	Mean	Range(a) Min	Range(a) Max	NOS	Mean	Range(a) Min	Range(a) Max	NOS	Mean	Range (2 S.D.)(b)
INORGANICS-METALS (in mg/l)										
Metals Present in Groundwater throughout EMF Study Area at Concentrations within or near Representative Levels										
Antimony	0.06	0.05	0.17	34	0.13	0.13	0.13	1	0.12	0.04 to 0.20
Lead	0.002	0.001	0.010	39	0.011	0.003	0.018	4	0.002	ND to 0.006
Molybdenum	0.01	0.01	0.03	29	0.10	0.09	0.12	2	0.03	ND to 0.07
Silver	0.004	0.002	0.013	33	0.00	0.004	0.004	1	0.004	0.002 to 0.006
Metals Present in Groundwater throughout EMF Study Area Detected Sporadically at Concentrations above Representative Levels										
Barium	0.08	0.01	0.20	100	0.29	0.20	0.43	4	0.12	0.02 to 0.22
Mercury	0.0003	0.0001	0.0024	34	0.0007	0.0007	0.0007	1	0.0006	ND to 0.0013
Metals Present in Groundwater beneath the Simplot Facility at Concentrations within or near Representative Levels for All Wells Except 318										
Cobalt	0.003	0.003	0.005	30	0.087	0.048	0.129	4	0.018	0.002 to 0.033
Iron	0.16	0.01	1.3	44	122	97	154	4	0.21	ND to 1.1
Thallium	0.001	0.001	0.002	28	0.040	0.011	0.112	4	0.040	0.040 to 0.040
Vanadium	0.011	0.002	0.037	51	18.7	13.8	22.3	4	0.024	ND to 0.124
Zinc	0.025	0.002	0.193	39	24.2	19.6	28.9	4	0.059	ND to 0.397
Metals Detected Sporadically in Groundwater beneath the Simplot Facility at Concentrations near Detection Limits Except for Well 318										
Beryllium	0.002	0.001	0.021	44	0.06	0.026	0.08	4	0.002	0.0007 to 0.003
Cadmium	0.002	0.0001	0.020	43	3.19	2.568	3.59	3	0.003	0.001 to 0.006
Chromium	0.002	0.001	0.019	66	4.76	0.003	7.58	4	0.005	ND to 0.012
Copper	0.006	0.004	0.038	54	1.00	0.836	1.12	4	0.007	ND to 0.022

(a) Min = Minimum detected value, Max = Maximum, NOS = Number of Samples in which parameter detected.
(b) S.D. = Standard Deviation. Range is mean ± two times Standard Deviation

ND = Results for all samples below Detection Limit.

Table 4

CONSTITUENTS AT OR BELOW REPRESENTATIVE LEVELS IN GROUNDWATER BENEATH THE FMC FACILITY

Parameter	ALL MONITORING WELLS WITHIN FMC FACILITY				REPRESENTATIVE LEVELS	
	Number of Samples Analyzed:			274	REPRESENTATIVE WELLS 16 WELLS	
	Mean	Range(a) Min	Max	NOS	Mean	Range (2 S.D.)(b)
INORGANICS-METALS (in mg/l)						
Metals Present in Groundwater throughout EMF Study Area at Concentrations within or near Representative Levels						
Antimony	0.09	0.06	to 0.11	2	0.12	0.04 to 0.20
Lead	0.006	0.002	to 0.016	11	0.002	ND to 0.006
Molybdenum	0.03	0.01	to 0.07	53	0.03	ND to 0.07
Silver	0.00	0.002	to 0.011	68	0.004	0.002 to 0.006
Metals Present in Groundwater throughout EMF Study Area Detected Sporadically at Concentrations above Representative Levels						
Barium	0.15	0.01	to 2.2	249	0.12	0.02 to 0.22
Mercury	0.0008	0.0001	to 0.0043	26	0.0006	ND to 0.0013
Metals Present in Groundwater beneath the FMC Facility at Concentrations within or near Representative Levels						
Beryllium	0.002	0.001	to 0.002	11	0.002	0.0007 to 0.003
Thallium	0.00	0.001	to 0.002	4	0.040	0.040 to 0.040
Zinc	0.03	0.004	to 0.110	15	0.059	ND to 0.397
Metals Detected Sporadically in Groundwater beneath the FMC Facility at Concentrations near Detection Limits						
Cadmium	0.003	0.0001	to 0.009	11	0.003	0.001 to 0.006
Chromium	0.004	0.0003	to 0.022	95	0.005	ND to 0.012
Nickel	0.03	0.01	to 0.08	39	0.01	0.01 to 0.01

(a) Min = Minimum detected value, Max = Maximum, NOS = Number of Samples in which parameter detected.
(b) S.D. = Standard Deviation. Range is mean ± two times Standard Deviation

ND = Results for all samples below Detection Limit.

Table 5

CONSTITUENTS AT OR BELOW REPRESENTATIVE LEVELS IN GROUNDWATER
FROM OFFSITE WELLS WITHIN THE EMF STUDY AREA

	ALL OFFSITE MONITORING WELLS WITHIN THE EMF STUDY AREA				REPRESENTATIVE LEVELS	
	Number of Samples Analyzed: 127				REPRESENTATIVE WELLS 16 WELLS	
Parameter	Mean	Range(a) Min	Max	NOS	Mean	Range (2 S.D.)(b)
INORGANICS-METALS (in mg/l)						
Metals Present in Groundwater throughout EMF Study Area at Concentrations within or near Representative Levels						
Antimony	0.05	0.05	0.06	34	0.12	0.04 to 0.20
Lead	0.001	0.001	0.003	46	0.002	ND to 0.006
Molybdenum	0.02	0.01	0.07	45	0.03	ND to 0.07
Silver	0.004	0.002	0.004	36	0.004	0.002 to 0.006
Metals Present in Groundwater throughout EMF Study Area Detected Sporadically at Concentrations above Representative Levels						
Barium	0.13	0.02	2.2	106	0.12	0.02 to 0.22
Mercury	0.0003	0.0001	0.0020	54	0.0006	ND to 0.0013
Metals Present in Groundwater from Offsite EMF Monitoring Wells at Concentrations within or near Representative Levels						
Beryllium	0.001	0.001 to	0.003	41	0.002	0.0007 to 0.003
Chromium	0.001	0.001 to	0.002	73	0.005	ND to 0.012
Thallium	0.001	0.001 to	0.005	39	0.040	0.040 to 0.040
Zinc	0.024	0.002 to	0.126	60	0.059	ND to 0.397
Metals Detected Sporadically in Groundwater in Offsite EMF Wells at Concentrations near Detection Limits						
Cadmium	0.002	0.0004 to	0.008	44	0.003	0.001 to 0.006
Nickel	0.03	0.01 to	0.09	37	0.01	0.01 to 0.01

(a) Min = Minimum detected value, Max = Maximum, NOS = Number of Samples in which parameter detected.
(b) S.D. = Standard Deviation. Range is mean ± two times Standard Deviation

ND = Results for all samples below Detection Limit.

Table 6
CONSTITUENTS DETECTED ABOVE REPRESENTATIVE LEVELS IN GROUNDWATER BENEATH THE SIMPLOT FACILITY

		Northwestern Area: Upper Gypsum Stack Influence, Former Calciner Ponds/Kiln Scrubber Ponds Areas					Central, Southern, and Eastern Areas: Upper and Lower Gypsum Stacks															REPRESENTATIVE LEVELS	DRINKING WATER MAXIMUM CONTAMINANT LIMITS
							Gypsum Stacks					East Overflow Pond											
		Wells 307, 308, 309, 310, 312, 324, and 331					Wells 300, 304, 306, 313, 315, 316, 323, 325, 326, 332, 333, PEI-3, PEI-5					Wells 317, 320, and 327					Well 318					Upper Limit (2 S.D.) (a)	(mg/l)
					NOA=	24				NOA=	39				NOA=	10				NOA=	4		
PARAMETER (mg/l)		Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS		
Arsenic,	total	0.306	(±0.245)	0.014	0.815	22	0.295	(±0.196)	0.001	0.783	38	0.181	(±0.174)	0.024	0.459	10	0.411	(±0.173)	0.289	0.665	4	0.032	0.050
	dissolved	ND		ND	ND	0	0.423	(±0.243)	0.085	0.722	5	ND		ND	ND	0	0.383		0.383	0.383	1		
Boron,	total	0.59	(±0.22)	0.12	0.95	24	0.49	(±0.17)	0.05	0.96	38	0.42	(±0.19)	0.16	0.65	10	3.4	(±3.1)	0.36	6.8	4	0.36	NR
	dissolved	ND		ND	ND	0	0.53	(±0.12)	0.36	0.60	4	ND		ND	ND	0	ND		ND	ND	0		
Lithium,	total	0.325	(±0.200)	0.048	0.665	23	0.208	(±0.139)	0.013	0.704	36	0.170	(±0.090)	0.057	0.293	9	0.546	(±0.127)	0.363	0.650	4	0.062	NR
	dissolved	ND		ND	ND	0	0.219	(±0.092)	0.144	0.379	5	ND		ND	ND	0	0.320		0.320	0.320	1		
Manganese,	total	0.244	(±0.289)	0.003	0.894	22	0.110	(±0.359)	0.001	1.821	25	0.267	(±0.265)	0.002	0.619	5	8.65	(±1.17)	7.13	9.60	4	0.078	0.05(b)
	dissolved	ND		ND	ND	0	0.023	(±0.018)	0.008	0.049	4	ND		ND	ND	0	6.50		6.50	6.50	1		
Nickel,	total	0.03	(±0.04)	0.01	0.10	9	0.05	(±0.12)	0.01	0.44	13	0.06	(±0.05)	0.01	0.12	5	2.9	(±0.5)	2.4	3.5	4	0.01	NR
	dissolved	ND		ND	ND	0	0.01		0.01	0.01	1	ND		ND	ND	0	2.1		2.1	2.1	1		
Selenium,	total	0.044	(±0.065)	0.001	0.200	21	0.016	(±0.012)	0.004	0.048	30	0.010	(±0.010)	0.002	0.025	7	0.026	(±0.014)	0.013	0.044	4	0.007	0.050
	dissolved	ND		ND	ND	0	0.017	(±0.019)	0.003	0.049	5	ND		ND	ND	0	0.031		0.031	0.031	1		
Parameters Found at Elevated Levels in Well 318 Only																							
Beryllium,	total	0.001	(±0.000)	0.001	0.001	11	0.002	(±0.005)	0.001	0.021	19	0.001	(±0.000)	0.001	0.001	3	0.056	(±0.028)	0.026	0.083	4	0.003	NR
	dissolved	ND		ND	ND	0	0.001	(±0.000)	0.001	0.001	2	ND		ND	ND	0	0.031		0.031	0.031	1		
Cadmium,	total	0.004	(±0.006)	0.0004	0.020	10	0.001	(±0.002)	0.0001	0.008	18	0.005	(±0.004)	0.001	0.012	5	3.19	(±0.54)	2.57	3.59	3	0.006	0.005
	dissolved	0.004	(±0.006)	0.0004	0.020	10	0.001		0.001	0.001	1	0.005		ND	ND	0	3.45		3.45	3.45	1		
Chromium,	total	0.002	(±0.002)	0.001	0.007	15	0.002	(±0.001)	0.001	0.005	24	0.001	(±0.000)	0.001	0.002	7	4.76	(±3.59)	0.003	7.58	4	0.012	0.100
	dissolved	ND		ND	ND	0	0.002	(±0.000)	0.002	0.002	3	ND		ND	ND	0	3.91		3.91	3.91	1		
Cobalt,	total	0.004	(±0.001)	0.003	0.005	8	0.003	(±0.0002)	0.003	0.004	12	0.003	(±0.000)	0.003	0.003	2	0.087	(±0.033)	0.048	0.129	4	0.033	NR
	dissolved	ND		ND	ND	0	0.003		0.003	0.003	1	ND		ND	ND	0	ND		ND	ND	0		
Copper,	total	0.007	(±0.009)	0.004	0.038	14	0.006	(±0.004)	0.004	0.020	22	0.004	(±0.001)	0.004	0.006	5	1.00	(±0.144)	0.836	1.12	4	0.022	1(b)
	dissolved	ND		ND	ND	0	0.005	(±0.001)	0.004	0.006	4	ND		ND	ND	0	0.689		0.689	0.689	1		
Iron,	total	0.08	(±0.05)	0.01	0.2	9	0.16	(±0.17)	0.01	0.69	18	0.05	(±0.04)	0.01	0.08	3	122	(±28)	97.1	154	4	1.1	0.3(b)
	dissolved	ND		ND	ND	0	0.05	(±0.03)	0.03	0.07	2	ND		ND	ND	0	102		102	102	1		
Thallium,	total	0.001	(±0.000)	0.001	0.001	7	0.001	(±0.0003)	0.001	0.002	11	0.001	(±0.000)	0.001	0.001	2	0.040	(±0.048)	0.011	0.112	4	0.040	NR
	dissolved	ND		ND	ND	0	0.001		0.001	0.001	1	ND		ND	ND	0	0.012		0.012	0.012	1		
Vanadium,	total	0.018	(±0.012)	0.002	0.037	16	0.007	(±0.006)	0.002	0.021	20	0.020	(±0.015)	0.002	0.036	5	18.7	(±3.7)	13.8	22.3	4	0.124	NR
	dissolved	ND		ND	ND	0	0.004	(±0.003)	0.002	0.006	2	ND		ND	ND	0	13.1		13.1	13.1	1		
Zinc,	total	0.012	(±0.008)	0.002	0.028	8	0.030	(±0.053)	0.002	0.193	15	0.039	(±0.029)	0.002	0.084	6	24.2	(±5.2)	19.6	28.9	4	0.397	NR
	dissolved	ND		ND	ND	0	0.012		0.012	0.012	1	ND		ND	ND	0	17.4		17.4	17.4	1		
Parameters Related to the Presence of Silt or to Well Construction Materials																							
Aluminum,	total	0.08	(±0.11)	0.02	0.37	10	0.96	(±2.6)	0.02	11	19	0.05	(±0.04)	0.02	0	4	449	(±106)	311	567	4	0.68	50-200(b)
	dissolved	ND		ND	ND	0	0.02		0.02	0.02	1	ND		ND	ND	0	215		215	215	1		

Abbreviations: SD = Standard Deviation, Min = minimum, Max = maximum, NOS = number of samples in statistical calculations (Samples with concentrations below detection limit--with "U" qualifier-- not included), ND = below detection limit

NOA = number of samples analyzed

(a) 2 S.D. = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.

(b)Secondary Standard. NR = Not currently regulated.

Table 7
CONSTITUENTS DETECTED ABOVE REPRESENTATIVE LEVELS IN GROUNDWATER BENEATH THE FMC FACILITY

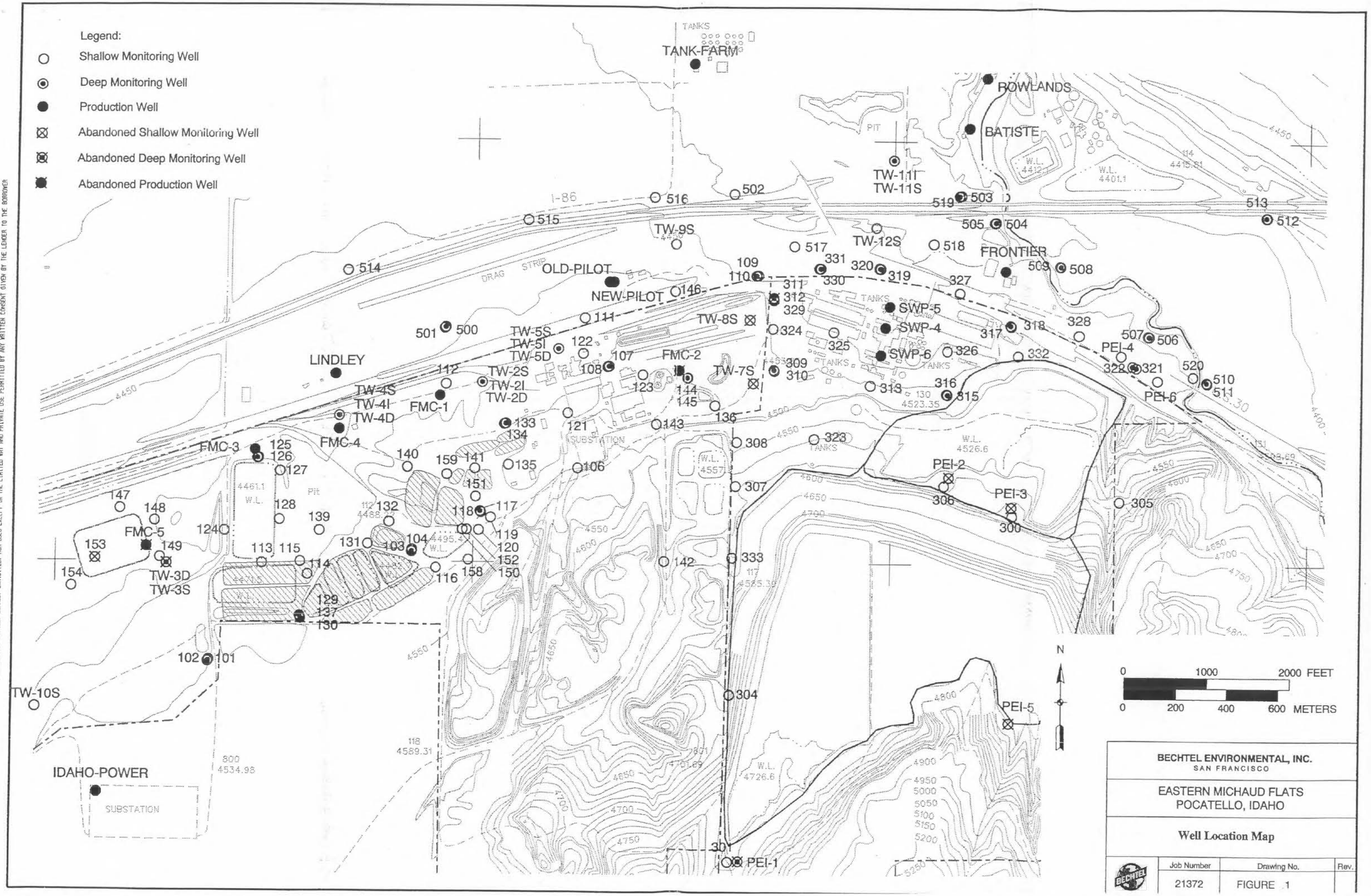
		Former Ponds/8S Area (Includes Southwestern Area former Ponds 1E-6E, 5S-7S, and 10S and Central Area former Ponds 1S-3S)					Slag Pit/Slag Pit Sump Area (Includes Railroad Swale)					Former Kiln Scrubber Pond Area (with Gypsum Stack Influence)					Gypsum Stack Influence Only					Former Calciner Ponds/Calciner Fines Storage Area/Former Kiln Scrubber Overflow Pond/IWW Basin and Ditch (with Gypsum Stack Influence)					REPRESENTATIVE LEVELS Upper Limit (2 S.D.) (a)	DRINKING WATER MAXIMUM CONTAMINANT LIMITS (mg/l)
		Michaud Flats Wells 111, 122, 135, 137, 140, 159, TW-5S Bannock Range Wells 103, 104, 113, 114, 115, 117, 118, 131, 132, 133, 134, 141, 150, 151, 152 Undetermined Regime Well 116					Michaud Flats Well 121 Bannock Range Wells 108, 146					Undetermined Regime Well 123					Undetermined Regime Well 142					Undetermined Regime Wells 136, 143, 144, 145 Bannock Range Well 110						
					Number of Analyses:	108				Number of Analyses:	15			Number of Analyses:	5				Number of Analyses:	4			Number of Analyses:	21		
PARAMETER (in mg/l)		Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS		
Arsenic,	total	0.096	(±0.066)	0.008	0.252	96	0.025	(±0.010)	0.008	0.043	13	0.571	(±0.196)	0.449	0.909	5	0.002	(±0.001)	0.002	0.003	2	0.318	(±0.204)	0.002	0.699	19	0.032	0.05
	dissolved	0.045	(±0.023)	0.002	0.072	6	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	0.003		0.003	0.003	1		
Boron,	total	3.1	(±12)	0.07	89	98	0.54	(±0.24)	0.23	1.0	15	0.96	(±0.25)	0.54	1.2	5	0.32	(±0.03)	0.28	0.35	4	0.73	(±0.21)	0.41	1.0	21	0.36	NR
	dissolved	2.1	(±0.33)	1.5	2.3	5	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	0.37		0.37	0.37	1		
Cobalt,	total	0.029	(±0.031)	0.003	0.139	65	0.006	(±0.002)	0.004	0.010	9	0.007	(±0.002)	0.005	0.008	3	0.010		0.010	0.010	1	0.011	(±0.004)	0.005	0.017	8	0.033	NR
	dissolved	0.018	(±0.006)	0.008	0.021	5	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	0.015		0.015	0.015	1		
Copper,	total	0.007	(±0.007)	0.002	0.041	31	0.005	(±0.000)	0.005	0.005	3	0.016	(±0.006)	0.012	0.020	2	0.013	(±0.008)	0.004	0.019	3	0.015	(±0.009)	0.005	0.031	8	0.022	1(b)
	dissolved	0.085	(±0.115)	0.004	0.166	2	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0		
Lithium,	total	0.146	(±0.437)	0.025	4.30	94	0.069	(±0.013)	0.051	0.092	13	0.252	(±0.034)	0.208	0.298	5	0.033	(±0.014)	0.021	0.053	4	0.301	(±0.200)	0.067	0.709	21	0.062	NR
	dissolved	0.076	(±0.063)	0.038	0.187	5	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	0.066		0.066	0.066	1		
Manganese,	total	2.58	(±9.36)	0.0002	91.2	96	0.391	(±0.283)	0.050	0.832	14	0.457	(±0.031)	0.417	0.491	5	0.027	(±0.030)	0.007	0.062	3	0.805	(±0.776)	0.073	2.273	21	0.078	0.05(b)
	dissolved	0.334	(±0.072)	0.203	0.398	6	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	0.313		0.313	0.313	1		
Selenium,	total	0.006	(±0.006)	0.001	0.026	48	0.030	(±0.085)	0.002	0.312	13	0.336	(±0.127)	0.200	0.534	5	0.008		0.008	0.008	1	0.103	(±0.096)	0.007	0.300	19	0.007	0.05
	dissolved	0.005	(±0.004)	0.002	0.011	4	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	0.014		0.014	0.014	1		
Vanadium,	total	0.012	(±0.009)	0.003	0.042	33	0.016	(±0.005)	0.010	0.020	3	0.188	(±0.028)	0.150	0.222	5	0.013	(±0.011)	0.005	0.020	2	0.050	(±0.048)	0.004	0.138	10	0.124	NR
	dissolved	0.005	(±0.000)	0.005	0.006	2	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0		
Parameters Related to the Presence of Silt or to Well Construction Materials																												
Aluminum,	total	4.4	(±10)	0.02	33	17	0.04	(±0.02)	0.02	0.05	2	0.04	(±0.01)	0.03	0.04	2	ND		ND	ND	0	1.0	(±0.39)	0.75	1.3	2	0.68	50-200(b)
	dissolved	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0		
Iron,	total	1.6	(±5.6)	0.01	29	46	0.03	(±0.02)	0.02	0.05	4	0.02		0.02	0.02	1	ND		ND	ND	0	0.50	(±0.57)	0.01	1.4	5	1.1	0.3(b)
	dissolved	0.06	(±0.06)	0.02	0.10	2	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0		

Abbreviations: SD = Standard Deviation, Min = minimum, Max = maximum, NOS = number of samples in statistical calculations (Samples with concentrations below detection limit--with "U" qualifier-- not included), ND = below detection limit
NOA = number of samples analyzed
(a) 2 S.D. = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.
(b)Secondary Standard. NR = Not currently regulated.

Table 8
CONSTITUENTS DETECTED ABOVE REPRESENTATIVE LEVELS IN OFFSITE GROUNDWATER

PARAMETER (mg/l)		Portneuf River Regime: Representative Levels — Representative Wells 510, 511, 512, 513 and Wells 506, 507, 509, 520 (NOA= 33)					Bannock Range Regime: Representative Levels — Representative Well Idaho Power and Wells 500, 502, 504, 508, 514, 516, 519, NPH, Rowlands, Tank Farm, TW-11I, TW-11S, Williamsen (NOA= 51)					Michaud Flats Regime: Representative Levels — Wells 501, 515, and Lindley (NOA= 9)					Impacted Wells — Wells 503, 505, 517, 518, TW-9S, TW-12S, Frontier, OPH, and Batiste Spring groundwater station (NOA= 34)					REPRESENTATIVE LEVELS Upper Limit (2 S.D.) (a)	DRINKING WATER MAXIMUM CONTAMINANT LIMITS (mg/l)
		Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS	Mean	(±SD)	Min	Max	NOS		
Arsenic,	total	0.005	(±0.002)	0.002	0.009	22	0.007	(±0.005)	0.002	0.020	38	0.007	(±0.003)	0.004	0.011	6	0.027	(±0.015)	0.002	0.050	31	0.032	0.050
	dissolved	ND		ND	ND	0	0.007		0.007	0.007	1	ND		ND	ND	0	ND		ND	ND	0		
Boron,	total	0.15	(±0.05)	0.09	0.25	26	0.11	(±0.03)	0.06	0.18	34	0.19	(±0.12)	0.07	0.41	6	0.36	(±0.25)	0.12	0.88	30	0.36	NR
	dissolved	ND		ND	ND	0	0.08		0.08	0.08	1	ND		ND	ND	0	ND		ND	ND	0		
Lithium,	total	0.029	(±0.004)	0.022	0.039	26	0.039	(±0.013)	0.013	0.075	41	0.048	(±0.016)	0.026	0.074	8	0.067	(±0.023)	0.030	0.104	31	0.062	NR
	dissolved	ND		ND	ND	0	0.041	(±0.002)	0.040	0.042	2	ND		ND	ND	0	ND		ND	ND	0		
Manganese,	total	0.002	(±0.001)	0.001	0.004	9	0.011	(±0.019)	0.001	0.08	20	0.003	(±0.003)	0.001	0.006	3	0.463	(±0.485)	0.001	1.21	24	0.078	0.05(b)
	dissolved	ND		ND	ND	0	0.004	(±0.002)	0.003	0.006	2	ND		ND	ND	0	ND		ND	ND	0		
Selenium,	total	0.003	(±0.001)	0.001	0.005	17	0.003	(±0.001)	0.001	0.006	27	0.003	(±0.001)	0.002	0.005	6	0.005	(±0.005)	0.002	0.019	23	0.007	0.050
	dissolved	ND		ND	ND	0	0.002		0.002	0.002	1	ND		ND	ND	0	ND		ND	ND	0		
Vanadium,	total	0.002	(±0.000)	0.002	0.002	8	0.004	(±0.005)	0.002	0.020	19	0.003	(±0.002)	0.002	0.006	3	0.015	(±0.036)	0.002	0.140	14	0.124	NR
	dissolved	ND		ND	ND	0	0.005		0.005	0.005	1	ND		ND	ND	0	ND		ND	ND	0		
Parameters Detected Sporadically in Groundwater in Offsite EMF Wells																							
Cadmium,	total	0.001	(±0.0002)	0.0003	0.001	9	0.001	(±0.0002)	0.0001	0.001	18	0.001	(±0.000)	0.001	0.001	2	0.002	(±0.002)	0.0004	0.008	15	0.006	0.005
	dissolved	0.001	(±0.0002)	0.0003	0.001	9	0.001		0.001	0.001	1	ND		ND	ND	0	ND		ND	ND	0		
Nickel,	total	0.01	(±0.003)	0.01	0.02	8	0.01	(±0.00)	0.01	0.01	13	0.01	(±0.00)	0.01	0.01	2	0.03	(±0.03)	0.01	0.09	14	0.01	NR
	dissolved	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0		
Parameters Related to the Presence of Silt or to Well Construction Materials																							
Aluminum,	total	0.10	(±0.24)	0.02	0.93	14	0.03	(±0.01)	0.02	0.06	16	0.04	(±0.03)	0.02	0.07	3	0.03	(±0)	0.02	0.08	11	0.68	50-200(b)
	dissolved	ND		ND	ND	0	0.05		0.05	0.05	1	ND		ND	ND	0	ND		ND	ND	0		
Copper,	total	0.005	(±0.003)	0.004	0.012	10	0.005	(±0.002)	0.004	0.010	15	0.042	(±0.036)	0.004	0.083	5	0.005	(±0.001)	0.004	0.009	12	0.022	1(b)
	dissolved	ND		ND	ND	0	0.002		0.002	0.002	1	ND		ND	ND	0	ND		ND	ND	0		
Iron,	total	0.30	(±0.56)	0.07	2.0	12	0.59	(±1.1)	0.05	4.4	22	0.06	(±0.01)	0.05	0.07	3	0.50	(±1)	0.05	2.7	20	1.1	0.3(b)
	dissolved	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0	ND		ND	ND	0		

Abbreviations: SD = Standard Deviation, Min = minimum, Max = maximum, NOS = number of samples in statistical calculations (Samples with concentrations below detection limit--with "U" qualifier-- not included), ND = below detection limit
NOA = number of samples analyzed
(a) 2 S.D. = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.
(b)Secondary Standard. NR = Not currently regulated.



BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Well Location Map

Job Number	Drawing No.	Rev.
21372	FIGURE 1	

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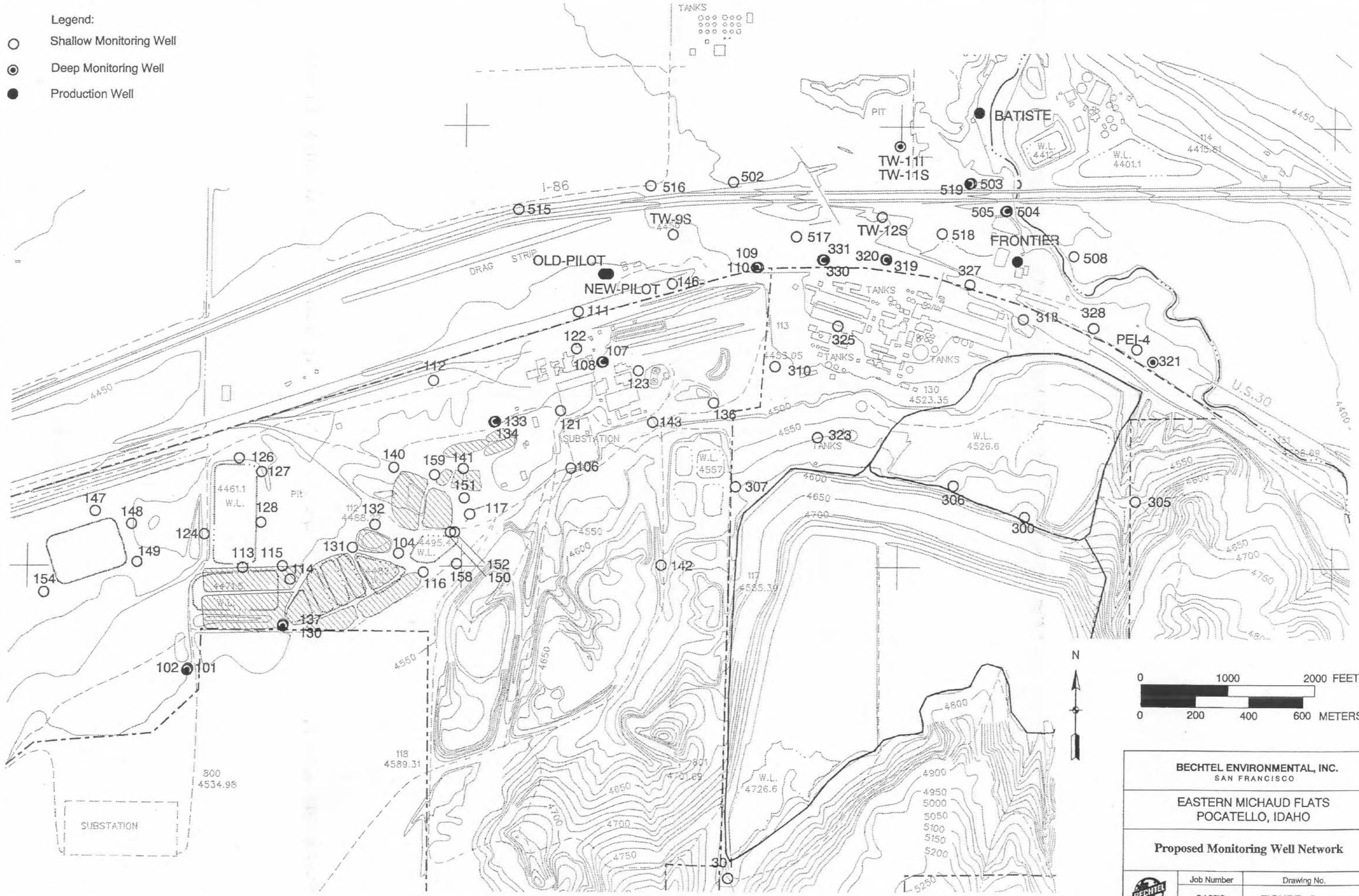

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Proposed Monitoring Well Network

Job Number	Drawing No.	Rev.
21372	FIGURE 2	

Table 9

J.R. SIMPLOT FACILITY MONITORING WELLS

Current Monitoring Network	Proposed Monitoring Network
300	X
301	X
304	
305	X
306	X
307	X
308	
309	
310	X
312	
313	
315	
316	
317	
318	X
319	X
320	X
321	
323	
324	
325	X
326	
327	X
328	X
329	
330	X
331	X
332	
333	
PEI-4	X
PEI-6	

Table 10

FMC FACILITY MONITORING WELLS

Current Monitoring Network	Proposed Monitoring Network
101 (a)	X
102	X
103	
104 (a)	X
106	X
107	X
108 (a)	X
110	X
111	X
112	X
113 (a)	X
114 (a)	X
115 (a)	X
116 (a)	X
117	X
118	
119	
120	
121 (a)	X
122 (a)	X
123 (a)	X
124 (a)	X
125	
126 (a)	X
127 (a)	X
128 (a)	X
129	
130 (a)	X
131 (a)	X
132 (a)	X
133	X
134	X
135	
136	X
137 (a)	X
139	
140	X
141	X

Table 10 (cont'd)

FMC FACILITY MONITORING WELLS

Current Monitoring Network	Proposed Monitoring Network
142	X
143	X
144	
145	
146	X
147 (a)	X
148 (a)	X
149 (a)	X
150 (a)	X
151	X
152 (a)	X
154 (a)	X
158 (a)	X
159	X
TW-3D	
TW-5S	
TW-5I	
TW-5D	
TW-10S	

(a) RCRA well

Table 11

OFF-SITE MONITORING WELLS

Current Monitoring Network	Proposed Monitoring Network
TW- 9S	X
TW-11S	X
TW-11I	X
TW-12S	X
500	
501	
502	X
503	X
504	X
505	X
506	
507	
508	X
509 (a)	X
510	
511	
512	
513	
514	
515	
516	X
517	X
518	X
519	X
520	
Frontier	X
Old Pilot House	X
New Pilot House	X
Batiste Spring	X
Idaho Power	
Rowlands	
Tank Farm	

(a) Water level only

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

Reply To
Attn Of: HW-113

FEB 17 1994

FEB 1994
Received
Environmental Department/FMC

Steve Curreri
J.R. Simplot Company
Box 912
Pocatello, Idaho 83202

Ron Hosking
FMC Corporation
Phosphorus Chemicals Division
Box 4111
Pocatello, Idaho 83202

Subject: Response to Proposed EMF Groundwater Monitoring Reductions

Dear Messrs. Curreri and Hosking:

We have completed our review of your proposed groundwater monitoring reductions memorandum of December 1, 1993, for the Eastern Michaud Flats Site. Our evaluation of this request is also based upon information provided in the January 1994 Preliminary Site Characterization Summary.

Based upon this review EPA is in agreement with your proposal to reduce the number of wells currently being monitored under the Eastern Michaud Flats RI/FS. We also support a reduction in monitoring frequency from quarterly to semiannually as discussed in your proposal. In accordance with this proposal the next sampling will occur in June 1994, with the second sampling round in December 1994.

In regards to the reduction in the analyte list we are still reviewing your proposal. Our goal in this review is to insure that the parameters carried forward in future groundwater monitoring are consistent with the goals of the risk assessments. At this time we do not anticipate a significant difference from the list that you have proposed.

Finally, EPA now recommends low flow sampling of groundwater at sites with metals contamination. Such sampling generally reduces the problems associated with turbidity and suspended solids impacting groundwater. Based upon EPA's experiences at the UPRR, Kerr McGee, and Monsanto sites, this technique results in less purge water, faster well stabilization, elimination of filtering, and more consistent results. We strongly encourage

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you to consider this technique for the June 1994 RI/FS sampling. In addition, it is likely that the RCRA program will soon be recommending that this technique be used in sampling for metals.

Should you have questions regarding the low flow sampling technique contact Lorraine Edmond at (206) 553-7366.

Sincerely,

Bill Adams

Bill Adams
Project Manager

cc: EMF TAG

Pat: Please cc: RRH
JPS
WSM
JDB
REH

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

MAY 11 1994

Reply To
Attn Of: HW-113

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL
# of pages ▶ 4

To Pam French	From Bill Adams
Dept./Agency FMC	Phone # 206 553 2806
Fax # 208 236 8396	Fax # 206 553 0124

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Steve Curreri
J.R. Simplot Company
Box 912
Pocatello, Idaho 83202

Jim Sieverson
FMC Corporation
Phosphorus Chemicals Division
Box 4111
Pocatello, Idaho 83202

Re: Proposal to modify ground water monitoring at the Eastern Michaud Flats NPL Site, Pocatello, Idaho

Dear Messrs. Curreri and Sieverson:

These comments are in response to your request (dated December 1, 1993) to reduce the frequency, number of chemical analytes, and the number of wells sampled in the ongoing ground water monitoring at the EMF site. In my letter of February 17, 1994, we agreed to reduce monitoring frequency from quarterly to semi-annually, but indicated that we preferred to defer our final decision on the list of analytes and the monitoring well network until after we had the opportunity to review the Preliminary Site Characterization Summary. Since then, we have provided you with our draft comments on the PSCS. To date, we have not received your response to these comments. In general, we agree that the current ground water database is adequate for the purposes of evaluating risk and deciding between alternatives and therefore have approved certain reductions in the list of analytes, at this time.

General comment:

The monitoring modification proposal needs to be revised based on EPA's PSCS comments, particularly with regards to the background ground water quality. The comments related to the selection of representative wells and with the methodology used to calculate the representative concentrations need to be resolved before the modification proposal is finalized and approved by EPA. After EPA has agreed to those two aspects of the definition of representative concentrations, we would accept the proposal that analytes not detected above this range be discontinued.

In addition, a modified list of wells and analytes proposed will apply only as long as the current patterns of contamination are seen. If in the future, the most mobile constituents should show an increasing trend in a currently unimpacted well. For example, the adequacy of the monitoring network and analyte list would need to be re-evaluated.

The revised proposal should include a list of wells that are currently unimpacted but which will continue to be monitored as part of the "early warning" system to detect any changes in current patterns of contamination.

Comments on modifications to analyte list:

- discontinue analyzing for antimony, lead, molybdenum, silver, thallium and zinc (except for thallium and zinc in 318). These elements may well remain within the background range of concentrations even after those are redefined in accordance with EPA comments on the PSCS. If so, they can be discontinued.

- discontinue analyzing for barium, copper, beryllium, cadmium, chromium. Acceptable based on sporadic exceedances.

- discontinue analyzing for mercury. Acceptable to discontinue due to generally sporadic exceedances.

- discontinue analyzing for aluminum and iron. Exceedances occurred only in turbid, silty samples. Acceptable to discontinue analyzing for these, provided that collection of turbid, silty samples is discontinued as well (see comment below).

- discontinue analyzing for boron, cobalt, lithium, nickel, and vanadium. These analytes, although elevated, are proposed to be discontinued because they are detected less frequently than other metals, because they are less mobile than other metals, and because they have no MCLs. A lower frequency of detection does not mean that the elements are not site related, any more than the lack of an MCL means that they pose low risk. Before agreeing to discontinue these, we would like to see a more thorough summary of their spatial distribution. Any of these elements that do not appear to be site related could be discontinued on that basis. Others may be site related but pose very low risk at the concentrations found, but some kind of risk analysis would have to be done before that determination is made.

- discontinue analyzing for ammonia. Acceptable based on spatial correlation with nitrate and orthophosphate

- discontinue analyzing for gross beta. Acceptable based on its correlation with potassium-40.

- discontinue analyzing the complete list of cations and anions. As long as the current database of those analytes is considered adequate for the proposed geochemical modeling, EPA has no objection to discontinuing their analysis.

Comments on modifications to monitoring network

In general, we think the proposed network will be adequate to monitor ground water flow direction and water quality as long as conditions remain essentially stable. We recommend continuing to monitor well 317, however (the deep well associated with well 318, downgradient from Simplot's east overflow pond). When well 318 shows sufficiently improved water quality, as discussed in the proposal, the elimination of well 317 from the network can be re-evaluated.

As pointed out in one of EPA's earlier comments, the list of wells to be monitored as described in the text and as shown on Tables 9 and 10 are not identical. Additions should be made to the Tables, where necessary.

Low-Flow Purging/Sampling

It was our impression at our ground water modeling meeting on April 15 that you objected to our suggestion to begin using low-flow sampling techniques to reduce turbidity in unfiltered samples. It was also our impression that you believe that there is not a turbidity problem at the site. The monitoring modification proposal, however, makes several references to exceedances that occur because turbid, silt-containing samples were collected.

Our discussion of the topic on April 15 was very brief and I am sure we will have an opportunity to discuss it in more detail during our meeting on May 19, 1994. Based on what we see in the monitoring memorandum, however, along with the values in Table 4.4-9 of the PSCS, which summarizes total and dissolved concentrations of site-related metals, we continue to recommend that low-flow sampling techniques be used in the future at the site. Additionally, turbidity and dissolved oxygen should be added to the list of field parameters. (If filtered and unfiltered sample pairs show good correlation using low flow sampling, the filtered analyses can be discontinued, which would result in a significant savings of both time and analytical costs.)

Please contact me or Lorraine Edmond if you have any questions or wish to discuss this matter further.

Sincerely,

Bill Adams

Bill Adams
Project Manager

cc: Lorraine Edmond, ESD
Gordon Brown, IDEQ
Gary Fenwick, Sho-Ban Tribe
Andy Hafferty, E&E

June 17, 1994

Mr. Bill Adams
M/S HW-113
U. S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Eastern Michaud Flats RI/FS
Revisions to Representative Groundwater Concentrations
and Proposed Reductions in Groundwater Analytes

Dear Mr. Adams:

Enclosed is a brief summary of the revised representative groundwater concentrations and the overall impact to interpretations made in the Preliminary Site Characterization Summary. This summary is not intended to be exhaustive, but it provides the needed supporting information to make decisions regarding the analytes for the June 1994 groundwater monitoring program.

As agreed in the May 18, 1994 meeting in Seattle, representative concentrations in groundwater were calculated using the data flagged with "U" qualifiers (non-detects) at the full detection limit value and one-half the detection limit value. The 95% upper confidence limit about the mean values of Bannock Range, Michaud Flats, and Portneuf River Valley representative wells were used to define representative concentrations of each constituent in groundwater. Mean values for each constituent at all other wells will be calculated and summarized in a future submittal.

Should you have any questions regarding this transmittal, please do not hesitate to call either of us.

Sincerely yours,

for

S. Currer
J. R. Simplot Company

for

J. Sieverson
FMC Corporation

cc: Mike Thomas, ID Dept. of Health and Welfare, Div. of Environ. Quality
Gordon Brown, ID Dept. of Health and Welfare, Pocatello Field Office
Gary Fenwick, Shoshone-Bannock Tribe
Andy Hafferty, Ecology and Environment

Revisions to Representative Groundwater Quality at the EMF Site and Proposed Sampling Program for June 1994

Based on EPA's and E&E's comments regarding the definition of representative groundwater quality at the EMF site, the values were recalculated using several different scenarios. These values were then compared to the representative concentrations presented in the PSCS (Preliminary Site Characterization Summary) and the December 1, 1993, Proposed Groundwater Monitoring Reductions. The following pages provide a background and results of the new calculations and the impact to the proposed reductions in groundwater monitoring.

BACKGROUND - PSCS Submittal and Comments

In January 1994, the PSCS was submitted for agency review. Section 4.4 of the PSCS described the impacts of site-related activities on local groundwater. This section of the report used representative concentrations of numerous constituents in wells outside site-related influences to define the nature and extent of site-related constituents in groundwater.

The method for assessing groundwater quality used in the PSCS is outlined below:

1. Representative wells were selected based on their hydraulic relationship to known source areas within the EMF site. If a well was hydraulically upgradient from the source areas, data were reviewed for inclusion into the representative network. Recognizing that concentrations of chemicals in groundwater can be highly variable, Bechtel selected the largest number of wells to incorporate as much of the potential variability as possible.

2. The EMF sources that impact groundwater all contribute high concentrations of major ions (K, Cl, sulfate, Ca, and Na). The major ions are mobile and are conservative (are not precipitated as minerals once dissolved in water). These were used as primary indicators of site impacts to groundwater. Statistically these ions provide a reliable data set since none of these ions were non-detects. These ions provide an uncensored normally-distributed dataset. The upper limit of representative concentrations was defined as the mean plus two times the standard deviation, which is an approximation of the 95% upper confidence limit about the mean for normally-distributed populations. Mean values and upper limits were calculated for each of the three hydrogeochemical regimes and for a combination of all three regimes.

3. Bechtel identified three hydrogeochemical regimes at the EMF site. The Michaud Flats regime is that groundwater occurring in the upper saturated gravels beneath the northern and westernmost portions of the site. The Bannock Range and Portneuf River Valley regimes were also identified, although the geochemistry of these two water types is quite similar in many aspects. By grouping all representative wells in the three regimes the overall variability of constituents was calculated; however, this "lumped" or grouped value was not used to define the nature and extent of site-related constituents. Where

feasible, the groundwater chemistry at each well was compared to the nearest groundwater regime. In cases where monitoring wells were located in a mixing zone between two groundwater types, the groundwater chemistry at this well was compared to a grouped value.

Wells 120 and 130 were included in the network, but as a separate subgroup. These wells were separated due to chemical differences and their proximity to known or suspected source areas. The Companies advised EPA in PSCS that these wells might reflect site influences and that Well 158 might be substituted after further sampling.

Issues to be Resolved

1. Calculation of Representative Analyte Concentrations in Groundwater

EPA and E&E disagreed with the "two times standard deviation" approach, especially since applying the two times standard deviation method to metals with a high proportion of non-detects was not a good approximation of the 95% upper confidence limit. At the 5/19/94 meeting it was agreed that Bechtel would provide EPA with a table showing the differences between representative concentrations calculated using the two time standard deviation vs. the 95% upper confidence limit. These values would be calculated by including values qualified with a U. Another comparison would utilize one-half the U value. Description of the nature and extent of site-related constituents would be based on the 95% upper confidence limit about the mean calculated using the full value for all U-qualified data.

EPA and E&E also agreed that nature and extent would also be defined by hydraulic relationships and presence or absence of major ions. Statistical definitions of confidence limits inherently acknowledge that a certain number of observations will exceed the upper confidence limit. Since the number of samples analyzed and the number wells in the EMF monitoring network comprise a very large population, virtually every well (both representative wells and wells downgradient of potential sources) will exceed one or more of the upper limits for at least one constituent. This statistical artifact will "force" the acceptance of every analyte as "site-related" or every well as "impacted" by site-related releases.

Without consideration of hydraulic relationships, this could lead to erroneous conclusions regarding the nature and extent of these constituents and the fate and transport. For example, barium is highest in wells west of any FMC source area in the vicinity of Pond 16S. Pond 16S was installed in 1993, after numerous water samples from Wells 147, 148, 149, 153, and 154 were analyzed for barium. These wells are downgradient from areas of undisturbed land; no FMC sources, past or present, were identified and yet the wells contained barium at the some of the highest levels observed at the site. Using a strict definition of site-related impacts as any constituent exceeding the 95% upper confidence limit of the representative mean value, one concludes (a) wells 147, 148, 149, 153, and 154 are impacted by EMF-related activities and (b) barium is a site-related

consituent. These are erroneous conclusions because the transport of barium from EMF sources to these wells does not fit the hydraulic relationships observed in numerous wells and because wells located within known EMF-related plumes do not have elevated barium, which supports the conclusion that barium is not site related.

The December 1993 validated groundwater monitoring data were included in the representative groundwater calculations. These data were not used in the PSCS due to availability. EPA and E&E agreed that Wells 514, 515, and 158 should be added to the representative network. Inclusion of these wells and the December 1993 data provide a larger database which better defines the natural variation in representative concentrations. All three of the new representative wells are upgradient of all known sources (see PSCS groundwater contour plot for August 1993 monitoring event - Figure 3.3-3E).

2. Inclusion of Wells 120 and 130 in Representative Monitoring Network

Wells 120 and 130 will not be used to calculate the 95% upper confidence limit for representative concentrations. Wells 158, 514, and 515 would be added to the representative network. Well 158 would be used as a replacement for 120 and 130 since it is upgradient of Pond 8S and other FMC potential sources. Wells 514 and 515 are north of the FMC facility and monitoring the Michaud Flats groundwater area.

3. Turbidity in Groundwater Samples - low flow purging

EPA requested the Companies use low flow sampling techniques at the EMF site to reduce the possibility of collecting turbid samples (nonrepresentative). FMC illustrated the cost impacts to the project if low flow techniques were implemented. The Companies proposed field monitoring with a turbidity meter rather than low flow purging. EPA agreed that field turbidity measurements would be a better method to ensure that non-turbid samples were collected. Guidance documents recommend samples to be less than 5 Nephelometric Turbidity Units (NTUs). The field measurements will be made prior to collecting samples at each monitoring wells. If the water is greater than 10 NTUs and pH, specific conductance, and temperature have stabilized, a filtered and unfiltered sample should be collected. The unfiltered sample will be analyzed for the standard analytes and upon completion of sampling the total number of well exceeding 10 NTUs will be reviewed and the unfiltered and filtered samples may be analyzed for iron and aluminum.

Current sampling procedures used by Hydrometrics are similar to the "low flow" sampling procedures recommended by EPA Region 3 and 8 given the hydrogeologic conditions at the site. Specifically, low flow sampling calls for purging to induce zero drawdown in the well while purging less than 3 casing volumes. Typically, the temperature, pH, and specific conductance stabilizes after several minutes of pumping at 200 to 300 ml/min. At the EMF site, purge water disposal is not a cost-saving concern, and low flow purging, if guidance procedures were implemented, would actually increase well sampling costs.

Numerous pumping tests and slug tests conducted at the EMF site indicate the monitoring wells are screened in aquifers with very transmissivity (up to 1.7 million gallons per day per foot). Purging at 5 gpm will not induce drawdown in most monitoring wells and is analogous to low flow purging recommended by EPA.

REDUCED ANALYTES AND PROPOSED MONITORING NETWORK

In December 1993 the Companies submitted a proposal to reduce the frequency, well network, and analyte list for the 1994 groundwater monitoring program. EPA approved of the reduced frequency (from quarterly to semi-annual) and also approved of the reduced monitoring network, pending clarification of discrepancies between the proposal text and tables describing the monitoring network. Wells 321, 323, and 515 were proposed as monitoring wells in the text but were not noted in the tables as being included in the monitoring network.

Clarification: Wells 321 and 515 are important wells to maintain in the monitoring network for boundary monitoring. These wells will remain in the monitoring network as stated in the text of the December proposal.

Well 323 was included for monitoring the upper gypsum stack. This well will be kept in the monitoring network to maintain a continuous time-series for the upper gypsum stack. This is especially important since JRS will eventually abandon Wells 300 and 306 now that the lower gypsum stack has been reactivated.

Reduction in analytes

EPA tentatively agreed on the reduction in analytes pending reanalysis of the representative concentrations using the 95% upper confidence level. As agreed upon at the 5/19/94 meeting, the representative concentrations were calculated using the full value of the detection limit for non-detects. Below is a brief description of impacts the revised representative values have in the previously proposed monitoring proposal.

The RI report will contain a more comprehensive discussion regarding the representative concentrations and their impacts on the nature and extent of site-related releases. Overall, the revised values lower than those in the PSCS; however, there are no changes to the initial interpretation regarding the nature and extent of site-related releases.

Antimony, Lead, Molybdenum, Silver, Thallium, and Zinc - Approved by EPA (June 13, 1994, telephone conversation between Bill Adams of EPA and Pam French of FMC).

Barium, Beryllium, Cadmium, Chromium, and Copper - The revised representative groundwater concentrations do not change the interpretations made in the PSCS regarding these constituents. The highest barium concentrations were observed in the

wells located near Pond 16S and were collected prior to the installation and operation of this pond.

Beryllium was detected at above representative concentrations in Wells PEI-5 and 318 at mean concentrations of 0.015 and 0.051 mg/l. Cadmium was detected at concentrations above the revised representative levels in Wells 318, 320, and 308 at mean concentrations of 3.25, 0.0058, and 0.0096 mg/l (for comparison to representative levels, see Table 1).

Chromium was detected above representative levels in Wells 318, 158, and 153 at concentrations of 4.59, 0.082, and 0.016 mg/l (Table 1). Well 153 is upgradient of all known FMC potential sources; it was located at Pond 16S. Well 158 is upgradient of all known FMC potential sources; it is upgradient of Pond 8S.

Copper was detected above-representative levels (Table 1) in numerous wells; however, only Well 318 and the Lindley well, had mean concentrations greater than 0.018 mg/l. Representative concentrations ranged from 0.0085 to 0.013 mg/l for the three groundwater regimes.

These metals will remain on the analyte list for Well 318. Further analyses are not warranted in other wells.

Mercury - Exceedances of the revised representative levels (0.0005 to 0.0008 mg/l) were observed in the mean concentrations at Wells 506, 520, and PEI-4 in the Portneuf River area, Wells 514, 516, and 144 for Bannock Range groundwater, Wells 515 and TW-5S for Michaud Flats groundwater. Wells 506, 520, 514, 515, and 516 are upgradient of known sources. PEI-4 shows no other site-related impacts. Thus, no further analyses for mercury in groundwater are warranted.

Aluminum and Iron - No further analyses are needed for these wells as the revised representative concentrations do not affect initial interpretations made in the PSCS.

Ammonia - The initial interpretations made in the PSCS are not affected. Revised representative concentrations are lower (0.5 mg/l), but there is a strong spatial correlation between nitrate and ammonia, and nitrate is an analyte that will be monitored.

Boron, Cobalt, Lithium, Nickel, and Vanadium - The Companies will continue monitoring for boron. This constituent was detected above the revised representative concentrations in several wells near the limits of the site-related groundwater impacts. Therefore, additional monitoring appears warranted at this time. The results of the March (FMC RCRA) and June groundwater monitoring events will be evaluated and a recommendation for further monitoring will be made after this evaluation.

Fourteen wells exceed the revised representative levels for cobalt. These wells are located within the facilities' fenceline. The area potentially impacted by cobalt is limited in extent and further monitoring for cobalt is not needed due to the observed lower

mobility of this constituent. Monitoring for sulfate, arsenic, and other more mobile constituents should provide adequate information regarding changes to groundwater flow patterns which may affect cobalt migration at the site. Thus, additional monitoring for cobalt does not appear warranted at this time.

EPA agreed that further monitoring for lithium is not warranted (Communication between Bill Adams of EPA and Pam French of FMC on June 13, 1994).

Nickel was above the revised representative concentrations in 13 wells. Nickel analyses will continue in Well 318, but additional nickel analyses should not continue as 11 of the remaining 12 are very close to sources currently monitored.

The 95% upper confidence limit for vanadium concentrations increased the representative concentration limit when compared to the method used in the PSCS for the Michaud Flats regime and the Bannock Range regime. Wells 507, 321, PEI-6, PEI-4, and 322 in the Portneuf River area exceeded the representative concentration for vanadium. None of these wells reflect site impacts, based on evaluation of other analytes, including major ions. Vanadium also exceeded the representative concentrations in Wells 143, 312, 123, and 318. Well 318 is associated with the former east overflow pond at Simplot and the vanadium concentrations in this well are indicative of past releases from this pond. Vanadium concentrations in Wells 143, 312, and 123 did not exceed 0.20 mg/l while the 95% upper confidence level for the Bannock Range groundwater was 0.100 mg/l and for Michaud Flats the representative level was 0.0745 mg/l. Based on these results, vanadium monitoring will not continue.

Gross Beta - No changes to the initial interpretations made in PSCS regarding gross beta. While the revised gross beta representative activities are lower, the correlation between potassium and gross beta still exists. Potassium will be retained in the list of analytes.

Cations and Anions - Sulfate and potassium are good indicator parameters and monitoring for these analytes will continue. Additional monitoring for calcium, chloride, and other cations and anions will not provide the level of confidence regarding changes in groundwater flow patterns at the EMF site. Revised representative concentrations for these parameters do not alter the interpretation that sulfate and potassium are the most reliable constituents for future monitoring.

Well 317 - At the recommendation of EPA, this well will be maintained in the monitoring network for 1994. Given the sharp decrease in dissolved metals observed in December 1993 in shallow well 318 at the former east overflow pond, there is a strong likelihood that these decreases will occur in Well 317; however, marked changes were not noted in the December results at Well 317. Since Well 317 is the deeper well, improvements to groundwater quality may lag the improvement already documented in Well 318.

The Companies proposed using the reduced analyte list for monitoring Well 317 rather than the analytes proposed for Well 318. The analytes on the reduced list are

comprehensive enough to document improvements to groundwater quality in the deeper groundwater. In addition, Well 317 did not contain the metals observed at elevated levels in Well 318, so further monitoring for the complete list of metals in this well will not provide additional useful information.

Representative Groundwater Concentrations

(mg/l or pCi/l)

CHEM_NAME	PSCS Bannock Range	Option A Bannock Range	Option B Bannock Range		PSCS Michaud Flats	Option A Michaud Flats	Option B Michaud Flats		PSCS Portneuf River	Option A Portneuf River	Option B Portneuf River
Alkalinity, bicarbonate	246	170	170		187	196	196		370	303	303
Alkalinity, carbonate	6.00	1.00	0.50		7.00	1.00	0.50		1.00	1.00	0.50
Aluminum	0.5200	0.4857	0.4857		0.1061	0.1059	0.0616		0.9000	0.9610	0.9215
Ammonia (NH3 as N)	1.09	0.50	0.25		0.77	0.68	0.63		0.72	0.50	0.25
Antimony	0.2300	0.1640	0.0862		0.1259	0.1000	0.0500		0.1019	0.1000	0.1000
Arsenic	0.0392	0.0195	0.0195		0.0190	0.0153	0.0153		0.0090	0.0069	0.0069
Barium	0.1407	0.1191	0.1191		0.2400	0.2352	0.2352		0.1900	0.1790	0.1690
Beryllium	0.0020	0.0040	0.0020		0.0020	0.0020	0.0010		0.0040	0.0020	0.0010
Boron	0.40	0.18	0.18		0.19	0.30	0.16		0.37	0.25	0.25
Cadmium	0.0060	0.0050	0.0050		0.0050	0.0094	0.0047		0.0020	0.0050	0.0025
Calcium	91.00	77.37	67.90		104.00	100.08	100.08		101.00	89.23	89.23
Chloride	106.00	52.10	52.10		196.00	193.60	193.60		82.00	69.25	69.25
Chromium	0.0102	0.0100	0.0090		0.0120	0.0100	0.0068		0.0150	0.0100	0.0050
Cobalt	0.0400	0.0168	0.0168		0.0150	0.0188	0.0100		0.0210	0.0169	0.0156
Copper	0.0240	0.0083	0.0083		0.0160	0.0053	0.0027		0.0360	0.0128	0.0065
Fluoride	0.59	0.60	0.60		0.83	0.80	0.80		0.37	0.40	0.40
Gross alpha	7.16	4.94	4.94		7.46	7.26	7.26		4.63	4.29	3.55
Gross beta	20.70	12.40	11.00		28.73	20.29	20.29		12.69	12.25	9.28
Iron	0.8100	0.2776	0.2646		1.3000	0.1705	0.1705		1.2000	0.9378	0.0020
Lead	0.0050	0.0038	0.0031		0.0040	0.0020	0.0010		0.0080	0.0020	0.0020
Lithium	0.0400	0.0171	0.0103		0.0720	0.0614	0.0614		0.0367	0.0342	0.0323
Magnesium	42.00	24.75	24.75		34.00	33.93	33.93		39.00	33.90	33.90
Manganese	0.0500	0.0154	0.0147		0.0670	0.0094	0.0059		0.0901	0.0694	0.0347
Mercury	0.0011	0.0007	0.0004		0.0012	0.0008	0.0004		0.0013	0.0004	0.0004
Molybdenum	0.0200	0.0555	0.0285		0.0370	0.0375	0.0188		0.0800	0.0300	0.0300
Nickel	0.0100	0.0200	0.0100		0.0207	0.0200	0.0100		0.0300	0.0258	0.0129
Nitrate (NO3 as N)	2.40	1.58	1.58		5.70	6.04	6.04		4.25	3.80	3.80
Orthophosphate (PO4 as P)	2.5000	0.1200	0.1040		0.1400	0.0400	0.0390		0.3900	0.0595	0.0545
Phosphorus	4.0000	0.0800	0.0500		1.9000	0.0484	0.0416		0.1300	0.1625	0.1605
Potassium	13.00	10.14	10.14		13.00	12.93	12.93		8.00	6.87	6.87
Radium-226	2.2337	1.9140	1.9140		4.1632	2.5165	2.5165		1.0895	1.0090	0.5340
Radium-228	3.5765	2.2750	2.1050		4.6739	4.5450	4.5450		5.4944	5.4900	5.4900
Selenium	0.0080	0.0053	0.0053		0.0060	0.0068	0.0049		0.0050	0.0067	0.0039
Silver	0.0100	0.0040	0.0040		0.0060	0.0040	0.0028		0.0030	0.0040	0.0020
Sodium	50.00	27.38	27.38		74.00	79.20	79.20		55.82	53.29	53.29
Specific conductance, at 25 C	927.31	562.25	562.25		1138.51	1062.40	1062.40		933.89	859.00	859.00
Sulfate	74.00	41.00	41.00		78.00	73.20	73.20		74.00	73.22	73.22
Thallium	0.0730	0.0040	0.0020		0.0193	0.0040	0.0020		0.0199	0.0053	0.0051
Total dissolved solids	611.00	410.00	410.00		876.00	964.00	964.00		591.00	580.00	580.00
Vanadium	0.0730	0.0885	0.0443		0.0110	0.1100	0.0550		0.3310	0.0200	0.0100
Zinc	0.5510	0.1918	0.1036		0.0290	0.0623	0.0311		0.2690	0.1067	0.1067
wells used to calculate representative values	120,130,PEI-1,301 106,305,Kinport	PEI-1,301,106 305,Kinport,158	PEI-1,301,106 305,Kinport,158		101,102,147, TW-10S	101,102,147, TW-10S,514,515	101,102,147, TW-10S,514,515		PEI-6,510,511,512 513	PEI-6,510,511,512 513	PEI-6,510,511,512, 513
representative wells with no exceedances of all representative levels	120,130,PEI-1,301 106,305,Kinport				101,102,147, TW-10S	101,102, 514,515	101,102, 514,515		PEI-6,510,511,512, 513	510,511,512, 513	510,511,512, 513

Notes:

PSCS = Representative levels used in Preliminary Site Characterization Summary calculated as mean plus two times standard deviation; all U'd data excluded

Option A = Representative levels calculated using 95% upper confidence level about mean; U'd data included at full U value

Option B = Representative levels calculated using 95% upper confidence level about mean; U'd data included at one-half U value

United States
Environmental Protection
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1200 Sixth Avenue
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Alaska
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000938

EPA

June 13, 1995

JUN 1995
Received
Environmental
Department/FMC

Reply to
Attn. of: HW-106

Mr J. David Buttelman
FMC Corporation
Phosphorous Chemicals Division
Pocatello, Idaho 83205

Re: Proposed RCRA Ground-Water Monitoring Reductions for the FMC Pocatello Facility, EPA ID# 07092 9518

Dear Mr. Buttelman:

In response to your May 22, 1995 letter, regarding a request for approval of a reduced analytical parameter list in your quarterly ground-water monitoring program the Environmental Protection Agency (Agency) has completed a technical review of the proposal. Under Part 265.93 (d) (4) and (7), the facility is responsible for determining the rate and extent of migration of the hazardous constituents in the groundwater and the concentrations of the waste constituents. The RCRA interim status ground-water program is largely self implementing. For this reason the Agency is unable to respond to requests for specific "approval" of your ground-water assessment plan components.

While the Agency does not offer specific approval of your proposed list, I would like to provide one technical comment. The reasons for eliminating parameters provided in your May 22 letter are similar to those developed in depth during previous meetings. With the exception of those arguments pertaining to cadmium, the reasons given are generally acceptable to the Agency. However, I believe FMC ought to consider retaining cadmium because it is a major component of your waste streams and could be reasonably expected to be present in site ground water. Acting within a technical support role, the Agency recommends that cadmium remain on the proposed analyte list.

The proposed analyte list is a significant reduction from 34 inorganic parameters and 4 radiological parameters to 10 inorganic parameters with no radiological parameters. The Agency agrees that this reduction appears appropriate at this stage of site characterization. It is, however, possible that FMC will further refine the conceptual model for the complex hydrogeologic system under study at this site. As this occurs, the facility may select additional parameters to be added to the list and should not hesitate to do so.

FMC Pocatello RCRA Analyte List, amended as discussed above:

Heavy Metals --	Arsenic, Cadmium, and Selenium
Water Quality --	Chloride, Fluoride, Potassium, Sulfate, Ammonia, Nitrate, and Orthophosphate
Field Parameters --	pH, Turbidity, Temperature and Specific Conductance

Should you have any questions or comments regarding this letter, or the effect of this program with regard to your site, please feel free to contact me at (206) 553-1262.

Sincerely,

Curt Black, Hydrogeologist
RCRA Permits Team
Hazardous Waste Division

cc: Sylvia Burges
Bill Adams
Mark Masarik, Idaho Operations Office

APPENDIX D

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 7

To Bob Hart | From Sylvia Burges
Dept./Agency FMC | Phone # 206 553-1254
Fax # 208/236-8205 | Fax # 206 553-8509
NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Technical Evaluation of RCRA Gro
FMC, Pocatello, Idaho January 12,

General Comments:

The RCRA ground-water monitoring system was evaluated for compliance with the Subpart F requirements of 40 CFR 265.91. This evaluation included a unit by unit evaluation of the following factors:

1) Hydrostratigraphic suitability of selected screen intervals;
2) Location of well, proximity to monitored units and down-gradient distribution along flow paths originating within the regulated unit;
3) Structural integrity and physical adequacy of the wells.

RCRA facilities engaged in detection and assessment monitoring are held to a substantial standard: "Monitoring wells (at least three) installed hydraulically down-gradient. . .at the limit of the waste management area. **Their number, locations and depths must ensure that they immediately detect** any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the uppermost aquifer".

Based on the comments submitted by the facility, the facility is convinced that the existing system is adequate. For a significant portion of the work they have completed, they are correct. All wells included in the RCRA ground-water monitoring program were found to be installed using materials and practices which should yield representative samples.

The system installed around Pond 16S, Pond 9E, and the Slag Pit Sump all appear to adequately address Subpart F requirements for location and choice of screened interval. The other three units will require modification to meet the requirements of 40 CFR 265.91. A total of seven new wells are recommended for adequate monitoring of this pond system. The basis for these modifications are discussed below in the specific comments. This section is followed by specific recommendations for each regulated unit.

To summarize the deficiencies regarding choice of screened interval, many of the wells were found to be screening gravels at depths considerably below the top of saturation. This is an accepted practice where ground-water production is the goal. In this RCRA monitoring system the following negative effects are anticipated from these deep well completions:

1) Excessive dilution in the gravel of the constituents of concern as they are delivered to this horizon and entrained in this highly productive aquifer.

2) Undesirable attenuation of constituents of concern during interaction with aquifer silts and clays prior to detection in the monitoring system.

3) Non-detection of an active release due to upward gradients out of the gravel horizon over most of the facility which would preclude migration to this horizon and subsequent detection in the deep screened intervals.

Additionally, the facility has encountered difficulty with detecting statistically significant differences between up-gradient and down-gradient wells. Reportedly, this has happened even in the absence of waste emplacement in the unit undergoing monitoring. The Agency has discussed with FMC a modified list of indicator parameters for use on this site. Another remedy for this challenge includes the location of wells as physically close as possible to each unit. Further, selecting screened intervals which are as shallow as practicable after reaching the depth of saturation provides for sampling water of local chemistry. In this way the facility avoids sampling high flow horizons affected by chemically distinct waters from different sources.

Specific Comments:

Below is a unit-by-unit/well-by-well assessment of each of the regulated units identified as not meeting the requirements of 40 CFR 265.91.

Regulated Unit #3 / Pond 15S

Up-gradient Well MW-101:

The chosen screened interval is surprising because it includes a 6-foot silt layer. If the screen were set 12 feet higher it could nearly completely screen the uppermost saturated unit with sufficient hydraulic conductivity to yield water to the well. As the well is screened the filter pack provides for mixing of a lower gravel zone and the sand of the uppermost saturated horizon, potentially diluting the aquifer horizon of interest.

Additionally, this well is located more than 700 feet up-gradient from the unit. This distance from the unit precludes isolating the changes in water chemistry produced by interaction with the regulated unit from those originating from other potential sources. Since the intended purpose of the detection monitoring system is to identify changes resulting from the regulated unit, this well is too far from the unit being monitored. The Agency typically defers to the facility to choose up-gradient locations. However, in this case, where the facility has encountered problems with changing ground-water chemistries across the site, the well should be substantially closer to the unit.

Up-gradient Well MW-130

This well is screened from 166.5 to 176.5 below ground surface (bgs). Saturation occurs at 70 bgs. A suitable sand (Silty Sand, with 20% silt) was logged at 69 to 95 feet bgs. The well is screened 98 feet deeper than appears necessary or desirable. A screened interval from 68-78 feet in depth would provide a better comparison with the screen intervals suggested below for the down-gradient wells for this unit. These horizons appear to correlate stratigraphically and are expected to be hydraulically connected.

This well is located obliquely up-gradient. A more suitable location would be 400 to 500 feet further west.

Down-gradient Well MW-113

The screened interval and location of this monitoring well appear to be appropriate.

Down-gradient Well MW-114

This well is screened at 116 to 126 feet bgs. Saturation occurs at 71 feet. A five-foot sand (Gravel with Sand, 10% silt and clay) occurs from 71 to 75 feet bgs. This appears to correlate with the sandy unit at a similar depth observed and screened in well 113. This unit and the underlying silty gravel with sand would be a good target interval for monitoring.

The well is located too far west to be considered down-gradient from Pond 15S due to converging flow lines which appear to be deflecting groundwater flow to the west in this area. The location appears suitable for monitoring the Phase IV Ponds, but the screened interval is approximately 46 feet too deep.

Down-gradient Well MW-115

To reach the screened interval chosen by the facility (118.5 - 128.5 feet bgs), descending groundwater must traverse 79 feet of silt. At the horizon screened in MW-113 a suitable silty gravel is logged in MW-115 with water production, "<1 gpm." One gpm should not be used as a cutoff for grondwater monitoring since usable wells producing at one tenth this level have amply served other monitoring programs. A screen from 78 to 85 feet bgs, or 40 feet above the interval selected by FMC appears appropriate. Since 25 feet of silt occurs as a single unit below the suggested interval and the horizon screened by FMC, it seems unlikely that infiltration would reach the horizon screened by FMC quickly enough to be considered "immediate detection."

The location selected for this well is suitable for monitoring for releases from this unit.

Regulated Unit #7 / Pond 8S

Up-gradient Well MW-116

This well appears suitably located and, while the screen is deeper than necessary or desirable (by 18 feet) it should perform the up-gradient function for this unit.

Up-gradient Well MW-158

This well appears suitably located. The screened interval at 136 to 146 feet bgs could be replaced with a screen at 91 to 101 feet bgs. The saturated unit present here was logged as a silty sand, but the description doesn't quantify the amount of silt. It was apparently producing sufficient water that the cuttings were returned as a slurry. That is, the formation delivers water at a rate more than adequate for use in ground-water monitoring. The factor which supports continued monitoring of the deeper horizon selected is that it appears stratigraphically similar to the horizons monitored by MW-120 and MW-152. In consideration of this, the well is suitable for use in the monitoring program.

N.B. The following discussion of wells MW-120 and MW-150 is based on the well designations indicated on Figure 1, Appendix C of FMC's Response to the CME. Other maps included in the Response reverse these designations.

Down-gradient Well MW-120

This well is screened within 4 feet of the highest possible interval. This interval appears to correlate with the interval screened by the up-gradient well. The well is suitable based on screened interval.

The location is down-gradient of the eastern most portion of the Regulated Unit. This location is acceptable. However, additional wells should be located further to the west.

"Down-gradient" Well MW-150

This well is unlikely to encounter any release from the regulated unit due to its location too far to the east. It is not useable in monitoring for this unit.

Down-gradient Well MW-152

The screened interval selected for this well is suitable for monitoring from this unit. The location is essentially the same as that of MW-120. It may be possible for the facility to continue to use this well if this location were augmented with a suitably sited well further west to encounter flow paths

originating near the center of the regulated unit. The facility should provide a third well location which meets the intention of "three wells. . .down-gradient" as established in the regulations.

Regulated Unit #8 and #11 / Phase IV and Pond 8E Combined System

Up-gradient Well MW-116

This well does not appear suitably located. The screened interval (106.6-116.1 feet) is also deeper than necessary or desirable (by 18 feet). Therefore this well is not capable of performing the up-gradient function for this unit.

Up-gradient Well MW-130

This well is screened from 166.5 to 176.5 bgs. Saturation occurs at 70 bgs. A suitable sand (Silty Sand, with 20% silt) was logged at 69 to 95 feet bgs. The well is screened 98 feet deeper than appears necessary or desirable. A screened interval from 68-78 feet in depth would provide a better comparison with the down-gradient screened intervals proposed below.

This well is located too far west to perform the up-gradient function. A more suitable location would be 600 to 700 feet further east.

Down-gradient Well MW-104

This well is screened suitably from 96.5 to 106.5 feet bgs. The location is only tangentially down-gradient from the edge of the unit. In the presence of other suitably located wells, this weakness might be overlooked. Due to the deficiencies noted below regarding MW-131 and MW-132, additional well coverage for the down-gradient portions of this unit are necessary. If replacement wells for MW-131 and MW-132 are added in suitable locations and properly screened then MW-104 could continue as the third down-gradient well.

Down-gradient Well MW-131

Water was encountered at 85 feet bgs during the advancement of the soil boring for this well. The screened interval (153.9-163.9) selected is 69 feet deeper than first water. Since the driller's log observed and logged "abundant ground-water discharge" from a unit logged as a "Clayey Gravel" (50% clay), it would be desirable to know how much water could be produced from the "Silty Sand" logged from 100 to 120 feet bgs. Given the depth to the screened interval, it is very difficult to give credit to this well as capable of "immediately detecting" a release. The well should be replaced with a well screening an appropriately shallow interval. Additionally, the new well

should be located to target the central portions of Pond 8E or the Phase IV Ponds, rather than the margins or the interval between the ponds.

Down-gradient Well MW-132

The screened interval from 106.4-115.9 appears as shallow as is possible given the units logged in the advancement of the soil boring. The location is nearly on the same line of ground-water flow as MW-104, which is already tangential to the unit. Considering the excessive distance to this well and the redundancy with the monitoring provided by MW-104, this well cannot be considered capable of "immediately detecting" a release from this unit.

A location somewhat equidistant between MW-131 and MW-114 would be a good choice.

Down-gradient Monitoring Well MW-114

MW-114 appears to be located too far west to perform the down-gradient function and is also too distant from the regulated unit. It would be desirable for a new downgradient well to screen the interval from 75 to 85 feet bgs, which would evaluate the uppermost water-bearing unit and be comparable to the suggested screen interval for the up-gradient well.

Recommendations:

Pond 15S:

The facility should install a new well providing an up-gradient function for this unit. The well should be physically close to the unit and screen an interval comparable to the stratigraphic unit seen down-gradient from 70 to 80 feet bgs.

Neither MW-114 or MW-115 screen an interval which could be considered the uppermost water-bearing zone. Since MW-115 is more favorably located, MW-114 should be replaced with a well located between MW-115 and MW-113. Alternate locations further west would also be suitable.

Summary: 1 new up-gradient well, 1 new down-gradient well.

Pond 8S:

The up-gradient wells, when considered together, provide adequate coverage to evaluate ground-water quality approaching this unit. While marginal, due to its tangentially, down-gradient location, MW-120 is screened adequately. Well MW-150 is not suitable due to its location and should be replaced. Similarly, since the location for MW-152 essentially overlaps that of MW-120, a new

location should be selected which monitors the central portions of the unit. In this way, two new wells can meet the intention of the requirement for three down-gradient wells.

Summary: 2 new down-gradient wells.

Phase IV and Pond 8E System:

MW-130 and MW-137 are located too far west to reflect the chemistry of the water which should be monitored at the down-gradient limit of the unit. A new up-gradient well at a truly up-gradient location and screened to sample the chemistry of the upper-most water-bearing unit is needed.

Down-gradient monitoring can be accomplished using the existing MW-104, augmented with 2 new wells. MW-131 and MW-114 should be replaced with wells screening an appropriately shallow interval. Additionally, the new wells should provide sampling locations from the central portions of the regulated units, rather than concentrating sampling at the margins of the units.

Summary: 1 new up-gradient well, 2 new down-gradient wells.

FMC Corporation

Phosphorus Chemical Division
Box 4111
Pocatello, Idaho 83205
(208) 236-8200

FMC

July 24, 1995

Curt Black
M/S HW-106
U.S. EPA, Region 10
1200 Sixth Avenue
Seattle WA 98101

Dear Curt:

I want to take the opportunity to thank you for your efforts to become acquainted with the FMC facility and it's issues, and in particular for your visit last week.

As we agreed I am attaching a summary of the agreements we reached regarding the well locations and construction intervals for the 1995 RCRA wells. Also I committed to get you two letters of explanation: (1) explaining the migration of contaminants through an upward gradient, as in the vicinity of Pond 8S; and (2) a letter from Idaho Power regarding masking the power line between Pond 9S and the Phase IV ponds. These letters will be forwarded in the next couple of weeks.

If you have any questions or concerns regarding the meeting, this letter or the agreement that I have summarized in the attachments, please let me know. Again, FMC appreciates your efforts.

Sincerely,

Pamela S. French
Sr. Environmental Engineer

Pamela S. French

cc: RE Hart
JD Buttelman

The following is an outline of the 1995 well installations and constructions agreed to during the July 18/19, 1995 meetings with Curt Black, Region 10 EPA.

15S wells

Well 165

This is an upgradient well for 15S. This well will be located just outside the south gate, between the FMC fence and the Kinport access road. It will be as near the fence corner as possible and still maintain the required distance from the overhead power lines. The split spoon interval will begin at 65ft. and continue to 95 ft. If a sand unit is present at approximately 75 ft. this will be the completion interval. If this unit is non-existent, it will be completed in the upper gravel,with the screen interval at the top of the gravel unit (i.e. at the facies change).

Well 166

This is a downgradient well for 15S. This well will be located north of the fence between the ponds and Bannock Paving, midway between existing wells 113 and 115. The split spoon sampling interval will begin at 60 ft. and continue for 30 ft. If an upper sand unit that is present in well 115 at about 70 feet is present, the well completion will be in this unit. If the sand unit is not present (as in well 113) then the well will be completed in the upper gravel, with the screen interval at the top of the gravel unit (i.e. at the facies change).

Phase IV and 8E wells

Well 167

This well is an upgradinet well for the Phase IV ponds and 8E. This well will be located as close as possible south of the middle dike of the Phase IV ponds, near the juncture of the south property road, and the south pond road. The split spoon interval will begin at 80 ft. and continue through 110 ft. If the sand unit present at approximately 90 ft. is present, the well completion will be in this unit. If the sand unit is not present, the well will be completed in the upper gravel, with the screen interval at the top of the gravel unit, (i.e. at the facies change).

Well 168

This is a downgradient well for the Phase IV ponds and 8E. This well will be located as far east of well 114 as possible, on the north side of the fence between FMC and Bannock Paving. The split spoon sample interval will begin at 65 ft. and continue to 95 ft. If the sand unit present in well 115 is present at about 70 ft..

the screen will be in this unit. If the sand is not present, this hole will be plugged and abandoned. The rig will then move to a location just east of well 114 and screen through the upper sand unit, immediately below the water table at about 70 ft.

Pond 8S wells

Three wells across the road from Pond 8S (downgradient) will be installed, one north of 150, one at the intersection of the ferrophos road and the Pond 8S road, and one as far east as possible, north of road and west of the slurry lines and power line north of 9S.

Well 155

The split spoon sample will begin at 95 ft. and continue to 120 ft. The screen will be placed at the facies change between the silt and the silty gravel, between 115 and 120 ft. in well log 150.

Well 156

This will have the same construction and sampling interval as well 155.

Well 157

This will have the same construction and sampling interval as well 155.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

AUG 1997
Received
Environmental
Department/FMC

August 19, 1997

Reply To
Attn Of: WCM-121

cc: PRY
WSM
REH
SEL
RJH
John Stillman
Dave Heineck
M. O'Bannon

Mr. Dave Buttleman
Environmental Manager
FMC Corporation
P.O. Box 4111
Pocatello, Idaho 83205

Re: FMC Corporation, EPA I.D. No. IDD 07092 9517
Pond 17 Response Action Plan/Groundwater Monitoring

Dear Mr. Buttleman:

The Environmental Protection Agency (EPA) has completed its technical review of FMC's proposed action leakage rate (ALR) for Pond 17. The results of this review have been sent under separate cover.

On May 30, 1997, as requested by EPA, FMC submitted information pursuant to 40 CFR Part 265 supporting conversion of the NOSAP Landfill to a surface impoundment (Pond 17). EPA has conducted a preliminary review of 1) the Response Action Plan (RAP), which FMC is required to submit pursuant to 40 CFR §265.223(a), and 2) the Groundwater Monitoring Plan pursuant to 40 CFR Part 265 Subpart F. EPA has not conducted a complete review of all the information submitted. FMC must ensure its plans and operations are compliant with all applicable regulations.

Although EPA regulations do not provide for approval of the RAP, or the Groundwater Monitoring Plan, we would like to share with you our concerns regarding these plans. We believe the RAP does not adequately address 40 CFR §265.223(b)(3), the requirement to determine the location, size and cause of any leak. The RAP implies that if the unit is used for wastes other than NOSAP wastes, FMC does not have the ability to determine the location, size and cause of a leak from the surface impoundment. The RAP also implies the facility could not respond to a

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catastrophic release if the unit is used for wastes other than NOSAP waste.

EPA does not believe this meets the requirements of this regulation. EPA similarly has comments on the proposed groundwater monitoring system. EPA has discussed these comments with FMC staff, and the comments are provided in the enclosure to this letter for your consideration.

If you have any questions, please do not hesitate to contact Linda Meyer at (206) 553-6636.

Sincerely,

David Cristor for

Michael A. Bussell, Director
Office of Waste and Chemicals Management

Enclosure

cc: Bob Hart, FMC
Candy Jackson, Shoshone-Bannock Tribe
Susan Hanson, Shoshone-Bannock Tribe
Deborah Reyher, DOJ

MONITORING WELL LOCATIONS AND SCREEN PLACEMENT

Figure A-1 presents the locations of three existing wells for monitoring releases from Pond 17; one proposed location for an additional well is also shown. Deficiencies with the well locations are:

- Well 169 is insufficient for monitoring groundwater quality upgradient of pond 17. FMC has stated previously that two chemically different groundwater regimes exist. Pond 17 lies near the convergence zone of the two regimes according to the flow paths shown in the figure, therefore it is important to obtain upgradient groundwater samples from both regimes.

- The well screens of well 169, and 171 are placed too deeply to properly monitor the uppermost aqnifer.

- Well 170 is completed within a layer of bedrock (Rhyolite) instead of overlying silty gravel and sandy silt. It is unknown if groundwater chemistry in this well is the same as that in the other monitoring wells. Further geochemistry characterization should be conducted after the baseline data are available to determine whether well 170 can be used as a downgradient monitoring well.

A total of three new wells should be installed: an upgradient well west of Pond 17, a downgradient well northeast of Pond 17 and northwest well 171, and the proposed new well 172 indicated in Figure A-1. The well screens of the new wells should be placed in the uppermost aquifer as near to the water table as possible, in a zone that yields significant amounts of groundwater (that is, enough to be a viable domestic water supply).

The geologic drill log of well 170 indicate complex lithology at the site of Pond 17. Rhyolite bedrock was encountered at an elevation of 4,391 feet above mean sea level. The bedrock was not found at this elevation in the other two borings. The lateral extent of the bedrock layer should be further characterized after the new monitoring wells are installed.

ALTERNATE VERSUS DETECTION MONITORING SYSTEM

The text indicates that an alternate groundwater monitoring system is being implemented for Pond 17. The Pond 17 groundwater monitoring program presented is actually a detection program (defined in Title 40 Code of Federal Regulations [40 CFR] 265 Subpart F) that meets the analytical parameter requirements specified in 40 CFR 265.92 [b][1 through 3] and includes three additional analytical parameters: ammonia, orthophosphate, and potassium. According to 40 CFR 265.90 (d), an alternate groundwater monitoring

system may be implemented if the "owner or operator assumes (or knows) that ground-water monitoring of indicator parameters in accordance with §§265.91 and 265.92 would show statistically significant increases (or decreases in the case of pH) when evaluated under §265.93(b)." Pond 17 is a new pond, and it does not appear that FMC acknowledges that contaminant releases to groundwater have occurred. Also, if FMC were to acknowledge that releases to groundwater have occurred, the alternate groundwater monitoring program would have to include analysis of the hazardous wastes or hazardous waste constituents at the facility (40 CFR 265.93 [d][3][ii]), not just indicator parameters, as currently proposed. The discrepancies should be resolved.

PROPOSED FUTURE REDUCTION IN MONITORING PARAMETERS

The text states that after four quarters of monitoring, the list of parameters monitored in the Pond 17 monitoring program will be reduced to he consistent with the monitoring programs for the other waste management units. Such a reduction should not occur by default after four quarters of monitoring but should be justified by the analytical results obtained during the four quarters. Any reductions should be approved by EPA before implementation.

FMC Corporation

Phosphorus Chemical Division
Box 4111
Pocatello, Idaho 83205
(208) 236-8200

FMC

September 23, 1997

Ms. Linda Meyer
M/S HW-106
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Additional Groundwater Monitoring Wells at Pond 17, FMC, Pocatello

Dear Ms. Meyer:

As we have discussed by telephone, FMC installed five (5) additional groundwater monitoring wells at Pond 17 during July 1997. One well (172) was installed as proposed in FMC's RCRA Groundwater Monitoring Plan for Pond 17, May 1997, and four wells (179, 180, 181 and 182) were installed in response EPA's comments on the Groundwater Monitoring Plan for Pond 17 as documented in a letter from EPA dated August 19, 1997. Details on the additional monitoring well locations and construction details are provided in this letter and attachments.

The current Pond 17 monitoring well network (a total of 8 wells) is shown on attached Figure A-1. Boring logs and well construction diagrams for the new wells are also attached. The additional well locations and screened interval are described below:

Monitoring well 179: Located up-gradient and adjacent (to the extent practical) to the west of Pond 17. This well is screened from 49 to 59 feet below ground surface (bgs) in the fine-grained (silt and clayey silt) saturated zone. This well is screened across the water table (static water level was measured at 50.77 feet bgs on August 18). Pump testing of this well showed that this well will not sustain a yield of 1 gallon per minute (gpm).

Monitoring well 181: Located down-gradient and north-east of Pond 17, northern-most down-gradient well. This location is as far north and west as practical from well 171 due to obstruction from the Chevron pipeline easement and Pond 17 access road. This well is screened from 50 to 60 feet below ground surface (bgs) in the fine-grained (silt and clayey silt) saturated zone. This well is screened at the water table (static water level was measured at 48.8 feet bgs on August 18). Pump testing of this well showed that this well will not sustain a yield of 1 gallon per minute (gpm).

Monitoring well 180: Located down-gradient and east of Pond 17, southern-most down-gradient well. This well is located in close proximity to well 170. This well is screened from 52 to 62 feet bgs in both the fine-grained (silt and clayey silt) saturated zone and uppermost coarse-grained (sand and gravel) saturated zone. This well is screened near the water table (static water level was measured at 50.7 feet bgs on August 18).

Monitoring well 182: Located down-gradient and east of Pond 17, "middle" down-gradient well. This well is screened from 48 to 58 feet bgs in the fine-grained (silt with gravel and clayey silt) saturated zone. This well is screened at the water table (static water level was measured at 48.42 feet bgs on August 18).

Monitoring well 172: Located as the third down-gradient well on the east side of Pond 17, between wells 170 and 171. This well is screened from 71 to 76 feet bgs in the uppermost coarse-grained (sand and gravel) saturated zone. This well is not screened across the water table (static water level was measured at 48.66 feet bgs on August 18).

Monitoring wells 179, 181 and 182 were installed at locations and screened intervals as recommended in EPA's comments. However, as FMC has stated in the past, the fine-grained saturated zone does not yield a significant quantity of water as demonstrated at wells 179 and 181. The silt with gravel encountered at well 182 does yield more water (well 182 yields greater than 1 gpm), however this more permeable horizon is not laterally extensive (was not encountered at well 179 or 181).

Well 180 was installed to address EPA's comment that well 170 is screened in rhyolitic bedrock and may monitor a different hydrogeochemical regime than encountered in the sand and gravel aquifer. Groundwater geochemistry data will be compared between the wells to evaluate possible geochemical differences prior to abandoning well 170 in favor of well 180 that is screened in the sand and gravel aquifer.

As noted by EPA, Pond 17 has not received any waste and releases have not occurred from Pond 17. FMC's groundwater monitoring at Pond 17 is for leak detection using an alternate statistical method for data evaluation. The alternate statistical method used by FMC was developed for leak detection monitoring in consultation with EPA (James R. Brown, EPA Office of Solid Waste). FMC has previously provided information to EPA demonstrating that concentrations of indicator parameters in down-gradient wells are statistically higher than the up-gradient well at Pond 17 using the analysis of variance technique recommended in RCRA guidance documentation. The statistical difference is due to the influence of different hydrogeochemical regimes and groundwater contamination from old ponds. The ANOVA technique cannot distinguish existing groundwater conditions from a potential future leak and is not appropriate for leak detection at the site.

The additional wells were sampled during the week of August 18 as part of the regularly scheduled third-quarter RCRA groundwater monitoring. Per FMC's RCRA Groundwater Monitoring Plan for Pond 17, the samples will be analyzed for the Appendix III list of parameters. Analytical results for the new wells will be included in the third quarter 1997 RCRA groundwater data package. As in the past, the quarterly data packages will be sent to your attention. Following the initial four quarters of data, FMC will review the data and reduce the analytical parameter list for Pond 17, as appropriate.

Please feel free to contact me at (208) 236-8658 should you have questions regarding this information.

Very truly yours,

Rob J. Hartman

Rob J. Hartman
FMC Corporation

Attachments

cc: Jim McCormick, EPA

Author: LINDA MEYER <MEYER.LINDA@epamail.epa.gov> at Internet
Date: 10/1/98 4:54 PM
Priority: Normal
TO: ROB HARTMAN at CPGPOC02
CC: LIT@ttemi.com at INTERNET
Subject: GW MW comments/questions -Forwarded

Hi Linda,
The following summarizes my comments and questions on FMC's proposal of new monitoring well installation. We may need to talk to Rob to make sure that my summary of FMC's proposal is accurate and to clarify that 10/12/98 well installation activity will have any deviations from the Pond 8S closure plan (may/1998) and Part B Permit Application (revised 1/31/1998). Any questions about this summary, please send me an e-mail (since you cannot talk now; hope you get better soon).

(1) Pond 8S

Currently: One upgradient well (158) and three downgradient wells (155, 156, and 157).

Proposal: Install a new upgradient well (183) near 158 and screened at water table.

Comments: I don't have problems with this proposal. However, we need to know the specific location of the new well 183. How far from 158? In which direction? Also 158 should be continuously monitored. I don't know whether we have representative upgradient wells even after we add 183. Lithology at Pond 8S changes significantly from up- to down-gradient of the pond (In FMC's term, maybe facies change). Whether the up- and down-gradient gradient wells are installed in a horizontally hydraulically well-connected zone remains to be evaluated.

In general, I agree with Rob's proposal: when well is advanced to the target depth, let it sit for awhile to evaluate the potential yield capacity. I would like to discuss with Rob what type of drilling rig/method he will be use: auger? air rotary? with driving casing? mud? It is critical to avoid using mud. The field geologist should be very experienced to be able to log the lithology without continuous coring.

(2) Pond 17

Currently: One upgradient well (179) and six down gradient wells (170, 171, 172, 180, 181, and 182). Out of total five down gradient wells, only three wells (171, 172, and 180) were proposed to be included in the monitoring network by FMC.

Proposal: Install a new upgradient well at deeper depth (173) to replace 179.

Comments: Several questions: what happened to well 170? This well was installed in rhyolite bedrock. Did we have sampling result for 170? How was it in comparison to the results from 180? What are the yield from wells 181 and 182? Were the wells dry or dry seasonally? Have the wells 181 and 182 been sampled? I am not concern about low yields of these two wells. The question is whether they are representative of the upper most aquifer. We need more information before approving the proposed 4-well monitoring network for Pond 17.

I don't have problem to add 173 as upgradient well. But it is too early to talk about to replace 179. Lithology and groundwater flow pattern are also complex in this area. Bedrock depth is shallow. Lateral continuity of lithologic layers may be limited. Cross sections perpendicular to flow directions show significant different features. It is still questionable that we can delineate a horizontally continuous upper aquifer zone along the flow direction. In other words, we don't know whether the current and proposed up- and down-gradient wells are monitoring the same zone and what zone is more appropriate to be monitored. I would like to discuss with Rob and his consultants on this issue.

(3) Ponds 18/19

Currently: One down-gradient well (154)

Proposal: two new upgradient wells 174 and 175. Three down gradient wells 176, 177, and 178. Six new wells (184, 185, 186, 187, 188, and 189) as contingency water table wells. These water table wells will be paired with wells 174, 175, 176, 177, 178, and 154, respectively.

Comments: I think that the plan was good. My recommendation is to drill the wells at the targeted water table depth. If there is water in the borehole after sit or initial well development, test the yield and complete the water table well. FMC may chose to construct deep wells too. Giving the complexity of lithology and hydrostratigraphy at this area, we may need the well pairs to figure out the groundwater flow pattern and geochemistry. I think FMC should plan to install the 11 wells as proposed in the Part B Permit Application. Make sure the paired wells are not too far with each other. I don't know the exact locations for pond 17 wells; but it appears to me some the shallow wells are 100 feet from the deep wells. Also make sure have an experienced field geologist/hydrogeologist log the boring consistently.

APPENDIX E

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	155

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 450,432.7 E 554,398.5	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-5-95	9-5-95	Layne Environmental	AP-1000	10"	123.6	0.0	123.6

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		8	4491.21	4489.0	▽ 92.9/4396.1 (9-8-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 122.7 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" N	% CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								4489.0				0 - 5 ft. **SILTY GRAVEL (FILL)**: Medium gray; gravel to 2"; 20% silt; loose, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
								4484.0	5			5 - 15 ft. **SILTY GRAVEL (GM)**: Moderate brown (5YR 4/4); subangular gravels to 2"; 20% fine- to medium-grained sand; 40% silt; loose, moist.	
									10				Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
								4474.0	15			15 - 48 ft. **SANDY SILT (ML)**: Moderate brown (5YR 4/4); 20% fine-grained sand; soft, moist.	
									20				
									25				
									30				
									35				
									40				
									45				
								4441.0	50			48 - 63 ft. **SILTY GRAVEL (GM)**: Moderate brown (5YR 4/4) to Grayish orange (10YR 7/4); subangular to subrounded gravel to 4", purple quartzite and colorful metamorphics; 20% silt; 20% fine- to coarse-grained sand; loose, slightly moist.	
									55				

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	155

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	155

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4426.0			
								65	63 - 95 ft. **SANDY SILT (ML)**: Grayish orange (10YR 7/4); 20% fine-grained sand, trace coarse-grained sand; soft, slightly moist. Occasional rounded quartzite and metamorphic cobbles to 4".	
								70		
								75		
								80	At 79 feet, becomes moist.	
								85		
								90	At 89 feet, increase in moisture and cobbles increase in abundance to 20-30%.	
							4394.0			
SS	2.0	2.0	4-4-7-19				4393.4	95	95 - 95.6 ft. **SAND (SP)**: Pale brown (5YR 5/2); medium-grained sand, loose, moist.	
SS	2.0	2.0	6-10-19-25				4391.0		95.6 - 98 ft. **CLAY (CL)**: Pale yellowish brown (10YR 6/2); 10% fine-grained sand; low plasticity, stiff, moist.	
SS	1.8	1.7	8-24-33-50/3"					100		At 99 ft. samples are wet.
SS	2.0	2.0	8-13-20-30						98 - 103 ft. **SANDY SILT (ML)**: Pale yellowish brown (10YR 6/2); 40% fine-grained sand; stiff, moist.	
							4386.0			
SS	2.0	2.0	4-5-15-22				4385.5			At 103 ft. thick clumps of silt resemble cobbles.
							4385.0			
SS	2.0	1.8	9-16-18-21				4383.5	105	103 - 103.5 ft. **CLAY (CL)**: Dark greenish gray (5GY 4/1); moderate plasticity, stiff, moist.	
							4382.0			At 105 ft. free water appears in cuttings.
SS	0.9	0.8	7-50/5"						103.5 - 104 ft. **SANDY SILT (ML)**: Light olive gray (5Y 5/2); 20% fine-grained sand; low plasticity, stiff, moist.	
SS	0.4	0.4	50/4"					110		At 107 ft. thick mud.
									104 - 105.5 ft. **SILTY SAND (SM)**: Light olive gray (5Y 5/2) mottled with Moderate brown (5YR 4/4); very fine-grained sand; 30% silt; dense, moist to wet.	
								115	105.5 - 107 ft. **SILTY SAND (SM)**: Pale yellowish brown (10YR 6/2); fine- to medium-grained sand; 20% silt; dense to loose, wet, muddy.	
								120	107 - 123.6 ft. **SILTY GRAVEL (GM)**: Pale yellowish brown (10YR 6/2); subrounded to rounded gravel to 6", colorful quartzite and metamorphics; 10% fine- to coarse-grained sand; 20% silt; loose, wet.	At 119 ft. moderate to abundant muddy water.
							4365.4			Installed 4" monitoring well on 9/5/95.

TOTAL DEPTH: 123.6 FEET

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 155

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	156

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 450,418.6 E 554,633.2	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-8-95	9-9-95	Layne Environmental	AP-1000	10"	124.1	0.0	124.1

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		7	4494.57	4492.1	▽ 95.7/4396.4 (9-10-95) ▼ /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 124.0 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4492.1				0 - 15 ft. **SILTY GRAVEL SLAG (FILL)**: Dark brownish gray; angular to rounded gravel to 4"; 30% silt; 30% fine- to coarse-grained sand; loose, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
								5				
								10				Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4477.1	15			15 - 25 ft. **SLUDGE (FILL)**: Dark brownish gray; soft puddy-like consistency; wet; odd swampy odor; does not smoke or smell like existing ponds at site.	
								20				
							4467.1	25			25 - 54 ft. **SANDY SILT (ML)**: Dark yellowish brown (10YR 4/2); 20% fine-grained sand; loose, wet, odor as above at 15 - 25 ft.	
								30				
								35				
								40				
								45				
								50				
							4438.1	55			54 - 62 ft. **SILTY GRAVEL (GM)**: Dark greenish gray (5GY 4/1); angular to subrounded gravel to 6"; 20% fine- to coarse-grained sand; 30% silt; loose, moist.	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	156

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	156

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4430.1				At 61 feet, color changes to Greenish gray (5GY 6/1).	
								65			62 - 98.5 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; trace rounded 1/4" sized gravel; soft, moist.	
								70				
								75				
								80				
								85			At 85 feet, color changes to Olive gray (5Y 4/1), with a trace of gravel to 4".	
								90				
SS	2.0	2.0	5-15-21-23					95				
SS	2.0	2.0	10-10-13-19				4393.6					
SS	2.0	2.0	4-8-10-21					100			98.5 - 102 ft. **CLAY (CL)**: Light olive gray (5Y 5/2); low plasticity; stiff, saturated.	
SS	2.0	2.0	4-6-10-20				4390.1					
SS	2.0	2.0	3-3-11-20				4388.6				102 - 103.5 ft. **SILT (ML)**: Pale yellowish brown (10YR 6/2); low plasticity, stiff, saturated.	
SS	2.0	2.0	11-26-39-44				4386.1	105			103.5 - 106 ft. **CLAY (CL)**: Moderate yellowish brown (10YR 5/4); low plasticity, stiff, saturated.	Above 106 ft. no free water.
SS	2.0	2.0	2-9-15-17				4384.1					
							4383.1	110			106 - 108 ft. **SILTY SAND (SM)**: Moderate yellowish brown (10YR 5/4); fine- to medium-grained sand; 20% silt; dense, saturated.	Below 106 ft. minor water. Below 108 ft. moderate amount of water.
								115			108 - 109 ft. **SILTY SAND (SM)**: Moderate yellowish brown (10YR 5/4); fine- to coarse-grained sand; 20% silt; 10% subangular to subrounded gravel to 1"; loose, saturated.	Below 109 ft. abundate water.
								120			109 - 124.1 ft. **SILTY GRAVEL (GM)**: Dusky yellowish brown (10YR 2/2); angular fragments to rounded cobbles to 6", colorful quartzite, metamorphics and volcanics; 20% silt; 20% fine- to coarse-grained sand; loose, saturated; pond-swamp odor.	
							4368.0				At 115 feet, color changes to Moderate yellowish brown (10YR 5/4), odor no longer present.	Installed 4" monitoring well on 9/9/95.

TOTAL DEPTH: 124.1 FEET

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 156

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 3	157

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 450,429.5 E 554,874.5	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-7-95	9-7-95	Layne Environmental	AP-1000	10"	134.5	0.0	134.5

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		12	4502.30	4500.2	▽ 104.3/4395.9 (9-8-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 133.5 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N"	% CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								4500.2				0 - 19 ft. **SILTY SANDY GRAVEL SLAG (FILL)**: Brownish gray (5YR 4/1); dense to loose, dry to moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
									5, 10, 15				Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
								4481.2	20, 25, 30, 35, 40			19 - 42 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; trace coarse-grained sand to 1/4" gravel; soft, moist.	
								4458.2	45			42 - 46 ft. **SILTY GRAVEL (GM)**: Moderate yellowish brown (10YR 5/4); 20% fine- to coarse-grained sand; 20% silt; loose, moist.	
								4454.2	50, 55			46 - 106.5 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; soft, moist.	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 157

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 3	157

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	6-29-27-29					95				
SS	2.0	1.7	18-26-23-28								At 97 feet, samples are saturated.	At 97 ft. split-spoon sampler wet. Samples saturated but no free water.
SS	2.0	1.8	13-29-43-39					100				
SS	2.0	2.0	12-17-28-35									
SS	2.0	2.0	11-19-25-37					105				
SS	2.0	2.0	17-21-24-22				4393.7				106.5 - 110 ft. **CLAY (CL)**: Pale yellowish brown (10YR 6/2) to Light olive gray (5Y 5/2); low to moderate plasticity, firm to stiff, saturated.	
SS	2.0	2.0	11-7-8-24									
SS	2.0	2.0	5-9-14-20				4390.2	110			110 - 113.5 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; stiff, moist to wet.	
SS	2.0	2.0	5-9-12-14									
SS	2.0	1.8	7-26-30-39				4386.7					At 113 ft. abundant water production.
SS	1.2	1.2	15-24-50/3"					115			113.5 - 118 ft. **SILTY SAND (SM)**: Light brown (5YR 5/6); fine-grained sand; 20% silt; wet.	
SS	0.3	0.3	50/4"				4382.2				At 115 - 115.5 feet, clayey silt layer.	
							4381.2					
								120			118 - 119 ft. **SILTY SAND (SM)**: Moderate brown (5YR 4/4); fine- to coarse-grained sand; 20% subangular to rounded gravel to 4", colorful quartzite and metamorphics and black volcanics.	
								125			119 - 134.5 ft. **SILTY GRAVEL (GM)**: Moderate brown (5YR 4/4); subangular to rounded gravel to 4", colorful quartzite and metamophics and black volcanics; 20% fine-	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 157

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	3 OF 3	157

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								130			to coarse-grained sand; 20% silt; loose, saturated.	
							4365.7				TOTAL DEPTH: 134.5 FEET	Installed 4" monitoring well on 9/7/95.

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 157

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	165

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 449,237.3 E 551,986.2	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
8-24-95	8-24-95	Layne Environmental	AP-1000	10"	97.2	0.0	97.2

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		8	4464.16	4461.7	▽ 64.6/4397.1 (9-5-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 97.0 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4461.7				0 - 83 ft. **SILT (ML)**: Moderate brown (5YR 4/4) to Moderate yellowish brown (10YR 5/4); 0-40% fine-grained sand; 0-30% angular to rounded gravel to 6"+, colorful metamorphics; soft to firm, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
								5				
								10				Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
								15				
								20				
								25				
								30				
								35				
								40			At 40 feet, encountered large (6") fragment of rounded white quartzite boulder.	
								45				
								50				
								55				

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 165

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	165

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
~~SS~~	~~0.5~~	~~0.5~~	~~50/6"~~					65				
SS	2.0	2.0	38-13-10-13									
SS	2.0	2.0	50-14-16-20					70				
SS	2.0	2.0	10-13-19-22									
SS	0.2	0.2	50/2"									At 73 - 80 ft. poor sampler and cuttings recovery.
~~SS~~	~~0.3~~	~~0.3~~	~~50/4"~~					75			At 75 - 83 feet, purple quartzite fragments, with 6"+ fragment at 83 feet.	
~~SS~~	~~0.4~~	~~0.4~~	~~70/5"~~									
SS	0.2	0.2	50/2"					80				
							4378.7					
								85			83 - 97.2 ft. **SILTY GRAVEL (GM)**: Moderate brown (5YR 4/4) matrix; 50% angular to rounded gravel to 6"+, multicolored metamorphics and volcanics; 30% fine- to coarse-grained sand; 20% silt; wet.	Above 83 ft. no free water or mud. Below 83 ft. encountered saturated soil.
								90			Gravel becomes more uniformly volcanic and 1/4" with depth.	
								95				
							4364.5				TOTAL DEPTH: 97.2 FEET	Installed 4" monitoring well on 8/25/95.

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 165

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	166

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 450,004.0 E 552,802.0	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
8-27-95	8-27-95	Layne Environmental	AP-1000	10"	99.0	0.0	99.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		12	4467.43	4465.4	69.3/4396.1 (9-6-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 98.0 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4465.4				0 - 12 ft. **SLAG GRAVEL (FILL)**: Gray gravel with brown sandy silt; loose, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
							4453.4				12 - 25 ft. **SANDY SILT (ML)**: Moderate brown (5YR 4/4); 20% fine-grained sand; soft, moist.	Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4440.4				25 - 45 ft. **SILTY GRAVEL (GM)**: Moderate brown (5YR 4/4); angular to subrounded gravel to 6"+, quartzite, metamorphics and volcanics; 20% silt; 20% fine- to coarse-grained sand; loose, moist.	
							4420.4				45 - 72 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; soft, moist; occasional fine- to coarse-grained sand layers <2" thick and 40% fine-grained sandy silt layers, firm to stiff, moderate plasticity.	
SS	2.0	2.0	12-21-									

Depth scale: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	166

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	166

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
			25-22									
SS	2.0	2.0	7-12-13-15									
SS	2.0	1.9	7-15-16-22								At 63 feet, becomes saturated, but no free water.	
SS	2.0	1.7	3-9-12-14					65				
SS	2.0	1.9	5-12-17-22									
SS	2.0	2.0	5-17-19-23					70				
SS	2.0	2.0	3-4-6-12				4393.4					
SS	2.0	2.0	2-7-14-19				4391.4				72 - 74 ft. **CLAY (CL)**: Pale yellowish brown (10YR 6/2); firm to stiff, low plasticity, saturated.	
SS	2.0	1.7	7-9-22-23					75			74 - 82 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20-40% fine-grained sand; 0-20% rounded gravel to 1/4"; firm to stiff, saturated.	
SS	2.0	2.0	7-12-14-23									
SS	2.0	2.0	2-13-23-28					80				
SS	2.0	2.0	10-16-27-33				4383.4					
							4382.4				82 - 83 ft. **SILTY SAND (SM)**: Moderate brown (5YR 4/4); fine-grained sand; 40% silt; dense, saturated.	At 82 - 83 ft. moderate water production.
								85			83 - 99 ft. **SILTY GRAVEL (GM)**: subangular to rounded gravel to 6"+, colorful quartzite, metamorphics and volcanics; 20% fine- to coarse-grained sand; 20% silt; loose, saturated.	Below 83 ft. abundant water production.
								90				
								95				
							4366.4				TOTAL DEPTH 99.0 FEET	Installed 4" monitoring well on 8/27/95.

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 166

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 3	167

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 449,404.1 E 554,015.5	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
8-22-95	8-24-95	Layne Environmental	AP-1000	10"	139.0	0.0	139.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		15	4492.17	4490.1	92.3/4397.8 (9-5-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 138.7 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4490.1				0 - 65 ft. **SILT (ML)**: Light brown (5YR 5/6); 0-20% angular to subangular basaltic gravel to 1/4"; dry.	Boring drilled using Dual-wall percussion method with reverse air circulation.
								5				
								10			At 10 feet, becomes moist and soft.	Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
								15				
								20				
								25				
								30				
								35				
								40				
								45				
								50				
								55				

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	167

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 3	167

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4425.1	65	65 - 77 ft. **SILTY SAND with GRAVEL (SM)**: Light brown (5YR 5/6); fine-grained sand; 30% silt; 30% angular to subrounded gravel to 4", medium gray to black, basaltic; moist.	
								70		
								75		
							4413.1		77 - 95 ft. **SILT (ML)**: Light brown (5YR 5/6); 40% very fine-grained sand; soft, loose, moist.	
SS	1.5	1.5	13-21-23					80		
SS	2.0	1.3	25-31-24-25							
SS	2.0	1.9	24-38-33-34					85		
SS	2.0	1.6	12-17-19-24						At 87 feet, becomes saturated.	At approx. 87 ft. encountered saturated soil.
SS	2.0	1.4	12-16-16-14							
SS	2.0	2.0	10-15-13-14					90		
SS	2.0	2.0	8-14-13-23							
SS	2.0	2.0	24-38-41-42				4395.1	95	95 - 97 ft. **SILTY SAND (SM)**: Light brown (5YR 5/6); very fine-grained sand; 40% silt; saturated.	
SS	2.0	1.7	5-9-12-13				4393.1			
SS	2.0	2.0	17-17-15-15				4392.1		97 - 98 ft. **SAND (SP)**: Brownish black (5YR 2/1); medium-grained sand; 5-10% silt; medium dense, saturated.	
SS	2.0	2.0	5-11-22-17					100		
									98 - 139 ft. **SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20-40% fine-grained sand; 0-10% coarse-grained sand and angular gravel to 1/2"; soft to firm, saturated.	
SS	2.0	2.0	8-18-23-24					105		
SS	2.0	2.0	9-14-34-42							
SS	2.0	2.0	9-16-20-26							
SS	2.0	2.0	4-9-18-22					110		
								115	At 115 - 116 feet, hard calcite-cemented silt layer.	Below 116 ft. water yield increases with depth.
								120	Below 116 feet, scattered thin layers of hard calcite-cemented silt. Percent sand and grain size increases with depth.	
								125		

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 167

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	3 OF 3	167

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								130				
								135				
							4351.1				At 139 feet, some 1" diameter soft, blue-gray, clayballs.	Installed 4" monitoring well on 8/24/95.
											TOTAL DEPTH: 139.0 FEET	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 167

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	168

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 450,082.2 E 553,285.9	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
8-28-95	8-28-95	Layne Environmental	AP-1000	10"	93.5		93.5

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		14	4473.94	4471.6	▽ 75.6/4396.0 (9-6-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 93.0 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6"	% CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								4471.6				0 - 12 ft. **SLAG GRAVEL (FILL)**: Gray; gravel to 6"+; 20-50% medium- to coarse-grained sand slag; loose, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
								4459.6	5, 10			12 - 28 ft. **SANDY SILT (ML)**: Pale yellowish brown (10YR 6/2); 20-40% fine-grained sand; soft, moist.	Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
								4443.6	15, 20, 25			28 - 48 ft. **SILTY GRAVEL (GM)**: Dusky yellowish brown (10YR 2/2) to Moderate yellowish brown (10YR 5/4); subangular to subrounded gravel to 6", colorful quartzite and metamophics; 20-40% fine- to coarse-grained sand; 20% silt; loose, dry to moist.	
								4423.6	30, 35, 40, 45			48 - 92 ft. **SILT (ML)**: Dark yellowish orange (10YR 6/6); 20% fine-grained sand; 0-20% subrounded gravel to 5", larger cobbles of quartzite and metamorphics, 1/4" gravels of mostly basalt; soft, moist.	
									50, 55				

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	168

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	168

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	2.0	12-17-19-21					65		
SS	2.0	1.7	10-11-14-16							
SS	2.0	2.0	10-14-15-21					70		
SS	2.0	1.6	6-10-12-15						At 72 feet, saturated.	
SS	2.0	2.0	3-6-7-11							
SS	2.0	2.0	3-5-6-9					75		
SS	2.0	2.0	2-3-9-15							
SS	2.0	2.0	7-11-15-17					80		
SS	2.0	1.8	7-12-17-21							
SS	2.0	2.0	8-15-11-18					85		
SS	2.0	2.0	10-12-19-23							
SS	2.0	2.0	6-8-11-17							At 87 ft. moderate yield of muddy water.
SS	2.0	2.0	6-11-17-20					90		
SS	2.0	2.0	6-14-12-15				4379.6			
							4378.1		92 - 93.5 ft. **CLAYEY SILT (ML)**: Moderate brown (5YR 4/4); 10% fine-grained sand; stiff, low plasticity, saturated.	Installed 4" monitoring well on 8/30/95.

TOTAL DEPTH: 93.5 FEET

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 168

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	169

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 448,217.2 E 550,035.8	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
8-31-95	8-31-95	Layne Environmental	AP-1000	10"	117.0	0.0	117.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		0	4474.40	4471.9	73.2/4398.7 (9-8-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 116.5 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4471.9				0 - 14 ft. **SANDY SILT (ML)**: Moderate brown (5YR 4/4); 20% fine-grained sand; trace coarse-grained sand; soft, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
								5, 10				Soil descriptions based on observations of drill cuttings using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4457.9				14 - 48 ft. **SILT (ML)**: Grayish orange (10YR 7/4); soft, dry.	
								15, 20, 25, 30, 35, 40, 45			At 43 feet, becomes moist.	
							4423.9				48 - 59 ft. **SILTY GRAVEL (GM)**: Moderate brown (5YR 4/4); angular fragments to rounded cobbles to 4", purple quartsite and metamorphics; 20% fine- to coarse-grained sand; 20% silt; loose, moist.	
								50, 55				
							4412.9				59 - 75 ft. **SANDY SILT (ML)**: Light brown	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	169

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	169

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								65, 70			(5YR 5/6); 20% fine-grained sand; trace coarse-grained sand; soft, moist.	
							4396.9	75			75 - 85 ft. **GRAVELLY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 40% angular to subrounded gravel to 4"; soft, saturated.	At approx. 73 ft. encountered saturated soil.
								80				
							4386.9	85			85 - 109 ft. **SILT (ML)**: Pale yellowish brown (10YR 6/2); 10% fine- to medium-grained sand; soft, saturated.	
								90, 95, 100, 105				
							4362.9	110			109 - 117 ft. **SILTY GRAVEL (GM)**: angular gravel to 3", purple porphyritic rhyolite; 20% silt; loose, saturated.	
								115				
							4354.9				At 117 feet, drilling refusal on black porphyritic basalt (bedrock ?).	Installed 4" monitoring well on 8/31/95.

TOTAL DEPTH: 117.0 FEET

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 169

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	170

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 449,078.0 E 550,967.6	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
8-29-95	8-29-95	Layne Environmental	AP-1000	10"	69.0	0.0	69.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		0	4452.40	4450.1	52.3/4397.8 (9-8-95) /	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 69.0 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6"	% CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								4450.1				0 - 11 ft. **SANDY SILT (ML)**: Dark yellowish brown (10YR 4/2); 20% fine-grained sand; soft, moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
									5, 10				
								4439.1				11 - 28 ft. **GRAVELLY SILT (ML)**: Dark yellowish brown (10YR 4/2); 40% subangular to rounded gravel to 6", quartzite, metamorphics and volcanics; loose, dry to moist.	Soil descriptions based on observations of drill cuttings using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
									15, 20, 25				Original boring 170X drilled 8/28/95 - 8/29/95 to 72 ft. was backfilled with grout on 8/29/95. Boring 170 drilled 50 ft. east of 170X.
								4422.1				28 - 58 ft. **SANDY SILT (ML)**: Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; soft, moist.	
									30, 35, 40, 45, 50				
									52			At 52 feet, becomes saturated.	At approx 52 ft. encountered saturated soil.
									55				
								4392.1					
								4391.1				58 - 59 ft. **SILTY GRAVEL (GM)**: Olive Black (5Y 2/1); angular to subrounded gravel to	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	170

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	170

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 4" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											1"; 30% silt; loose, saturated.	
								65			59 - 69 ft. **RHYOLITE**: Reddish black to Dark gray; porphyritic quartz and feldspar phenocrysts in aphanitic groundmass; very hard, saturated.	At 65 - 68 ft. moderate amount of water production. Installed 4" monitoring well on 8/29/95.
							4381.1				TOTAL DEPTH: 69.0 FEET	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 170

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	171

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 449,596.5 E 551,237.2	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-6-95	9-6-95	Layne Environmental	AP-1000	10"	89.0	0.0	89.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/		0	4452.41	4449.9	▽ 48.0/4401.9 ▼ 52.6/4397.3 (9-8-95)	/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 89.0 ft.	Curtis Obi

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4449.9				0 - 10 ft. **SANDY SILT (ML)**: Pale brown (5YR 5/2) to Moderate yellowish brown (10YR 5/4); 20% fine-grained sand; soft, dry. At 4 feet, becomes moist.	Boring drilled using Dual-wall percussion method with reverse air circulation.
							4439.9	10			10 - 31 ft. **SILTY GRAVEL (GM)**: angular to subrounded gravel to 4", green porphyritic volcanics and rounded cobbles of colorful quartzite and metamorphics; 20% fine- to coarse-grained sand; 20% silt; loose, moist. At 15 feet, becomes dry.	Soil descriptions based on observations of drill cuttings using the Unifed Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4418.9	30			31 - 56 ft. **SANDY SILT (ML)**: Moderate brown (5YR 4/4); 40% fine- to medium-grained sand; soft, moist.	
								45			At 48 feet, color changes to Pale yellowish brown (10YR 6/2); 10% coarse-grained sand to 1/4" gravel; becomes saturated.	At approx. 48 ft. saturated soil, cuttings began to form clumps but no free water.
							4393.9	55			56 - 70 ft. **CLAYEY SILT (ML)**: Pale yellowish brown (10YR 6/2) mottled with Moderate yellowish brown (10YR 5/4); low plasticity, stiff, saturated.	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	10-19-95	171

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	171

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								65				
							4379.9	70			70 - 72 ft. **SAND (SP)**: Coarse-grained sand to 1/4" gravel; loose, saturated.	
							4377.9				72 - 89 ft. **SILTY GRAVEL (GM)**: Light brown (5YR 5/6); subrounded to rounded cobbles to 6", colorful quartzite and metamorphics; 20% fine- to coarse-grained sand; 20% silt; loose, saturated.	
								75				
								80				
								85				
							4360.9				TOTAL DEPTH: 89.0 FEET	

SS = SPLIT SPOON; ST = SHELBY TUBE
D = DENNISON; P = PITCHER;
O = OTHER

SITE: FMC Corporation

Last Update: 10-19-95

HOLE NO. 171

MONITORING WELL

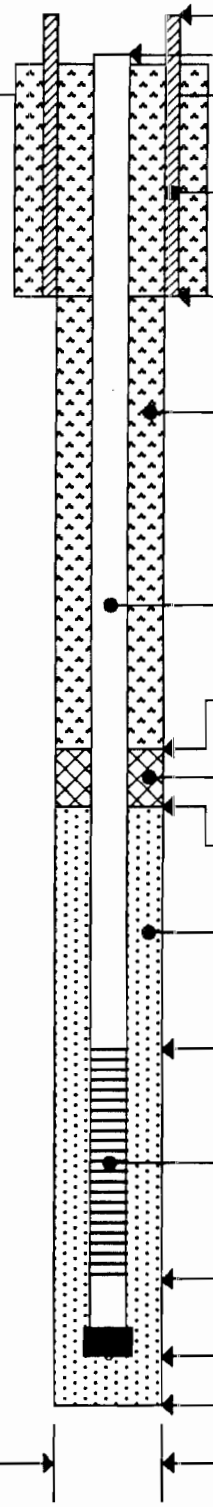
PROJECT	WELL NO.
EMF POCATELLO, ID	155

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 450,432.7 E 554,398.5

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
9-6-95	9-6-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	3.1	
TOP OF RISER CASING	2.2	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	1.9	
TOP OF SEAL	95.0	
TOP OF FILTER PACK	105.0	
TOP OF SCREEN	110.2	
BOTTOM OF SCREEN	120.2	
BOTTOM OF SUMP	122.7	
BOTTOM OF HOLE	123.6	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

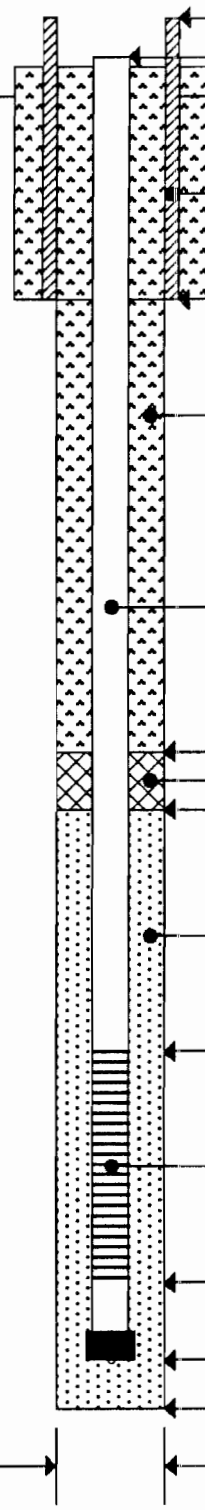
PROJECT	WELL NO.
EMF POCATELLO, ID	156

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 450,418.6 E 554,633.2

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
9-9-95	9-9-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.9	
TOP OF RISER CASING	2.5	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.1	
TOP OF SEAL	95.0	
TOP OF FILTER PACK	105.0	
TOP OF SCREEN	111.0	
BOTTOM OF SCREEN	121.0	
BOTTOM OF SUMP	124.0	
BOTTOM OF HOLE	124.1	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
Brady 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

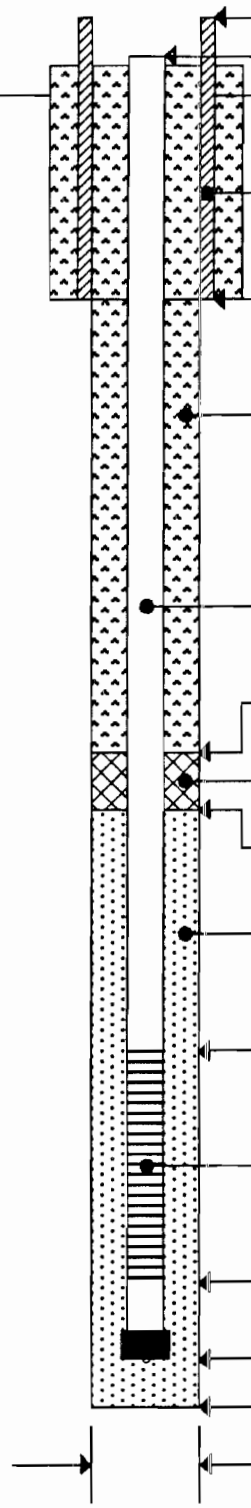
PROJECT	WELL NO.
EMF POCATELLO, ID	157

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 450,429.5 E 554,874.5

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
9-7-95	9-8-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.8	
TOP OF RISER CASING	2.1	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.2	
TOP OF SEAL	106.0	
TOP OF FILTER PACK	116.0	
TOP OF SCREEN	121.0	
BOTTOM OF SCREEN	131.0	
BOTTOM OF SUMP	133.5	
BOTTOM OF HOLE	134.5	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI & Brady 16-30 Silica

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

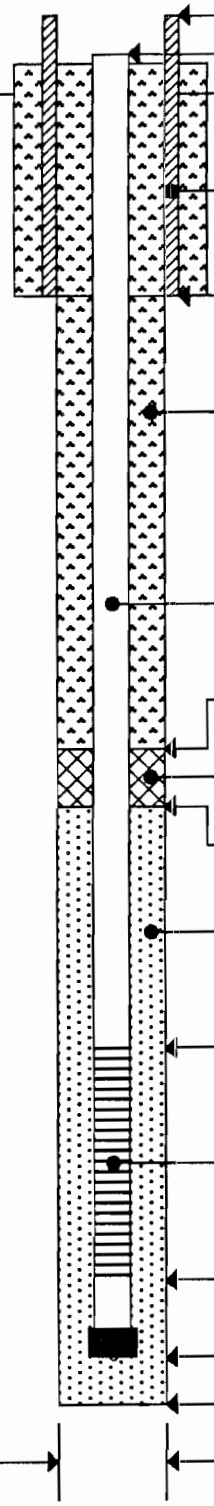
PROJECT	WELL NO.
EMF POCATELLO, ID	165

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 449,237.3 E 551,986.2

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
8-25-95	8-25-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.9	
TOP OF RISER CASING	2.5	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.1	
TOP OF SEAL	70.7	
TOP OF FILTER PACK	80.7	
TOP OF SCREEN	85.0	
BOTTOM OF SCREEN	95.0	
BOTTOM OF SUMP	97.0	
BOTTOM OF HOLE	97.2	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

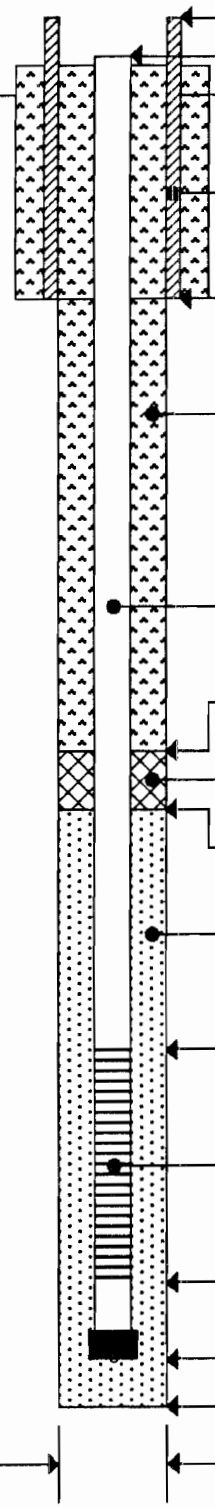
PROJECT	WELL NO.
EMF POCATELLO, ID	166

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 450,004.0 E 552,802.0

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
8-27-95	8-27-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.7	
TOP OF RISER CASING	2.0	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.3	
TOP OF SEAL	72.0	
TOP OF FILTER PACK	82.0	
TOP OF SCREEN	85.5	
BOTTOM OF SCREEN	95.5	
BOTTOM OF SUMP	98.0	
BOTTOM OF HOLE	99.0	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

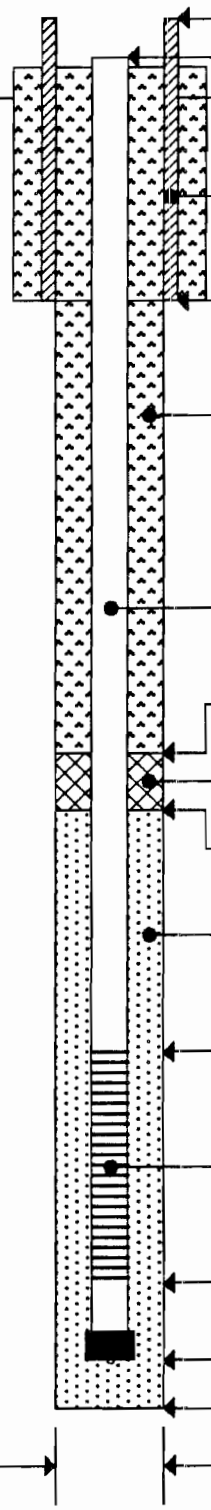
PROJECT	WELL NO.
EMF POCATELLO, ID	167

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 449,404.1 E 554,015.5

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
8-23-95	8-24-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.5	
TOP OF RISER CASING	2.1	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.5	
TOP OF SEAL	103.5	
TOP OF FILTER PACK	113.5	
TOP OF SCREEN	116.5	
BOTTOM OF SCREEN	136.5	
BOTTOM OF SUMP	139.0	
BOTTOM OF HOLE	139.0	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

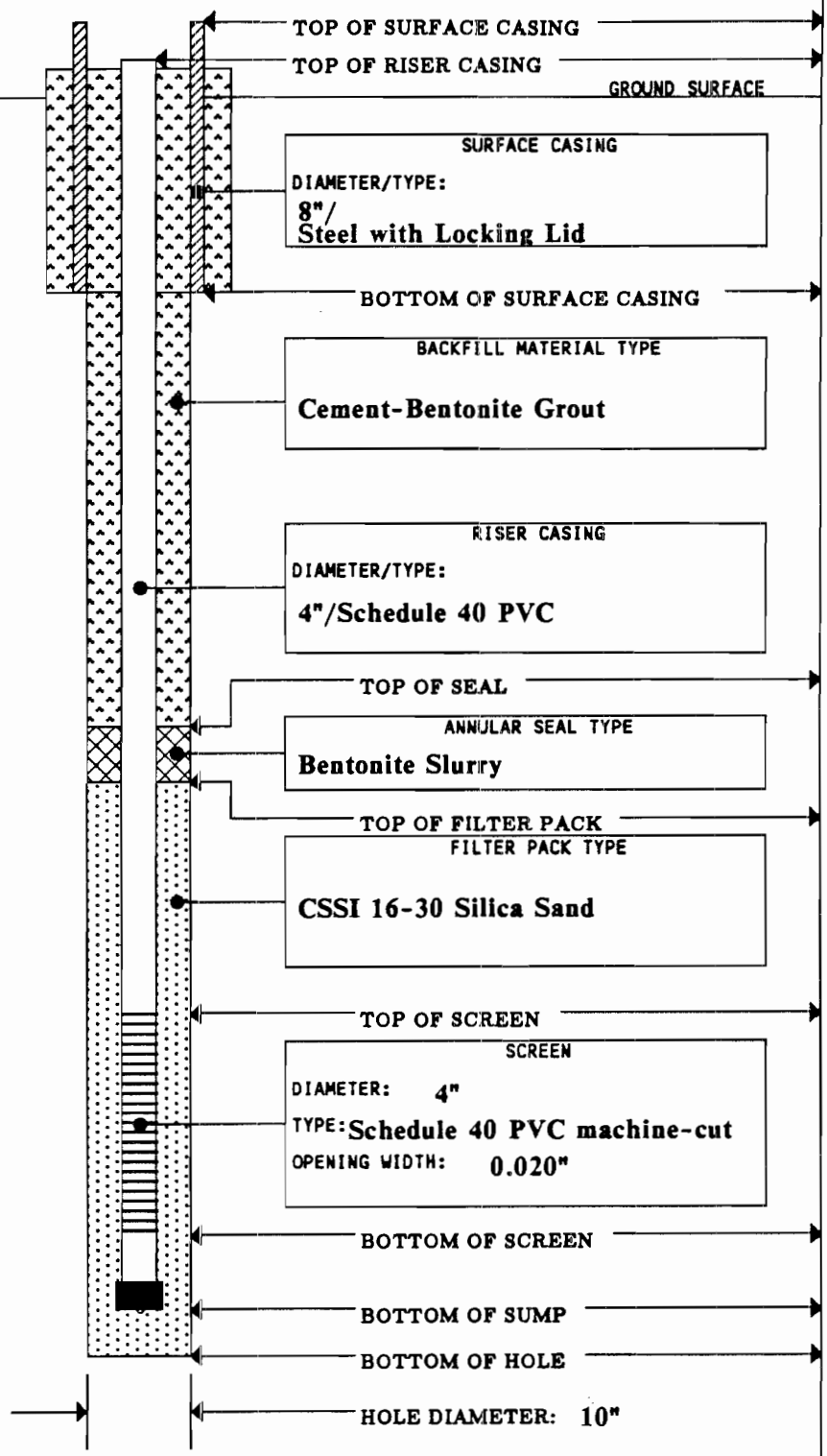
PROJECT	WELL NO.
EMF POCATELLO, ID	168

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 450,082.2 E 553,285.9

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
8-30-95	8-30-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.7	
TOP OF RISER CASING	2.3	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.3	
TOP OF SEAL	61.0	
TOP OF FILTER PACK	71.0	
TOP OF SCREEN	75.5	
BOTTOM OF SCREEN	90.5	
BOTTOM OF SUMP	93.0	
BOTTOM OF HOLE	93.5	

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

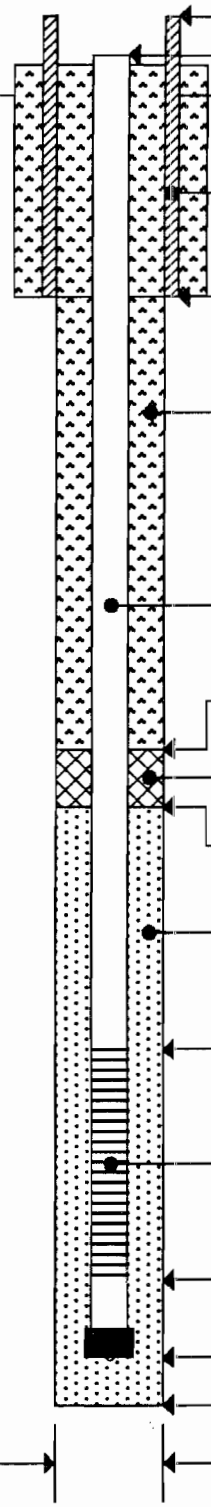
PROJECT	WELL NO.
EMF POCATELLO, ID	169

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 448,217.2 E 550,035.8

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
8-31-95	8-31-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	3.1	
TOP OF RISER CASING	2.5	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	1.9	
TOP OF SEAL	96.5	
TOP OF FILTER PACK	106.5	
TOP OF SCREEN	111.0	
BOTTOM OF SCREEN	116.0	
BOTTOM OF SUMP	116.5	
BOTTOM OF HOLE	117.0	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

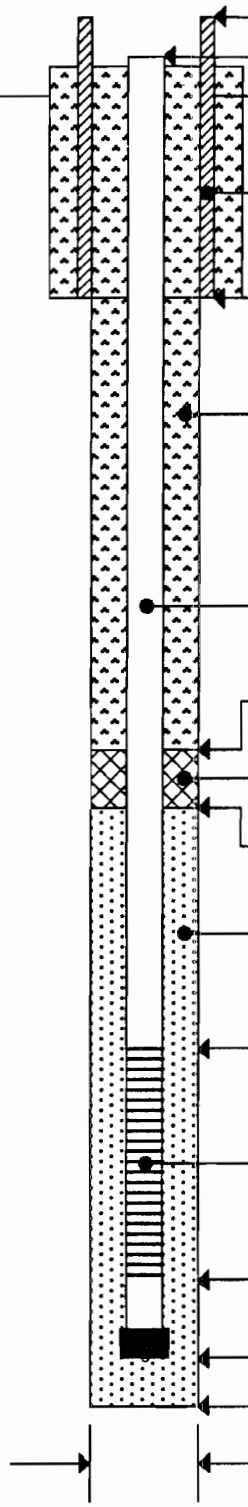
MONITORING WELL	PROJECT	WELL NO.
	EMF POCATELLO, ID	170

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 449,078.0 E 550,967.6

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
8-29-95	8-29-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.7	
TOP OF RISER CASING	2.3	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.3	
TOP OF SEAL	49.8	
TOP OF FILTER PACK	59.8	
TOP OF SCREEN	63.5	
BOTTOM OF SCREEN	68.5	
BOTTOM OF SUMP	69.0	
BOTTOM OF HOLE	69.0	

SURFACE CASING
DIAMETER/TYPE: 8"/ Steel with Locking Lid

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER/TYPE: 4"/Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
CSSI 16-30 Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Schedule 40 PVC machine-cut
OPENING WIDTH: 0.020"

HOLE DIAMETER: 10"

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

MONITORING WELL

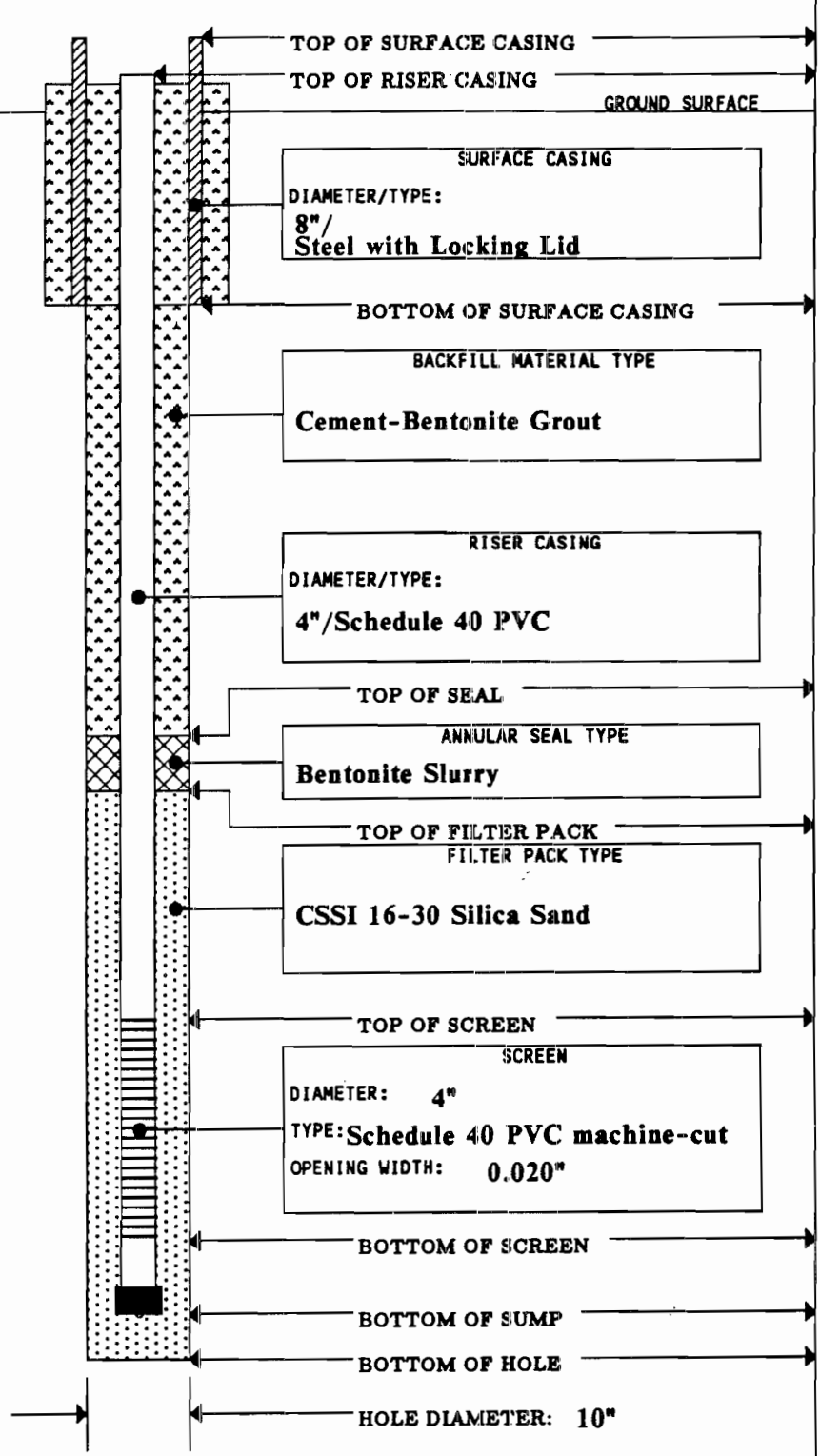
PROJECT	WELL NO.
EMF POCATELLO, ID	171

JOB NO.	SITE	COORDINATES and/or STATIONING
21372	FMC Corporation	N 449,596.5 E 551,237.2

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
9-6-95	9-6-95	Curtis Obi	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	2.8	
TOP OF RISER CASING	2.5	
GROUND SURFACE	0.0	
BOTTOM OF SURFACE CASING	2.2	
TOP OF SEAL	59.0	
TOP OF FILTER PACK	69.0	
TOP OF SCREEN	76.5	
BOTTOM OF SCREEN	86.5	
BOTTOM OF SUMP	89.0	
BOTTOM OF HOLE	89.0	

Update: 10-3-95
Template: 2WELLOG

NOT TO SCALE

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 2	172

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 17	N 449,271.6 E 551,080.8	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
7-15-97	7-15-97	Layne Christensen	AP-1000	10 in.	78.5	1.0	79.5

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	15	4450.57	4447.9	50 / 4397.9 (7-15-97)	78.5 / 4369.4

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4 in. PVC / 79.0 ft.	Dave Kyllonen

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											0 - 10 ft, **SILT (ML):** Dark yellowish brown [10YR 4/2], soft, dry; <5% fine- to coarse-grained sand. At 2 feet, moist.	Boring drilled using dual-wall percussion method with reverse air circulation.
								5				
											At 9 - 10 feet, some cobbles to 4 inches.	
							4437.9	10			10 - 15 ft, **SILTY GRAVEL with SAND (GM):** Multicolored gravel and sand, angular to subrounded, loose, moist; 20-25% fine- to coarse-grained sand; 15-20% silt; gravel is quartzite and volcanics.	Soil descriptions based on observations of drill cuttings and split-spoon samples using the Unified Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4432.9	15			15 - 29 ft, **GRAVEL with SILT and SAND (GW-GM):** Multicolored, predominantly green volcanics, angular to subrounded volcanics and quartzite, loose, dry; 3-inch pebbles of green volcanics; pink quartzite cobbles to 5 inches.	
								20			At 20 feet, mostly fine- to medium-grained gravel, fewer pebbles and cobbles.	
								25				
							4418.9	30			29 - 38 ft, **SANDY SILT (ML):** Dark yellowish brown [10YR 4/2], soft, moist; 30% fine- to medium-grained sand; <5% gravel to 1-inch, subrounded to subangular.	
								35				
							4409.9				38 - 44 ft, **SILT (ML):** Dark yellowish brown [10YR 4/2], soft, moist; <15% fine-grained	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		172

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	2 of 2	172

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									sand.	
SS	1.5	1.5	21-31-50				4403.9	45	44 - 52 ft, **SILT with GRAVEL (ML):** Dark yellowish brown [10YR 4/2], soft, wet; subrounded to angular gravel to 1-1/2 inches; fine- to coarse-grained sand.	At 44 feet, saturated cuttings with some water returns.
SS	1.5	1.5	6-11-13							
SS	1.5	0.9	11-17-20							
SS	1.5	1.5	5-9-13							
SS	2.0	1.3	3-5-5-7					50		At 50 feet, increased amount of water produced with cuttings. Cuttings are also clumping in cyclone due to the water.
SS	1.5	1.5	5-11-14				4395.9		52 - 55 ft, **GRAVELLY SILT with SAND (ML):** Pale yellowish brown [10YR 6/2], soft, wet; angular to rounded gravel to 1-1/2 inches, mostly fine-grained; fine- to coarse-grained sand; some pebbles to 3-inches.	
SS	1.5	1.5	6-8-11				4392.9	55	55 - 67 ft, **CLAYEY SILT (ML):** Pale yellowish brown [10YR 6/2], stiff, moist to saturated, low plasticity.	
SS	2.0	2.0	9-11-15-18							
SS	1.5	1.5	7-8-8							At 58 feet, water produced with cuttings.
SS	1.5	1.5	11-13-13					60	At 59 feet, color changes to pale yellowish brown [10YR 6/2] banded with dark gray [N3], manganese oxide (?).	
SS	2.0	2.0	3-5-6-9							
SS	1.5	1.5	7-11-11					65		
SS	2.0	2.0	10-11-13-13				4380.9		67 - 70 ft, **SILTY CLAY (CH):** Pale yellowish brown [10YR 6/2], stiff, medium to high plasticity, moist.	
SS	1.5	1.5	6-11-14							
SS	1.5	1.5	9-10-15				4377.9	70		
SS	0.0	0.0	5/0"				4376.9		70 - 71 ft, **SAND (SP):** Multicolored, predominantly moderate brown [5YR 3/4], fine- to medium-grained, loose, saturated.	At 70 feet, began to produce a moderate amount of water with cuttings.
								75	71 - 78.5 ft, **SAND with GRAVEL (SW):** Multicolored, predominantly dark colored, loose, saturated; fine- to coarse-grained sand; rounded to angular gravel to 1-1/2 inches; pebbles to 2-inches; quartzite and volcanic sand and gravel; 5% silt.	At 70.5 feet, unable to drive sampler with hammer due to water and flowing sands.
							4369.4			
							4368.4		78.5 - 79.5 ft, **RHYOLITE:** Dark gray [N3], quartz and feldspar phenocrysts in aphanitic groundmass, very hard.	
									TOTAL DEPTH: 79.5 FEET	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		172

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 2	179

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 17	N 449,247.5 E 550,185.4	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
7-17-97	7-17-97	Layne Christensen	AP-1000	10 in.	62.5	NA	62.5

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4453.06	4450.7	48 / 4402.7 (7-17-97)	NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
NA	4 in. PVC / 62.2 ft.	Dave Kyllonen

SAMP. TYPE AND DIAM. / SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
										0 - 12 ft, **SILT (ML):** Grayish brown [5YR 3/2], loose, soft, moist.	Boring drilled using dual-wall percussion method with reverse air circulation.
							5				
										At 8 feet, 10-15% subrounded to subangular gravel and pebbles to 3-inches.	
							10				Soil descriptions based on observations of drill cuttings using the Unified Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
						4438.7				12 - 18 ft, **SILTY GRAVEL with SAND (GM):** Dark yellowish brown [10YR 4/2], loose, dry to slightly moist, subangular to subrounded, volcanics and quartzite; 30-40% silt; fine- to coarse-grained sand; gravel to 1-1/2 inches, pebbles to 3-inches; cobbles to 5-inches.	
							15				
						4432.7				18 - 30 ft, **GRAVEL with SILT and SAND (GW-GM):** Dark yellowish brown [10YR 4/2], loose, dry, subangular to subrounded, volcanics and quartzite, gravel to 1-1/2 inches; fine- to coarse-grained sand; 10% silt; some pebbles to 2-inches.	
							20				
							25			At 25 feet, 5-10% silt, moist, most gravel <1/2-inches, a few quartzite cobbles to 6-inches.	
										At 27 feet, <5% silt, dry, gravel to 1-1/2 inches, pebbles to 2-inches.	
						4420.7	30			30 - 55 ft, **SILT (ML):** Dark yellowish brown [10YR 4/2], moist, loose; 5% fine- to medium-grained gravel; 5-10% fine- to coarse-grained sand.	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		179

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	2 of 2	179

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								40			At 38 feet, no gravel, <5% fine- to medium-grained sand.	
								45				
											At 48 feet, saturated to very moist.	At 48 feet, wet.
								50				
							4395.7	55			55 - 62.5 ft, **CLAYEY SILT (ML):** Dark yellowish brown [10YR 4/2], soft, low plasticity, saturated; <5% angular gravel to 3/4-inch; 5% fine- to coarse-grained sand.	
								60				
							4388.2				TOTAL DEPTH: 62.5 FEET	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		179

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 2	180

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 17	N 449,088.4 E 550,976.2	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
7-16-97	7-16-97	Layne Christensen	AP-1000	10 in.	62.0	3.5	65.5

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4452.77	4450.1	48 / 4402.1 (7-16-97)	62.0 / 4388.1

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
NA	4 in. PVC / 65.2 ft.	Dave Kyllonen

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10, 15, 20, 25, 30			0 - 11 ft, **SILT with SAND (ML):** Dark yellowish brown [10YR 4/2], soft, loose, moist, 15-20% fine-grained sand.	Boring drilled using dual-wall percussion method with reverse air circulation.
							4439.1				11 - 13 ft, **CLAYEY SILT (ML):** Pale olive [10Y 6/2], soft, low plasticity, wet.	Soil descriptions based on observations of drill cuttings using the Unified Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4437.1				13 - 28 ft, **GRAVEL with SILT and SAND (GW-GM):** Dark yellowish brown [10YR 4/2], loose, moist to dry; 20% silt; 20% fine- to coarse-grained sand; subangular to subrounded gravel to 1-1/2 inches; pebbles and cobbles to 5-inches; metamorphic and volcanic gravels, pebbles and cobbles.	
							4422.1				28 - 35 ft, **SILT with SAND (ML):** Moderate yellowish brown [10YR 5/4], soft, loose, moist to dry, 15-20% very fine- to fine-grained sand.	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE: FMC Pond 17 — *Last Update:* — HOLE NO. 180

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	2 of 2	180

SAMP. TYPE AND DIAM. / SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						4415.1				35 - 36 ft, **SANDY SILT with GRAVEL (ML):** Moderate yellowish brown [10YR 5/4], soft, loose, moist; 20% fine- to medium-grained sand; 20% subangular, volcanic gravel to 1-inch.	
						4414.1				36 - 53 ft, **SILT with SAND (ML):** Moderate yellowish brown [10YR 5/4], soft, loose, moist, 20% fine-grained sand.	
							40				
							45			At 46 feet, moist to very moist.	
										At 48 feet, saturated.	
							50				
						4397.1				53 - 57 ft, **CLAYEY SILT (ML):** Moderate yellowish brown [10YR 5/4], soft, saturated, low plasticity; 5-10% fine- to coarse-grained sand; 5-10% gravel to 1-inch, subrounded.	
							55				Drilled to 55 feet then pulled drill pipe back to 49 feet and waited 5 minutes. No water observed in borehole. At 57 feet, started producing water with cuttings.
						4393.1				57 - 62 ft, **GRAVEL with SAND (GW)** (Weathered Rhyolite): Dark reddish brown [10YR 3/4] to olive black [5Y 2/1], angular to subrounded gravel to 3/4 inch, coarse-grained sand; saturated, loose; rock fragments to 2-inches; 5% silt.	
							60				
						4388.1				62 - 65.5 ft, **RHYOLITE:** Blackish red [5R 2/2], quartz and feldspar phenocrysts in aphanitic groundmass. Bedrock fractured from 62-63 feet, more competent from 63-65.5 feet.	At 62 feet, drilling is harder, top of bedrock. At 63 feet, drilling even more difficult, rock is more competent.
							65				
						4384.6				TOTAL DEPTH: 65.5 FEET	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		180

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 2	181

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 17	N 449,666.4 E 551,188.5	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
7-17-97	7-17-97	Layne Christensen	AP-1000	10 in.	63.3	NA	63.3

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4451.63	4448.9	45 / 4403.9 (7-17-97)	NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
NA	4 in. PVC / 63.0 ft.	Dave Kyllonen

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10, 15, 20, 25, 30			0 - 12 ft, **SILT with SAND (ML):** Dark yellowish brown [10YR 4/2], soft, loose, moist; 15-20% fine-grained sand; 5% subrounded gravel to 1-inch. At 8 feet, no gravel.	Boring drilled using dual-wall percussion method with reverse air circulation.
							4436.9				12 - 17 ft, **SILTY GRAVEL (GM):** Dark yellowish brown [10YR 4/2] with multicolored volcanics and quartzite, angular to subrounded, up to 1-inch, loose, dry to moist; 20-30% fine- to coarse-grained sand; 30% silt; pebbles to 3-inches. At 15 feet, dry.	Soil descriptions based on observations of drill cuttings using the Unified Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
							4431.9				17 - 35 ft, **GRAVEL with SAND (GW):** Multicolored volcanics and quartzite, angular to subrounded, loose, dry; fine- to coarse-grained gravel to 1-inch; fine- to coarse-grained sand; pebbles and cobbles to 5-inches, <5% silt. At 28 feet, 40% sand, fewer pebbles and cobbles.	At 17 feet, drilling became very easy.

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		181

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	2 of 2	181

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4413.9				35 - 53 ft, **SILT (ML):** Moderate yellowish brown [10YR 5/4], soft, loose, moist; 10-15% very fine to fine-grained sand.	
								40			At 39 feet, 10% subrounded gravel to 3/4-inch.	
								45			At 44 feet, very moist. At 45 feet, saturated.	At 44 feet, cuttings are clumping in the return line and cyclone due to water.
								50			At 48 feet, gravel to 1-1/2 inches, angular.	
							4395.9				53 - 63 ft, **CLAYEY SILT (ML):** Light olive gray [5Y 5/2], stiff, saturated, low plasticity.	
								55				
								60			At 60 feet, color change to pale olive [10Y 6/2].	Drilled to 59 feet, pulled drill pipe back to 49 feet. Waited 5 minutes, measured 4 inches of water in bottom of open borehole. Advanced hole to 62 feet, waited 45 minutes, produced ~20 gallons of water when drill pipe was blown out with air.
							4385.6				TOTAL DEPTH: 63.3 FEET	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		181

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 2	182

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 17	N 449,359.7 E 551,105.4	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
7-16-97	7-16-97	Layne Christensen	AP-1000	10 in.	63.0	NA	63

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4449.92	4447.4	51 / 4396.4 (7-16-97)	NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
NA	4 in. PVC / 60.7 ft.	Dave Kyllonen

SAMP. TYPE AND DIAM. / SAMP. ADV. / LEN CORE / SAMPLE REC. / CORE REC. / SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M / PRESS. P.S.I. / TIME IN MIN.	ELEV.	DEPTH	GRAPHICS / SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					0 - 10 ft, **SILT (ML):** Dusky brown [5YR 2/2], loose, moist, soft; <10% fine-grained sand.	Boring drilled using dual-wall percussion method with reverse air circulation.
			5			
		4437.4	10		At 9 - 10 feet, some pebbles and cobbles to 4-1/2 inches.	
					10 - 16 ft, **SILTY GRAVEL with SAND (GM):** Dark yellowish brown [10YR 4/2], loose, moist to dry; fine- to coarse-grained sand; gravel to 1-1/2 inches, volcanics and quartzite; 15-20% silt; 20% sand.	Soil descriptions based on observations of drill cuttings using the Unified Soil Classification System (ASTM D 2488) and the GSA Rock Color Chart.
			15			
		4431.4			16 - 32 ft, **GRAVEL with SILT and SAND (GW-GM):** Multicolored, dry, loose, angular to subrounded volcanic and quartzite gravel; pebbles are mostly green volcanics; pink quartzite cobbles to 4-inches; 20% silt.	
			20			
			25		At 26 feet, decreased silt content <10%, mostly 1 to 1-1/2 inch gravel and pebbles to 2-inches.	
			30		At 30 feet, a few cobbles to 6-inches.	
		4415.4			32 - 38 ft, **SANDY SILT (ML):** Dark yellowish brown [10YR 4/2], soft, moist, loose; 20-30% fine- to medium-grained sand; 5% gravel to 1-inch, subrounded to subangular.	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		182

Report Form: EMF-FBL Date: Aug 12, 1997

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	2 of 2	182

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4409.4	40			38 - 44 ft, **SILT (ML):** Dark yellowish brown [10YR 4/2], soft, moist; 10 - 15% fine-grained sand.	
							4403.4	45, 50			44 - 52 ft, **SILT with GRAVEL (ML):** Dark yellowish brown [10YR 4/2], soft, wet; gravel to 1-1/2 inches, subrounded to subangular; fine- to coarse-grained sand; some pebbles to 2-inches.	Below 44 feet, moisture of cuttings increasing with depth.
							4395.4	55, 60			52 - 63 ft, **CLAYEY SILT (ML):** Pale yellowish brown [10YR 6/2] to light olive gray [5Y 6/1], soft, wet to saturated, low plasticity; 10-15% fine- to coarse-grained sand; 5% gravel to 1-inch, subrounded.	At 52-56 feet, little to no cuttings returned due to clumping in return line and cyclone. This is interval where much of the water appears to be coming from. Drilled to 59 feet, then pulled drill pipe back to 49 feet and let hole sit open for 5 minutes. Measured approximately 8 feet of water in hole.
							4384.4				TOTAL DEPTH: 63 FEET	

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		182

Report Form: EMF-FBL Date: Aug 12, 1997

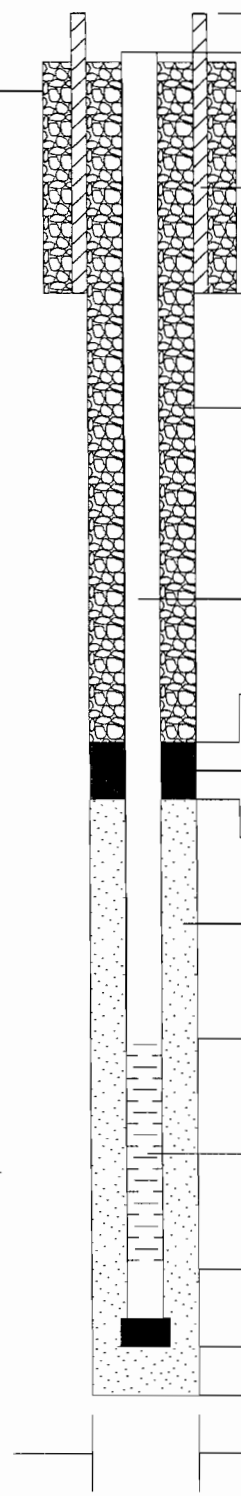
MONITORING WELL	PROJECT	WELL NO.
	EMF POCATELLO, ID	172

JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 17	N 449,271.6 : E 551,080.8

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
7-15-97	7-15-97	Dave Kyllonen	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-2.9	4450.8
TOP OF RISER CASING	-2.7	4450.57
GROUND SURFACE	0.0	4447.9
BOTTOM OF SURFACE CASING	2.2	4445.7
TOP OF SEAL	61.0	4386.9
TOP OF FILTER PACK	69.0	4378.9
TOP OF SCREEN	71.0	4376.9
BOTTOM OF SCREEN	76.0	4371.9
BOTTOM OF SUMP	79.0	4368.9
BOTTOM OF HOLE	79.5	4368.4

SURFACE CASING
DIAMETER: 8-5/8 inch OD
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 Colorado Silica Sand (5 bags)

SCREEN
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC
OPENING WIDTH: 0.020-inch
TYPE: Machine-cut

HOLE DIAMETER: 10-inches

Update: Aug 07, 1997
Report Form: EMF-WELLOG2

NOT TO SCALE

MONITORING WELL

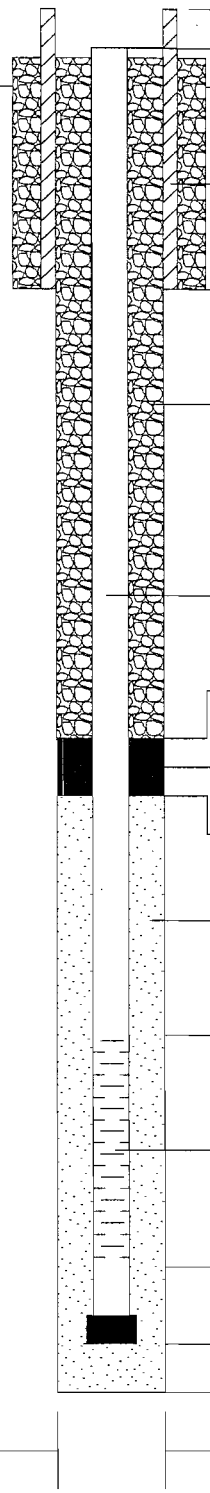
PROJECT	WELL NO.
EMF POCATELLO, ID	179

JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 17	N 449,247.5 : E 550,185.4

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
7-17-97	7-17-97	Dave Kyllonen	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3.1	4453.8
TOP OF RISER CASING	-2.4	4453.06
GROUND SURFACE	0.0	4450.7
BOTTOM OF SURFACE CASING	2.0	4448.7
TOP OF SEAL	38.0	4412.7
TOP OF FILTER PACK	46.5	4404.2
TOP OF SCREEN	49.2	4401.5
BOTTOM OF SCREEN	59.2	4391.5
BOTTOM OF SUMP	62.2	4388.5
BOTTOM OF HOLE	62.5	4388.2

SURFACE CASING
DIAMETER: 8-5/8 inch OD
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 Colorado Silica Sand (6 bags)

SCREEN
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC
OPENING WIDTH: 0.020-inch
TYPE: Machine-cut

HOLE DIAMETER: 10-inches

Update: Aug 07, 1997
Report Form: EMF-WELLOG2

NOT TO SCALE

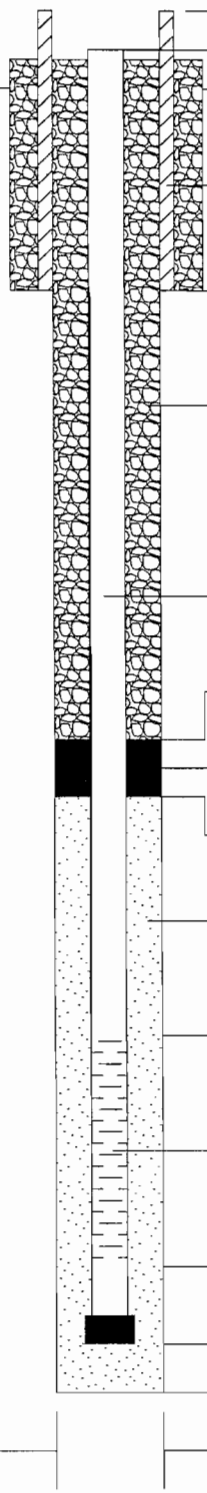
MONITORING WELL	PROJECT	WELL NO.
	EMF POCATELLO, ID	180

JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 17	N 449,088.4 : E 550,976.2

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
7-16-97	7-16-97	Dave Kyllonen	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4453.1
TOP OF RISER CASING	-2.7	4452.77
GROUND SURFACE	0.0	4450.1
BOTTOM OF SURFACE CASING	2.1	4448.0
TOP OF SEAL	40.0	4410.1
TOP OF FILTER PACK	48.7	4401.4
TOP OF SCREEN	52.2	4397.9
BOTTOM OF SCREEN	62.2	4387.9
BOTTOM OF SUMP	65.2	4384.9
BOTTOM OF HOLE	65.5	4384.6

SURFACE CASING
DIAMETER: 8-5/8 inch OD
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 Colorado Silica Sand (6 bags)

SCREEN
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC
OPENING WIDTH: 0.020-inch
TYPE: Machine-cut

HOLE DIAMETER: 10-inches

Update: Aug 07, 1997
Report Form: EMF-WELLOG2

NOT TO SCALE

001503

MONITORING WELL

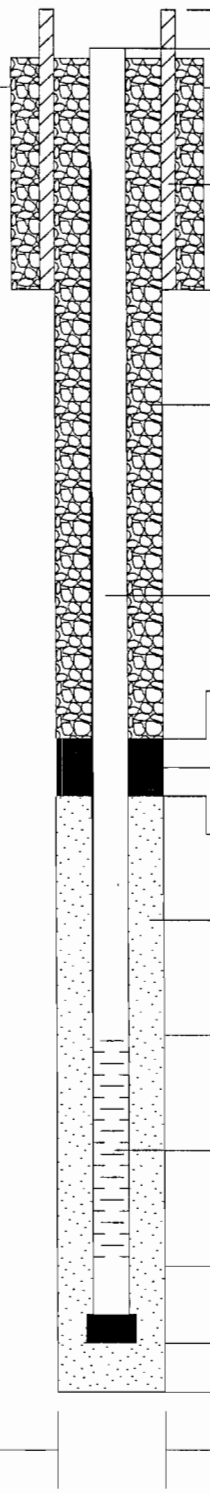
PROJECT	WELL NO.
EMF POCATELLO, ID	181

JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 17	N 449,666.4 : E 551,188.5

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
7-17-97	7-17-97	Dave Kyllonen	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4451.9
TOP OF RISER CASING	-2.7	4451.63
GROUND SURFACE	0.0	4448.9
BOTTOM OF SURFACE CASING	2.1	4446.8
TOP OF SEAL	39.0	4409.9
TOP OF FILTER PACK	47.0	4401.9
TOP OF SCREEN	50.0	4398.9
BOTTOM OF SCREEN	60.0	4388.9
BOTTOM OF SUMP	63.0	4385.9
BOTTOM OF HOLE	63.3	4385.6

SURFACE CASING
DIAMETER: 8-5/8 inch OD
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 Colorado Silica Sand (6-1/2 bags)

SCREEN
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC
OPENING WIDTH: 0.020-inch
TYPE: Machine-cut

HOLE DIAMETER: 10-inches

NOT TO SCALE

Update: Aug 07, 1997
Report Form: EMF-WELLOG2

MONITORING WELL

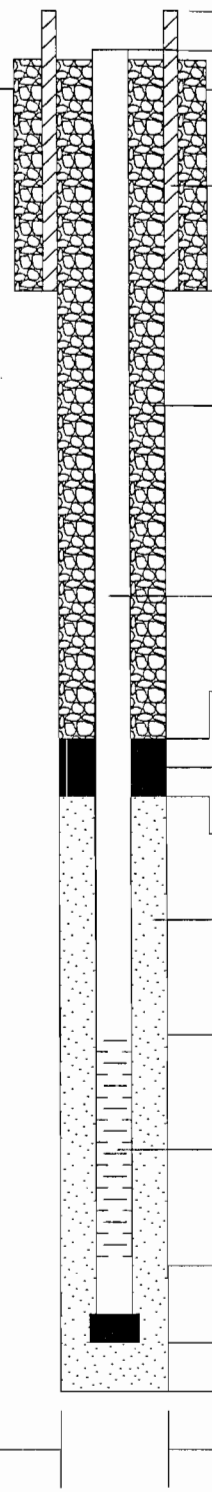
PROJECT	WELL NO.
EMF POCATELLO, ID	182

JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 17	N 449,359.7 : E 551,105.4

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
7-16-97	7-16-97	Dave Kyllonen	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3.1	4450.5
TOP OF RISER CASING	-2.5	4449.92
GROUND SURFACE	0.0	4447.4
BOTTOM OF SURFACE CASING	2.0	4445.4
TOP OF SEAL	38.0	4409.4
TOP OF FILTER PACK	45.8	4401.7
TOP OF SCREEN	47.7	4399.7
BOTTOM OF SCREEN	57.7	4389.7
BOTTOM OF SUMP	60.7	4386.7
BOTTOM OF HOLE	63.0	4384.4

SURFACE CASING
DIAMETER: 8-5/8 inch OD
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 Colorado Silica Sand (7 bags)

SCREEN
DIAMETER: 4-inch ID
TYPE: Schedule 40 PVC
OPENING WIDTH: 0.020-inch
TYPE: Machine-cut

HOLE DIAMETER: 10-inches

NOT TO SCALE

Update: Aug 07, 1997
Report Form: EMF-WELLOG2

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	173

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 17	N 449,231.3 E 550,171.8	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-16-98	10-16-98	Layne Environmental	AP-1000	9.6	85'	NA	89

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4452.58	4449.8		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 87.85 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10, 15, 20, 25			0.0-29.0: Silty gravel w/ sand (GM) Dark yellowish brown (10YR 3/4), subrounded, fine to coarse grained sand, dry. cobbles to 6 inches at 12 feet.	Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 " Logged from cuttings and 2-inch split spoon sampler using Unified Soil Classification System and GSA rock color chart.
							4420.8	30, 35, 40, 45			29.0-49.0: SILT (ML) Dark yellowish brown (10YR 3/4), 5 to 10% medium (1-1 1/2 inch) gravel, sand, dry. No gravel below 35 feet. Moist at 45 feet.	
							4400.8	50, 55, 60, 65, 70			49.0-75.0: Clayey SILT (ML) Dark yellowish brown (10YR 4/2), sand, wet. Wet at 50 feet. Increase in wetness at 62 feet.	
							4374.8	75, 80			75.0-85.0: Sandy Silty GRAVEL (GM) Dark yellowish brown (10YR 3/4), subrounded to well rounded coarse grained sand, water.	
							4364.8	85			85.0-89.0: Rhyolite Dark reddisn brown (10YR 3/4), hard.	
							4360.8					

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 17		173

Report Form: EMF-FBL Date Nov 12, 1998

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	174

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 18	N 449,232.7 E 549,303.4	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-15-98	10-15-98	Layne Environmental	AP-1000	9.6	88	NA	88

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4446.92	4444.1		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 87.9 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5			0.0-10.0: SILT (ML) Dark yellowish brown (10YR 3/4), dry.	Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 "
							4434.1	10			10.0-26.0: Gravelly SILT w/ sand (ML) Dark yellowish brown (10YR 3/4), subangular 15-20% quartz sand. Cobs encountered to 5 inch at 15 to 16 feet.	Logged from cuttings and 2-inch split spoon sampler using Unified Soil Classification System and GSA rock color chart.
								15				
								20				
							4418.1	25			26.0-75.0: Silty Clay (CL) Dark yellowish brown (10YR 3/4), slightly plastic, slightly moist.	
								30				
								35				
								40				
								45				
								50			Wet at 50 feet.	
								55				
SS	1.5	1.5	2 2 3					60		☒		
								65				
								70				
							4369.1	75			75.0-88.0: Silty GRAVEL and Sand (GM) Dark yellowish brown (10YR 3/4), to moderate brown (5YR 5/6), well graded.	Abundant water
								80				
								85			Cobbles to 5 inches encountered at 84 to 86 feet.	
							4356.1					

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 18		174

Report Form: EMF ... Date: Nov 12, 1998

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	175

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 18	N 449,797.1 E 549,119.0	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-15-98	10-15-98	Layne Environmental	AP-1000	9.6	85	NA	85

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4443.46	4440.6		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 84.9 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10			0.0-14.0: SILT (ML) Dark yellowish brown (10YR 3/4), slightly clayey, dry.	Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 "
							4426.6	15, 20, 25, 30			14.0-32.0: Silty GRAVEL (GM) Dark yellowish brown (10YR 3/4), some sand, gravel is subangular to rounded, dry.	Logged from cuttings using Unified Soil Classification System and GSA rock color chart.
							4408.6	35			32.0-72.0: Silty Clay (CL) Dark yellowish brown (10YR 3/4), moderately plastic, dry.	
SS	1.5	1.5	3 4 7					40		☒	damp at 40 feet.	
SS	1.5	1.5	2 5 5					45		☒	Wet at 45 feet. Trace pea gravel encountered at 45.5 feet.	
SS	1.5	1.5	4 5 6					50		☒	Trace of gravel encountered at 50 to 51 feet. 10% gravel at 51 to 56 feet.	
SS	1.5	1.0	4 5 7					55		☒	Clay is plastic at 55 feet.	
SS	1.5	1.5	3 4 4					60		☒	Becoming damp at 60 feet.	
SS	1.5	1.2	4 7 7					65		☒	Almost dry at 65 feet.	
SS	1.5	1.5	5 5 6				4368.6	70		☒		
SS	1.5	0.0	50/5"					75, 80			72.0-85.0: Silty GRAVEL (GM) Dark yellowish brown (10YR 3/4), well graded, subrounded, wet. 20% sand below 78 feet fine to coarse grained.	Abundant water below 74 feet.
							4355.6	85				

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 18		175

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	176

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 18	N 450,291.6 E 550,019.0	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-14-98	10-14-98	Layne Environmental	AP-1000	9.6	88	NA	88

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4443.13	4440.3		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 87.4 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10			0.0-12.0: SILT (ML) Dark yellowish brown (10YR 3/4), slightly clayey, dry, hard.	Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 "
							4428.3	15, 20, 25, 30, 35, 40, 45			12.0-52.0: Silty GRAVEL (GM) Dark yellowish brown (10YR 3/4), subangular quartz gravel. Pushing large boulder. No sample 20 to 50 feet. Damp at 47 feet.	Logged from cuttings and 2-inch split spoon sampler using Unified Soil Classification System and GSA rock color chart.
SS	1.5	0.0	50/5"					50				
							4388.3	55, 60, 65			52.0-67.0: Silty GRAVEL (GM) Dark yellowish brown (10YR 3/4), damp.	Very fine cuttings.
							4373.3	70			69.0-72.0: Silty Clay (CL) Grayish brown (5YR 3/2), slightly plastic damp.	Good returns. Very few cuttings.
							4368.3	75, 80, 85			72.0-88.0: Silty Sand and GRAVEL (GM) Dark yellowish brown (10YR 3/4), fine to 3-inch, wet. 83.0-88.0: Clean, well rounded gravel to 3-inch.	Abundant water.
							4352.3					

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 18		176

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	177

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 18	N 450,022.2 E 550,106.4	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-13-98	10-13-98	Layne Environmental	AP-1000	9.6	88.4	NA	88.4

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4444.61	4442.0		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 88.0 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10, 15, 20, 25			0.0-27.0: SILT (ML) Dark yellowish brown (10YR 3/4), dry, trace calcite. Sly moist at 18 feet.	Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 " Logged from cuttings and 2-inch split spoon sampler using Unified Soil Classification System and GSA rock color chart.
							4415.0	30, 35, 40			27.0-44.0: Gravelly SILT w/ some sand (ML) Dark yellowish brown (10YR 3/4), subangular, dry, large increase in gravel at 30 to 44 feet up to 5-inch cobbles.	
							4398.0	45, 50			44.0-53.0: Sandy GRAVEL (GP) Dark yellowish brown (10YR 3/4), trace silt, rounded to subrounded, moist. Wet at 50 feet.	
SS	0.3	0.0	50/6				4389.0	55, 60, 65			53.0-67.0: Silty Clay (CL) Dark yellowish brown (10YR 3/4), and grayish brown (5YR 3/2), slightly plastic, wet. Increase in wetness at 61 feet.	
SS	1.5	1.5	5, 5, 9				4375.0					
SS	1.5	1.5	9, 23, 27				4372.0	70			67.0-70.0: Shale Dusky yellowish brown (10YR 2/2), soft slightly fissile.	
SS	1.5	1.0	4, 4, 5								Trace silt and sand, damp at 70 feet. Some gravel at 72 feet, wet.	
SS	1.5	1.5	6, 10, 11					75, 80, 85			75.0-88.4: Silty GRAVEL (GM) Grayish brown (5YR 3/2), wet. Increase in flow at 82 feet. Approximately 20% sand, medium grained, subangular below 83 feet.	
SS	1.5	0.5	7, 13, 15									
SS	0.3	0.0	50/5				4353.6					

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 18		177

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	178

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 18	N 449,473.9 E 550,275.2	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-12-98	10-13-98	Layne Environmental	AP-1000	9.6	78.5	NA	78.5

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4451.14	4448.5		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 77.8 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								5, 10			0.0-13.5: SILT (ML) Dark yellowish brown (10YR 3/4), slightly plastic damp. Trace small gravel at 11 feet.	Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 "
							4435.0	15, 20			13.5-23.0: Silty GRAVEL (GM), 1-1/2 inch size, Dark yellowish brown (10YR 3/4), gravel subangular to rounded dry. Cobbles to 4"x5" at 17 feet.	Logged from cuttings and 2-inch split spoon sampler using Unified Soil Classification System and GSA rock color chart.
							4425.5	25, 30			23.0-32.0: Silty GRAVEL w/ sand (GM) Dark yellowish brown (10YR 3/4), well graded, volcanic, quartz subrounded to well rounded.	
							4416.5	35, 40			32.0-73.0: Silty Clay (CL) Dark yellowish brown (10YR 3/4), moderately plastic, soft, slightly moist. Cobbles to 5-inch encountered at 39 feet.	
SS	1.5	1.5	9, 11, 12					45		X	Moist at 45 feet. Wet at 46.5 feet.	
SS	1.5	1.5	4, 6, 6					50		X		
SS	1.5	1.5	6, 10, 13					55		X	Some gravel encountered at 56 feet.	
SS	1.5	1.5	5, 6, 6					60		X	10% sand at 60 feet.	
SS	1.5	1.5	4, 6, 7					65		X	Clay, pale yellowish brown (10YR 6/2), at 65 feet.	
SS	1.5	1.5	2, 4, 4					70		X		
SS	1.5	0.0	5, 7, 6				4375.5	75			73.0-78.5: Silty GRAVEL and sand (GM) Dark yellowish brown (10YR 3/4), fine to 4.5 to 5 inch size, mostly fine sand.	
							4370.0					

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE	Last Update:	HOLE NO.
FMC Pond 18		178

Report Form: EMF 6L Date: Nov 12, 1998

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	20906	1 of 1	183

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Pond 8S	N 450,017.7 E 554,927.8	-90	N00.0E

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-17-98	10-17-98	Layne Environmental	AP-1000	9.6	119.7'	NA	119.7

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND ELEV.	DEPTH / ELEVATION GROUND WATER	DEPTH / ELEVATION TOP OF ROCK
NA	NA	NA	4497.13	4494.3		NA

SAMPLE HAMMER WEIGHT / FALL	CASING LEFT IN HOLE: DIAMETER / LENGTH	LOGGED BY:
140 lbs. / 30 in.	4" PVC / 117.85 ft.	L. R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. / LEN CORE	SAMPLE REC. / CORE REC.	SAMPLE BLOWS "N" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME IN MIN.
SS	1.5	1.5	3 3 5			
SS	0.3	0.0	50/3"			

ELEV. / DEPTH / GRAPHICS / SAMPLE

DESCRIPTION AND CLASSIFICATION

- 0.0-7.0: Slag gravel, fill.
- 7.0-51.0: SILT (ML) Moderate yellowish brown (10YR 5/4), dry.
- 45.0-47.0: Mottled w/ silty clay, pale olive (10YR 6/2).
- 51.0-54.0: Silty Clay (CL) Pale olive (10YR 6/2), slightly plastic.
- 54.0-65.0: SAND (SP) Moderate yellowish brown (10YR 4/6), very fine to fine grained, slightly moist.
- 65.0-67.0: SAND w/ gravel (SP) Moderate reddish brown (10YR 4/6), moist.
- 67.0-82.0: SILT (ML) Moderate reddish brown (10YR 4/6), moist.
- 82.0-90.0: Silty GRAVEL (GM) Gravel - dark gray; Silt - moderate reddish brown (10YR 4/6), subrounded
- Large cobbles to 5-inch encountered at 84 feet.
- 90.0-91.0: Gravelly SAND (SP) Moderately reddish brown (10YR 4/6), medium to coarse grained.
- 91.0-108.0: Silty SAND (SM) Moderate yellowish brown (10YR 5/4), very fine grained.
- Wet at 95 feet.
- 108.0-120.0: GRAVEL (GP) 1/2 inchsize, Basalt grayish brown (5YR 3/2), and sand, moderate reddish brown (10YR 4/6), water.

ELEVATIONS: 4487.3, 4443.3, 4440.3, 4429.3, 4427.3, 4412.3, 4404.3, 4403.3, 4386.3, 4374.3

DEPTHS: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Dual wall percussion drilling with reverse air circulation. Diameter: inner pipe = 6 "; outer pipe = 9 5/8 "

Logged from cutttings and 2-inch split spoon sampler using Unified Soil Classification System and GSA rock color chart.

SS = Split Spoon; ST = Shelby Tube; D = Dennison; P = Pitcher; MC = Modified California; O = Other

SITE: FMC Pond 8S — Last Update: — HOLE NO. 183

Report Form: EMF-FBL Date: Nov 12 1998

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	173

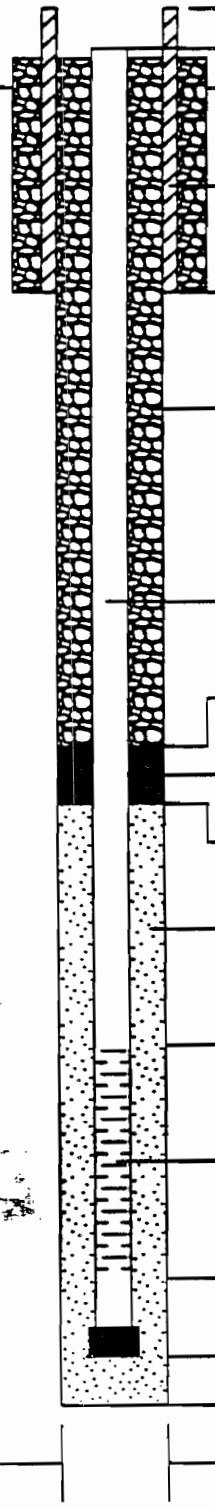
JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 17	N 449,231.3 : E 550,171.8

DN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-16-98	10-16-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4452.76
TOP OF RISER CASING	-2.8	4452.58
GROUND SURFACE	0.0	4449.8
BOTTOM OF SURFACE CASING	2.0	4447.8
TOP OF SEAL	55.0	4394.8
TOP OF FILTER PACK	65.4	4384.4
TOP OF SCREEN	70.0	4379.8
BOTTOM OF SCREEN	85.0	4364.8
BOTTOM OF SUMP	87.8	4361.9
BOTTOM OF HOLE	89.0	4360.8

SURFACE CASING
DIAMETER: 6"
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 Colorado Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1998
Report Form: EMF-WELLOG2

NOT TO SCALE

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	174

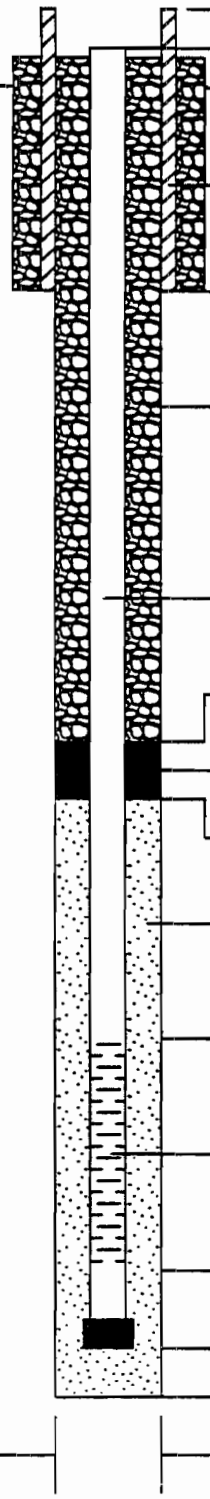
JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 18	N 449,232.7 : E 549,303.4

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-15-98	10-15-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4447.12
TOP OF RISER CASING	-2.8	4446.92
GROUND SURFACE	0.0	4444.1
BOTTOM OF SURFACE CASING	2.0	4442.1
TOP OF SEAL	60.0	4384.1
TOP OF FILTER PACK	70.1	4374.0
TOP OF SCREEN	75.0	4369.1
BOTTOM OF SCREEN	85.0	4359.1
BOTTOM OF SUMP	87.9	4356.2
BOTTOM OF HOLE	88.0	4356.1

SURFACE CASING
DIAMETER: 6"
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 CSSI Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1998
Report Form: EMF-WELLOG2

NOT TO SCALE

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	175

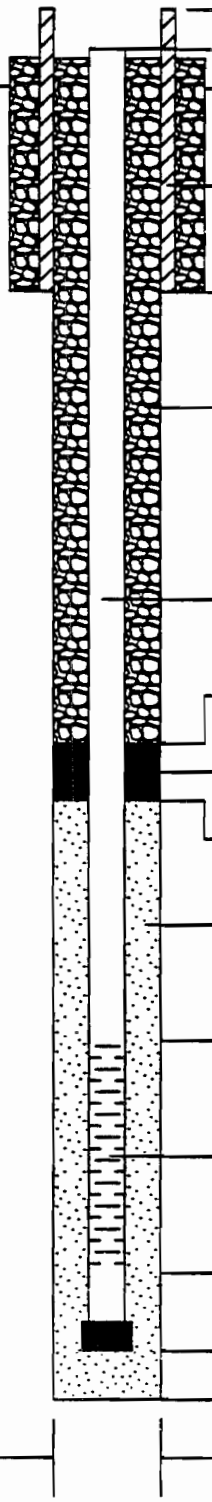
JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 18	N 449,797.1 : E 549,119.0

JN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-15-98	10-15-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4443.59
TOP OF RISER CASING	-2.9	4443.46
GROUND SURFACE	0.0	4440.6
BOTTOM OF SURFACE CASING	2.0	4438.6
TOP OF SEAL	57.0	4383.6
TOP OF FILTER PACK	67.0	4373.6
TOP OF SCREEN	72.0	4368.6
BOTTOM OF SCREEN	82.0	4358.6
BOTTOM OF SUMP	84.9	4355.7
BOTTOM OF HOLE	85.0	4355.6

SURFACE CASING
DIAMETER: 6"
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 CSSI Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1998
Report Form: EMF-WELLOG2

NOT TO SCALE

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	176

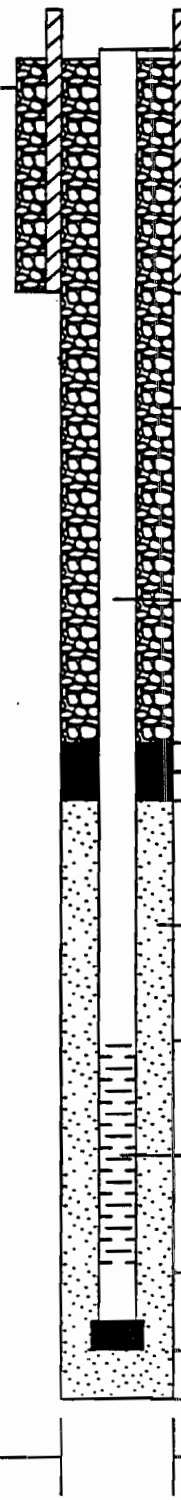
JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 18	N 450,291.6 : E 550,019.0

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-14-98	10-14-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4443.29
TOP OF RISER CASING	-2.8	4443.13
GROUND SURFACE	0.0	4440.3
BOTTOM OF SURFACE CASING	2.0	4438.3
TOP OF SEAL	60.5	4379.8
TOP OF FILTER PACK	70.5	4369.8
TOP OF SCREEN	74.8	4365.5
BOTTOM OF SCREEN	84.8	4355.5
BOTTOM OF SUMP	87.4	4352.9
BOTTOM OF HOLE	88.0	4352.3

SURFACE CASING
DIAMETER: 6"
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 CSSI Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1998
Report Form: EMF-WELLOG2

NOT TO SCALE

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	177

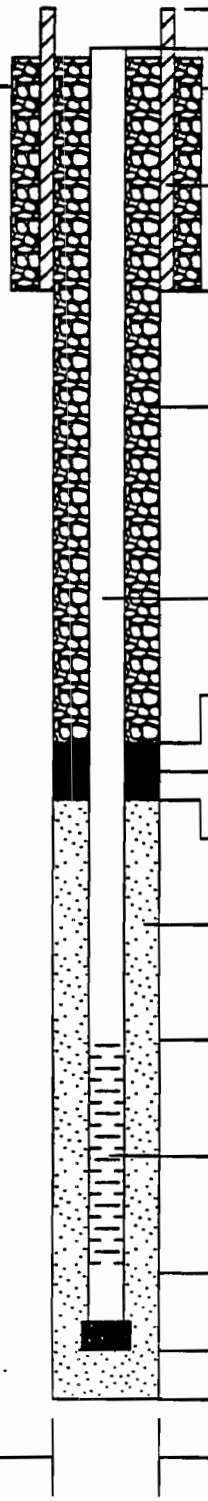
JOB NO.	SITE	COORDINATES and / or STATIONING
0906	FMC Pond 18	N 450,022.2 : E 550,106.4

N	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-13-98	10-13-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4444.95
TOP OF RISER CASING	-2.7	4444.61
GROUND SURFACE	0.0	4442.0
BOTTOM OF SURFACE CASING	2.0	4440.0
TOP OF SEAL	61.4	4380.6
TOP OF FILTER PACK	71.4	4370.6
TOP OF SCREEN	75.1	4366.9
BOTTOM OF SCREEN	85.1	4356.9
BOTTOM OF SUMP	88.0	4354.0
BOTTOM OF HOLE	88.4	4353.6

SURFACE CASING
DIAMETER: 6"
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 CSSI Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1998
Report Form: EMF-WELLOG2

NOT TO SCALE

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	178

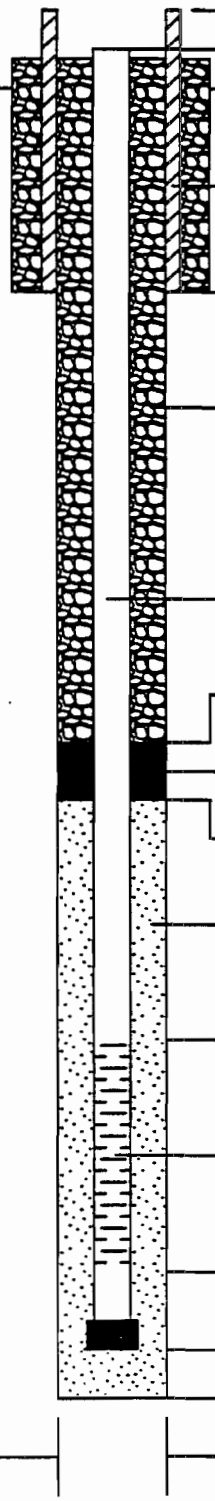
JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 18	N 449,473.9 : E 550,275.2

.GUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-12-98	10-13-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4451.47
TOP OF RISER CASING	-2.7	4451.14
GROUND SURFACE	0.0	4448.5
BOTTOM OF SURFACE CASING	2.0	4446.5
TOP OF SEAL	46.0	4402.5
TOP OF FILTER PACK	56.4	4392.1
TOP OF SCREEN	60.0	4388.5
BOTTOM OF SCREEN	75.0	4373.5
BOTTOM OF SUMP	77.8	4370.7
BOTTOM OF HOLE	78.5	4370.0

SURFACE CASING
DIAMETER: 8"
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 CSSI Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1996
Report Form: EMF-WELLOG2.

NOT TO SCALE

MONITORING WELL

PROJECT	WELL NO.
EMF POCATELLO, ID	183

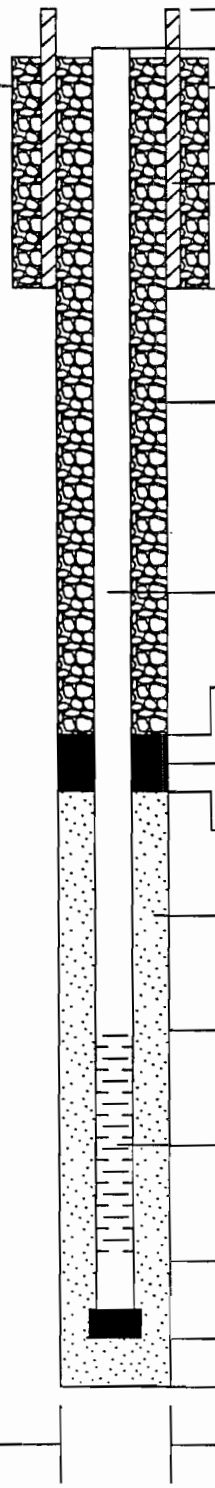
JOB NO.	SITE	COORDINATES and / or STATIONING
20906	FMC Pond 8S	N 450,017.7 : E 554,927.8

BEGUN	COMPLETED	PREPARED BY	REFERENCE POINT FOR MEASUREMENTS
10-17-98	10-17-98	L. R. West	Top of PVC Casing-Water Levels

(GENERALIZED GEOLOGIC LOG)

See Geologic Drill Log for Details.

NOT TO SCALE



	DEPTH (FT)	ELEV. (FTMSL)
TOP OF SURFACE CASING	-3	4497.33
TOP OF RISER CASING	-2.8	4497.13
GROUND SURFACE	0.0	4494.3
BOTTOM OF SURFACE CASING	2.0	4492.3
TOP OF SEAL	85.0	4409.3
TOP OF FILTER PACK	95.0	4399.3
TOP OF SCREEN	100.0	4394.3
BOTTOM OF SCREEN	115.0	4379.3
BOTTOM OF SUMP	117.9	4376.5
BOTTOM OF HOLE	119.7	4374.6

SURFACE CASING
DIAMETER: 8-5/8 inch OD
TYPE: Steel

BACKFILL MATERIAL TYPE
Cement-Bentonite Grout

RISER CASING
DIAMETER: 4"
TYPE: Schedule 40 PVC

ANNULAR SEAL TYPE
Bentonite Slurry

FILTER PACK TYPE
10-20 CSSI Silica Sand

SCREEN
DIAMETER: 4"
TYPE: Sch. 40 PVC
OPENING WIDTH: 0.020"
TYPE: Machine-cut

HOLE DIAMETER: 9 5/8-inches

Update: Nov 12, 1998
Report Form: EMF-WELLOG2

NOT TO SCALE

MFG, Inc.
Consulting Scientists and Engineers

LOG OF BORING 189

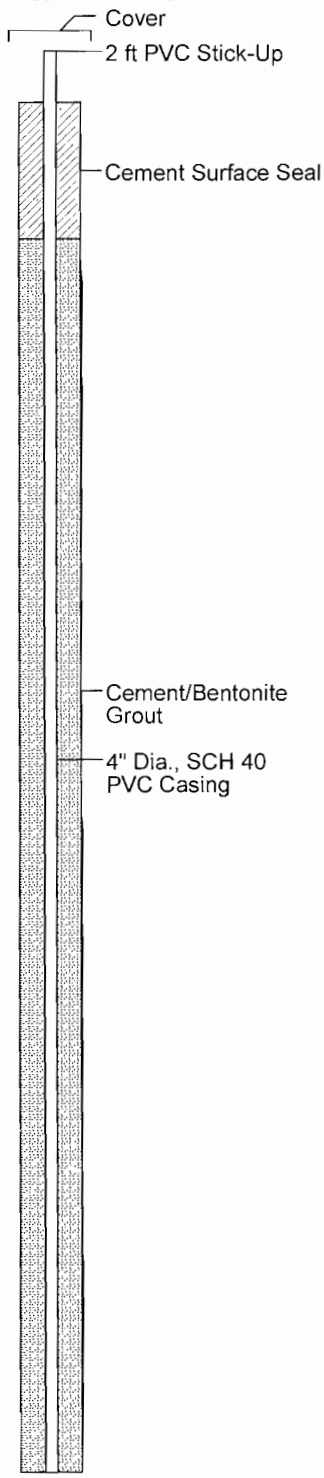
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 6/19/03-6/20/03
Drilling Method	: AP-1000 Percussion Hammer	Northing Coord.	: 451486.4
Drill Bit Size	: 9" O.D.	Easting Coord.	: 557824.5
Sampler Type	: N/A	Surface Elevation	: 4558.7 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
0	SILT with GRAVEL. Gravel well sorted and round. Color grades from yellowish brown (10 YR 5/4) to very dark grayish brown (10 YR 3/2).	AR/ML					
5							
	At 8' GRAVEL turns from rock to slag. Dominant color is very dark grayish brown (10 YR 3/2), dry to slightly moist fill.						
10	At 11', Cobbles and Gravel.						
	Alternating layers of yellowish brown (10 YR 5/4) with dark grayish brown (10 YR 3/2). Dark gray layers have abundant slag gravel and brown layers have trace rock gravel.						
15							
20	SLAG is angular to rounded.						
	ROCK is rounded.						
	Continued alternating light and dark layers.						
25	SILT. Yellowish brown (10 YR 5/6), homogenous, dry to slightly moist, trace gravel, no plasticity.	ML					
30	GRAVELS are subangular, black with some white weathered phenocrysts, weathered volcanic.						Easy Drilling.
35							
40							
45							Easy Drilling.
50							

Well: 189R
Elev.: TOC 4560.72



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LOG OF BORING 189

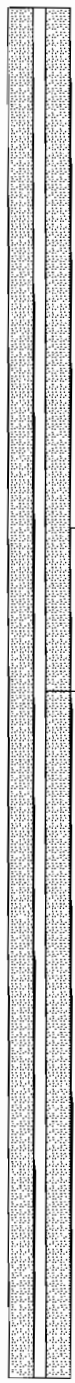
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 6/19/03-6/20/03
Drilling Method	: AP-1000 Percussion Hammer	Northing Coord.	: 451486.4
Drill Bit Size	: 9" O.D.	Easting Coord.	: 557824.5
Sampler Type	: N/A	Surface Elevation	: 4558.7 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
50							
55							Easy Drilling.
60	SILT. Yellowish brown (10 YR 5/6), dry, trace gravel with layer <1' thick.						
65		ML					Easy Drilling.
70							
75							Easy Drilling.
80	Increasing GRAVEL content.						
85	GRAVEL with SILT. Poorly sorted, subangular to rounded, volcanics and quartzite, dry, grayish brown (10 YR 5/2).	GM					
90							
95	SILT. Yellowish brown (10 YR 5/6), dry, non-plastic, trace volcanic gravel.	ML					
100							

Well: 189R
Elev.: TOC 4560.72



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LOG OF BORING 189

Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 6/19/03-6/20/03
Drilling Method	: AP-1000 Percussion Hammer	Northing Coord.	: 451486.4
Drill Bit Size	: 9" O.D.	Easting Coord.	: 557824.5
Sampler Type	: N/A	Surface Elevation	: 4558.7 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Well: 189R
Elev.: TOC 4560.72

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
100		ML					
105	GRAVEL with SILT and COARSE SAND. Pale brown (10 YR 6/3), subangular to well rounded, poorly sorted, with trace cobbles.	GM/GP					
110							
115	GRAVEL with SILT. Weathered volcanics and andesite. Dry, poorly sorted and trace cobbles.	GM					
120							
125							
130	GRAVEL with SILT, yellowish brown (10 YR 5/6) and trace sand. Angular weathered andesite, poorly sorted. Increase sand with depth.						
135	SILT with GRAVEL. Dark yellowish brown (10 YR 4/6), weathered andesite, no plasticity.	ML					
140	GRAVEL with SILT. Yellowish brown (10 YR 5/6), gravel, poorly sorted, moist to dry.	GM					
145	Layer ~1' thick coarse gravels and cobbles.						Soft.
150							

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LOG OF BORING 189

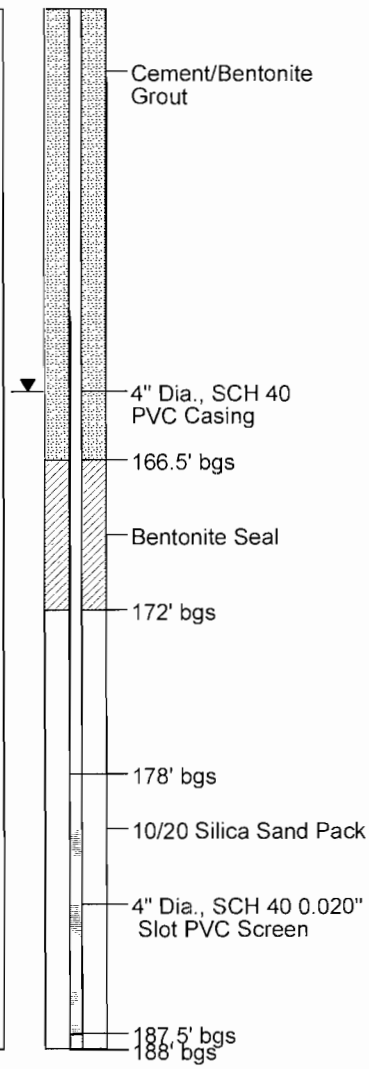
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 6/19/03-6/20/03
Drilling Method	: AP-1000 Percussion Hammer	Northing Coord.	: 451486.4
Drill Bit Size	: 9" O.D.	Easting Coord.	: 557824.5
Sampler Type	: N/A	Surface Elevation	: 4558.7 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
150	GRAVEL with SILT and SAND. Yellowish brown (10 YR 5/6), moist, poorly sorted, and trace cobbles.	GM/GW					
155	Increasing sand content with depth.						
160	GRAVEL with medium to coarse sand. Pale brown (10 YR 6/3), poorly sorted, dry.	GW					
165	Becoming moist at 164'. Increase % silt at 165'.						Water Encountered @ 164' bgs.
170	SILT. Yellowish brown (10 YR 5/6), wet, slow dilatancy, no to slight plasticity, trace gravels.	ML					
175	GRAVEL with SILT. Wet with trace clay clasts.	GM					
180	GRAVEL. Poorly sorted, angular to well rounded, wet, trace fines.	GP					
185	Weathered andesite.						
	TD= 188' bgs						
190							
195							
200							

Well: 189R
Elev.: TOC 4560.72



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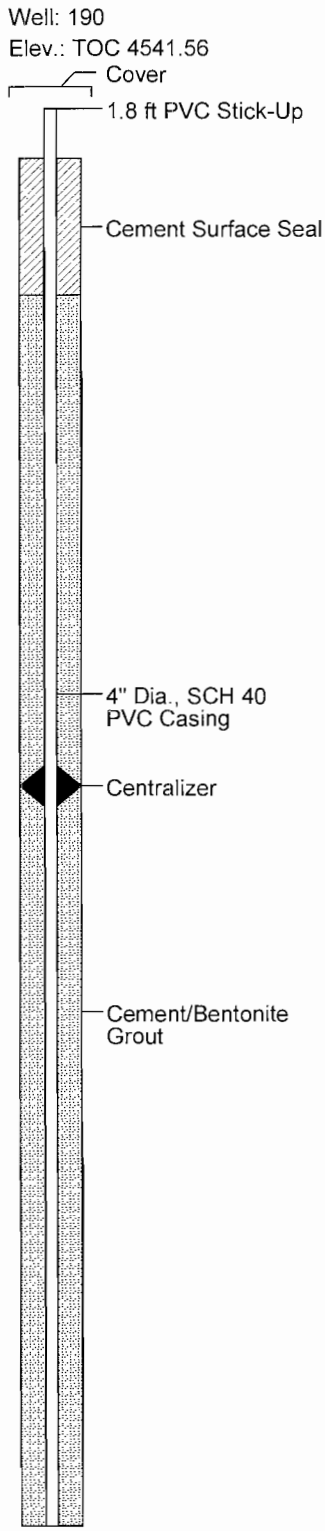
LOG OF BORING 190

Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-11-03/7-13-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 451000.4
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557256.7
Sampler Type	: N/A	Surface Elevation	: 4539.8 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
0	Fill. Dark brown (10 YR 3/3) to very dark grayish brown (10 YR 3/2) slag and light gray (10 YR 7/1) rock mix, angular texture.	AR					
5	SILT with light gray (10 YR 7/1) rock (slag?). Yellowish brown (10 YR 5/4) to pale brown (10 YR 6/3), dry to slightly moist.	ML					Easy Drilling.
10							
15	No gray rock.						
20							
25	Gravel layer <1' thick.						
30							
35	Increasing gravel, volcanics (~10%), trace fine sand.						
40	Gravel <5%.						
45							
50							



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LOG OF BORING 190

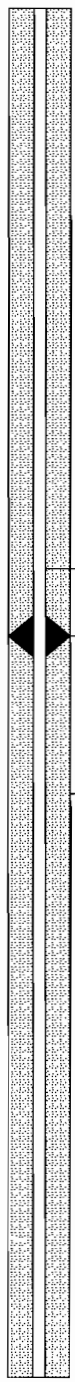
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-11-03/7-13-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 451000.4
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557256.7
Sampler Type	: N/A	Surface Elevation	: 4539.8 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Well: 190
Elev.: TOC 4541.56

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
50–65	Increasing gravel and sand, trace cobbles.	ML					
65–77	GRAVEL with SILT and SAND. Brownish yellow (10 YR 6/6), subangular to rounded, poorly sorted, dark volcanics, trace cobbles. Decreasing silt. Increasing silt. Decreasing cobbles.	GM/GP					
77–86	GRAVEL with fine to medium grained sand. Poorly sorted, subangular to well rounded.	GP					
86–93	GRAVEL. Poorly sorted with some sand, subangular to rounded, some cobbles, dry.	GW					Alternating Hard and Soft Drilling Zones.
93–100	GRAVEL with medium sand. Moist, subangular to rounded, trace cobbles. Increase silt content ~1'. Increasing sand content.	GP					



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LOG OF BORING 190

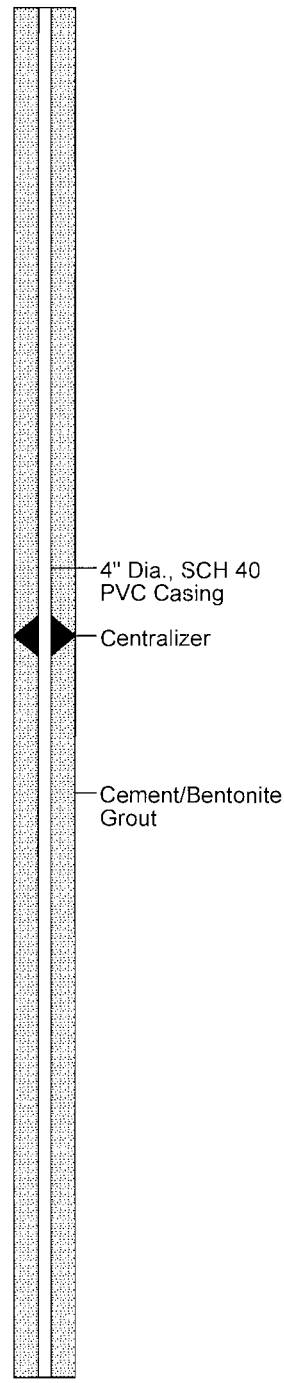
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-11-03/7-13-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 451000.4
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557256.7
Sampler Type	: N/A	Surface Elevation	: 4539.8 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
100	Alternating lenses of gravel and sand with gravel.	GP					
105	Decreasing sand, increasing silt.						
110	GRAVEL with SILT. Brown (7.5 YR 5/4), moist.	GM					
115	Weathered Andesite. Porphyritic, gray with white phenocrysts. Cuttings are poorly sorted, silt to fine gravels, angular gravels.	VL					Slightly Wet.
120							
125							
130	Weathered Andesite.						
135							Slow Drilling.
140	Andesite becoming more weathered.						
145							
150							

Well: 190
Elev.: TOC 4541.56



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LOG OF BORING 190

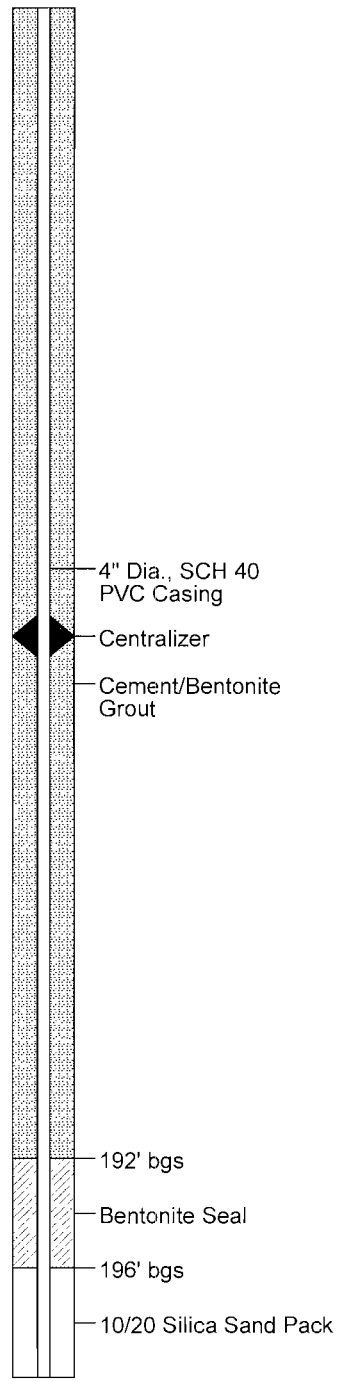
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-11-03/7-13-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 451000.4
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557256.7
Sampler Type	: N/A	Surface Elevation	: 4539.8 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
150							
155							Slow Drilling.
160							
165							
170							
175		VL					Slow Drilling.
180							
185							
190							
195							
200							

Well: 190
Elev.: TOC 4541.56



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LOG OF BORING 190

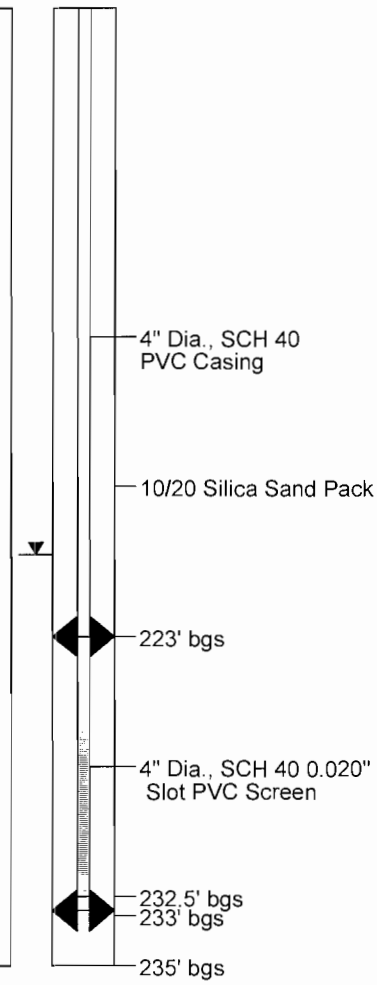
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-11-03/7-13-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 451000.4
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557256.7
Sampler Type	: N/A	Surface Elevation	: 4539.8 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Well: 190
Elev.: TOC 4541.56

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
200							
205	Weathered Andesite cuttings are poorly sorted, silt to coarse sand to fine gravel.						
210							
215		VL					
220	Cuttings turning to angular gravel, decreasing silt, possible gravel layer rather than bedrock.						Water Encountered @ 220' bgs.
225							
230	~60% red oxidation on edges.						
235	TD = 235' bgs						
240							
245							
250							



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LOG OF BORING 191

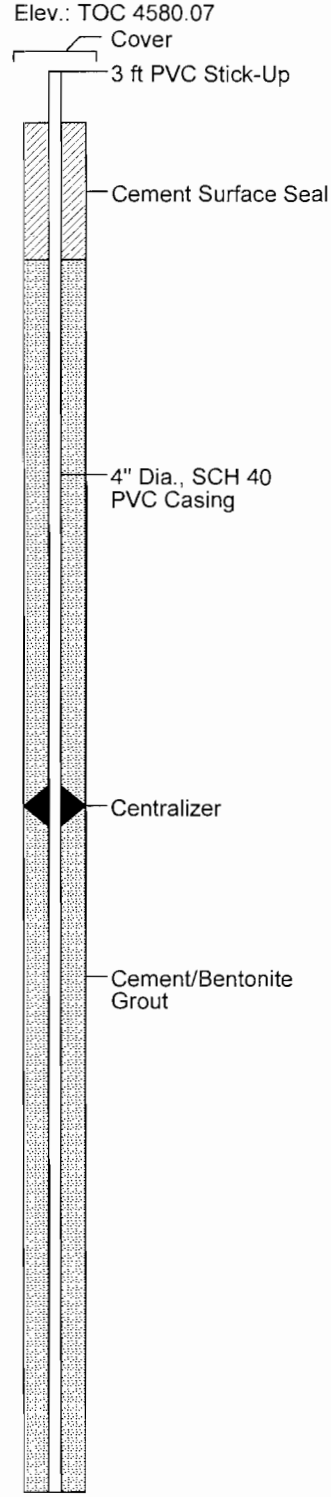
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-08-03/7-10-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 449477.3
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557404.5
Sampler Type	: N/A	Surface Elevation	: 4577.1 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
0	SILT. Pale brown (10 YR 6/3), with some slag, dry. Fill.	AR					
10	SILT. Yellowish brown (10 YR 5/6), dry to moist, non-plastic, trace gravel. Loess.	ML					Easy Drilling.
25	Gravel layer ~2' thick.						
40	Increasing gravel with depth.						Slow Drilling.
50							

Well: 191
Elev.: TOC 4580.07



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LOG OF BORING 191

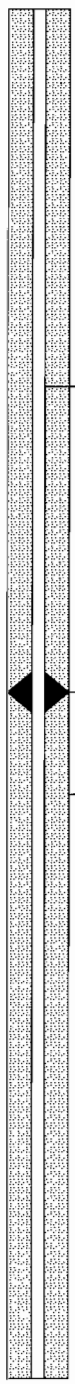
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-08-03/7-10-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 449477.3
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557404.5
Sampler Type	: N/A	Surface Elevation	: 4577.1 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Well: 191
Elev.: TOC 4580.07

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
50	Andesite. Light olive gray (5 Y 3/2), weathered and porphyritic.	ML					
55	Cuttings are poorly sorted, very angular, 1-10mm in diameter and dry.						Casing 54' bgs.
60							Slow Drilling.
65	Porphyritic Andesite. Dark olive gray (5 Y 3/2), cuttings are angular, with some edges showing red oxidation.						
70							
75		VL					
80	Color changes to a red-purple.						
85							
90							
95							
100							



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LOG OF BORING 191

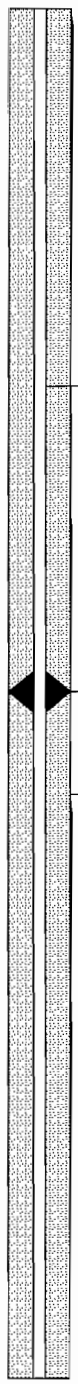
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-08-03/7-10-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 449477.3
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557404.5
Sampler Type	: N/A	Surface Elevation	: 4577.1 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Well: 191
Elev.: TOC 4580.07

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
100							
105	Cuttings grade to dark olive gray (5 Y 3/2), some red oxidation, poorly sorted, 2mm to 10mm in diameter.	VL					Drilling Rate Increased Slightly.
110							
115							
120							
125							
130	SILT and very fine grained sand. Reddish brown (5 YR 4/3), with some Andesite. Reddish brown silt clasts with Andesite.	ML					
135	Decreasing Andesite.						
140	GRAVELS. Black with trace (~10%) red-brown silt and silt clasts. Dry.	GP/GM					Drilling Rate Increased Slightly. Easy Drilling.
145	Black volcanic ash (?). Small obsidian sphericles (~1mm), highly reflective surfaces, black silt with gravel.						
150							



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LOG OF BORING 191

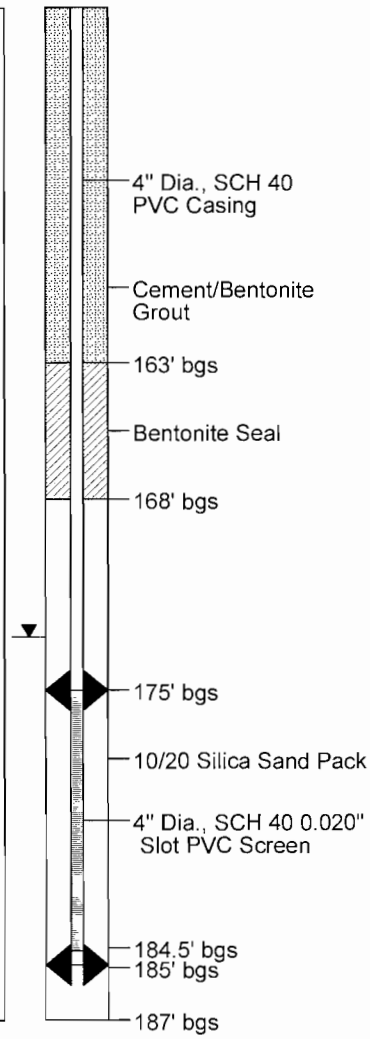
Simplot Plant Area
Eastern Michaud Flats Superfund Site
Pocatello, Idaho

MFG Job# 010121.1

Drilling Agency	: LAYNE GEOCONSTRUCTION	Start/Complete Date	: 7-08-03/7-10-03
Drilling Method	: Odex/Down Hole Hammer	Northing Coord.	: 449477.3
Drill Bit Size	: 8" O.D.	Easting Coord.	: 557404.5
Sampler Type	: N/A	Surface Elevation	: 4577.1 ft AMSL
Sampling Method	: Grab	Logged By	: JPL

Well: 191
Elev.: TOC 4580.07

Depth in Ft.	DESCRIPTION	Formation	GRAPHIC	Samples	Blow Count	Recov. (ft)	REMARKS
150							
155							
160		GP/GM					Easy Drilling.
165	70% Dark gray silt to fine sand with obsidian like appearance with some gravel.						
170	CLAYEY SILT/SAND. Yellowish brown (10 YR 5/6), slight plasticity, damp to moist, some black spherical particles, trace gravel ground up volcanic Tuff (?).	ML					Encountered Water @ 173' bgs.
175	SAND. Poorly sorted, wet, angular to rounded, grains are fine to medium grained, trace silt and coarse grained.	SW/SM					
180	SILT with trace black fragments. Light yellowish brown (2.5 Y 6/4), some sand, fine grained, wet. Possible ground up volcanic Tuff or Tuffeceous silt.	ML					
185							
	TD = 187' bgs.						
190							
195							
200							



GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 10 Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
8/4/80	Alluvium, light brown, silty	0	60
	Rhyolite, gray, weathered, Ca stained grains	60	145
	Rhyolite, gray, samples do not show weathering,		
	sample cuttings are angular	145	200
	Note: No water encountered during drilling. Measured		
	static water level on 8/18/80 and detected		
	water at 141.5 ft.		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 2D Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
9/16/80	Slag and fill	0	2
	Alluvium	2	18
	Clay, light brown, silty	18	32
	Gravel, subangular to subrounded, pebbles up to	32	38
	1/4 inch in length.		
	Boulders and light brown clay	38	58
	Clay, light brown	58	88
	Clay, light brown with gravel	88	98
	Boulders and gravel	98	130
	Boulders and light brown clay	130	142
	Boulders and gravel	142	194
	Clay, light brown	194	200
	Boulders and gravel	200	228
	Weathered lava flow	228	241
	Clay, light brown, sandy	241	251
	Clay, light brown with gravel	251	260
	Volcanic ash and tan clay in alternating layers	260	265
	Volcanic ash, clay and gravel in alternating layers	265	278
	Gravel, subangular to subrounded	278	282
	Weathered lava, gray and brown	282	292
	Rhyolite, red	292	312
	Note: Water encountered at 103 feet while drilling.		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 3D Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
10/9/80	Alluvium	0	9
	Gravel and cobbles	9	31
	Clay, light brown	31	74
	Gravel, subangular to subrounded	74	91
	Clay, sandy, light brown. Sand is medium grained.	91	176
	Clay, light brown, very hard.	176	185
	Clay, white, appears to be decomposed ash, very hard, also contains fragments of volcanic rock	185	210
	Rhyolite, red, extremely fractured	210	
	NOTE: Water encountered at 59 feet while drilling		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 4D Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
9/23/80	Alluvium	0	16
	Gravel, cobbles and boulders	16	39
	Clay, light brown	39	78
	Gravel	78	88
	Clay, light brown, sandy with gravel	88	102
	Sand, light brown, clayey, contains dark sand size particles and traces of gravel	102	119
	Rhyolite, red	119	169
	Rholite, red, extremely fractured	169	172
	Rhyolite, red	172	177
	Rhyolite, red, contains white and yellow clay in void spaces	177	178
	Rhyolite, red	178	200
	NOTE: Water encountered at 78 feet while drilling		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 5D Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
10/30/80	Alluvium	0	35
	Gravel, boulders and light brown clay	35	60
	Gravel	60	70
	Clay, light brown	70	100
	Gravel and light brown clay	100	104
	Boulders, gravel and light brown clay	104	106
	Gravel and light brown clay	106	110
	Clay, light brown	110	125
	Gravel	125	127
	Alternating layers of gravel and light brown clay	127	149
	Boulders and gravel	149	153
	Clay and gravel	153	198
	Same as above	198	234
	Clay, light brown, sandy	234	254
	Clay, light brown with gravel	254	258
	Rhyolite, gray, porphoritic	258	
	NOTE: Water encountered at 98 feet while drilling.		
	A deeper aquifer was encountered while drilling at		
	155 feet		

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 6 Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
10/30/80	Loess	0	54
	Loess and gravel	54	75
	Vitrophere, black and red, glassy in texture	75	78
	NOTE: No water encountered while drilling. Boring		
	is located behind new sanitary landfill.		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 7S Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
12/2/80	Alluvium	0	17
	Gravel	17	38
	Clay, light brown	38	66
	Clay, light brown with gravel	66	75
	Gray Rhyolite, extremely fractured	75	105
	Note: No water encountered while drilling.		
	Water found at bottom of casing next		
	morning (75 feet).		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 8S Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
12/3/80	Alluvium	0	6
	Gravel, medium, subrounded	6	36
	Sand, white, very coarse with light brown clay	36	45
	Gravel, medium subrounded	45	53½
	Boulder, 3 feet in diameter	53½	56½
	Clay, light brown	56½	65
	Gravel, medium and subrounded	65	79
	Rhyolite, gray and fractured	79	95
	Note: Water seeped into casing after sitting		
	overnight. No water was detected in gravel zone		
	above bedrock.		

GEOLOGIST'S LOG

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 9S Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
12/13/80	Alluvium	0	9
	Boulders and gravel	9	52
	Volcanic ash flow	52	55
	Gravel, medium and subrounded	55	62
	Volcanic ash flow	62	66
	Gravel and light brown clay	66	75
	Gravel, larger grain size, no clay present.		
	Water bearing zone.	75	80

(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 10S Project FMC-Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
10-28-81	Light brown silt, slightly moist at 15 feet	0	18
	Light brown, silt, slightly clayey and slightly moist	18	36.2
	Large sized multicolored gravel with cobbles, fine to	36.2	41.0
	coarse sand and light brown silt, sample is dry		
	Light brown clayey sand. Sample is very moist at 50ft	41.0	76.0
10-29-81	Boulder	76.0	77.0
	Light brown clayey silt, water at 80 feet	77.0	89.0
	Light brown clayey silt, interbedded with fine sand	89.0	98.0 TD
	and large sized gravel		
	Note: Water encountered at 80 feet while drilling.		
	Screened with a 6-inch diameter 20 slot stain-		
	less steel well screen between 90 and 98 feet		
	below land surface.		

(An interpretative combination of the sample, core, driller, and geophysical logs)

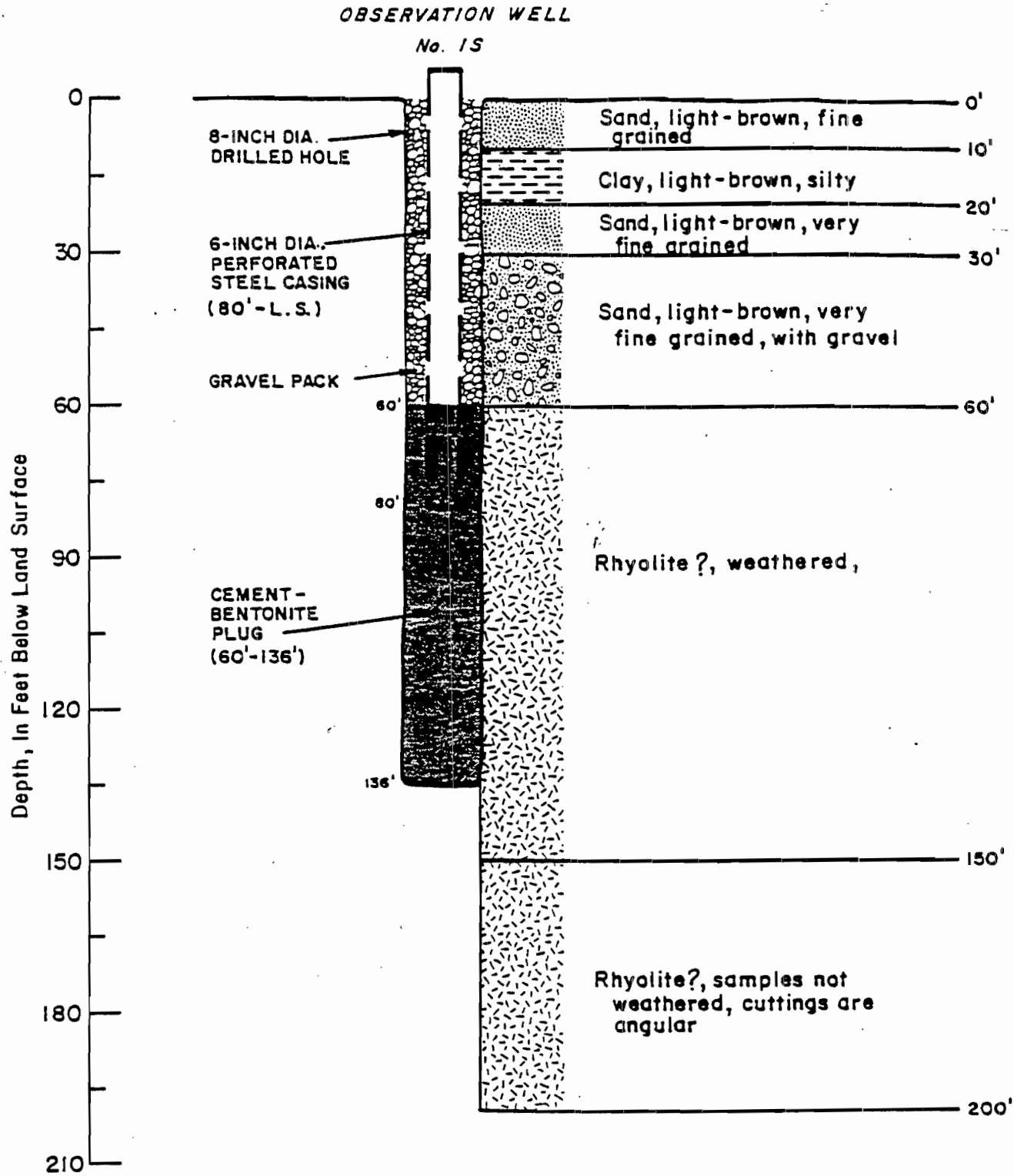
Well 11I Project FMC - Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
3/81	Light brown silt with small to large gravel	0	5.0
	Boulder	5.0	6.0
	Gravel, small to large, multicolored, with light brown silt	6.0	11.3
	Boulder	11.3	13.0
	Gravel, small to large with cobbles and light brown silt	13.0	28.0
	Boulder	28.0	29.0
	Gravel, small to large, cobbles small boulders and light brown silt	29.0	102.0
	Light brown clayey silt with medium sized gravel	102.0	115.0
	Gravel with medium to coarse sand and clayey silt. Gravel is subrounded and angular, Sample resembles tallus	115.0	118.0
	Rhyolite, gray porphoritic cavity between 121 and 123 feet	118.0	135 TD
	Note: Open hole 5-5/8-inch diameter between 126 and 135 ft. below land surface. Static water level 37.91 ft. below land surface		

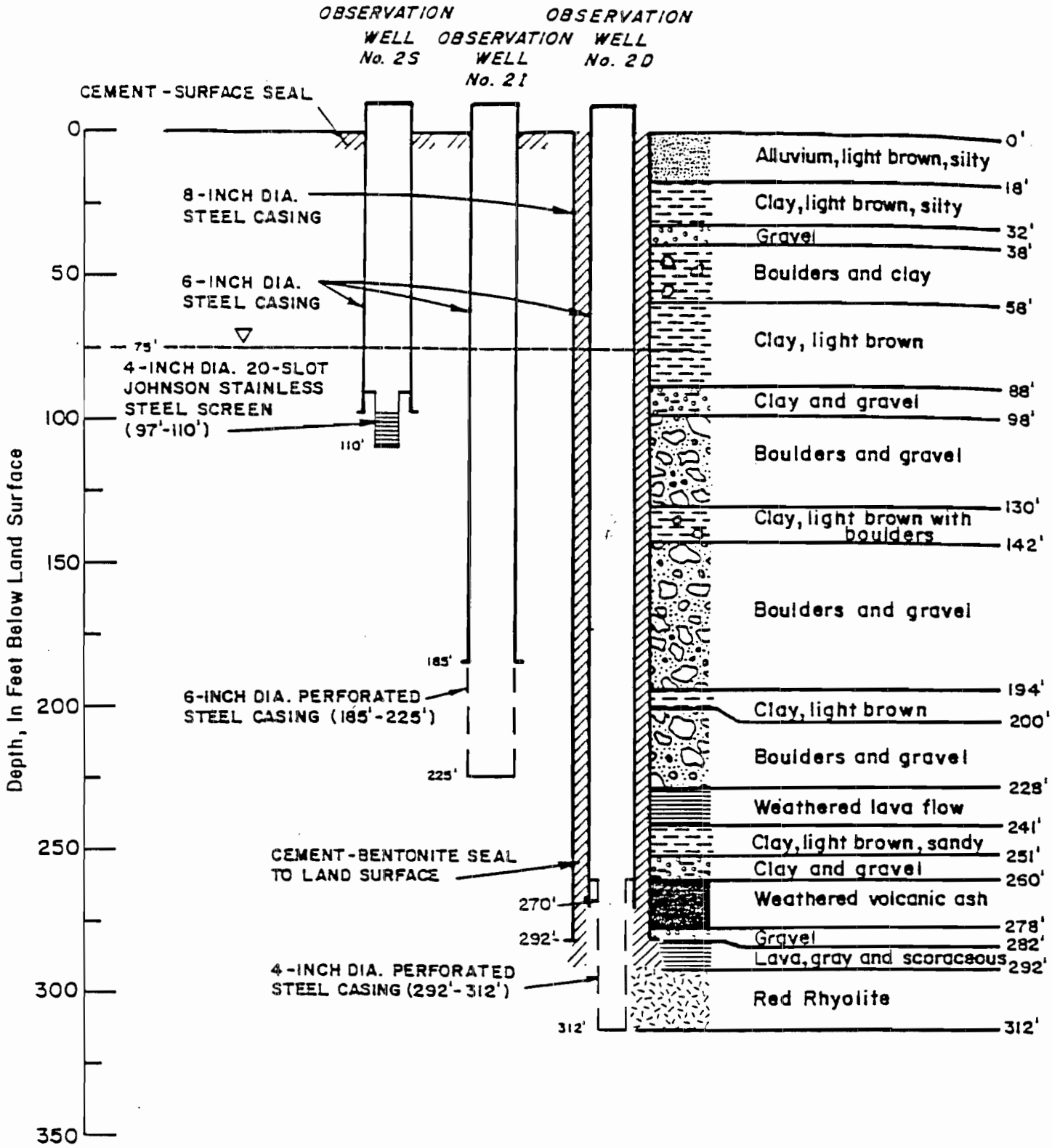
(An interpretative combination of the sample, core, driller, and geophysical logs)

Well 12S Project FMC-Pocatello Page ____ of ____

Date/ Time	Lithologic Unit Description	Lithologic Unit Depth Below Land Surface from (ft)	to (ft)
11/9/81	Light brown silt and gravel	0	3
	Gravel, small to large with cobbles, boulders and light brown silt	3	62 TD
	Note: Water encountered at 52 feet while drilling. Screened with a 6-inch diameter 20' slot stainless steel well screen		



PREPARED FOR FMC CORPORATION POCATELLO, IDAHO		
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 1		
COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	No A-1



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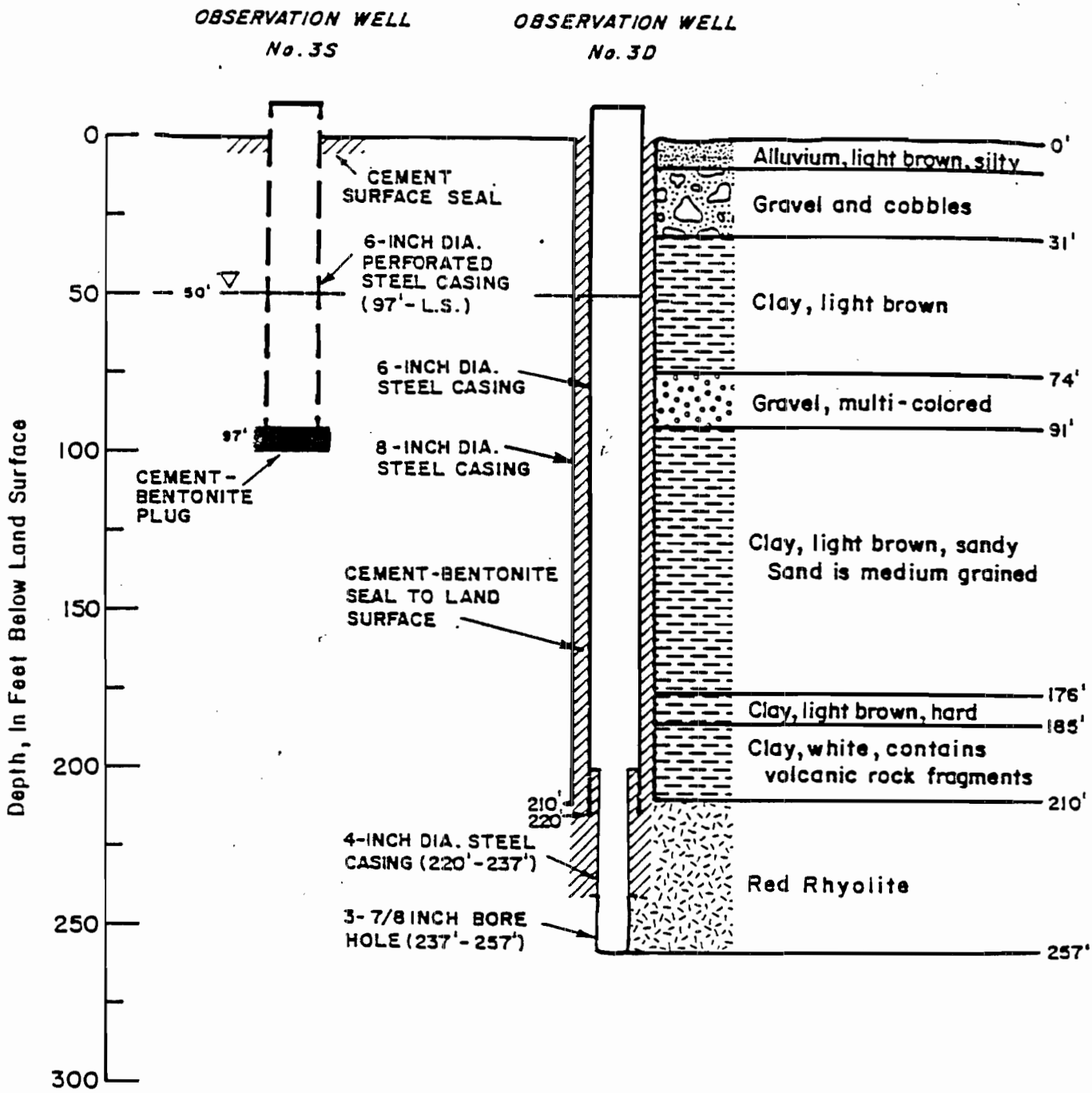
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 2		
COMPILED BY Chris Cregg	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	No A-2



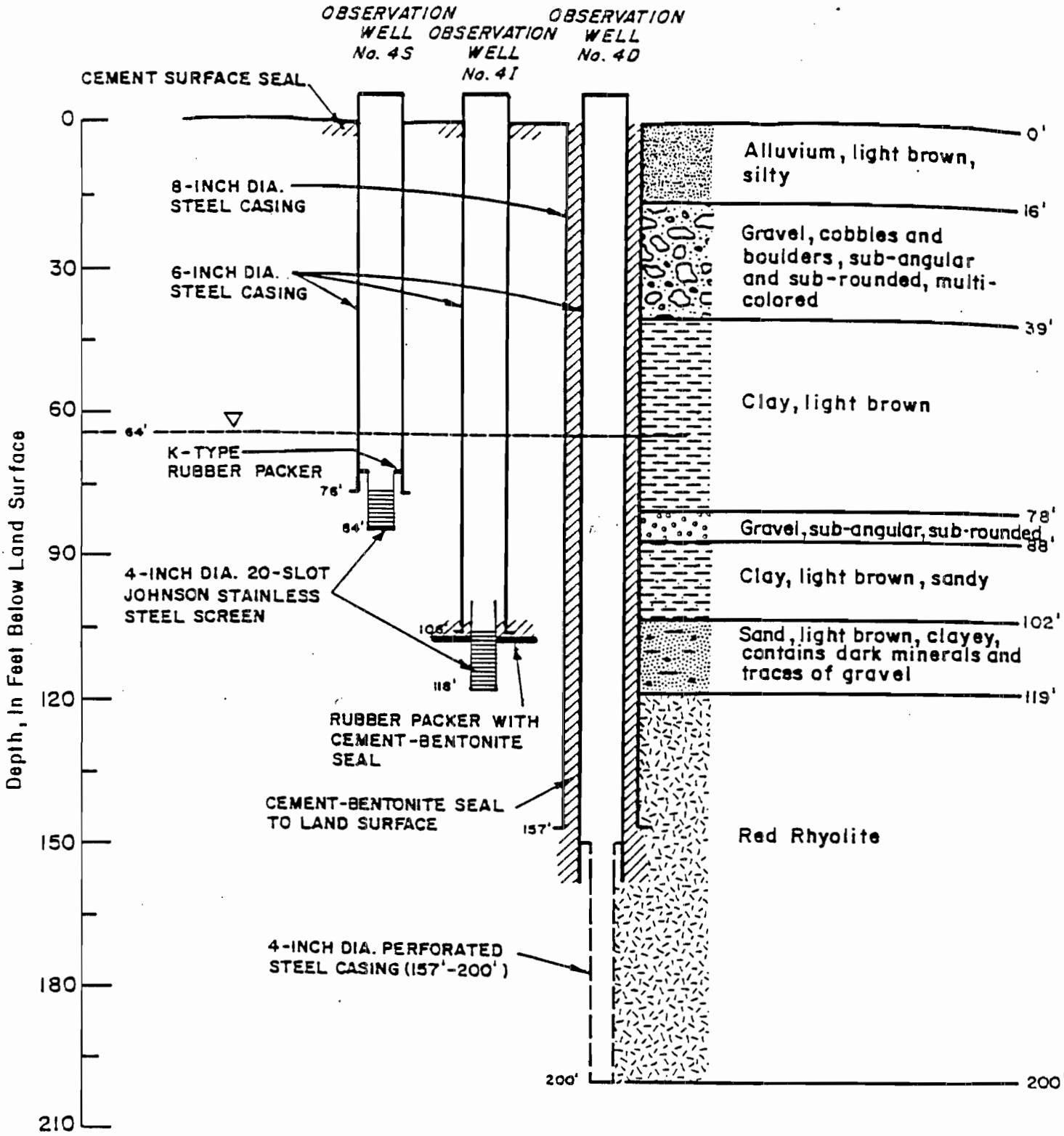
PREPARED FOR

FMC CORPORATION
POCATELLO, IDAHO

TITLE

WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 3

COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	Nº A-3



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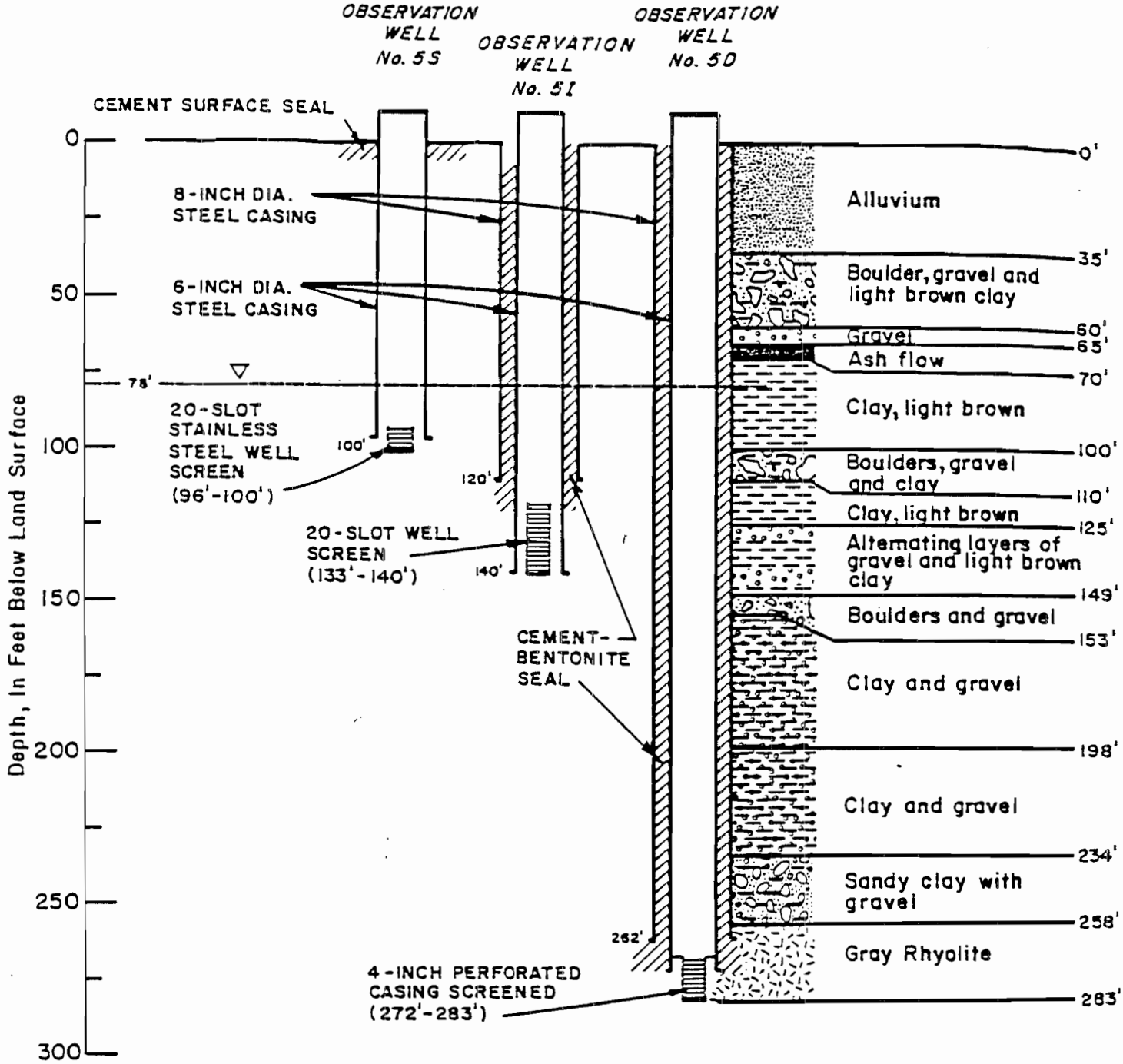
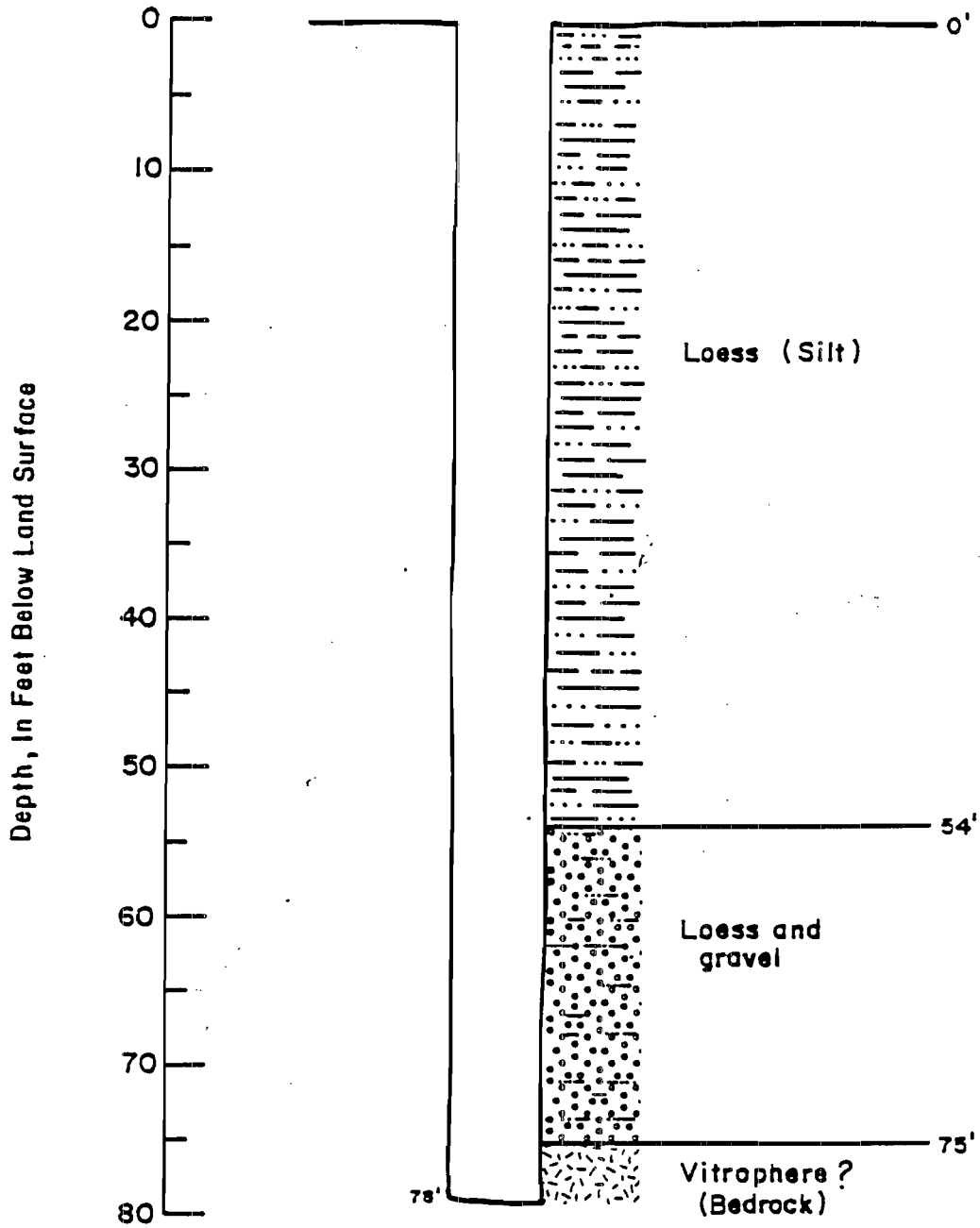
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 4		
COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	Nº A-4

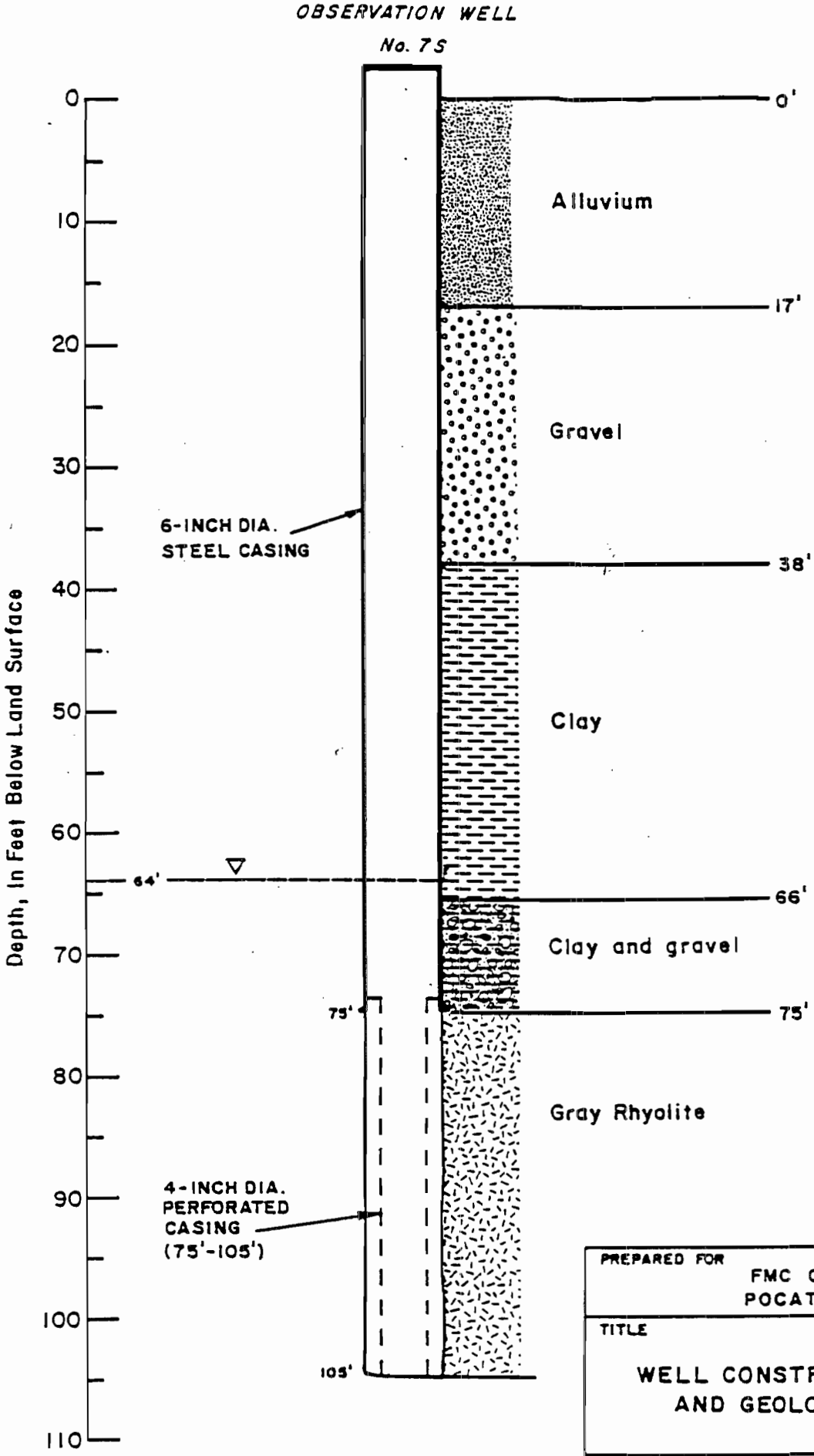


PREPARED FOR FMC CORPORATION POCATELLO, IDAHO		
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 5		
COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	Nº A-5

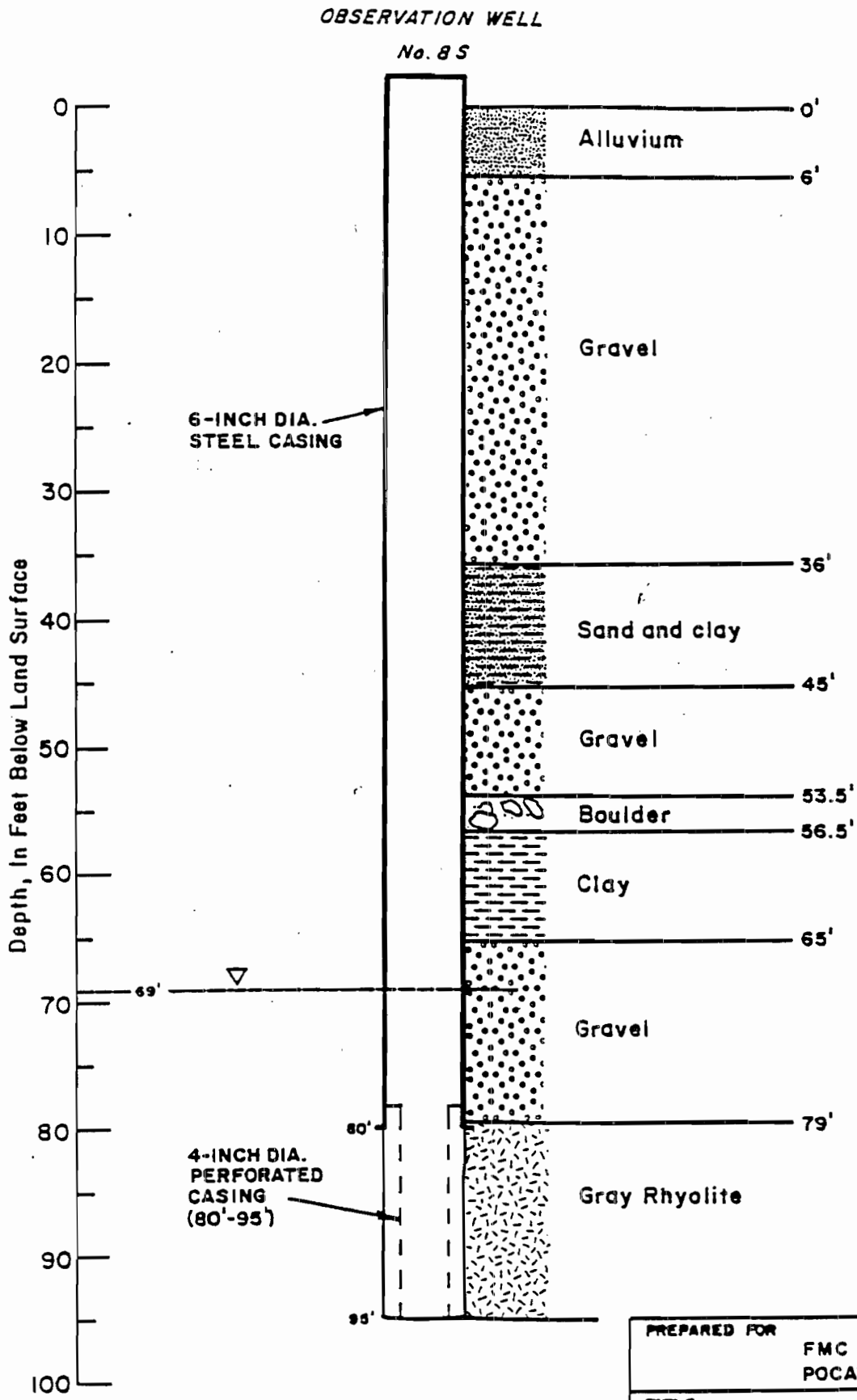
BORING No. 6



PREPARED FOR FMC CORPORATION POCATELLO, IDAHO		
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 6		
COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	No A-6



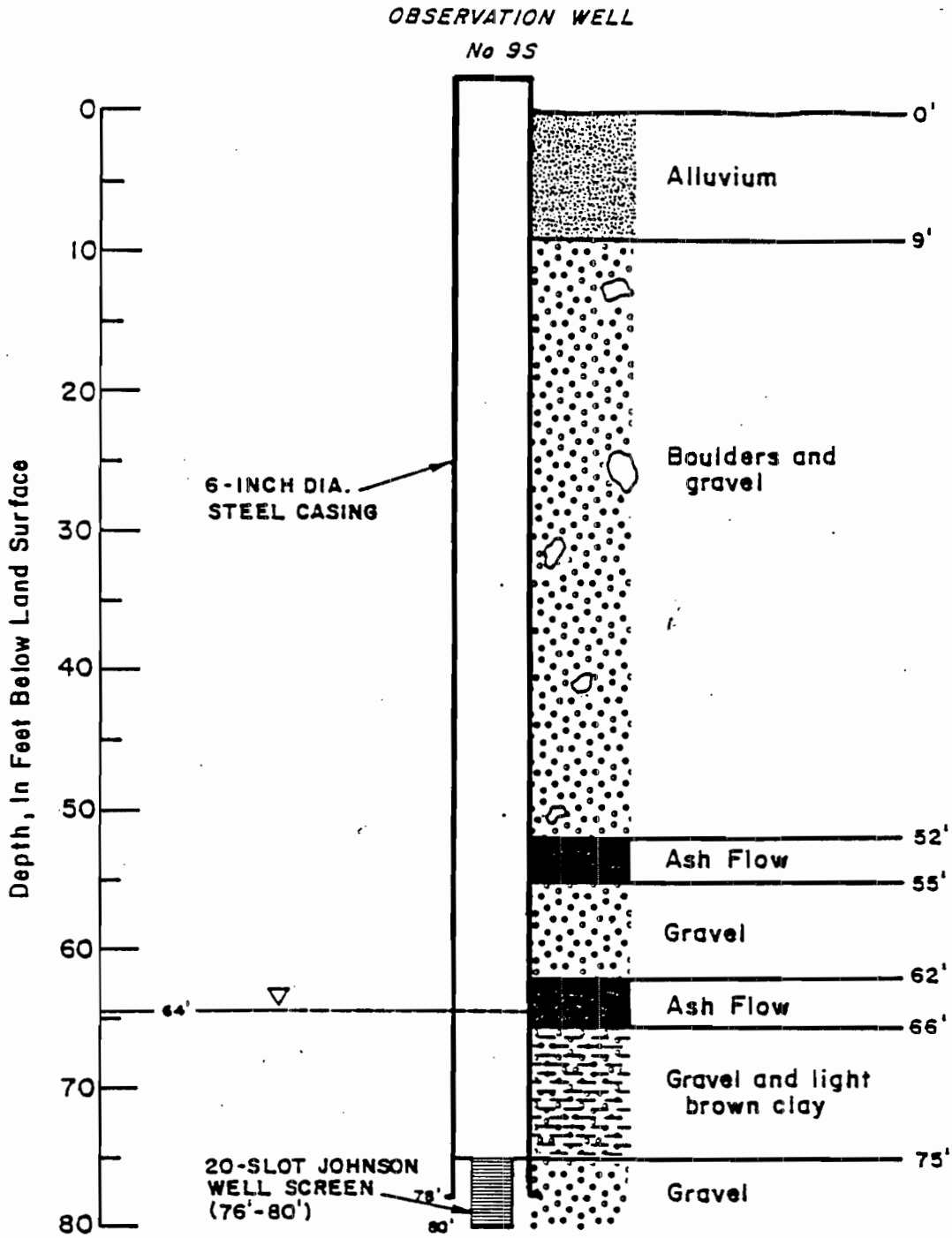
PREPARED FOR FMC CORPORATION POCATELLO, IDAHO		
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 7		
COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	Nº A-7



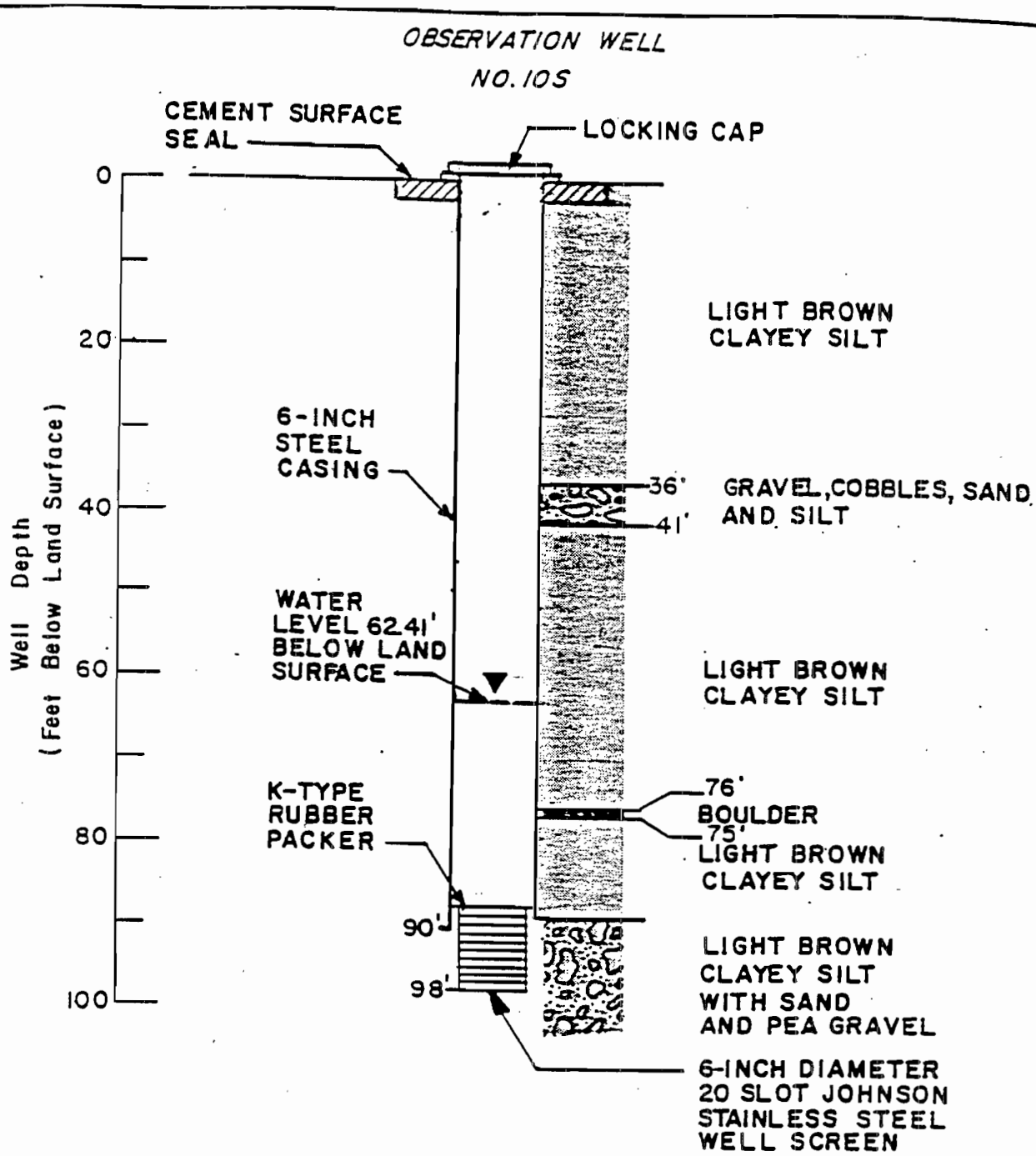
PREPARED FOR
FMC CORPORATION
POCATELLO, IDAHO

TITLE
WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 8

COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY	SCALE	No A-8



PREPARED FOR FMC CORPORATION POCATELLO, IDAHO		
TITLE WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 9		
COMPILED BY Chris Creed	Geraghty & Miller, Inc. Syosset, N.Y	DATE 4/81
DRAWN BY C. Robertson		REVISED
CHECKED BY E. Koch	SCALE	Nº A-9



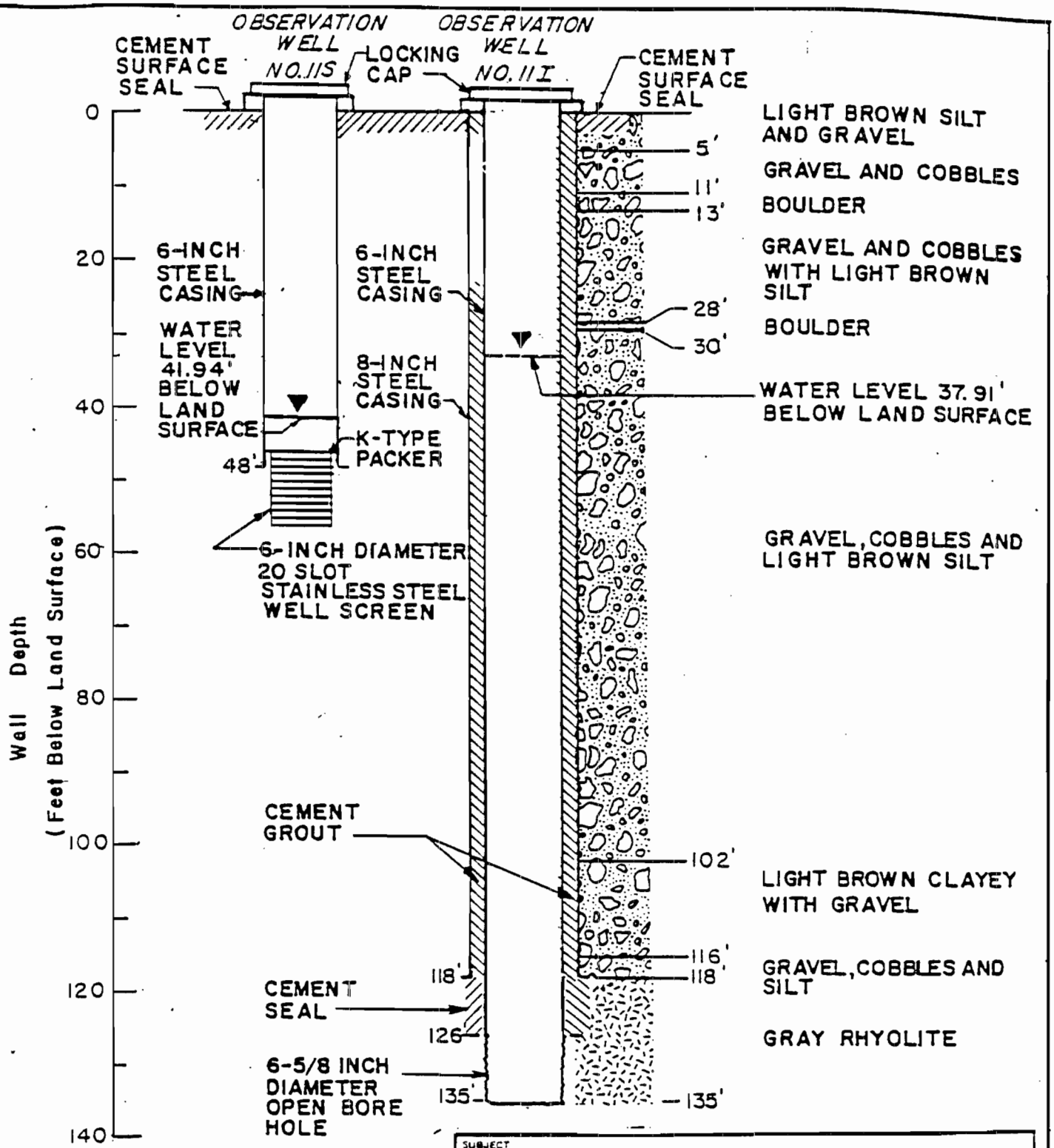
SUBJECT

WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 10

PREPARED FOR

FMC CORPORATION
POCATELLO, IDAHO

Geraghty & Miller, Inc.	COMPILED BY CHRISTOPHER CREED	SCALE SHOWN	FIGURE
	PREPARED BY D. MONTANINO	DATE 3/82	A-10
	PROJECT MGR ELLIS KOCH		



SUBJECT

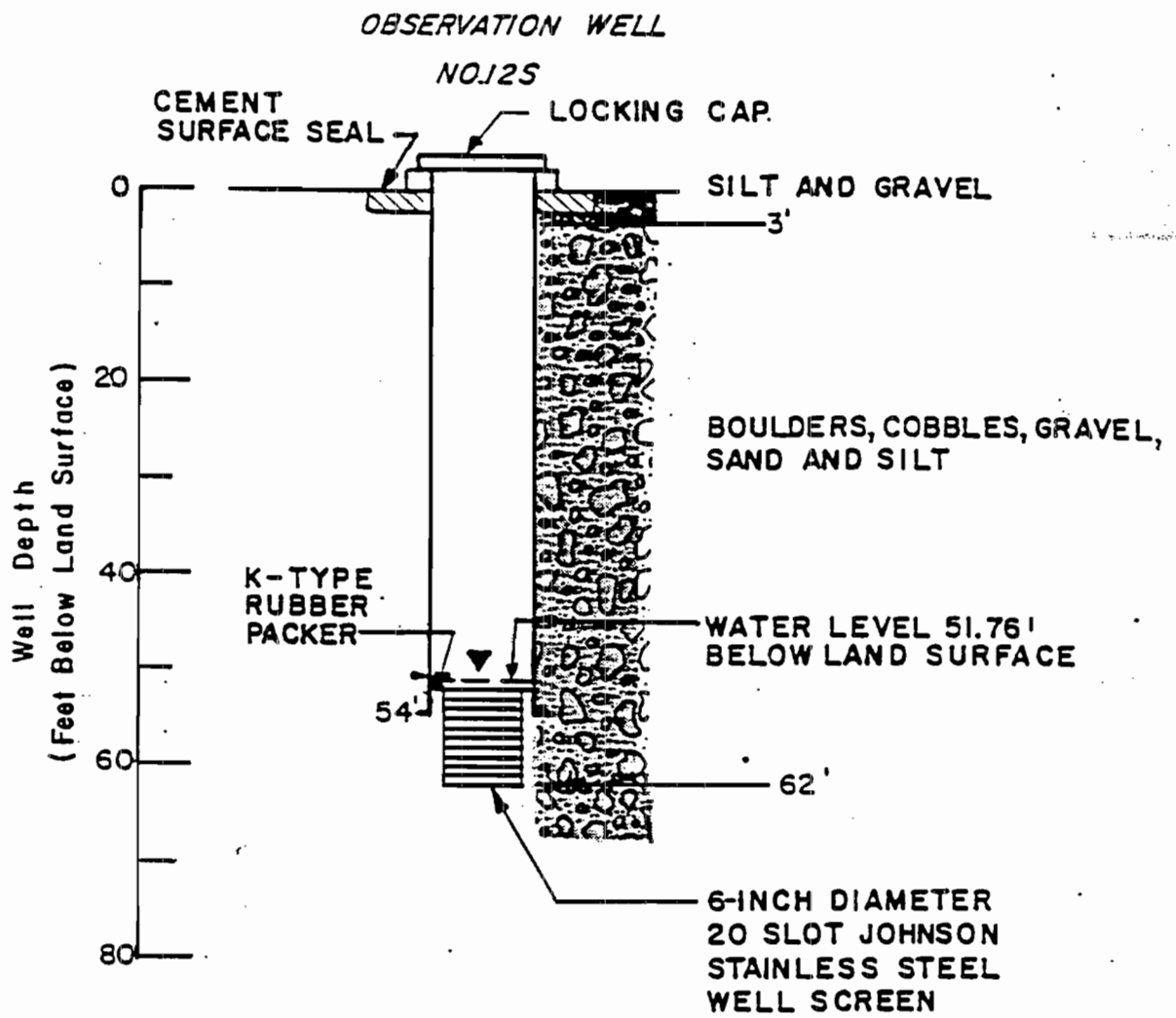
WELL CONSTRUCTION DIAGRAM AND GEOLOGY OF SITE 11

PREPARED FOR

FMC CORPORATION
POCATELLO, IDAHO

Geraghty & Miller, Inc.

COMPILED BY CHRISTOPHER CREED	SCALE SHOWN	FIGURE
PREPARED BY D. MONTANINO	DATE 3/82	A-11
PROJECT MGR ELLIS KOCH		



SUBJECT

WELL CONSTRUCTION DIAGRAM
AND GEOLOGY OF SITE 12

PREPARED FOR

FMC CORPORATION
POCATELLO, IDAHO

Geraghty & Miller, Inc.	COMPILED BY CHRISTOPHER CRECO	SCALE SHOWN	FIGURE A-12
	PREPARED BY D. MONTANINO	DATE 3/82	
	PROJECT MGR. ELLIS KOCH		

APPENDIX F

DATA VALIDATION/USABILITY SUMMARY

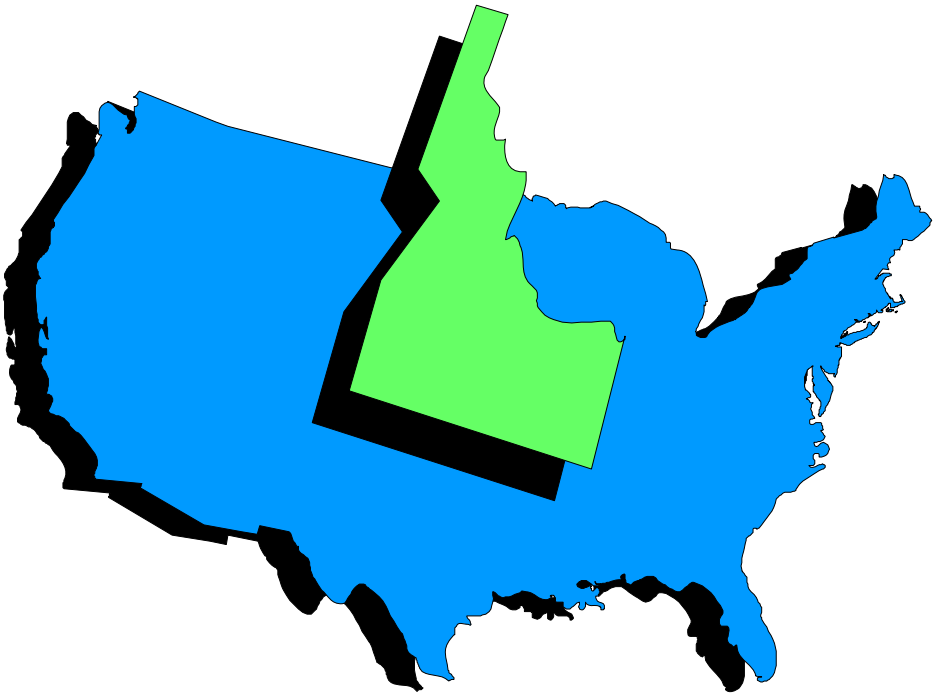
SECOND QUARTER 2008

FMC /POCATELLO GROUNDWATER MONITORING

Prepared For:

FMC Corporation

POCATELLO, IDAHO



Hydrometrics, Inc.

consulting scientists and engineers

OCTOBER 2008

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DATA VALIDATION/USABILITY SUMMARY

May 2008
RCRA SDG Groundwater Samples
Metals, Wet Chemistry Parameters, and Radiological Parameters

Prepared for:

FMC Corporation
Pocatello, Idaho Plant
P.O. Box 4111
Pocatello, ID 83202

Prepared by:

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

and

Environmental Chemistry Consultants, Inc.
10146 Banner Rd., S.E.
Olalla, WA 98359

July 2008

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SDG RCRAQ28A (LOTS A8E220163 AND A8E230133)

SDG RCRAQ28B (LOTS A8E300124 AND A8E310182)

SDG RCRASTQ28A (LOTS A8E220216 AND A8E230284)

SDG RCRASTQ28B (LOTS A8E300228 AND A8F030124)

ENVIRONMENTAL CHEMISTRY CONSULTANTS, INC.

10146 Banner Rd., S.E.
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Tel: (253) 509-4568

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Administrative: gwallin@tampabay.rr.com
Technical: brucekw327@live.com

Data Validation/Usability Report

Groundwater Samples

FMC Corporation, Pocatello, Idaho

Second Quarter 2008

SDG RCRAQ28A, RCRASTQ28A, RCRAQ28B, AND RCRASTQ28B

7 October 2008

Prepared by: Bruce K. Wallin, PhD

1. INTRODUCTION

This memo summarizes the Site Chemist's usability evaluation of the technically reviewed groundwater results generated by Test America, Inc. N. Canton, Ohio (TANC), St. Louis, MO (TASL), Lancaster Laboratories, in Lancaster, Pennsylvania (LLI), and DataChem Laboratory in Salt Lake City, Utah for FMC's second quarter 2008 Resource Conservation and Recovery Act (RCRA) sampling event for the laboratory sample lots listed above. The samples were collected on 20-30 May 2008. The samples were analyzed for total elements arsenic, cadmium, selenium, potassium, antimony, boron, manganese, mercury, vanadium, phosphorus, wet chemistries chloride, fluoride, nitrate, ammonia, sulfate, cyanide, white phosphorus, and gross alpha, radium 226 and radium 228.

Laboratory analyses were performed in accordance with the U.S. Environmental Protection Agency (USEPA) SW-846 Method 6020 for all elements except mercury, Method 7470A for mercury, Method 7580 for white phosphorus, selected methods from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983 for wet chemistries, and Methods 900, 903, and 904 for radionuclides. All of the above methods are hereafter referred to as "Methods". Wet chemistry analyses were conducted by TAL N. Canton, and the remainder of the parameters, with the exception of white phosphorus, were analyzed by TAL St. Louis. Elemental phosphorus was analyzed by DataChem Laboratory. All of the above methods are hereafter referred to as "Methods". A listing of parameters and analytical methods is provided in Table 1-1.

Elemental parameter analysis was conducted by TASL, wet chemistry analysis was conducted by TANC, and fluoride by Bellack distillation was conducted by LLI.

TABLE 1-1. SECOND QUARTER 2008
RCRA MONITORING EVENT PARAMETERS AND ANALYTICAL METHODS

PARAMETER	MCAWW(1) METHOD	SW-846(2) METHOD	CFR(3) METHOD
elemental parameters	--	6020	--
total phosphorus	--	6020	--
mercury	--	7470A	--
white phosphorus	--	7580	--
ammonia - N	350.3	--	--
chloride	300.0A	--	--
nitrate	300.0A	--	--
fluoride	300.0A	--	--
sulfate	300.0A	--	--
total cyanide	335.4	--	--
gross alpha	--	--	900
radium-226	--	--	903.3
radium-228	--	--	904

NOTES:

(1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

(2) "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods", Third Edition, November 1996.

(3) "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

The data were technically reviewed based on method specifications, and laboratory-developed performance criteria by adapting the procedures set forth in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, USEPA Office of Solid Waste and Emergency Response, EPA-540-R-04-004, October 2004 (Guidelines).

For all parameters, a Level II technical review was performed for these SDGs, which included a review/evaluation of all quality control summary forms, raw data, preparation logs, instrument printouts, notebook records and forensic deliverables provided by the laboratory.

A detailed description and summary of these efforts is provided in the Technical Review Reports in Appendix A.

The following validation/usability report is the result of a collective assessment of all information associated with the analytical results available. The information includes the project-specific data quality objectives (DQOs) specified in the RCRA Interim Status Groundwater Monitoring Plan, prepared by Bechtel Environmental Inc., August 1999, Appendix 4-A, Quality Assurance Project Plan (QAPjP), Appendix 4-B Field Sampling Plan for RCRA Groundwater Monitoring of Pond 16S (WMU #10) which, other than the well network associated with each RCRA pond, is the same for each of the WMUs subject to RCRA groundwater monitoring requirements, the Remedial Investigation / Feasibility Study Sampling and Analysis Plan for the Eastern Michaud Flats Site as amended for this 2nd Quarter 2008 special monitoring program (April 2008 SAP Addendum), as well as historical data, site knowledge, and the technical review results.

2. SUMMARY OF USABILITY ISSUES

The data technical review reports indicate which laboratory results are considered non-compliant when compared to the requirements set forth in the relevant documents. However, most of these exceptions are minor quality control problems and do not affect data usability. The cases where the exceptions may impact data usability are discussed in the following sections. In most cases these problems are typical analytical difficulties or are the result of sample matrix problems. A summary of data quality goals and observations is provided in Table 2-1.

DATA USABILITY SUMMARY

For samples 802155 and 802157 associated with Lot A8C010132, only the fluoride data from the Bellack distillation method should be used due to historical and contemporary indication of mixed biases and/or interferences with the IC method at this well location.

No other data were considered unusable due to QC or historical trend anomalies.

TABLE 2-1 DATA QUALITY SUMMARY FMC IDAHO RCRA GROUNDWATER EVENT
SECOND QUARTER 2008 RCRA SAMPLING EVENT

DATA QUALITY INDICATOR	PURPOSE	METHOD OF MEASUREMENT & EVALUATION	GOAL	SUMMARY OF RESULTS
Precision	Reproducibility of results	1. Collocated samples	S & D >5RL, RPD <30, S &/or D <5RL, S-D <2RL	*All criteria were met - no flagging was required or deemed necessary.*
		2. Laboratory replicates	S & D >5RL, RPD <20, S &/or D <5RL, S-D <RL	*All criteria were met - no flagging was required or deemed necessary.*
Accuracy	Proximity of result to true value	1. Calibration	Meet method/guidance criteria	*All criteria were met - no flagging was required or deemed necessary.*
		2. Laboratory control samples	Meet lab-developed or method criteria	*SDG Q28B LCS high for V. Positive results flagged as estimated high (J+).*
		3. Matrix spikes/Serial Dilutions	Meet lab-developed or method criteria	*SDG Q28B MS/MSD nitrate-N low and total cyanide both high and low. Positive results reported for nitrate-N flagged as estimated low (J-) and total cyanide estimated (J) due to evidence of mixed bias. ICP dilutions higher for Mn, total P, K, and V results flagged as estimated low (J-).*
Representativeness	Sample integrity and sampling precision	1. Collocated samples	S & D >5RL, RPD <30, S &/or D <5RL, S-D <2RL	*See Item 1 above.*
		2. Blanks	Sample results ND or >5X blank	*Preparation and calibration blanks Sb, Cd, V. Results for several samples adjusted to not-detected (U).A1*
		3. Holding times	Per method	*No deviations requiring actions.*
		4. Preservation	Per method	*All criteria were met - no flagging was required or deemed necessary.*
Comparability	Consistent practices	Use of and adherence to appropriate analytical methods	Compliance with required USEPA methods	*Method compliance achieved, goal met for all samples.*
Completeness	Obtain intended information from the event	Comparison of planned vs usable data obtained	>90% of planned	*Completeness 100%*
Consistency	Expansion of historical database	Comparison with historical statistics	Meet completeness objective	*Modest outliers, no significant trends apparent. Continue evaluation.*

3. DATA VALIDATION RESULTS

To determine the ultimate utility of data, the following indicators were evaluated:

3.1 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS AND CONSISTENCY

3.1.1 PRECISION

Precision is a quantitative determination of the reproducibility of an analytical value. For this program, collocated samples are collected to assess overall precision of the sampling, preparation and analytical process, and matrix spike/matrix spike duplicates are required to address aliquoting reproducibility in order to provide information on matrix reproducibility otherwise unobtainable from samples reported below the reporting limits. Matrix spikes also provide an indication of the accuracy of native results: this will be discussed in the accuracy section.

The collocated samples further address the ability to obtain a representative sample of the medium studied, this will be discussed further in the representativeness section. For elemental parameters, the methods require the preparation of laboratory replicates at a specified frequency to address aliquoting precision.

For laboratory replicates the Guidelines specify the utilization of difference criteria for samples providing values below a limiting value and relative percent difference (RPD) criteria for samples providing values above a limiting value. The Guidelines utilize 5X the contract required detection limit (CRDL). These specifications are as follows:

When either one or both of the analyses provide results below the limiting value, the following criteria apply:

$$|S - R| \leq CRDL$$

Where: S = sample value
R = replicate sample value

When both of the analyses provide results above or equal to the limiting value, the following criteria apply:

$$RPD = (|S - R|/S + R)200 \leq 20$$

Where: RPD = Relative Percent Difference

The QAPjP provides an RPD specification of 20 percent for laboratory replicates for elements, but does not provide specific criteria for low level results or collocated samples. The Guidelines do not provide precision criteria for collocated samples. The technical reviewer utilized the 20 percent RPD criteria specified in the QAPjP and Guidelines and the low-level criteria above specified in the Guidelines with the substitution of the laboratory reporting limit (RL) for the CRDL where they differed. For collocated samples, the technical reviewer utilized the 2 RL and RPD <30 criteria specified in the USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, June 13, 1988.

For this event, all replicate sample precision was within specification.

For this event the following are collocated samples:

SDG	SAMPLE	COLLOCATED SAMPLE
RCRAQ28A	805108	805600
RCRAQ28B	805168	805603

Note: All parameters were reported to standard laboratory reporting limits (RL) which approximate estimated quantitation limits (EQL) specified in the methods. The technical reviewer utilized the RL values to conduct the precision analysis.

For this event the following collocated sample precision was not within specification:

For Lots A8B290145 and A8C010132 samples 802114, 802155, 802156, and 802157 were analyzed for fluoride by both ion chromatography and Bellack distillation methods. For samples 802155 and 802157 the results from the two methods were not within the precision limits indicated above for replicate samples. Since the Bellack method is more specific than the ion chromatography method only the results from the former should be used.

For all parameters, STL reported to their standard reporting limits (RL) and to the method detection limit (MDL) flagged with a "B" for levels below the RL. The MDL described in 40 CFR Part 136, Appendix B and incorporated by reference in SW-846, provides a precision of ± 100 percent. The RL values used approximate the estimated quantitation limit (EQL) which is established at approximately 5-10X the MDL in SW-846. At 5X the MDL the EQL precision is approximately ± 30 percent. As a result all values reported below the RL but above the MDL (flagged B by the laboratory), have been flagged as estimated (J). ***The project manager is cautioned that the imprecision associated with the project-required reporting conventions must be taken into consideration when utilizing the data below the minimum EQL or RL.***

3.1.2 ACCURACY

Accuracy is the proximity of the reported analytical value to the true concentration in the sample. To estimate the proximity factor, laboratory control, laboratory blank and environmental samples are fortified with the parameter of interest, and for organics analysis, each sample is also fortified with surrogate indicators, and the level recovered, expressed as a percentage of the spiking level, is utilized. For laboratory control samples

(LCS), the analytical values must be within either a published range or within laboratory or method established windows about the true concentration.

If these conditions are not met, the method is to be considered out of control, corrective action taken, and the entire process repeated with compliant LCS before the associated data can be reported. For elements, laboratory blanks are spiked with low-level reference materials for ICP (CRI). According to the Guidelines associated analytical values must fall within ± 20 percent of the true value or all the potential impact on all environmental sample results associated with the non-compliant CRI must be evaluated during technical review using professional judgment. The technical reviewer has considered that all associated sample results reported at values <2RL or CRDL are evaluated: for CRI recoveries <80 percent, both positive results and non-detects are flagged as estimated (J), and for CRI recoveries >120 percent, positive results only are flagged as estimated (J).

For the recovery of spiked parameter from environmental samples, the quantity of parameter matrix spiked (MS) must be large enough to be uniquely distinguishable from the level of native analyte present in the sample. When this condition exists, if the recovery value is outside established values, all associated environmental samples are flagged as estimated (J) with an indication of bias direction during technical review. The Guidelines establish that the native level of analyte must be less than four times the spiking level for valid accuracy estimation.

The formula utilized is as follows:

Percent Recovery = ((SSC - USC)/CS))100

Where: SSC = Spiked Sample Concentration
USC = Unspiked Sample Concentration
CS = Concentration Spiked

For elements, the QAPjP establishes acceptance criteria at 70-130 percent that are less stringent than the 75-125 percent specified in the Guidelines. The QAPjP does not

specify accuracy criteria for water quality parameters. The technical reviewer has utilized the laboratory-derived limits, as required by SW-846 methods, and the more stringent 75-125 percent criteria specified in the Guidelines where laboratory-established limits were not provided for the water quality parameters.

For elements analyzed by ICP, the method requires assessment of matrix interference by performing serial dilution analyses in addition to the matrix spike indicated above. The Guidelines suggest that, for samples containing sufficient signal in the undiluted sample (>50IDL) that the diluted result should be within 10 percent of the undiluted value to verify absence of interference.

Note that the comparative values evaluated below are established for groundwater only since the reviewer is unaware of the statistical attenuation factors that may be associated with any potential impact of the groundwater locations to surface water.

For SDG Q28B the laboratory control sample provided a recovery of vanadium above the upper limit. The positive results reported for this element in all samples associated with the SDG are flagged as estimated high (J+). ***These results are considered usable when the bias factor is taken into account. Doing so will have no impact on the decision since either the unadjusted values are below the comparative value or adjusted values are above the comparative value for the associated samples.***

For SDG Q28B sample 805123 provided MS/MSD recoveries of nitrate-N and total cyanide below the lower limit and sample 805122 provided recoveries of total cyanide above the upper limit. The results reported for nitrate-N in all samples associated with the SDG are flagged as estimated low (J-) and for total cyanide as estimated (J) to signify the indication of mixed biases. ***These results are considered usable when the bias indications are taken into account. Doing so has no impact on the decision since comparative values are not established for these parameters.***

For SDG Q28A sample 805123 provided ICP serial dilution values for manganese, phosphorus, potassium, and vanadium that were approximately 26-40% larger than the undiluted values. For associated samples 805183, 805123, 805108, 805122, 805BTS, and 805156 the results reported for manganese and vanadium, for associated samples 805183, 805123, 805108, 805122, and 805BTS the results reported for phosphorus, and for associated samples 805183, 805123, and 805BTS the results reported for potassium are flagged as estimated low (J-). ***These results are considered usable when the bias factors are taken into account. Doing so will have no impact on the decision since for samples 805123, 805108, 805156, and 805122 the unadjusted values for manganese are above the comparative value and for the remainder the adjusted values are below the comparative value, for sample 805123 the unadjusted value for vanadium is above the comparative value and for the remainder the adjusted values are below the comparative value, and no comparative values are established for total phosphorus and potassium.***

For SDG Q28A sample 805112 provided an ICP serial dilution value for potassium approximately 33% larger than the undiluted value. The results reported for this element in associated samples 805173, 805174, 805175, 805147, 805149, 805127, 805167, and 805112 are flagged as estimated low (J-). ***These results are considered usable when the bias factor is taken into account. Doing so will not impact the decision since a comparative value is not established for this element.***

For SDG Q28A sample 805112 provided an ICP serial dilution value for potassium approximately 33% larger than the undiluted value. The results reported for this element in associated samples 805173, 805174, 805175, 805147, 805149, 805127, 805167, and 805112 are flagged as estimated low (J-). ***These results are considered usable when the bias factor is taken into account. Doing so will not impact the decision since a comparative value is not established for this element.***

For SDG Q28B sample 805145 provided ICP serial dilution values for manganese, phosphorus, and potassium approximately 13-16% larger than the undiluted values. The results reported for these elements all samples associated with the SDG are flagged as estimated low (J-). ***These results are considered usable when the bias factors are taken into account. Doing so will not impact the decision since for manganese either the unadjusted values are above the comparative value or the adjusted values are below the comparative value and no comparative value is established for total phosphorus or potassium.***

Initial and continuing calibrations are performed to verify instrument performance and stability prior to and during the analysis of environmental samples. The Methods require that the initial calibration linearity coefficients are $\geq$ 0.995, the continuing calibration stabilities are within 90-110 percent and, for elements, the Guidelines require consideration of blanks indicating a negative instrument drift >|IDL|. The technical reviewer has utilized the flagging criteria suggested in the Guidelines for lack of linearity and continuing calibration stability, and has utilized professional judgment for actions for non-compliant instrument drift associated with samples with levels reported at <5 IDL.

For SDG Q28B the continuing calibration associated with samples 805168, 805148, 805113, and 805166 provided a slightly elevated recovery of vanadium. The positive results reported for this element in associated samples 805168 and 805148 are flagged as estimated high (J+). ***These results are considered usable when the bias factor is taken into account. Doing so will not impact the decision since the unadjusted values are below the comparative value.***

For these lots all additional calibrations were reported within specification.

3.1.3 REPRESENTATIVENESS

To perform a valid environmental assessment, the samples, when analyzed, must be representative of the media under study. Factors influencing representativeness include

preparation of wells prior to sampling to obtain aliquots of the groundwater strata of interest. This is accomplished through purging of standing water to constant temperature, conductivity and pH prior to collecting the sample. Collocated samples are also collected to provide information regarding the ability to reproducibly collect a sample. If reproducibility is not obtained, representativeness is not verified. The sample must be collected with uncontaminated equipment, placed in uncontaminated containers, and not contaminated throughout the transport, receipt, storage, preparation and analytical processes. Evaluation of the potential for contamination is conducted through collection of field blanks, and utilization of laboratory process blanks. Once the sample has been collected, it is maintained in such a state that changes are not expected to occur in its concentration of target parameters. This is accomplished by chemical and physical preservation, and minimization of time from collection to analysis.

A review of the sample receipt logs indicate that preservation requirements were met, therefore, no action was taken.

Calibration and preparation blanks were reported with antimony, cadmium, and vanadium present at concentrations that generated action levels resulting in the adjustment of the positive results reported for several samples as not-detected at the reported value (U). ***These results should be considered as maximum potential concentrations.***

On the basis of professional judgment no action was taken for the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

3.1.4 COMPARABILITY

The characteristic of comparability reflects both the internal consistency of measurements and the expression of results in units that are consistent with other organizations reporting

similar data. Each value reported for a given measurement should be similar to other values within the same data set and with other related data sets. Comparability was assured through the use of standardized sampling procedures and USEPA analytical methods.

3.1.5 COMPLETENESS

Completeness is a measure of the extent of attainment of usable data points from an investigation. For this program a completeness goal of 85 percent is established in the QAPjP. The ability to obtain a sample, (human) error and sample characteristics are major contributors to reduced completeness. For this investigation, all intended samples were collected and received by the laboratory. The laboratory analyzed all of the samples for all of the intended parameters. Completeness for this event is, therefore, 100 percent.

3.1.6 CONSISTENCY

Consistency is a measure of the reasonableness of data to those that have been previously generated. For this program, an extensive data base has been developed that allows the evaluation of analytical results that may represent historical outliers. The statistical summary provided by Hydrometrics, Inc. is summarized as follows:

Some outliers were noted, however, these were all either slightly above or slightly below the historical limits and likely represent simple trends.

4. REFERENCES

Bechtel, 1999. RCRA Interim Status Groundwater Monitoring Plan, prepared by Bechtel Environmental, Inc., August 1999.

USEPA, 2004. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Final, USEPA, OSWER, EPA 540-R-04-004, October 2004.

USEPA, Contract Laboratory Program Statement of Work for Inorganics Analysis, Document Number ILM02.0 and latest revisions.

USEPA, 1989. Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, USEPA Region I, June 13, 1988, Modified by Deborah Szaro, et. al. February 1989.

USEPA, 1983. Methods for Chemical Analysis of Water and Wastes, EMSL, EPA-600/4-79-020, Revised March 1983.

USEPA, 1986. Test Methods for Evaluating Solid Waste, OSWER, SW-846, Third Edition, November 1986.

APPENDIX A

TECHNICAL REVIEW REPORTS

ENVIRONMENTAL CHEMISTRY CONSULTANTS, INC

10146 Banner Rd., S.E.
Olalla, WA 98359

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Data Technical Review Report

Groundwater Samples

FMC Corporation, Pocatello, Idaho

Second Quarter 2008

SDG RCRAQ28A (LOTS A8E220163 AND A8E230133)

SDG RCRAQ28B (LOTS A8E300124 AND A8E310182)

SDG RCRASTQ28A (LOTS A8E220216 AND A8E230284)

SDG RCRASTQ28B (LOTS A8E300228 AND A8F030124)

7 October 2008

Prepared by: Bruce K. Wallin, PhD

This memo summarizes the technical review of groundwater results generated by TANC, TASL, LLI, and DataChem for FMC's second quarter 2008 RCRA sampling event for the laboratory lots listed above. The samples associated with all Lots were analyzed for elements, wet chemistries, and radiological parameters.

For elements, laboratory analyses were performed in accordance with the U.S. Environmental Protection Agency (USEPA) SW-846 Methods, and for wet chemistries, methods from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983. All of the above methods are hereafter referred to as "Methods". A list of the parameters and associated methods utilized is provided in Table 1-1.

TECHNICAL REVIEW REPORT

SDG RCRASTQ28A

(LOTS A8E220216 AND A8E230284)

ELEMENTAL PARAMETERS

TECHNICAL REVIEW REPORT

SDG RCRASTQ28A

ELEMENTAL PARAMETERS

For antimony, arsenic, boron, cadmium, manganese, phosphorus, potassium, selenium, uranium, and vanadium the data evaluation was based on USEPA SW-846 Method 6020 and for mercury Method 7470A, (Methods) and included the following parameters:

- calibration
- blanks
- * ICP interference check sample
- matrix spike analysis
- duplicate sample analysis
- * laboratory control sample analysis
- ICP serial dilution analysis
- detection limits
- overall assessment

* All criteria were met for this parameter.

Table A-1 summarizes the technical review actions that are detailed below.

Data validation, described in SW-846 and the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

CALIBRATION:

Calibration verifications providing recoveries not within 90-110% are tabulated below:

CCV ID.	ELEMENT	RECOVERY (%)
6/10 22:48	uranium	112.3

Associated samples: NONE

BLANKS:

Blanks reported with elements present and the associated 5X action levels are tabulated below:

BLANK ID.	ELEMENT	CONC (µg/L).	ACTION LEVEL (µg/L)
ICB 6/10 20:14	antimony	1.5	7.5
	cadmium	0.1	0.5
CCB 6/10 20:45	antimony	1.5	7.5
	cadmium	0.1	0.5
CCB 6/10 21:49	antimony	1.7	8.5
	cadmium	0.1	0.5
CCB 6/10 22:54	antimony	1.8	9.0
	cadmium	0.1	0.5
ICB 6/11 11:13	antimony	1.7	8.5
	cadmium	0.2	1
CCB 6/11 11:42	antimony	1.7	8.5
	cadmium	0.2	1
CCB 6/11 12:31	antimony	1.9	9.5
	cadmium	0.2	1
CCB 6/11 13:36	antimony	1.7	8.5
	cadmium	0.2	1
CCB 6/11 14:35	antimony	1.9	9.5
	cadmium	0.2	1
CCB 6/11 15:33	antimony	1.7	8.5
	cadmium	0.2	1
CCB 6/11 16:32	antimony	1.8	9.0
	cadmium	0.2	1

BLANK ID.	ELEMENT	CONC (µg/L).	ACTION LEVEL (µg/L)
CCB 6/11 17:30	antimony	1.8	9.0
	cadmium	0.2	1
CCB 6/11 18:16	antimony	1.8	9.0
	cadmium	0.2	1
ICB 8/21 21:24	antimony	2.4	12
	cadmium	0.1	0.5
CCB 8/21 21:53	antimony	2.5	13
	cadmium	0.1	0.5
CCB 8/21 22:14	antimony	2.7	14
	cadmium	0.1	0.5
CCB 8/21 23:15	antimony	2.2	11
	cadmium	0.1	0.5
CCB 8/22 00:16	antimony	2.3	12
	cadmium	0.1	0.5
CCB 8/22 01:18	antimony	2.4	12
	cadmium	0.1	0.5
CCB 8/22 02:03	antimony	2.4	12
	cadmium	0.1	0.5
Prep. Blank 8150141	antimony	3.8	19
	cadmium	0.075	0.38
805700	cadmium	0.52	2.6
	manganese	25.6	128
	phosphorus	234	1170
	potassium	2920	14600
805PB1	antimony	1.3	6.5
	boron	87.6	438
	cadmium	0.054	0.27
805CDI	antimony	0.73	3.7
	boron	86.7	434
	cadmium	0.054	0.27

Associated samples with concentrations reported above the MDL but below the action level:

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES		
CCB 6/11 14:35	cadmium	805121		
CCB 6/11 15:33	cadmium	805121		
CCB 8/21 23:15	cadmium	805123		
CCB 8/22 00:16	antimony	805122	805BTS	805156
	cadmium	805123 805156	805122 805167	805BTS
CCB 8/22 01:18	antimony	805122 805112	805BTS	805156
	cadmium	805122 805167	805BTS	805156
CCB 8/22 02:03	antimony	805112		
Prep. Blank 8150141	antimony	805173		
	cadmium	805173	805167	
805700	cadmium	805121 805BTS	805122 805156	805123 805157
	phosphorus	805183 805108 805174 805149	805121 805122 805175 805127	805123 805173 805147 805112
	potassium	805183 805175 805127	805173 805147 805167	805174 805149 805112
805PB1	antimony	805122	805BTS	805156
	boron	805121 805173	805108 805112	805600
	cadmium	805123	805157	

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES		
805CDI	antimony	805122	805156	805BTS
	boron	805121 805173	805108 805112	805600
	cadmium	805123	805156	

Action:

- Associated sample results for the element are flagged as not-detected at the reported value (U).

Comments:

On the basis of professional judgment no action was taken for target elements reported present in the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike (MS)/MS duplicate (MSD) recoveries not within 75-125% when the native level is reported less than four times the spiking level are tabulated below:

SAMPLE ID. (Lot #/DATE)	ELEMENT	MS/MSD RECOVERY (%)
805123 (8150137/6-11)	boron	126.5/133.7

Associated samples:

LOT #	ASSOCIATED SAMPLES			
8150137	805183	805158	805121	805123
	805108	805600	805122	805BTS
	805156	805155	805157	

Action:

- For both MS and MSD recoveries above the upper limit associated sample results reported positive for the elements are flagged as estimated high (J+).

DUPLICATE SAMPLE ANALYSIS:

Field Duplicates.

Comments:

For these Lots, sample 805600 is collocated with sample 805108.

The QAPjP provides precision objectives, however, detail regarding objectives for laboratory replicates *vs* collocated samples as well as criteria for situations where one or both are reported positive but below five times the reporting limit are not presented. As a result, the reviewer utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various EPA Regional guidance documents.

For this collocated sample pair, the above precision criteria were met.

ICP SERIAL DILUTION ANALYSIS:

Samples containing greater than 50 IDL of analyte providing 5-fold serial dilution analysis values not within 10% of the undiluted value (%D) are tabulated below:

SAMPLE ID. (Lot#/DATE)	ELEMENT	%D
805123 (8150137/8-21)	manganese	28.5
	phosphorus	39.7
	potassium	25.8
	vanadium	27.4
805112 (8150141/8-22)	potassium	33.4

Associated samples:

SAMPLE ID. (Lot#/DATE)	ELEMENT	ASSOCIATED SAMPLES		
805123 (8150137/8-21)	manganese	805183	805123	805108
		805122	805BTS	805156
	phosphorus	805183	805123	805108
		805122	805BTS	
	potassium	805183	805123	
		805BTS		
	vanadium	805183	805123	805108
		805122	805BTS	805156
805112 (8150141/8-22)	potassium	805173	805174	805175
		805147	805149	805127
		805167	805112	

Action:

- Associated sample results reported the elements are flagged as estimated low (J-).

Comments:

In all cases the diluted values were larger than the undiluted values therefore low bias is indicated.

DETECTION LIMITS:

For these Lots the laboratory was required to report results to their method detection limits (MDL). The MDL as described in 40CFR Part 136, Appendix B and incorporated by reference in SW-846 provides an error band of ± 100 percent. The Estimated Quantitation Limit (EQL) is established at 5-10X the MDL in SW-846. At 5X MDL, the minimum EQL will contain an error band of ± 30 percent.

Action:

- Values below the RL and above the MDL (flagged "B" by the laboratory) have been flagged as estimated (J).

Comments:

Any values below the RL contain inherently increasing error bands as the numbers become smaller. It is essential that the data user considers these statistical impacts on data quality at the low levels.

OVERALL ASSESSMENT:

Calibration and preparation blanks were reported with antimony and cadmium present at concentrations that generated action levels resulting in the flagging of the positive values reported for several samples as not-detected at the reported value (U).

On the basis of professional judgment no action was taken for target elements reported present in the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

Sample 805123 associated with preparatory lot 8150137 analyzed on 6-11 provided MS/MSD recoveries of boron slightly above the upper limit. The positive results reported for this element in associated samples 805121, 805123, 805108, 805600, 805122, 805BTS, 805156, 805155, and 805157 are flagged as estimated high (J+).

Sample 805123 associated with preparatory lot 8150137 analyzed on 8-21 provided ICP serial dilution results for manganese, phosphorus, potassium, and vanadium that were approximately 26-40% larger than the undiluted values. The results reported for manganese and vanadium in associated samples 805183, 805123, 805108, 805122, 805BTS, and 805156; phosphorus in associated samples 805183, 805123, 805108, 805122, and 805BTS; and potassium in associated samples 805183, 805123, and 805BTS are flagged as estimated low (J-).

Sample 805112 associated with preparatory lot 8150141 analyzed on 8-22 provided an ICP serial dilution result for potassium that was approximately 33% larger than the undiluted value. The results reported for this element in associated samples 805173, 805174, 805175, 805147, 805149, 805127, 805167, and 805112 are flagged as estimated low (J-).

Any values reported above the MDL but below the RL, which are flagged as estimated (J), contain inherently increasing error band as the numbers become smaller. It is essential that the data user considers the statistical impacts on data quality at the low levels.

TABLE A-1.

TECHNICAL REVIEW ACTION SUMMARY

SDG RCRASTQ28A

Antimony	J1, U1	Arsenic	J1
Boron	J1, J2	Cadmium	J1, U1
Manganese	J1, J3	Mercury	
Phosphorus	J1, J3	Potassium	J3
Selenium	J1	Uranium	J1
Vanadium	J1, J3		

J1 - Positive result is flagged as estimated (J) due to uncertainty at the low levels.

J2 - Positive result is flagged as estimated high (J+) due to non-compliant MS/MSD recoveries.

J3 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

U1 - Positive result is flagged as not-detected (U) due to blank contamination.

TECHNICAL REVIEW REPORT

SDG RCRASTQ28B

(LOTS A8E300228 AND A8F030214)

ELEMENTAL PARAMETERS

TECHNICAL REVIEW REPORT
SDG RCRASTQ28B
ELEMENTAL PARAMETERS

For antimony, arsenic, boron, cadmium, manganese, phosphorus, potassium, selenium, uranium, and vanadium the data evaluation was based on USEPA SW-846 Method 6020 (Method) and included the following parameters:

- calibration
- blanks
- * ICP interference check sample
- matrix spike analysis
- duplicate sample analysis
- laboratory control sample analysis
- ICP serial dilution analysis
- detection limits
- overall assessment

* All criteria were met for this parameter.

Table A-2 summarizes the technical review actions that are detailed below.

Data validation, described in SW-846 and the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

CALIBRATION:

Calibration verifications providing recoveries not within 90-110% are tabulated below:

CCV ID.	ELEMENT	RECOVERY (%)
6/25 00:56	vanadium	112.0

Associated samples: 805168 805148 805113 805166

Action:

- Associated sample results reported positive for the element are flagged as estimated high (J+).

BLANKS:

1. Blanks providing results >IDL and their associated 5X action levels are tabulated below:

BLANK ID.	ELEMENT	CONC. (µg/l)	ACTION LEVEL
ICB 6/24 18:31	antimony	2.5	13
	cadmium	0.1	0.5
	vanadium	2.3	12
CCB 6/24 19:12	antimony	0.9	5
	vanadium	2.9	15
CCB 6/25 00:22	vanadium	2.3	12
Prep. Blank 8157285	antimony	2.1	11

Associated samples with concentrations reported above the MDL but below the action level:

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES
CCB 6/25 00:22	vanadium	805168

Action:

- Sample result reported for the element is flagged as not-detected at the reported value (U).

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike (MS)/MS duplicate (MSD) recoveries not within 75-125% when the native level is reported less than four times the spiking level are tabulated below:

SAMPLE ID.	ELEMENT	MS/MSD RECOVERY (%)
805145	potassium	/125.6

Action:

- None, see comments.

Comments:

No action is taken when only one of the MS/MSD pairs is out of specification.

DUPLICATE SAMPLE ANALYSIS:

For this Lot, sample 808603 is collocated with sample 805168.

The QAPjP provides precision objectives, however, detail regarding objectives for laboratory replicates *vs* collocated samples as well as criteria for situations where one or both are reported positive but below five times the reporting limit are not presented. As a result, the reviewer utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various EPA Regional guidance documents.

For this collocated sample pair, the above precision criteria were met.

LABORATORY CONTROL SAMPLE ANALYSIS:

Elements providing recoveries not within 85-115% are tabulated below:

ELEMENT	RECOVERY (%)
vanadium	117.7

Associated samples: ALL SAMPLES

Action:

- Associated sample results reported positive for the element are flagged as estimated high (J+).

ICP SERIAL DILUTION ANALYSIS:

Samples with >50 MDL of analyte providing five-fold serial dilution results differing by more than 10% (%D) from the undiluted value are tabulated below:

SAMPLE ID.	ELEMENT	%D
805145	manganese	12.7
	phosphorus	15.6
	potassium	15.3

Action:

- Results reported for the element are flagged as estimated low (J-).

Comments:

The above action is applied to all samples associated with the SDG.

The diluted value was larger than the undiluted value, therefore, low bias is indicated.

DETECTION LIMITS:

For these Lots, the laboratory was required to report results to their method detection limits (MDL). The MDL (described in 40CFR Part 136, Appendix B and incorporated by reference in SW-846) provides an error band, by definition, of ± 100 percent. The Estimated Quantitation Limit (EQL) is established at 5-10X the MDL in SW-846. At 5X MDL, the minimum EQL (EQL (min)) will contain an error band of ± 30 percent.

Action:

- Values below the RL and above the MDL (flagged "B" by the laboratory) have been flagged as estimated (J).

Comments:

Any values below the RL contain inherently increasing error bands as the numbers become smaller. It is essential that the data user considers these statistical impacts on data quality at the low levels.

OVERALL ASSESSMENT:

A calibration verification provided an elevated recovery of vanadium. The positive results reported for this element in associated samples 805168 and 805148 are flagged as estimated high (J+).

A calibration blank was reported with vanadium present at a concentration that generated an action level resulting in the flagging of the positive results reported for samples 805168 and 805148 as not-detected at the reported value (U).

The laboratory control sample provided an elevated recovery of vanadium. The positive results reported in associated samples 805168 and 805148 are flagged as estimated high (J+).

Sample 805145 provided serial dilution values for manganese, phosphorus, and potassium approximately 13-16% larger than the undiluted values. The results reported for these elements in all samples associated with the Lot are flagged as estimated low (J-).

Any values reported above the MDL but below the RL, which are flagged as estimated (J), contain inherently increasing error band as the numbers become smaller. It is essential that the data user considers the statistical impacts on data quality at the low levels.

TABLE A-2.

TECHNICAL REVIEW ACTION SUMMARY

SDG RCRASTQ28B

Antimony		Arsenic	J1
Boron	J1	Cadmium	
Manganese	J3	Phosphorus	J1, J3
Potassium	J3	Selenium	J1
Uranium	J1	Vanadium	J1, J2, J4, U1

J1 - Positive result is flagged as estimated (J) due to uncertainty at the low levels.

J2 - Positive result is flagged as estimated high (J+) due to non-compliant calibration verification stability.

J3 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

J4 - Positive result is flagged as estimated high (J+) due to non-compliant LCS recovery.

U1 - Positive result is flagged as not-detected (U) due to blank contamination.

TECHNICAL REVIEW REPORT

SDG RCRAQ28A

(LOTS A8E220163 AND A8E230133)

WET CHEMISTRIES

TECHNICAL REVIEW REPORT

SDG RCRAQ28A

WET CHEMISTRIES

The data evaluation was based on the procedures set forth in the Methods and included the following parameters:

* - holding times
  - blanks
  - matrix spike sample analysis
* - standard reference material analysis
  - duplicate sample analysis
  - detection limits
  - overall assessment

* All criteria were met for this parameter.

Data validation, described in SW-846 and the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

A glossary of data qualifier definitions is presented in Appendix B.

BLANKS:

Blanks reported with positive values and their associated 5X action levels are tabulated below:

BLANK ID.	PARAMETER	CONC. (mg/l)	ACTION LEVEL (mg/L)
805CDI	chloride	0.20	1.0
805700	chloride	0.40	2.0
	sulfate	0.30	1.5
805PB1	chloride	0.20	1.0

Associated samples with values reported positive but below the action level: NONE

MATRIX SPIKE SAMPLE ANALYSIS:

Samples providing matrix spike (MS)/MS duplicate (MSD) results not within 75-125% when the native level is reported at less than four times the spiking level are tabulated below:

SAMPLE ID.	PARAMETER	MS/MSD RECOVERY (%)
805123	nitrate-N	68/64
	total cyanide	73/70
805122	total cyanide	157/150

Action:

- For MS and MSD recoveries below the lower limit sample results reported for the parameter are flagged as estimated low (J-).
- For MS and MSD recoveries both below and above the upper limit sample results reported for the parameter are flagged as estimated (J).

Comments:

The above actions are applied to all environmental samples associated with the Lots.

DUPLICATE SAMPLE ANALYSIS:

Field Duplicates.

Comments:

For these Lots, sample 805600 is collocated with sample 805108.

The QAPjP provides precision objectives, however, detail regarding objectives for laboratory replicates *vs* collocated samples as well as criteria for situations where one or both are reported positive but below five times the reporting limit are not presented. As a result, the reviewer utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various EPA Regional guidance documents.

For this collocated sample pair, the above precision criteria were met.

DETECTION LIMITS:

For all parameters, STL reported to their standard reporting limits (RL) and for levels between the RL and the method detection limit (MDL) flagged with a "B" qualifier. The MDL described in 40 CFR Part 136, Appendix B and incorporated by reference in SW-846, provides a precision of ± 100 percent. The RL values used by the laboratory, approximate the estimated quantitation limit (EQL) which is established at approximately 5-10X the MDL in SW-846. At 5X the MDL the EQL precision is approximately ± 30 percent.

Action:

- Values reported between the RL and MDL (flagged B by the laboratory), are flagged as estimated (J).

OVERALL ASSESSMENT:

Sample 805123 provided MS/MSD recoveries of nitrate-N below the lower limit. The results reported for this parameter in all environmental samples associated with the Lots are flagged as estimated low (J-).

Sample 805123 provided MS/MSD recoveries of total cyanide below the lower limit and sample 805122 provided MS/MSD recoveries of total cyanide above the upper limit. The results reported for this parameter in all environmental samples associated with the lots are flagged as estimated (J) to signify the indication of mixed biases, both high and low.

For the field blank 805700 chloride and sulfate and for the pour blank and deionized water blank chloride was reported at values between the RL and MDL (flagged "B" by the laboratory). These results are flagged as estimated (J) to signify the potential for lack of analytical reproducibility and statistical validity at the low level.

With the exception of low-level blank contamination, that did not require actions or flagging, all additional QC information evaluated was in specification and no further actions or qualifications were required or deemed necessary.

TECHNICAL REVIEW REPORT

SDG RCRAQ28B

(LOTS A8E300124 AND A8E310182)

WET CHEMISTRIES

TECHNICAL REVIEW REPORT
SDG RCRAQ28B
WET CHEMISTRIES

The data evaluation was based on the procedures set forth in the Methods and included the following parameters:

- holding times
- blanks
- * matrix spike sample analysis
- * standard reference material analysis
- duplicate sample analysis
- detection limits
- overall assessment

* All criteria were met for this parameter.

Data validation, described in SW-846 and the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

A glossary of data qualifier definitions is presented in Appendix B.

HOLDING TIMES:

Samples with holding times in excess of the limits specified in the Method are tabulated below:

SAMPLE ID.	PARAMETER	HOLDING TIME (DAYS)
805168	nitrate-N	4
805148	nitrate-N	4

SAMPLE ID.	PARAMETER	HOLDING TIME (DAYS)
805113	nitrate-N	3
805166	nitrate-N	3
805115	nitrate-N	4
805114	nitrate-N	3
805603	nitrate-N	4

Action:

- None, see comments.

Comments:

The case narrative indicates that due to analyst error the samples could not be analyzed within the two day holding time. No action is required, however, since an FMC keeping quality study has indicated that this parameter is stable well beyond the method specified holding time in the matrix under study.

BLANKS:

Blanks reported with positive values and their associated 5X action levels are tabulated below:

BLANK ID.	PARAMETER	CONC. (mg/L)	ACTION LEVEL
805CDI	chloride	0.20	1.0
805PB1	chloride	0.20	1.0
805703	chloride	0.40	2.0
	sulfate	0.20	1.0

Associated samples with values reported positive but below the action level: NONE

Comments:

The pour blank and deionized water blank are reviewed with Lot A8E220163.

DUPLICATE SAMPLE ANALYSIS:

Field Duplicates.

Comments:

For these Lots, sample 805603 is collocated with sample 805168.

The QAPjP provides precision objectives, however, details regarding objectives for laboratory replicates *vs* collocated samples as well as criteria for situations where one or both are reported positive but below five times the reporting limit are not presented. As a result, the reviewer utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various EPA Regional guidance documents.

For this collocated sample pair the precision criteria specified in the QAPP were met.

Sample 805114 was analyzed for fluoride by both the IC and Bellack distillation methods and the precision value was outside that normally expected for laboratory replicates. Since the Bellack method is less subject to interference only the results from it should be used for this sample.

DETECTION LIMITS:

For all parameters, STL reported to their standard reporting limits (RL) and for levels between the RL and the method detection limit (MDL) flagged with a "B" qualifier. The MDL described in 40 CFR Part 136, Appendix B and incorporated by reference in SW-846, provides a precision of ± 100 percent. The RL values used by the laboratory, approximate the estimated quantitation limit (EQL) which is established at approximately 5-10X the MDL in SW-846. At 5X the MDL the EQL precision is approximately ± 30 percent.

Action:

- Values reported between the RL and MDL (flagged B by the laboratory), have been flagged as estimated (J).

OVERALL ASSESSMENT:

Sample 805114 was analyzed for fluoride by both the IC and Bellack methods due to historical evidence of potential for interferences in the IC method. The reported values from the two methods exceeded the normally expected precision values for laboratory replicates, therefore, only the result from the Bellack method should be used.

For the field blank 805703 chloride and sulfate were reported at values between the RL and MDL (flagged "B" by the laboratory). These results are flagged as estimated (J) to signify the potential for lack of analytical reproducibility and statistical validity at the low level.

With the exception of low-level blank contamination, that did not require actions or flagging, all additional QC information evaluated was in specification and no further actions or qualifications were required or deemed necessary.

APPENDIX B

DEFINITION OF DATA QUALIFIERS

GLOSSARY OF DATA QUALIFIERS

J - The associated value is an estimated quantity.

R - The data are unusable.

U - The parameter is not detected at the reported value.

B - The value is above the MDL or IDL but below the RL, or CRDL

APPENDIX C

GLOSSARY OF ACRONYMS

GLOSSARY OF ACRONYMS

SDG	-	Sample Delivery Group
USEPA	-	Unites States Environmental Protection Agency
DQO	-	Data Quality Objectives
QAPjP	-	Quality Assurance Project Plan
RPD	-	Relative Percent Difference
CRDL	-	Contract Required Detection Limit
RL	-	Reporting Limit
IDL	-	Instrument Detection Limit
MDL	-	Method Detection Limit
CLP	-	Contract Laboratory Program
ICP	-	Ion Coupled Plasma
MS	-	Matrix Spike
MSD	-	Matrix Spike Duplicate

TECHNICAL DATA REVIEW REPORT

RCRA SDG Groundwater Samples Analyzed by Test America

FMC Corporation, Pocatello, Idaho

Prepared by:

W. N. Bishop

and

Frederick S. Ordway

August 8, 2008

TECHNICAL DATA REVIEW REPORT

RCRA SDG Groundwater Samples Analyzed by Test America

FMC Corporation, Pocatello, Idaho

Prepared by:

W. N. Bishop

and

Frederick S. Ordway

August 8, 2008

1. INTRODUCTION

This memo summarizes the usability evaluation of the technically reviewed sample results generated by Test America Laboratories, Inc for FMC Corporation. The analyses were performed at the Test America St. Louis laboratory. The data were technically reviewed based on method specifications, and laboratory-developed performance criteria by adapting the procedures set forth in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, EPA402-R-97-016, Final, December 1997; USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, USEPA Office of Solid Waste and Emergency Response, EPA-540/R-94-013, February 1994 and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, USEPA office of Solid Waste and Emergency Response, EPA540/R-94/012, February 1994 (Guidelines).

The samples were water from the Idaho site. The samples were processed in two laboratory sets, A8E220216, and A8E230284. The sample numbers in each set are listed in Appendix A.

The samples were analyzed for gross alpha, radium-226, and Ra-228 activity. Laboratory procedures were not included for review. The laboratory reports listed EPA methods 900 for gross alpha, 903.3 MOD for radium-226 and 904 MOD for radium-228.

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A summary report and a data report were submitted. The summary reports contained a case narrative and a report page for each sample. The data report contained the following items:

Case narrative
Analytical results
Quality control results
Background measurements
Prep reports for Ra-226 and Ra-228
Run logs
Instrument calibrations for Ra-226 and Ra-228
Crosstalk Corrections Standards documentation
Shipping and receiving documents
Chain of custody records
Periodic instrument checks

A Level I technical review was performed on the information provided by the laboratory and professional judgment.

2. RECALCULATION OF RESULTS

The gross alpha, radium-226, and radium-228 concentrations were recalculated for selected samples, duplicates, laboratory control standards, matrix-spike standards and method blanks using the data submitted. The values for activity, counting uncertainty, and MDC were recalculated.

There were no significant differences between the reported and recalculated values for any of the quantities. It should be noted that the number of reported digits for radium-226 counting efficiency limited the ability to verify calculation accuracy. A comparison of the reported and recalculated values in the selected samples is contained in Appendix B.

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3. DATA REVIEW

The technical review included an evaluation of the following parameters:

- data completeness
- sample receipt
- chemical recovery
- laboratory control samples**
- laboratory duplicates**
- matrix spikes
- blanks**
- standards and calibration**
- detection limits
- measurement uncertainties
- overall assessment

** Denotes all criteria for this parameter were met

DATA COMPLETENESS

The laboratory reports contained all information necessary for the review.

SAMPLE RECEIPT:

Samples were water from the Idaho site. Samples were collected on May 20, May 21, and May 22, 2008 and were shipped on May 21 and May 22, 2008. The samples were received at the laboratory on the morning after shipment. The chain-of-custody information indicated that most of the samples were received in good condition. The custody seals on sample set A8E210216 had fallen off the bottles in the cooler. The chain of custody information after receipt at the laboratory was appropriate and did not indicate any problem.

CHEMICAL RECOVERY:

The procedures for radium-226 and radium-238 include addition of known amount of carriers and weighing of the recovered precipitates to determine the recoveries for analysis.

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Chemical yields for radium-226 ranged from 91% to 106%. The yields for radium-228 ranged from 79% to 89%. All of the recoveries were in the generally specified acceptance range of 50 - 125%.

LABORATORY CONTROL SAMPLE (LCS):
The recoveries for gross alpha in laboratory control samples were 107% and 117%. The laboratory acceptance range is 50 – 121%. The recoveries for radium-226 were 89% and 105%. The laboratory acceptance range is 73 – 122%. The recoveries for radium-228 were 89% and 110%. The laboratory acceptance range is 50 – 121%. All recoveries were within the laboratory acceptance range.

LABORATORY DUPLICATES:
The laboratory uses the Duplicate Error Ratio (DER) as a measure of agreement for duplicate samples. The DER is the ratio of the difference between sample and duplicate to the sum of the squares of the total propagated uncertainty (TPU) for the two measurements. Both of the DER values for pairs of duplicate measurements of uranium-238 were 1.24. The values for radium-226 duplicates were 0.16 and 0.04. For radium-228 the DER values were .036 and 1.11. All of the duplicate results showed acceptable agreement.

MATRIX SPIKES
The recoveries of gross alpha matrix spikes ranged from 55% to 93% compared to the laboratory acceptance limits of 44 – 150%. For radium-226 the matrix spikes recoveries ranged from 105% to 116% compared to the laboratory acceptance limits of 50 – 130%. For radium-228 the matrix spikes recoveries ranged from 97% to 128% compared to the laboratory acceptance limits of 54 – 150. All recoveries were within the laboratory acceptance range.

METHOD BLANK:
The method blanks for uranium-238 were 0.05 and 0.21. The blanks for radium-226 were 0.065 and 0.042. The blanks for radium-228 were 0.06 and 0.28. None of the reported activities the blanks exceeded the MDC.

STANDARDS AND CALIBRATION
The laboratory provided copies of NIST certifications for the standards used. Appropriate documentation for preparation of the working standards and calibration of detectors was provided. A review of the information provided did not indicate any problem.

DETECTION LIMITS:
The detection limit is reported as minimum detectable concentration (MDC). A criterion for MDC was not specified. In general a value of 0.2 for radium-226 MDC

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provides adequate sensitivity. The counter background for radium-228, measured by beta counting, is about 10 times that for radium-226 which is measured by alpha counting. Thus the achievable MDC for radium-228 will be about 3 times that for radium-226, or a value of 0.7.

Most of the results for radium-226 and radium-228 had MDC values less than 0.2 and 0.7 pCi/g. Thirteen of the 17 MDC values for radium-226 were less than 0.2 and 16 of 17 values for radium-228 were less than 0.7. The values for MDC were recalculated from information provided and agreed with those reported by the laboratory.

PROBLEMS REPORTED BY TEST AMERICA

The laboratory reported one problem in the receipt of the samples. This problem was described above.

DATA FLAGS

The laboratory report assigned the data flag U to several because the reported activity value was less than the reported MDC. In addition the data flag M was assigned to results when the MDC value was greater than 0.2 for radium-226 or 0.7 for radium-228, and the flag Y was assigned to results calculated using a chemical yield value exceeding 100%. The assignment of data flags and the definition of the flags are shown in Appendix C.

4. OVERALL ASSESSMENT

With the exceptions noted below the data were acceptable.

One set of samples was received without the chain of custody seals. The seals had come off in the ice water in the cooler during shipment. There was no other evidence to indicate any tampering with these samples; however, because the seals were not on the bottles the possibility of tampering cannot be excluded.
Radium-226 and radium-228 results were calculated using the measured chemical yields even when the yield was greater than 100%. It is not possible to recover more than all of a substance. It is better practice to use 100% recovery whenever the measured recovery exceeds 100%. The maximum reported yield was 106% thus the maximum discrepancy caused was no more than 6%.

The recoveries for matrix spike standards tended to be high. One matrix spike recovery was 99%. The other seven matrix spike recoveries were greater than 100%. This could indicate a bias in the measurements.

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APPENDIX A
LIST OF SAMPLES

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TABLE A1. Samples from Report RCRASTQ28A

FMC Sample ID	Laboratory Sample ID
805183	A8E220216-001
805123A,B,C	A8E220216-004
805108	A8E220216-005
805600	A8E220216-006
805122	A8E220284-007
805BTS	A8E220284-008
805700	A8E220284-009
805156	A8E220284-0010
805PB1	A8E220284-0011
805CD1	A8E220284-0012
805173	A8E230284-001
805174	A8E230284-002
805175	A8E230284-003
805147	A8E230284-004
805149	A8E230284-005
805127	A8E230284-006
805167	A8E230284-007

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APPENDIX B
RECALCULATION OF RESULTS

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TABLE B1. Recalculation of Results for Gross Alpha

Laboratory Sample ID	FMC Sample ID	Reported Values			Recalculated Values		
		Activity	Error	MDC	Activity	Error	MDC
A8E220216-001	805183	5.2	3.2	3.7	5.2	3.2	3.5
A8E220216-012	805CDI	0.10	0.32	0.62	0.10	0.32	0.58
A8E230284-002	805174	5.4	3.3	4.0	5.4	3.3	3.7
A8E230284-005	805149	1.1	1.7	2.8	1.1	1.7	2.6
F8E270000-128B	BLANK	0.21	0.40	0.70	0.21	0.40	0.65
F8E270000-130C	LCS	57.6	4.1	0.8	57.6	4.1	0.8
A8E220216-004	SPIKE	294	30	10	293	30	10

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TABLE B2. Recalculation of Results for Radium-226

Laboratory	FMC	Reported Values			Recalculated Values		
Sample ID	Sample ID	Activity	Error	MDC	Activity	Error	MDC
A8E220216-001	805183	0.0076	0.087	0.17	0.0074	0.085	0.16
A8E220216-012	805CDI	-0.032	0.092	0.199	-0.031	0.090	0.180
A8E230284-002	805174	0.24	0.11	0.11	0.24	0.11	0.10
A8E230284-005	805149	0.049	0.072	0.121	0.050	0.073	0.113
F8E220000-421B	BLANK	0.065	0.095	0.160	0.064	0.095	0.147
F8E220000-421C	LCS	10.790	0.716	0.161	11.120	0.738	0.155
A8E220216-004Sa	SPIKE	12.110	0.817	0.154	12.051	0.813	0.143

Values are in picocuries/gram.

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TABLE B3. Recalculation of Results for Radium-228

Laboratory	FMC	Reported Values			Recalculated Values		
Sample ID	Sample ID	Activity	Error	MDC	Activity	Error	MDC
A8E220216-001	805183	0.34	0.34	0.56	0.34	0.31	0.51
A8E220216-012	805CDI	-0.14	0.33	0.59	-0.14	0.30	0.54
A8E230284-002	805174	1.18	0.46	0.67	1.18	0.41	0.61
A8E230284-005	805149	0.65	0.44	0.68	0.66	0.40	0.63
A8E230284-005	BLANK	0.28	0.36	0.59	0.28	0.33	0.54
A8E230284-005	LCS	7.01	0.63	0.56	7.01	0.57	0.52
A8E230284-005	SPIKE	8.19	0.70	0.61	8.15	0.64	0.56

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APPENDIX C
DATA FLAGS ASSIGNED TO RESULTS

CONFIDENTIAL WORK PRODUCT PREPARED IN ANTICIPATION OF LITIGATION: PRIVELIGED ATTORNEY-CLIENT COMMUNICATION; DO NOT COPY OR DISTRIBUTE FOR ANY PURPOSE, INCLUDING LEGAL DISCOVERY, WITHOUT THE PRIOR CONSENT OF CLIENT'S ATTORNEY.

TABLE C1. Data Flags Assigned by Paragon to Radium-226 Results

Laboratory Sample ID	Data flags		
	Gross Alpha	Ra-226	Ra-228
A8E220216-001		U Y	U Y
A8E220216-004	U	U	U
A8E220216-005	U	M U	
A8E220216-006	U	M	U
A8E220284-007	U		U
A8E220284-008	U	U	U
A8E220284-009	U	M U	M U
A8E220284-0010	U		U
A8E220284-0011	U	M U Y	U Y
A8E220284-0012	U	U Y	U Y
A8E230284-001		U Y	U Y
A8E230284-002			
A8E230284-003		Y	U Y
A8E230284-004	U	U Y	U Y
A8E230284-005	U	U Y	U Y
A8E230284-006	U	Y	U Y
A8E230284-007	U		

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TABLE C2. Definition of Data Flags

M	Desired MDC is not met.
U	The result is less than the measured MDC.
Y	The chemical yield is greater than 100%. Measures yield was used to calculate sample activity.

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DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRAQ28A

LOT A8E220163

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	BATISTE SPRING	BATISTE SPRING	FMC-RCRA Groundwater		
5	D.I.BLANK	D.I.BLANK	FMC-RCRA Groundwater QC		
5	POUR BLANK	POUR BLANK	FMC-RCRA Groundwater QC		
5	RINS BLANK	RINS BLANK RCRA	FMC-RCRA Groundwater QC		
1	WELL-108	WELL-108	FMC-RCRA Groundwater	4482.40	
1	WELL-121	WELL-121	FMC-RCRA Groundwater	4485.58	
1	WELL-122	WELL-122	FMC-RCRA Groundwater	4475.92	
1	WELL-123	WELL-123	FMC-RCRA Groundwater	4484.12	
1	WELL-155	WELL-155	FMC-RCRA Groundwater	4491.21	
3	WELL-156	WELL-156	FMC-RCRA Groundwater	4494.57	
3	WELL-157	WELL-157	FMC-RCRA Groundwater	4502.30	
3	WELL-158	WELL-158	FMC-RCRA Groundwater	4496.36	
3	WELL-183	WELL-183	FMC-RCRA Groundwater	4497.33	

Sample Type: FMC-RCRA Groundwater

SITE CODE	BATISTE SPRIN	WELL-108	WELL-108	WELL-121	WELL-122	WELL-123	WELL-155
SAMPLE DATE	05/21/2008	05/21/2008	05/21/2008	05/20/2008	05/22/2008	05/21/2008	05/21/2008
SAMPLE TIME	10:30	09:15	09:40	19:05	13:10	07:50	13:15
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK5	KNNK0	KNNK3	KNNKW	KNQ19	KNNKX	KNNLE
REMARKS			DUPLICATE		RESAMPLE		
SAMPLE NUMBER	805BTS	805108	805600	805121	805122	805123A	805155
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)		90.55		92.36	83.78	92.15	95.94
OXIDATION REDUCTION POTENTIAL	-37.8	-8.9		-67.4	17.3	82.5	-55.7
FLOW (cfs)	1.25						
OXYGEN (O) (FLD) DIS	1.4	4.18		3.21	0.27	0.3	0.21
PH (FLD)	6.76	7.07		6.89	6.92	6.67	7.22
SC (UMHOS/CM AT 25 C) (FLD)	1004.0	2182.0		3593.0	2653.0	3247.0	3153.0
TURBIDITY (NTU) (FLD)	0.3	0.4		0.4	0.4	0.4	0.5
WATER TEMPERATURE (C) (FLD)	13.2	19.1		16.8	17.6	18.1	14.6
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	11.7	156.0	138.0	81.5	181.0	19.9	494.0
	,J					,J	
SULFATE (SO4)	171.0	242.0	242.0	256.0	323.0	383.0	260.0
						NC M	
CHLORIDE (CL)	51.4	354.0	354.0	406.0	367.0	189.0	222.0
FLUORIDE (F)	0.4	1.0	1.0	0.6	0.2	1.2	<0.1
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	1.4	<0.2	<0.2	<0.2	<0.2	3.6	<0.2
NITRATE (NO3-N)	7.1	17.2	17.2	26.3	25.1	7.9	5.7
ELEMENTAL PHOSPHORUS (P4)	<0.00005	0.03	0.0307	<0.00005	0.00101	<0.00005	<0.00005
PHOSPHORUS (P) TOT	17.6	1.03	1.39	0.735	9.17	0.823	43.0
	,J	N,J		N	N,J	,J	
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT	0.00096	<0.005	<0.05		0.0028	<0.005	
	,U				BN,U		
ARSENIC (AS) TOT	0.0246	0.0186	<0.1	<0.1	0.0635	0.244	0.201
				N			
BORON (B) TOT	0.2	0.343	0.284		1.03	0.744	
		BN			N	N	
CADMIUM (CD) TOT	0.00038	<0.0005	<0.005		0.00016	0.00012	
	,U				BN,U	B,U	
MANGANESE (MN) TOT	0.0492	0.487	0.725		1.01	0.122	
	,J	E,J	N		,J	N,J	
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	
SELENIUM (SE) TOT	0.0042	0.0087	0.011	0.0126	0.0083	0.141	0.0053
				BN	BN		
VANADIUM (V) TOT	0.005	0.0049	<0.1		0.0116	0.182	
	,J	BE,J			,J	E,J	
-- OTHER PARAMETERS --							
GROSS ALPHA (PCI/L)	-0.6	-1.3	5.2		3.2	5.4	
	,U	,U	,U		,U	,U	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	BATISTS SPRIN	WELL-108	WELL-108	WELL-121	WELL-122	WELL-123	WELL-155
SAMPLE DATE	05/21/2008	05/21/2008	05/21/2008	05/20/2008	05/22/2008	05/21/2008	05/21/2008
SAMPLE TIME	10:30	09:15	09:40	19:05	13:10	07:50	13:15
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK5	KNNK0	KNNK3	KNNKW	KNQ19	KNNKX	KNNLE
REMARKS			DUPLICATE		RESAMPLE		
SAMPLE NUMBER	805BTS	805108	805600	805121	805122	805123A	805155
-- OTHER PARAMETERS --							
RADIUM 226 (PCI/L)	0.15	0.22	0.28		0.33	0.008	
	,U	,M,U	,U			,U	
RADIUM 228 (PCI/L)	0.22	0.42	0.72		0.5	-0.04	
	,U		,U		,U	,U	
TOTAL URANIUM	0.00081	0.00049	<0.01		<0.001	0.00089	
		B				B	
CYANIDE (CN) TOT	<0.01	0.019	0.014		0.031	<0.01	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: PMC-RCRA Groundwater

SITE CODE	WELL-156	WELL-157	WELL-158	WELL-183
SAMPLE DATE	05/21/2008	05/21/2008	05/20/2008	05/20/2008
SAMPLE TIME	11:40	13:55	18:25	17:45
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK8	KNNLG	KNNKQ	KNNKG
SAMPLE NUMBER	805156	805157	805158	805183
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LEVEL (FEET)	99.22	107.18	100.05	100.69
OXIDATION REDUCTION POTENTIAL	-124.1	-138.4	-63.6	-66.9
OXYGEN (O) (FLD) DIS	0.27	0.24	4.19	4.6
PH (FLD)	7.04	6.79	6.84	7.31
SC (UMHOS/CM AT 25 C) (FLD)	6096.0	3460.0	2169.0	1542.0
TURBIDITY (NTU) (FLD)	1.0	0.4	0.3	0.6
WATER TEMPERATURE (C) (FLD)	15.6	16.1	16.6	16.7
-- MAJOR CONSTITUENTS --				
POTASSIUM (K) TOT	888.0	370.0	17.7	9.4
				B,J
SULFATE (SO4)	212.0	238.0	284.0	98.9
CHLORIDE (CL)	357.0	278.0	82.9	154.0
FLUORIDE (F)	<0.1	0.5	0.4	0.5
-- NUTRIENTS --				
TOTAL AMMONIA (NH3+NH4 AS N)	14.0	3.1	<0.2	<0.2
NITRATE (NO3-N)	<0.1	<0.1	1.6	1.6
ELEMENTAL PHOSPHORUS (P4)	0.0000946	<0.00005	<0.00005	<0.00005
PHOSPHORUS (P) TOT	464.0	284.0	<0.5	0.0365
			N	B,J
-- METALS & MINOR CONSTITUENTS --				
ANTIMONY (SB) TOT	0.001			<0.005
	,U			
ARSENIC (AS) TOT	0.163	0.177	<0.1	0.0144
			N	
BORON (B) TOT	6.24			<0.5
				N
CADMIUM (CD) TOT	0.00023			<0.0005
	,U			
MANGANESE (MN) TOT	1.24			<0.002
	,J			B,J
MERCURY (HG) TOT	<0.0002			<0.0002
SELENIUM (SE) TOT	0.003	<0.05	<0.05	0.0073
			N	
VANADIUM (V) TOT	<0.01			0.0042
	,J			BE,J
-- OTHER PARAMETERS --				
GROSS ALPHA (PCI/L)	0.8			5.2
	,U			
RADIUM 226 (PCI/L)	0.42			0.008
				,U,Y

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless Field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-156	WELL-157	WELL-158	WELL-183
SAMPLE DATE	05/21/2008	05/21/2008	05/20/2008	05/20/2008
SAMPLE TIME	11:40	13:55	18:25	17:45
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK8	KNNLG	KNNKQ	KNNKG
SAMPLE NUMBER	805156	805157	805158	805183
-- OTHER PARAMETERS --				
RADIUM 228 (PCI/L)	0.61			0.34
	,U			,U,Y
TOTAL URANIUM	<0.001			0.0056
CYANIDE (CN) TOT	0.063			<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater QC

SITE CODE	D.I.BLANK	POUR BLANK	RINS BLANK
SAMPLE DATE	05/21/2008	05/21/2008	05/21/2008
SAMPLE TIME	12:10	12:00	11:15
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNLD	KNNLA	KNNK7
REMARKS	BLANK	BLANK	BLANK
SAMPLE NUMBER	805CDI	805PB1	805700
-- MAJOR CONSTITUENTS --			
POTASSIUM (K) TOT	<0.1	<0.1	2.92
SULFATE (SO4)	<1.0	<1.0	0.3
			B
CHLORIDE (CL)	0.2	0.2	0.4
	B	B	B
FLUORIDE (F)	<0.1	<0.1	<0.1
-- NUTRIENTS --			
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2
NITRATE (NO3-N)	<0.1	<0.1	<0.1
ELEMENTAL PHOSPHORUS (P4)	<0.00005	<0.00005	<0.00005
PHOSPHORUS (P) TOT	<0.05	<0.05	0.234
-- METALS & MINOR CONSTITUENTS --			
ANTIMONY (SB) TOT	0.00073	0.0013	<0.05
ARSENIC (AS) TOT	<0.01	<0.01	<0.1
BORON (B) TOT	0.0867	0.0876	<0.5
CADMIUM (CD) TOT	0.000054	0.000054	0.00052
MANGANESE (MN) TOT	<0.002	<0.002	0.0256
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	<0.005	<0.005	<0.05
VANADIUM (V) TOT	<0.1	<0.1	<0.1
-- OTHER PARAMETERS --			
GROSS ALPHA (PCI/L)	0.1	-0.05	0.25
	,U	,U	,U
RADIUM 226 (PCI/L)	-0.032	-0.19	0.006
	,U,Y	,M,U,Y	,U
RADIUM 228 (PCI/L)	-0.14	0.19	-0.13
	,U,Y	,U,Y	,U
TOTAL URANIUM	<0.001	<0.001	<0.01
CYANIDE (CN) TOT	<0.01	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

INDEX

SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
1	805108	KNNK0	05/21/2008	WELL-108
1	805121	KNNKW	05/20/2008	WELL-121
1	805122	KNQ19	05/22/2008	WELL-122
1	805123A	KNNKX	05/21/2008	WELL-123
1	805155	KNNLE	05/21/2008	WELL-155
3	805156	KNNK8	05/21/2008	WELL-156
3	805157	KNNLG	05/21/2008	WELL-157
3	805158	KNNKQ	05/20/2008	WELL-158
3	805183	KNNKG	05/20/2008	WELL-183
1	805600	KNNK3	05/21/2008	WELL-108
5	805700	KNNK7	05/21/2008	RINS BLANK
1	805BTS	KNNK5	05/21/2008	BATISTE SPRING
5	805CDI	KNNLD	05/21/2008	D.I.BLANK
5	805PB1	KNNLA	05/21/2008	POUR BLANK

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1	KNNK0	805108	05/21/2008	WELL-108
1	KNNK3	805600	05/21/2008	WELL-108
1	KNNK5	805BTS	05/21/2008	BATISTE SPRING
5	KNNK7	805700	05/21/2008	RINS BLANK
3	KNNK8	805156	05/21/2008	WELL-156
3	KNNKG	805183	05/20/2008	WELL-183
3	KNNKQ	805158	05/20/2008	WELL-158
1	KNNKW	805121	05/20/2008	WELL-121
1	KNNKX	805123A	05/21/2008	WELL-123
5	KNNLA	805PB1	05/21/2008	POUR BLANK
5	KNNLD	805CDI	05/21/2008	D.I.BLANK
1	KNNLE	805155	05/21/2008	WELL-155
3	KNNLG	805157	05/21/2008	WELL-157
1	KNQ19	805122	05/22/2008	WELL-122

SAMPLE ID CODES

SAMPLE SUMMARY

RCRAQ28A : A8E220163

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNNKG	001	805183	05/20/08	17:45
KNNKQ	002	805158	05/20/08	18:25
KNNKW	003	805121	05/20/08	19:05
KNNKX	004	805123 A,B,C	05/21/08	07:50
KNNK0	005	805108	05/21/08	09:15
KNNK3	006	805600	05/21/08	09:40
KNNK4	007	805122	05/21/08	10:00
KNNK5	008	805BTS	05/21/08	10:30
KNNK7	009	805700	05/21/08	11:15
KNNK8	010	805156	05/21/08	11:40
KNNLA	011	805PBI	05/21/08	12:00
KNNLD	012	805CDI	05/21/08	12:10
KNNLE	013	805155	05/21/08	13:15
KNNLG	014	805157	05/21/08	13:55

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRAQ28A

The following report contains the analytical results for twenty-two water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 22, 2008 and May 23, 2008, according to documented sample acceptance procedures.

The 340.2 Fluoride, Bellack analysis was performed at the Lancaster Laboratories. A copy of their report has been provided.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 04, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 0.8 and 1.3°C.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805123 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for 805123 A,B,C and 805122 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The analytical sequence should be CCV/CCB. Due to an analyst error, the analytical sequence was CCV/CCV for Chloride and Sulfate associated with sample(s) 805183. Since the CCB and CCV were within acceptance criteria for the rest of the sequence and the analytical sequence had no impact on the sample results, the data has been accepted.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

Chain of Custody Record

TAL-4142 (0907)

RCRA SDG-1

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

No Carton

Client	FMC
Address	PO Box 4111
City	Pocatello
State	ID
Zip Code	83202
Project Name and Location (State)	FMC Pocatello ID
Contract/Purchase Order/Quote No.	RCRA
Project Manager	Rob Hartman
Telephone Number (Area Code)/Fax Number	(208) 241-8216
Site Contact	Rob Hartman
Lab Contact	Mark Loed
Carrier/Waybill Number	Fed Ex airbill #8605 0511 7777
Date	5/21/08
Chain of Custody Number	376088
Lab Number	
Page	1 of 2

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed	Soil	Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis (Attach list if more space is needed): WQP uF/Raw	Ammonia uF/H2SO4	CN uF/NaOH	Special Instructions/ Conditions of Receipt
805183	5/20/08	17:45		X			L	500			250		L	500	250	see comments
805158		18:25		X												
805121		19:05		X												
805123A	5/21/08	0750									250				250	
805123B		0750														
805123C		0750														
805108		0915														
805600		0940														

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Normal

QC Requirements (Specify)

	Date	Time
1. Relinquished By: Walter Crane	5/21/08	15:00
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By: [illegible]	5-22-08	0920
2. Received By		
3. Received By		

Comments: Routine & Special RCRA Analysis see attached parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4142 (0907)

RCRA SDG-1

N. Canton

Client: FMC	Project Manager: Rob Hartman	Date: 5/21/08	Chain of Custody Number: 376087
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 2 of 2
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loed	
Project Name and Location (State): FMC Pocatello, ID	Carrier/Waybill Number: Fed Ex airbill #8605 0511 7777		
Contract/Purchase Order/Quote No.: RCRA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	WRP uF/Rad	Ammonia uF/H2SO4	CN uF/NaOH	Bel. Fl uF/Rad	Special Instructions/ Conditions of Receipt
805122	5/21/08	1000		X													
805BTS		1030					L	500			250	1	L	500	250		see comments
805700		1115															
805156		1140					L L	L L									
805PB1		1200													250		
805CDI		1210															
805155		1315					L L	L L									
805157		1355													250		NO CN on 155
															250		" " " 157

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

1. Relinquished By: Walter Crane	Date: 5/21/08	Time: 15:00	1. Received By: [signature]	Date: 5/22/08	Time: 0920
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Special RCRA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

TestAmerica Cooler Receipt Form/Narrative **Lot Number: ABE220163**
North Canton Facility

Client FMC Project _____ By: _____ (Signature)
Cooler Received on 5-22-08 Opened on 5-22-08
FedEx ☑ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # _____ Multiple Coolers ☑ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☑ No ☐ Intact? Yes ☑ No ☐ NA ☐
   If YES, Quantity 4
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☑ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☐ No ☑
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes ☑ No ☐
3. Did custody papers accompany the sample(s)? Yes ☑ No ☐ Relinquished by client? Yes ☑ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☑ No ☐
5. Packing material used: Bubble Wrap ☑ Foam ☐ None ☐ Other _____
6. Cooler temperature upon receipt _____ °C See back of form for multiple coolers/temps ☑
   METHOD: IR ☑ Other ☐ _____
   COOLANT: Wet Ice ☑ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☑ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☑ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☑ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☑ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☑
12. Sufficient quantity received to perform indicated analyses? Yes ☑ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☑ Were VOAs on the COC? Yes ☐ No ☑

Contacted PM MSL Date 5/22 by [illegible] via Verbal ☒ Voice Mail ☐ Other ☐
Concerning #14

14. CHAIN OF CUSTODY

The following discrepancies occurred:
Rec'd 1XL preserved w/nitric for sample 805122
No volume to run unpreserved tests.

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
193	<2 >12	5-22-08	MJ
158	<2		
121	<2		
123A, B, C	<2 <2 <2 >12 >12 >12		
~~123~~ 108	<2 >12		
~~123~~ 600	<2 >12		
~~108~~ 122	<2 >12		
BTS	<2 >12		

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials
700	<2 >12	5-22-08	NS
156	<2 >12	↓	↓
PB1	<2 >12		
CDI	<2 >12		
155	<2		
157	<2		

Cooler #	Temp. °C	Method	Coolant
L644	2.8	IR	ice
L854	3.2	↓	↓

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRAQ28A

LOT A8E230133

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	WELL-122	WELL-122	FMC-RCRA Groundwater	4475.92	
1	WSLL-127	WELL-127	FMC-RCRA Groundwater	4458.20	
1	WELL-147	WELL-147	FMC-RCRA Groundwater	4443.69	
1	WELL-149	WELL-149	FMC-RCRA Groundwater	4447.25	
1	WELL-167	WELL-167	FMC-RCRA Groundwater	4492.17	
1	WELL-173	WELL-173	FMC-RCRA Groundwater	4452.76	
1	WELL-174	WELL-174	FMC-RCRA Groundwater	4447.12	
3	WELL-175	WELL-175	FMC-RCRA Groundwater	4443.59	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-122	WELL-127	WELL-147	WELL-149	WELL-167	WELL-173	WELL-174
SAMPLE DATE	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/21/2008	05/21/2008
SAMPLE TIME	13:10	09:45	08:20	09:10	10:25	17:55	18:35
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNQ19	KNQ17	KNQ14	KNQ15	KNQ18	KNQ1R	KNQ12
REMARKS	RESAMPLE						
SAMPLE NUMBER	805122	805127	805147	805149	805167	805173	805174
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	83.78	63.33	48.16	51.78	95.06	56.59	50.64
OXIDATION REDUCTION POTENTIAL	17.3	41.3	87.1	53.8	24.0	-16.1	-20.6
OXYGEN (O) (FLD) DIS	0.27	3.73	4.68	5.89	0.27	6.65	5.13
PH (FLD)	6.92	7.36	7.4	7.53	7.21	7.59	7.4
SC (UMHOS/CM AT 25 C) (FLD)	2653.0	1750.0	1060.0	919.0	1531.0	1165.0	1230.0
TURBIDITY (NTU) (FLD)	0.4	0.4	0.2	0.3	0.6	0.9	0.5
WATER TEMPERATURE (C) (FLD)	17.6	14.2	16.8	16.0	14.5	16.7	16.7
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	181.0	11.2	9.4	8.84	10.0	10.6	9.52
		,J	,J	,J	,J	,J	,J
SULFATE (SO4)	323.0	193.0	63.8	55.0	139.0	54.0	91.7
CHLORIDE (CL)	367.0	322.0	158.0	126.0	128.0	236.0	211.0
FLUORIDE (F)	0.2	0.8	0.9	1.2	<0.1	1.0	0.9
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	25.1	4.9	3.8	1.7	1.8	3.9	4.3
ELEMENTAL PHOSPHORUS (P4)	0.00101						
PHOSPHORUS (P) TOT	9.17	0.125	0.0369	0.0624	7.14	0.032	0.0351
	N,J					,J	
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT	0.0028	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	BN,U					,U	
ARSENIC (AS) TOT	0.0535	0.0053	0.0033	0.0067	0.0561	0.0028	<0.01
BORON (B) TOT	1.03	0.45	<0.5	<0.5	3.23	0.204	<0.5
	N					,J	
CADMIUM (CD) TOT	0.00016	<0.0005	<0.0005	<0.0005	0.000045	<0.0005	<0.0005
	BN,U				,U	,U	
MANGANESE (MN) TOT	1.01	<0.002	<0.002	<0.002	0.923	0.0015	<0.002
	,J					,U	
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	0.0083	0.0046	0.0034	0.002	0.0027	0.0052	0.0046
	BN						
VANADIUM (V) TOT	0.0116	0.003	<0.01	<0.01	0.0083	<0.01	<0.01
	,J						
-- OTHER PARAMETERS --							
GROSS ALPHA (PCI/L)	3.2	2.1	2.0	1.1	2.0	4.3	5.4
	,U	,U	,U	,U	,U		
RADIUM 226 (PCI/L)	0.33	0.145	0.116	0.049	0.27	0.125	0.24
		,Y	,U,Y	,U,Y		,U,Y	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-122	WELL-127	WELL-147	WELL-149	WELL-167	WELL-173	WELL-174
SAMPLE DATE	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/21/2008	05/21/2008
SAMPLE TIME	13:10	09:45	08:20	09:10	10:25	17:55	18:35
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNQ19	KNQ17	KNQ14	KNQ15	KNQ18	KNQ1R	KNQ12
REMARKS	RESAMPLE						
SAMPLE NUMBER	805122	805127	805147	805149	805167	805173	805174
-- OTHER PARAMETERS --							
RADIUM 228 (PCI/L)	0.5	0.42	0.4	0.65	0.95	0.6	1.18
	,U	,U,Y	,U,Y	,U,Y		,U,Y	
TOTAL URANIUM	<0.001	0.0014	0.0033	0.0022	0.00044	0.0016	0.0035
						,U	
CYANIDE (CN) TOT	0.031	<0.01	<0.01	<0.01	0.13	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-175
SAMPLE DATE	05/22/2008
SAMPLE TIME	07:40
LAB	TESTAMERIC
LAB NUMBER	KNQ13
SAMPLE NUMBER	805175
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	47.3
OXIDATION REDUCTION POTENTIAL	36.4
OXYGEN (O) (FLD) DIS	5.38
PH (FLD)	7.29
SC (UMHOS/CM AT 25 C) (FLD)	1056.0
TURBIDITY (NTU) (FLD)	0.5
WATER TEMPERATURE (C) (FLD)	16.0
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	8.67
	,J
SULFATE (SO4)	62.4
CHLORIDE (CL)	147.0
FLUORIDE (F)	0.7
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	5.3
PHOSPHORUS (P) TOT	0.0425
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.0049
BORON (B) TOT	<0.5
CADMIUM (CD) TOT	<0.0005
MANGANESE (MN) TOT	<0.002
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	0.0032
VANADIUM (V) TOT	<0.01
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	4.8
RADIUM 226 (PCI/L)	0.17
	,Y
RADIUM 228 (PCI/L)	0.25
	,U,Y
TOTAL URANIUM	0.0043
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

PMCW01 - PMC - ALL DATA ANALYSES SUMMARY REPORT

INDEX

+---------- SAMPLE NUMBER ORDER ----------+

Page	Sample Number	Lab ##	Date	Site Code
1	805122	KNQ19	05/22/2008	WELL-122
1	805127	KNQ17	05/22/2008	WELL-127
1	805147	KNQ14	05/22/2008	WELL-147
1	805149	KNQ15	05/22/2008	WELL-149
1	805167	KNQ18	05/22/2008	WELL-167
1	805173	KNQ1R	05/21/2008	WELL-173
1	805174	KNQ12	05/21/2008	WELL-174
3	805175	KNQ13	05/22/2008	WELL-175

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
1	KNQ12	805174	05/21/2008	WELL-174
3	KNQ13	805175	05/22/2008	WELL-175
1	KNQ14	805147	05/22/2008	WELL-147
1	KNQ15	805149	05/22/2008	WELL-149
1	KNQ17	805127	05/22/2008	WELL-127
1	KNQ18	805167	05/22/2008	WELL-167
1	KNQ19	805122	05/22/2008	WELL-122
1	KNQ1R	805173	05/21/2008	WELL-173

SAMPLE ID CODES

SAMPLE SUMMARY

RCRAQ28A : A8E230133

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNQ1R	001	805173	05/21/08	17:55
KNQ12	002	805174	05/21/08	18:35
KNQ13	003	805175	05/22/08	07:40
KNQ14	004	805147	05/22/08	08:20
KNQ15	005	805149	05/22/08	09:10
KNQ17	006	805127	05/22/08	09:45
KNQ18	007	805167	05/22/08	10:25
KNQ19	008	805122 RESAMPLE	05/22/08	13:10

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRAQ28A

The following report contains the analytical results for twenty-two water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 22, 2008 and May 23, 2008, according to documented sample acceptance procedures.

The 340.2 Fluoride, Bellack analysis was performed at the Lancaster Laboratories. A copy of their report has been provided.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 04, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 0.8 and 1.3°C.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805123 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for 805123 A,B,C and 805122 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The analytical sequence should be CCV/CCB. Due to an analyst error, the analytical sequence was CCV/CCV for Chloride and Sulfate associated with sample(s) 805183. Since the CCB and CCV were within acceptance criteria for the rest of the sequence and the analytical sequence had no impact on the sample results, the data has been accepted.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

RCRA SDG-1

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/22/08	Chain of Custody Number: 376063
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number:	Page 1 of 3
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Lord	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: Fed Ex airbill #8605 0511 7814		
Contract/Purchase Order/Quote No.: RCRA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil		Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		WQP UF/Raw	Ammonia UF/H2SO4	CN UF/NaOH										Special Instructions/ Conditions of Receipt
805173	5/21/08	17:55		X				L		500		200			L	500	250										See comments
805174	↓	1835		↓				↓		↓		↓			↓	↓	↓										
805175	5/22/08	0740																									
805147	↓	0820																									
805149		0910																									
805127		0945																									
805167		1025																									
~~805112A~~																											
End of RCRA SDG-1																											
Part of RCRA SDG-1																											
805122 Resample	5/22/08	13:10		X				L							L												

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Normal

QC Requirements (Specify):

1. Relinquished By: Walter Crane	Date: 5/22/08	Time: 16:00	1. Received By: [signature]	Date: 5/23/08	Time: 0930
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Special RCRA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

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TestAmerica Cooler Receipt Form/Narrative Lot Number: ABE230133
North Canton Facility

Client FMC Project _____ By: [illegible] (Signature)
Cooler Received on 5-23-08 Opened on 5-23-08
FedEx ☑ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # _____ Multiple Coolers ☑ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☑ No ☐ Intact? Yes ☑ No ☐ NA ☐
   If YES, Quantity _____
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☑ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☐ No ☑
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes ☑ No ☐
3. Did custody papers accompany the sample(s)? Yes ☑ No ☐ Relinquished by client? Yes ☑ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☑ No ☐
5. Packing material used: Bubble Wrap ☑ Foam ☐ None ☐ Other _____
6. Cooler temperature upon receipt _____ °C See back of form for multiple coolers/temps ☑
   METHOD: IR ☑ Other ☐ _____
   COOLANT: Wet Ice ☑ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☑ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☑ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☑ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☑ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☑
12. Sufficient quantity received to perform indicated analyses? Yes ☑ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☑ Were VOAs on the COC? Yes ☐ No ☑

Contacted PM _____ Date _____ by _____ via Verbal ☐ Voice Mail ☐ Other ☐
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092005-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
173	<2 >12	5-23-08	[illegible]
174	<2 >12		
175	<2 >12		
147	<2 >12		
149	<2 >12		
127	<2 >12		
163	<2 >12		
112	<2 <2 <2 >12 >12 >12		

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH		Date	Initials
523	<2	7.2	5-23-08	WS
524	<2	7.2		
701	<2	7.2		
525	<2	7.2		
601	<2	7.2		

Cooler #	Temp. °C	Method	Coolant
L862	1.3	IR	ICE
L815	0.8		

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRAQ28B

LOT A8E300124

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
3	RINS BLANK	RINS BLANK RCRA	FMC-RCRA Groundwater QC		
1	WELL-104	WELL-104	FMC-RCRA Groundwater	4486.71	
1	WELL-124	WELL-124	FMC-RCRA Groundwater	4448.45	
1	WELL-126	WELL-126	FMC-RCRA Groundwater	4455.97	
1	WELL-128	WELL-128	FMC-RCRA Groundwater	4461.85	
1	WELL-131	WELL-131	FMC-RCRA Groundwater	4485.95	
1	WELL-154	WELL-154	FMC-RCRA Groundwater	4447.05	
1	WELL-165	WELL-165	FMC-RCRA Groundwater	4464.16	
2	WELL-171	WELL-171	FMC-RCRA Groundwater	4452.41	
2	WELL-172	WELL-172	FMC-RCRA Groundwater	4450.57	
2	WELL-176	WELL-176	FMC-RCRA Groundwater	4443.29	
2	WELL-177	WELL-177	FMC-RCRA Groundwater	4444.95	
2	WELL-178	WELL-178	FMC-RCRA Groundwater	4451.14	
2	WELL-180	WELL-180	FMC-RCRA Groundwater	4452.77	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-104	WELL-124	WELL-126	WELL-128	WELL-131	WELL-154	WELL-165
SAMPLE DATE	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008
SAMPLE TIME	12:45	15:40	14:45	14:15	13:40	08:40	12:10
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN4HQ	KN4HO	KN4HX	KN4HV	KN4HR	KN4HE	KN4HP
SAMPLE NUMBER	805104	805124	805126	805128	805131	805154	805165
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	91.13	53.18	61.08	66.98	90.88	51.26	68.64
OXIDATION REDUCTION POTENTIAL	21.5	7.0	-4.3	-5.3	-34.3	68.4	18.1
OXYGEN (O) (FLD) DIS	0.19	4.07	4.65	3.86	0.19	4.85	0.26
PH (FLD)	7.57	7.49	7.66	7.43	7.36	7.47	7.31
SC (UMHOS/CM AT 25 C) (FLD)	2034.0	1152.0	858.0	3809.0	2065.0	1182.0	2026.0
TURBIDITY (NTU) (FLD)	0.3	0.2	0.6	0.2	46.0	0.3	0.2
WATER TEMPERATURE (C) (FLD)	14.7	14.4	16.5	12.5	14.0	16.8	12.5
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) DIS					14.0		
					,J		
POTASSIUM (K) TOT	239.0	12.7	9.03	17.4	14.0	13.3	13.3
	,J	,J	,J	,J		,J	,J
SULFATE (SO4)	144.0	88.7	87.7	137.0	164.0	50.1	237.0
CHLORIDE (CL)	149.0	179.0	87.7	359.0	228.0	206.0	387.0
FLUORIDE (F)	3.9	1.0	1.2	0.7	<0.1	1.2	0.3
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	3.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	25.3	2.7	2.0	5.6	<0.1	2.6	4.5
	,J	,J	,J	,J	,J	,J	,J
PHOSPHORUS (P) TOT	2.1	<0.5	<0.5	0.288	165.0	<0.5	0.652
	,J	,J	,J	B,J	,J	,J	,J
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS					<0.1		
ARSENIC (AS) TOT	0.0603	<0.1	<0.1	0.0198	0.0719	<0.1	0.0261
	B			B	B		B
CADMIUM (CD) DIS					<0.005		
CADMIUM (CD) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SELENIUM (SE) DIS					<0.05		
SELENIUM (SE) TOT	<0.05	<0.05	<0.05	<0.05	0.0052	<0.05	0.0085
					B		B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: PMC-RCRA Groundwater

SITE CODE	WELL-171	WELL-172	WELL-176	WELL-177	WELL-178	WELL-180
SAMPLE DATE	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008
SAMPLE TIME	11:10	10:35	07:35	08:10	09:10	10:00
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN4EM	KN4HL	KN4FG	KN4HA	KN4HF	KN4HJ
SAMPLE NUMBER	805171	805172	805176	805177	805178A	805180
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)	56.87	54.88	47.37	48.8	54.54	56.96
OXIDATION REDUCTION POTENTIAL	22.2	16.1	115.4	83.3	67.7	29.4
OXYGEN (O) (FLD) DIS	5.71	3.22	3.71	4.19	3.07	2.52
PH (FLD)	7.46	7.37	7.27	7.42	7.17	7.39
SC (UMHOS/CM AT 25 C) (FLD)	1254.0	1242.0	1085.0	1144.0	4003.0	1771.0
TURBIDITY (NTU) (FLD)	0.2	0.1	0.2	0.4	0.5	0.3
WATER TEMPERATURE (C) (FLD)	13.2	12.5	17.5	17.3	15.4	13.2
-- MAJOR CONSTITUENTS --						
POTASSIUM (K) TOT	21.0	22.2	11.7	11.4	22.0	28.2
	,J	,J	,J	,J	,J	,J
SULFATE (SO4)	96.0	84.0	66.4	68.9	560.0	174.0
CHLORIDE (CL)	212.0	160.0	160.0	182.0	897.0	157.0
FLUORIDE (F)	0.8	0.5	0.9	0.9	0.9	0.6
-- NUTRIENTS --						
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	4.5	9.7	4.5	3.8	4.9	29.6
	,J	,J	,J	,J	,J	,J
PHOSPHORUS (P) TOT	<0.5	0.449	<0.5	<0.5	0.222	1.06
	,J	B,J	,J	,J	B,J	,J
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	0.0267	0.0323	<0.1	<0.1	<0.1	0.0453
	B	B				B
CADMIUM (CD) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SELENIUM (SE) TOT	<0.05	<0.05	0.0056	0.0065	0.0095	0.0121
			B	B	B	B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: FMC-RCRA Groundwater QC

SITE CODE	RINS BLANK
SAMPLE DATE	05/29/2008
SAMPLE TIME	09:35
LAB	TESTAMERIC
LAB NUMBER	KN4HH
REMARKS	BLANK
SAMPLE NUMBER	805703
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	<1.0
SULFATE (SO4)	0.2
	B
CHLORIDE (CL)	0.4
	B
FLUORIDE (F)	<0.1
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	<0.1
PHOSPHORUS (P) TOT	<0.5
-- METALS & MINOR CONSTITUENTS --	
ARSENIC (AS) TOT	<0.1
CADMIUM (CD) TOT	<0.005
SELENIUM (SE) TOT	<0.05

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

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+---------- SAMPLE NUMBER ORDER ----------+

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1	805124	KN4HO	05/29/2008	WELL-124
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1	805128	KN4HV	05/29/2008	WELL-128
1	805131	KN4HR	05/29/2008	WELL-131
1	805154	KN4HE	05/29/2008	WELL-154
1	805165	KN4HP	05/29/2008	WELL-165
2	805171	KN4HM	05/29/2008	WELL-171
2	805172	KN4HL	05/29/2008	WELL-172
2	805176	KN4FG	05/29/2008	WELL-176
2	805177	KN4HA	05/29/2008	WELL-177
2	805178A	KN4HF	05/29/2008	WELL-178
2	805180	KN4HJ	05/29/2008	WELL-180
3	805703	KN4HH	05/29/2008	RINS BLANK

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
2	KN4FG	805176	05/29/2008	WELL-176
2	KN4HA	805177	05/29/2008	WELL-177
1	KN4HE	805154	05/29/2008	WELL-154
2	KN4HF	805178A	05/29/2008	WELL-178
3	KN4HH	805703	05/29/2008	RINS BLANK
2	KN4HJ	805180	05/29/2008	WELL-180
2	KN4HL	805172	05/29/2008	WELL-172
2	KN4HM	805171	05/29/2008	WELL-171
1	KN4HO	805124	05/29/2008	WELL-124
1	KN4HP	805165	05/29/2008	WELL-165
1	KN4HQ	805104	05/29/2008	WELL-104
1	KN4HR	805131	05/29/2008	WELL-131
1	KN4HV	805128	05/29/2008	WELL-128
1	KN4HX	805126	05/29/2008	WELL-126

SAMPLE ID CODES

SAMPLE SUMMARY

RCRAQ28B : A8E300124

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN4FG	001	805176	05/29/08	07:35
KN4HA	002	805177	05/29/08	08:10
KN4HE	003	805154	05/29/08	08:40
KN4HF	004	805178 A,B,C	05/29/08	09:10
KN4HH	005	805703	05/29/08	09:35
KN4HJ	006	805180	05/29/08	10:00
KN4HL	007	805172	05/29/08	10:35
KN4HM	008	805171	05/29/08	11:10
KN4HP	009	805165	05/29/08	12:10
KN4HQ	010	805104	05/29/08	12:45
KN4HR	011	805131	05/29/08	13:40
KN4HV	012	805128	05/29/08	14:15
KN4HX	013	805126	05/29/08	14:45
KN4H0	014	805124	05/29/08	15:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRAQ28B

The following report contains the analytical results for twenty-one water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello, ID Site. The samples were received May 30, 2008 and May 31, 2008, according to documented sample acceptance procedures.

This SDG consists of (2) laboratory ID's: A8E300124, and A8E310182.

The Fluoride analysis was subcontracted to Lancaster Laboratories, Inc. A copy of their report has been provided.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 10, 2008, and June 11, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 2.8, 1.0, and 1.2°C.

See TestAmerica's Cooler Receipt Form for additional information.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805178 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for 805178 A,B,C had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

Analyst added concentrated effluent into instrument for Nitrate; due to this error, sample(s) 805168, 805148, 805113, 805166, 805114, and 805603 were unable to be analyzed properly and within the required hold time. Samples were reprepped and reanalyzed outside of hold and results were reported as is.

The matrix spike/matrix spike duplicate data for batch(es) 8156349 are not included in this report for Nitrate. The batch QC samples, which document the effect of a specific sample matrix on method performance, were not associated with a sample reported in this lot. The data, therefore, has no bearing on the samples reported herein. In order to document compliance with the QC requirement for an MS/MSD per 20 environmental samples, a summary of sample/QC associations has been provided following this case narrative.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the reprepparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

RCRA SDG-2

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/29/08	Chain of Custody Number: 376064
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 2
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello, ID	Carrier/Waybill Number: FedEx Airbill # 8605 0511 7906		
Contract/Purchase Order/Quote No.: RCRA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis (Attach list if more space is needed): WQP UF/Raw	Ammonia UF/H2SO4	Special Instructions/ Conditions of Receipt
805176	5/29/08	0735		X			L						L		see comments
805177		0810													
805154		0840													
805178A		0910													
805178B		0910													
805178C		0910													
805703		0935													
805180		1000													

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

1. Relinquished By: Walter Crane	Date: 5/29/08	Time: 16:00	1. Received By: Alana Mangun	Date: 5/30/08	Time: 0930
2. Relinquished By	Date	Time	2. Received By	Date	Time: 245
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Regular/Routine RCRA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

RCRA SDG-2

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/29/08	Chain of Custody Number: 376065
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number:	Page 2 of 2
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: FedEx Airbill # 8605 0511 7906		
Contract/Purchase Order/Quote No.: RCRA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): WBP VF Raw	Ammonia VF/H2SO4	Special Instructions/ Conditions of Receipt
805172	5/29/08	1035		X				L	500						L	500	see comments
805171		1110															
805165		1210															
805104		1245															
805131		1340															
805128		1415															
805~~131~~ 126		1445															
805124		1540															

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Walter Crane	5/29/08	16:00	1. Received By: Alana Mangum	5/30/08	0930
2. Relinquished By			2. Received By		945
3. Relinquished By			3. Received By		

Comments: RCRA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

20

th Canton

TestAmerica Cooler Receipt Form/Narrative Lot Number: 180338024
North Canton Facility

Client RMC Project _____ By: Deana Mangan (Signature)
Cooler Received on 5/30/08 Opened on 5/30/08
FedEx ☐ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # _____ Multiple Coolers ☐ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☒ No ☐ Intact? Yes ☒ No ☐ NA ☐
   If YES, Quantity 3
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☒ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☒ No ☐
   If YES, are there any exceptions? No
2. Shippers' packing slip attached to the cooler(s)? Yes ☒ No ☐
3. Did custody papers accompany the sample(s)? Yes ☒ No ☐ Relinquished by client? Yes ☒ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☒ No ☐
5. Packing material used: Bubble Wrap ☒ Foam ☐ None ☐ Other Air Bags
6. Cooler temperature upon receipt _____ °C See back of form for multiple coolers/temps ☒
   METHOD: IR ☒ Other ☐ _____
   COOLANT: Wet Ice ☒ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☒ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☒ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☒ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☒ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☒
12. Sufficient quantity received to perform indicated analyses? Yes ☒ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☒ Were VOAs on the COC? Yes ☐ No ☒

Contacted PM _____ Date _____ by _____ via Verbal ☐ Voice Mail ☐ Other ☐
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
176	<2	5/30/08	DM
177	<2		
154	<2		
178	<2		
703	<2		
180	<2		
172	<2		
171	<2		

SOP: NC-SC-0005, Sample Receiving
N:\QAQC\NARRATIV\TestAmerica\Cooler Receipt TestAmerica\COOLER_TestAmerica_Rev 66 033108.doc

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials
165	< 2	5/30/08	AM
164	< 2		
131	< 2		
128	< 2		
126	< 2		
124	< 2		

Cooler #	Temp. °C	Method	Coolant
Ch. Ctr #1	2.8	IR	wet ice
L244	1.6		

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRAQ28B

LOT A8E310182

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	WELL-113	WELL-113	FMC-RCRA Groundwater	4467.93	
1	WELL-114	WELL-114	FMC-RCRA Groundwater	4470.60	
1	WELL-115	WELL-115	FMC-RCRA Groundwater	4469.73	
1	WELL-148	WELL-148	FMC-RCRA Groundwater	4446.45	
1	WELL-166	WELL-166	FMC-RCRA Groundwater	4469.77	
1	WELL-168	WELL-168	FMC-RCRA Groundwater	4473.94	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-113	WELL-114	WELL-115	WELL-148	WELL-166	WELL-168	WELL-168
SAMPLE DATE	05/30/2008	05/30/2008	05/30/2008	05/29/2008	05/30/2008	05/29/2008	05/30/2008
SAMPLE TIME	07:25	09:45	08:50	18:10	08:10	17:35	17:55
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN8WH	KN8WL	KN8WK	KN8WF	KN8WJ	KN8WE	KN9RG
REMARKS							DUPLICATE
SAMPLE NUMBER	805113	805114	805115	805148	805166	805168	805603
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	72.76	75.38	74.69	51.08	74.81	78.78	
OXIDATION REDUCTION POTENTIAL	-30.6	-5.8	1.4	43.9	-18.2	156.4	
OXYGEN (O) (FLD) DIS	1.15	0.2	0.19	3.31	0.23	0.61	
PH (FLD)	7.03	7.02	7.07	7.51	6.94	7.3	
SC (UMHOS/CM AT 25 C) (FLD)	1257.0	1708.0	2342.0	1149.0	2115.0	1959.0	
TURBIDITY (NTU) (FLD)	3.1	0.7	0.7	0.3	0.7	0.8	
WATER TEMPERATURE (C) (FLD)	12.1	11.3	11.6	15.9	11.8	13.1	
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	16.8	16.4	8.85	10.6	23.7	10.6	9.47
	NE,J	NE,J	NE,J	NE,J	NE,J	NE,J	NE,J
SULFATE (SO4)	96.4	111.0	184.0	84.4	161.0	557.0	568.0
CHLORIDE (CL)	135.0	141.0	148.0	169.0	236.0	86.7	88.2
FLUORIDE (F)	0.5	0.5	0.3	0.8	0.7	5.0	5.1
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	1.4	<0.2	<0.2	<0.2	0.3	0.4
NITRATE (NO3-N)	9.5	<0.1	25.7	3.0	19.4	14.7	14.9
	,J	,J	,J	,J	,J	,J	,J
PHOSPHORUS (P) TOT	0.353	7.95	2.9	<0.5	0.57	<0.5	<0.5
	BNE,J	NE,J	NE,J	NE,J	NE,J	NE,J	NE,J
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT							<0.05
ARSENIC (AS) TOT	0.0211	0.116	0.242	<0.1	<0.1	0.0202	0.0306
	B					B	B
BORON (B) TOT							1.91
CADMIUM (CD) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MANGANESE (MN) TOT							0.152
							B
SELENIUM (SE) TOT	<0.05	<0.05	<0.05	<0.05	0.005	0.0335	0.0251
					B	B	B
VANADIUM (V) TOT							0.033
							B
-- OTHER PARAMETERS --							
TOTAL URANIUM							0.003
							B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

PMCWC1 - PMC - ALL DATA ANALYSES SUMMARY REPORT

INDEX

+---------- SAMPLE NUMBER ORDER ----------+

Page	Sample Number	Lab ##	Date	Site Code
1	805113	KN8WH	05/30/2008	WELL-113
1	805114	KN8WL	05/30/2008	WELL-114
1	805115	KN8WK	05/30/2008	WELL-115
1	805148	KN8WF	05/29/2008	WELL-148
1	805166	KN8WJ	05/30/2008	WELL-166
1	805168	KN8WE	05/29/2008	WELL-168
1	805603	KN9RG	05/30/2008	WELL-168

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
1	KN8WE	805168	05/29/2008	WELL-168
1	KN8WF	805148	05/29/2008	WELL-148
1	KN8WH	805113	05/30/2008	WELL-113
1	KN8WJ	805166	05/30/2008	WELL-166
1	KN8WK	805115	05/30/2008	WELL-115
1	KN8WL	805114	05/30/2008	WELL-114
1	KN9RG	805603	05/30/2008	WELL-168

SAMPLE ID CODES

SAMPLE SUMMARY

RCRAQ28B : A8E310182

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN67G	001	805168	05/29/08	17:35
KN67T	002	805148	05/29/08	18:10
KN67V	003	805113	05/30/08	07:25
KN67W	004	805166	05/30/08	08:10
KN67X	005	805115	05/30/08	08:50
KN670	006	805114	05/30/08	09:45
KN671	007	805603	05/29/08	17:55

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LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRAQ28B

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This SDG consists of (2) laboratory ID's: A8E300124, and A8E310182.

The Fluoride analysis was subcontracted to Lancaster Laboratories, Inc. A copy of their report has been provided.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 10, 2008, and June 11, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 2.8, 1.0, and 1.2°C.

See TestAmerica's Cooler Receipt Form for additional information.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805178 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for 805178 A,B,C had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

Analyst added concentrated effluent into instrument for Nitrate; due to this error, sample(s) 805168, 805148, 805113, 805166, 805114, and 805603 were unable to be analyzed properly and within the required hold time. Samples were reprepped and reanalyzed outside of hold and results were reported as is.

The matrix spike/matrix spike duplicate data for batch(es) 8156349 are not included in this report for Nitrate. The batch QC samples, which document the effect of a specific sample matrix on method performance, were not associated with a sample reported in this lot. The data, therefore, has no bearing on the samples reported herein. In order to document compliance with the QC requirement for an MS/MSD per 20 environmental samples, a summary of sample/QC associations has been provided following this case narrative.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

RCRA SDG-2

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/30/08	Chain of Custody Number: 376067
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello, ID	Carrier/Waybill Number: Fed Ex Airbill # 8605 0511 7917		
Contract/Purchase Order/Quote No.: RCRA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	WQP UF Raw	Ammonia UF H2SO4	Bal FL UF Raw	Special Instructions/ Conditions of Receipt
805168	5/29/08	1735		X			L	500					L	500		see comments
805148	↓	1810		↓			↓	↓					↓	↓		
805113	5/30/08	0725		↓			↓	↓					↓	↓		
805166	↓	0810		↓			↓	↓					↓	↓		
805115	↓	0850		↓			↓	↓					↓	↓		
805114	↓	0945		↓			↓	↓					↓	↓	500	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

1. Relinquished By: Walter Crane	Date: 5/30/08	Time: 10:30	1. Received By: M a Jerome	TEST AMERICA	Date: 31 May 08	Time: 9:15
2. Relinquished By	Date	Time	2. Received By		Date	Time
3. Relinquished By	Date	Time	3. Received By		Date	Time

Comments: Routine RCRA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

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North Canton

TestAmerica Cooler Receipt Form/Narrative **Lot Number:** A8E310183
North Canton Facility

Client FMC Project RCRA By: [signature] (Signature)
Cooler Received on 31 May 2008 Opened on 31 May 2008
FedEx ☒ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other ☐
TestAmerica Cooler # L 580 Multiple Coolers ☐ Foam Box ☐ Client Cooler ☐ Other ☐

1. Were custody seals on the outside of the cooler(s)? Yes ☒ No ☐ Intact? Yes ☒ No ☐ NA ☐
   If YES, Quantity 2
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☒ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☒ No ☐
   If YES, are there any exceptions? EACH BOTTLE SEALED
2. Shippers' packing slip attached to the cooler(s)? Yes ☒ No ☐
3. Did custody papers accompany the sample(s)? Yes ☒ No ☐ Relinquished by client? Yes ☒ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☒ No ☐
5. Packing material used: Bubble Wrap ☐ Foam ☐ None ☐ Other BAG ICE
6. Cooler temperature upon receipt 1.2 °C See back of form for multiple coolers/temps ☐
   METHOD: IR ☒ Other ☐
   COOLANT: Wet Ice ☒ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☒ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☐ No ☒
9. Were sample(s) at the correct pH upon receipt? Yes ☒ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☒ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☒
12. Sufficient quantity received to perform indicated analyses? Yes ☒ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☒ Were VOAs on the COC? Yes ☐ No ☒

Contacted PM MJL Date 5/31/08 by JB via Verbal ☐ Voice Mail ☒ Other ☐
Concerning #14

14. CHAIN OF CUSTODY

The following discrepancies occurred:
RECEIVED 1xL AND 1x 500mL FOR 805603 ON 5/29/08 @1755, NOT ON COC - logged per bottles received.

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
168	<2	31 May 08	MJF
148	<2		
113	<2		
166	<2		
115	<2		
114	<2		
1003	<2		

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler #	Temp. °C	Method	Coolant

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRASTQ28A

LOT A8E220216

ANALYTICAL SUMMARY REPORT

TECHNICAL REVIEW ACTION SUMMARY
SDG RCRASTQ28A

Antimony	J1, U1	Arsenic	J1
Boron	J1, J2	Cadmium	J1, U1
Manganese	J1, J3	Mercury	
Phosphorus	J1, J3	Potassium	J3
Selenium	J1	Uranium	J1
Vanadium	J1, J3		

J1 - Positive result is flagged as estimated (J) due to uncertainty at the low levels.

J2 - Positive result is flagged as estimated high (J+) due to non-compliant MS/MSD recoveries.

J3 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

U1 - Positive result is flagged as not-detected (U) due to blank contamination.

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	BATISTE SPRING	BATISTE SPRING	FMC-RCRA Groundwater		
5	D.I.BLANK	D.I.BLANK	FMC-RCRA Groundwater QC		
5	POUR BLANK	POUR BLANK	FMC-RCRA Groundwater QC		
5	RINS BLANK	RINS BLANK RCRA	FMC-RCRA Groundwater QC		
1	WELL-108	WELL-108	FMC-RCRA Groundwater	4482.40	
1	WELL-121	WELL-121	FMC-RCRA Groundwater	4485.58	
1	WELL-122	WELL-122	FMC-RCRA Groundwater	4475.92	
1	WELL-123	WELL-123	FMC-RCRA Groundwater	4484.12	
1	WELL-155	WELL-155	FMC-RCRA Groundwater	4491.21	
3	WELL-156	WELL-156	FMC-RCRA Groundwater	4494.57	
3	WELL-157	WELL-157	FMC-RCRA Groundwater	4502.30	
3	WELL-158	WELL-158	FMC-RCRA Groundwater	4496.36	
3	WELL-183	WELL-183	FMC-RCRA Groundwater	4497.33	

Sample Type: FMC-RCRA Groundwater

SITE CODE	BATISTE SPRIN	WELL-108	WELL-108	WELL-121	WELL-122	WELL-123	WELL-155
SAMPLE DATE	05/21/2008	05/21/2008	05/21/2008	05/20/2008	05/22/2008	05/21/2008	05/21/2008
SAMPLE TIME	10:30	09:15	09:40	19:05	13:10	07:50	13:15
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK5	KNNK0	KNNK3	KNNKW	KNQ19	KNNKX	KNNLE
REMARKS			DUPLICATE		RESAMPLE		
SAMPLE NUMBER	805BTS	805108	805600	805121	805122	805123A	805155
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)		90.55		92.36	83.78	92.15	95.94
OXIDATION REDUCTION POTENTIAL	-37.8	-8.9		-67.4	17.3	82.5	-55.7
FLOW (cfs)	1.25						
OXYGEN (O) (FLD) DIS	1.4	4.18		3.21	0.27	0.3	0.21
PH (FLD)	6.76	7.07		6.89	6.92	6.67	7.22
SC (UMHOS/CM AT 25 C) (FLD)	1004.0	2182.0		3593.0	2653.0	3247.0	3153.0
TURBIDITY (NTU) (FLD)	0.3	0.4		0.4	0.4	0.4	0.5
WATER TEMPERATURE (C) (FLD)	13.2	19.1		16.8	17.6	18.1	14.6
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	11.7	156.0	138.0	81.5	181.0	19.9	494.0
	,J					,J	
SULFATE (SO4)	171.0	242.0	242.0	256.0	323.0	383.0	260.0
						NC M	
CHLORIDE (CL)	51.4	354.0	354.0	406.0	367.0	189.0	222.0
FLUORIDE (F)	0.4	1.0	1.0	0.6	0.2	1.2	<0.1
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	1.4	<0.2	<0.2	<0.2	<0.2	3.6	<0.2
NITRATE (NO3-N)	7.1	17.2	17.2	26.3	25.1	7.9	5.7
ELEMENTAL PHOSPHORUS (P4)	<0.00005	0.03	0.0307	<0.00005	0.00101	<0.00005	<0.00005
PHOSPHORUS (P) TOT	17.6	1.03	1.39	0.735	9.17	0.823	43.0
	,J	N,J		N	N,J	,J	
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT	0.00036	<0.005	<0.05		0.0028	<0.005	
	,U				BN,U		
ARSENIC (AS) TOT	0.0246	0.0186	<0.1	<0.1	0.0635	0.244	0.201
				N			
BORON (B) TOT	0.2	0.343	0.284		1.03	0.744	
		BN			N	N	
CADMIUM (CD) TOT	0.00038	<0.0005	<0.005		0.00016	0.00012	
	,U				BN,U	B,U	
MANGANESE (MN) TOT	0.0492	0.487	0.725		1.01	0.122	
	,J	E,J	N		,J	N,J	
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	
SELENIUM (SE) TOT	0.0042	0.0087	0.011	0.0126	0.0083	0.141	0.0053
				BN	BN		
VANADIUM (V) TOT	0.005	0.0049	<0.1		0.0116	0.182	
	,J	BE,J			,J	E,J	
-- OTHER PARAMETERS --							
GROSS ALPHA (PCI/L)	-0.6	-1.3	5.2		3.2	5.4	
	,U	,U	,U		,U	,U	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	BATISTE SPRIN	WELL-108	WELL-108	WELL-121	WELL-122	WELL-123	WELL-155
SAMPLE DATE	05/21/2008	05/21/2008	05/21/2008	05/20/2008	05/22/2008	05/21/2008	05/21/2008
SAMPLE TIME	10:30	09:15	09:40	19:05	13:10	07:50	13:15
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK5	KNNK0	KNNK3	KNNKW	KNQ19	KNNKX	KNNLE
REMARKS			DUPLICATE		RESAMPLE		
SAMPLE NUMBER	805BTS	805108	805600	805121	805122	805123A	805155
-- OTHER PARAMETERS --							
RADIUM 226 (PCI/L)	0.15	0.22	0.28		0.33	0.008	
	,U	,M,U	,U			,U	
RADIUM 228 (PCI/L)	0.22	0.42	0.72		0.5	-0.04	
	,U		,U		,U	,U	
TOTAL URANIUM	0.00081	0.00049	<0.01		<0.001	0.00089	
		B				B	
CYANIDE (CN) TOT	<0.01	0.019	0.014		0.031	<0.01	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-156	WELL-157	WELL-158	WELL-183
SAMPLE DATE	05/21/2008	05/21/2008	05/20/2008	05/20/2008
SAMPLE TIME	11:40	13:55	18:25	17:45
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK8	KNNLG	KNNKQ	KNNKG
SAMPLE NUMBER	805156	805157	805158	805183
-- PHYSICAL PARAMETERS --				
DEPTH TO WATER LEVEL (FEET)	99.22	107.18	100.05	100.69
OXIDATION REDUCTION POTENTIAL	-124.1	-138.4	-63.6	-66.9
OXYGEN (O) (FLD) DIS	0.27	0.24	4.19	4.6
PH (FLD)	7.04	6.79	6.84	7.31
SC (UMHOS/CM AT 25 C) (FLD)	6096.0	3460.0	2169.0	1542.0
TURBIDITY (NTU) (FLD)	1.0	0.4	0.3	0.6
WATER TEMPERATURE (C) (FLD)	15.6	16.1	16.6	16.7
-- MAJOR CONSTITUENTS --				
POTASSIUM (K) TOT	888.0	370.0	17.7	9.4
				E,J
SULFATE (SO4)	212.0	238.0	284.0	98.9
CHLORIDE (CL)	357.0	278.0	82.9	154.0
FLUORIDE (F)	<0.1	0.5	0.4	0.5
-- NUTRIENTS --				
TOTAL AMMONIA (NH3+NH4 AS N)	14.0	3.1	<0.2	<0.2
NITRATE (NO3-N)	<0.1	<0.1	1.6	1.6
ELEMENTAL PHOSPHORUS (P4)	0.0000946	<0.00005	<0.00005	<0.00005
PHOSPHORUS (P) TOT	464.0	284.0	<0.5	0.0365
			N	B,J
-- METALS & MINOR CONSTITUENTS --				
ANTIMONY (SB) TOT	0.001			<0.005
	,U			
ARSENIC (AS) TOT	0.163	0.177	<0.1	0.0144
			N	
BORON (B) TOT	6.24			<0.5
				N
CADMIUM (CD) TOT	0.00023			<0.0005
	,U			
MANGANESE (MN) TOT	1.24			<0.002
	,J			E,J
MERCURY (HG) TOT	<0.0002			<0.0002
SELENIUM (SE) TOT	0.003	<0.05	<0.05	0.0073
			N	
VANADIUM (V) TOT	<0.01			0.0042
	,J			BE,J
-- OTHER PARAMETERS --				
GROSS ALPHA (PCI/L)	0.8			5.2
	,U			
RADIUM 226 (PCI/L)	0.42			0.008
				,U,Y

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-156	WELL-157	WELL-158	WELL-183
SAMPLE DATE	05/21/2008	05/21/2008	05/20/2008	05/20/2008
SAMPLE TIME	11:40	13:55	18:25	17:45
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNK8	KNNLG	KNNKQ	KNNKG
SAMPLE NUMBER	805156	805157	805158	805183
-- OTHER PARAMETERS --				
RADIUM 228 (PCI/L)	0.61			0.34
	,U			,U,Y
TOTAL URANIUM	<0.001			0.0056
CYANIDS (CN) TOT	0.063			<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater QC

SITE CODE	D.I.BLANK	POUR BLANK	RINS BLANK
SAMPLE DATE	05/21/2008	05/21/2008	05/21/2008
SAMPLE TIME	12:10	12:00	11:15
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNNLD	KNNLA	KNNK7
REMARKS	BLANK	BLANK	BLANK
SAMPLE NUMBER	805CDI	805PB1	805700
-- MAJOR CONSTITUENTS --			
POTASSIUM (K) TOT	<0.1	<0.1	2.92
SULFATE (SO4)	<1.0	<1.0	0.3
			B
CHLORIDE (CL)	0.2	0.2	0.4
	B	B	B
FLUORIDE (F)	<0.1	<0.1	<0.1
-- NUTRIENTS --			
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2
NITRATE (NO3-N)	<0.1	<0.1	<0.1
ELEMENTAL PHOSPHORUS (P4)	<0.00005	<0.00005	<0.00005
PHOSPHORUS (P) TOT	<0.05	<0.05	0.234
-- METALS & MINOR CONSTITUENTS --			
ANTIMONY (SB) TOT	0.00073	0.0013	<0.05
ARSENIC (AS) TOT	<0.01	<0.01	<0.1
BORON (B) TOT	0.0867	0.0876	<0.5
CADMIUM (CD) TOT	0.000054	0.000054	0.00052
MANGANESE (MN) TOT	<0.002	<0.002	0.0256
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	<0.005	<0.005	<0.05
VANADIUM (V) TOT	<0.1	<0.1	<0.1
-- OTHER PARAMETERS --			
GROSS ALPHA (PCI/L)	0.1	-0.05	0.25
	,U	,U	,U
RADIUM 226 (PCI/L)	-0.032	-0.19	0.006
	,U,Y	,M,U,Y	,U
RADIUM 228 (PCI/L)	-0.14	0.19	-0.13
	,U,Y	,U,Y	,U
TOTAL URANIUM	<0.001	<0.001	<0.01
CYANIDE (CN) TOT	<0.01	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

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1	805122	KNQ19	05/22/2008	WELL-122
1	805123A	KNNKX	05/21/2008	WELL-123
1	805155	KNNLE	05/21/2008	WELL-155
3	805156	KNNK8	05/21/2008	WELL-156
3	805157	KNNLG	05/21/2008	WELL-157
3	805158	KNNKQ	05/20/2008	WELL-158
3	805183	KNNKG	05/20/2008	WELL-183
1	805600	KNNK3	05/21/2008	WELL-108
5	805700	KNNK7	05/21/2008	RINS BLANK
1	805BTS	KNNK5	05/21/2008	BATISTE SPRING
5	805CDI	KNNLD	05/21/2008	D.I.BLANK
5	805PB1	KNNLA	05/21/2008	POUR BLANK

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
1	KNNKO	805108	05/21/2008	WELL-108
1	KNNK3	805600	05/21/2008	WELL-108
1	KNNK5	805BTS	05/21/2008	BATISTE SPRING
5	KNNK7	805700	05/21/2008	RINS BLANK
3	KNNK8	805156	05/21/2008	WELL-156
3	KNNKG	805183	05/20/2008	WELL-183
3	KNNKQ	805158	05/20/2008	WELL-158
1	KNNKW	805121	05/20/2008	WELL-121
1	KNNKX	805123A	05/21/2008	WELL-123
5	KNNLA	805PB1	05/21/2008	POUR BLANK
5	KNNLD	805CDI	05/21/2008	D.I.BLANK
1	KNNLE	805155	05/21/2008	WELL-155
3	KNNLG	805157	05/21/2008	WELL-157
1	KNQ19	805122	05/22/2008	WELL-122

SAMPLE ID CODES

SAMPLE SUMMARY

RCRASTQ28A : A8E220216

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNN9A	001	805183	05/20/08	17:45
KNN9N	002	805158	05/20/08	18:25
KNN9T	003	805121	05/20/08	19:05
KNN9V	004	805123 A,B,C	05/21/08	07:50
KNN90	005	805108	05/21/08	09:15
KNN91	006	805600	05/21/08	09:40
KNN92	007	805122	05/21/08	10:00
KNN95	008	805BTS	05/21/08	10:30
KNN96	009	805700	05/21/08	11:15
KNN97	010	805156	05/21/08	11:40
KNN99	011	805PB1	05/21/08	12:00
KNPAA	012	805CDI	05/21/08	12:10
KNPAD	013	805155	05/21/08	13:15
KNPAG	014	805157	05/21/08	13:55

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRASTQ28A

The following report contains the analytical results for twenty-one water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 22, 2008 and May 23, 2008, according to documented sample acceptance procedures.

This SDG consists of (2) laboratory ID's: A8E220216 and A8E230284.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson, Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The matrix spike/matrix spike duplicate(s) for 805183, 805158, 805121, 805123 A,B,C, 805108, 805600, 805122, 805BTS, 805700, 805156, 805PB1, 805CDI, 805155, 805157, 805173, 805174, 805175, 805147, 805149, and 805127 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8150141 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRASTQ28A

LOT A8E230284

ANALYTICAL SUMMARY REPORT

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Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
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1	WELL-147	WELL-147	FMC-RCRA Groundwater	4443.69	
1	WELL-149	WELL-149	FMC-RCRA Groundwater	4447.25	
1	WELL-167	WELL-167	FMC-RCRA Groundwater	4492.17	
1	WELL-173	WELL-173	FMC-RCRA Groundwater	4452.76	
1	WELL-174	WELL-174	FMC-RCRA Groundwater	4447.12	
1	WELL-175	WELL-175	FMC-RCRA Groundwater	4443.59	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-127	WELL-147	WELL-149	WELL-167	WELL-173	WELL-174	WELL-175
SAMPLE DATE	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/21/2008	05/21/2008	05/22/2008
SAMPLE TIME	09:45	08:20	09:10	10:25	17:55	18:35	07:40
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNQ17	KNQ14	KNQ15	KNQ18	KNQ1R	KNQ12	KNQ13
SAMPLE NUMBER	805127	805147	805149	805167	805173	805174	805175
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	63.33	48.16	51.78	95.06	56.59	50.64	47.3
OXIDATION REDUCTION POTENTIAL	41.3	87.1	53.8	24.0	-16.1	-20.6	36.4
OXYGEN (O) (FLD) DIS	3.73	4.68	5.89	0.27	6.65	5.13	5.38
PH (FLD)	7.36	7.4	7.53	7.21	7.59	7.4	7.29
SC (UMHOS/CM AT 25 C) (FLD)	1750.0	1060.0	919.0	1531.0	1165.0	1230.0	1056.0
TURBIDITY (NTU) (FLD)	0.4	0.2	0.3	0.6	0.9	0.5	0.5
WATER TEMPERATURE (C) (FLD)	14.2	16.8	16.0	14.5	16.7	16.7	16.0
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	11.2	9.4	8.84	10.0	10.6	9.52	8.67
	,J	,J	,J	,J	,J	,J	,J
SULFATE (SO4)	193.0	63.8	55.0	139.0	54.0	91.7	62.4
CHLORIDE (CL)	322.0	158.0	126.0	128.0	236.0	211.0	147.0
FLUORIDE (F)	0.8	0.9	1.2	<0.1	1.0	0.9	0.7
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	4.9	3.8	1.7	1.8	3.9	4.3	5.3
PHOSPHORUS (P) TOT	0.125	0.0369	0.0624	7.14	0.032	0.0351	0.0425
					,J		
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
					,U		
ARSENIC (AS) TOT	0.0053	0.0033	0.0067	0.0561	0.0028	<0.01	0.0049
BORON (B) TOT	0.45	<0.5	<0.5	3.23	0.204	<0.5	<0.5
					,J		
CADMIUM (CD) TOT	<0.0005	<0.0005	<0.0005	0.000045	<0.0005	<0.0005	<0.0005
				,U	,U		
MANGANESE (MN) TOT	<0.002	<0.002	<0.002	0.923	0.0015	<0.002	<0.002
					,U		
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	0.0046	0.0034	0.002	0.0027	0.0052	0.0046	0.0032
VANADIUM (V) TOT	0.003	<0.01	<0.01	0.0083	<0.01	<0.01	<0.01
-- OTHER PARAMETERS --							
GROSS ALPHA (PCI/L)	2.1	2.0	1.1	2.0	4.3	5.4	4.8
	,U	,U	,U	,U			
RADIUM 226 (PCI/L)	0.145	0.116	0.049	0.27	0.125	0.24	0.17
	,Y	,U,Y	,U,Y		,U,Y		,Y
RADIUM 228 (PCI/L)	0.42	0.4	0.65	0.95	0.6	1.28	0.25
	,U,Y	,U,Y	,U,Y		,U,Y		,U,Y
TOTAL URANIUM	0.0014	0.0033	0.0021	0.00044	0.0016	0.0035	0.0043
					,J		

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-127	WELL-147	WELL-149	WELL-167	WELL-173	WELL-174	WELL-175
SAMPLE DATE	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/21/2008	05/21/2008	05/22/2008
SAMPLE TIME	09:45	08:20	09:10	10:25	17:55	18:35	07:40
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNQ17	KNQ14	KNQ15	KNQ18	KNQ1R	KNQ12	KNQ13
SAMPLE NUMBER	805127	805147	805149	805167	805173	805174	805175
-- OTHER PARAMETERS --							
CYANIDE (CN) TOT	<0.01	<0.01	<0.01	0.13	<0.01	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

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1	805174	KNQ12	05/21/2008	WELL-174
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LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
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1	KNQ14	805147	05/22/2008	WELL-147
1	KNQ15	805149	05/22/2008	WELL-149
1	KNQ17	805127	05/22/2008	WELL-127
1	KNQ18	805167	05/22/2008	WELL-167
1	KNQ1R	805173	05/21/2008	WELL-173

SAMPLE ID CODES

SAMPLE SUMMARY

RCRASTQ28A : A8E230284

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNTHA	001	805173	05/21/08	17:55
KNTHH	002	805174	05/21/08	18:35
KNTHJ	003	805175	05/22/08	08:40
KNTHK	004	805147	05/22/08	08:20
KNTHM	005	805149	05/22/08	09:10
KNTHN	006	805127	05/22/08	09:45
KNTHR	007	805167	05/22/08	10:25

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
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LABORATORY CASE NARRATIVE

CASE NARRATIVE

RCRASTQ28A

The following report contains the analytical results for twenty-one water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 22, 2008 and May 23, 2008, according to documented sample acceptance procedures.

This SDG consists of (2) laboratory ID's: A8E220216 and A8E230284.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson, Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The matrix spike/matrix spike duplicate(s) for 805183, 805158, 805121, 805123 A,B,C, 805108, 805600, 805122, 805BTS, 805700, 805156, 805PB1, 805CDI, 805155, 805157, 805173, 805174, 805175, 805147, 805149, and 805127 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8150141 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRASTQ28B

LOT A8E300228

ANALYTICAL SUMMARY REPORT

TECHNICAL REVIEW ACTION SUMMARY
SDG RCRASTQ28B

Antimony		Arsenic	J1
Boron	J1	Cadmium	
Manganese	J3	Phosphorus	J1, J3
Potassium	J3	Selenium	J1
Uranium	J1	Vanadium	J1, J2, J4, U1

J1 - Positive result is flagged as estimated (J) due to uncertainty at the low levels.

J2 - Positive result is flagged as estimated high (J+) due to non-compliant calibration verification stability.

J3 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

J4 - Positive result is flagged as estimated high (J+) due to non-compliant LCS recovery.

U1 - Positive result is flagged as not-detected (U) due to blank contamination.

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
3	RINS BLANK	RINS BLANK RCRA	FMC-RCRA Groundwater QC		
1	WELL-104	WELL-104	FMC-RCRA Groundwater	4486.71	
1	WELL-124	WELL-124	FMC-RCRA Groundwater	4448.45	
1	WELL-126	WELL-126	FMC-RCRA Groundwater	4455.97	
1	WELL-128	WELL-128	FMC-RCRA Groundwater	4461.85	
1	WELL-131	WELL-131	FMC-RCRA Groundwater	4485.95	
1	WELL-154	WELL-154	FMC-RCRA Groundwater	4447.05	
1	WELL-165	WELL-165	FMC-RCRA Groundwater	4464.16	
2	WELL-171	WELL-171	FMC-RCRA Groundwater	4452.41	
2	WELL-172	WELL-172	FMC-RCRA Groundwater	4450.57	
2	WELL-176	WELL-176	FMC-RCRA Groundwater	4443.29	
2	WELL-177	WELL-177	FMC-RCRA Groundwater	4444.95	
2	WELL-178	WELL-178	FMC-RCRA Groundwater	4451.14	
2	WELL-180	WELL-180	FMC-RCRA Groundwater	4452.77	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-104	WELL-124	WELL-126	WELL-128	WELL-131	WELL-154	WELL-165
SAMPLE DATE	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008
SAMPLE TIME	12:45	15:40	14:45	14:15	13:40	08:40	12:10
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN4HQ	KN4HO	KN4HX	KN4HV	KN4HR	KN4HE	KN4HP
SAMPLE NUMBER	805104	805124	805126	805128	805131	805154	805165
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	91.13	53.18	61.08	66.98	90.88	51.26	68.64
OXIDATION REDUCTION POTENTIAL	21.5	7.0	-4.3	-5.3	-34.3	68.4	18.1
OXYGEN (O) (FLD) DIS	0.19	4.07	4.65	3.86	0.19	4.85	0.26
PH (FLD)	7.57	7.49	7.66	7.43	7.36	7.47	7.31
SC (UMHOS/CM AT 25 C) (FLD)	2034.0	1152.0	858.0	1809.0	2065.0	1182.0	2026.0
TURBIDITY (NTU) (FLD)	0.3	0.2	0.6	0.2	46.0	0.3	0.2
WATER TEMPERATURE (C) (FLD)	14.7	14.4	16.5	12.5	14.0	16.8	12.5
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) DIS					14.0		
					,J		
POTASSIUM (K) TOT	239.0	12.7	9.03	17.4	14.0	13.3	13.3
	,J	,J	,J	,J		,J	,J
SULFATE (SO4)	144.0	88.7	87.7	137.0	164.0	50.1	237.0
CHLORIDE (CL)	149.0	179.0	87.7	359.0	228.0	206.0	387.0
FLUORIDE (F)	3.9	1.0	1.2	0.7	<0.1	1.2	0.3
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	3.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	25.3	2.7	2.0	5.6	<0.1	2.6	4.5
	,J	,J	,J	,J	,J	,J	,J
PHOSPHORUS (P) TOT	2.1	<0.5	<0.5	0.288	165.0	<0.5	0.652
	,J	,J	,J	B,J	,J	,J	,J
-- METALS & MINOR CONSTITUENTS --							
ARSENIC (AS) DIS					<0.1		
ARSENIC (AS) TOT	0.0603	<0.1	<0.1	0.0198	0.0719	<0.1	0.0261
	B			B	B		B
CADMIUM (CD) DIS					<0.005		
CADMIUM (CD) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SELENIUM (SE) DIS					<0.05		
SELENIUM (SE) TOT	<0.05	<0.05	<0.05	<0.05	0.0052	<0.05	0.0085
					B		B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-171	WELL-172	WELL-176	WELL-177	WELL-178	WELL-180
SAMPLE DATE	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008	05/29/2008
SAMPLE TIME	11:10	10:35	07:35	08:10	09:10	10:00
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN4HM	KN4HL	KN4FG	KN4HA	KN4HF	KN4HJ
SAMPLE NUMBER	805171	805172	805176	805177	805178A	805180
-- PHYSICAL PARAMETERS --						
DEPTH TO WATER LEVEL (FEET)	56.87	54.88	47.37	48.8	54.54	56.96
OXIDATION REDUCTION POTENTIAL	22.2	16.1	115.4	83.3	67.7	29.4
OXYGEN (O) (FLD) DIS	5.71	3.22	3.71	4.19	3.07	2.52
PH (FLD)	7.46	7.37	7.27	7.42	7.17	7.39
SC (UMHOS/CM AT 25 C) (FLD)	1254.0	1242.0	1085.0	1144.0	4003.0	1771.0
TURBIDITY (NTU) (FLD)	0.2	0.1	0.2	0.4	0.5	0.3
WATER TEMPERATURE (C) (FLD)	13.2	12.5	17.5	17.3	15.4	13.2
-- MAJOR CONSTITUENTS --						
POTASSIUM (K) TOT	21.0	22.2	11.7	11.4	22.0	28.2
	,J	,J	,J	,J	,J	,J
SULFATE (SO4)	96.0	84.0	66.4	68.9	560.0	174.0
CHLORIDE (CL)	212.0	160.0	160.0	182.0	897.0	157.0
FLUORIDE (F)	0.8	0.5	0.9	0.9	0.9	0.6
-- NUTRIENTS --						
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	4.5	9.7	4.5	3.8	4.9	29.6
	,J	,J	,J	,J	,J	,J
PHOSPHORUS (P) TOT	<0.5	0.449	<0.5	<0.5	0.222	1.06
	,J	B,J	,J	,J	B,J	,J
-- METALS & MINOR CONSTITUENTS --						
ARSENIC (AS) TOT	0.0267	0.0323	<0.1	<0.1	<0.1	0.0453
	B	B				B
CADMIUM (CD) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
SELENIUM (SE) TOT	<0.05	<0.05	0.0056	0.0065	0.0095	0.0121
			B	B	B	B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-RCRA Groundwater QC

SITE CODE	RINS BLANK
SAMPLE DATE	05/29/2008
SAMPLE TIME	09:35
LAB	TESTAMERIC
LAB NUMBER	KN4HH
REMARKS	BLANK
SAMPLE NUMBER	805703
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	<1.0
SULFATE (SO4)	0.2
	B
CHLORIDE (CL)	0.4
	B
FLUORIDE (F)	<0.1
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	<0.1
PHOSPHORUS (P) TOT	<0.5
-- METALS & MINOR CONSTITUENTS --	
ARSENIC (AS) TOT	<0.1
CADMIUM (CD) TOT	<0.005
SELENIUM (SE) TOT	<0.05

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
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FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

INDEX

+---------- SAMPLE NUMBER ORDER ----------+

Page	Sample Number	Lab ##	Date	Site Code
1	805104	KN4HQ	05/29/2008	WELL-104
1	805124	KN4HO	05/29/2008	WELL-124
1	805126	KN4HX	05/29/2008	WELL-126
1	805128	KN4HV	05/29/2008	WELL-128
1	805131	KN4HR	05/29/2008	WELL-131
1	805154	KN4HE	05/29/2008	WELL-154
1	805165	KN4HP	05/29/2008	WELL-165
2	805171	KN4HM	05/29/2008	WELL-171
2	805172	KN4HL	05/29/2008	WELL-172
2	805176	KN4FG	05/29/2008	WELL-176
2	805177	KN4HA	05/29/2008	WELL-177
2	805178A	KN4HF	05/29/2008	WELL-178
2	805180	KN4HJ	05/29/2008	WELL-180
3	805703	KN4HH	05/29/2008	RINS BLANK

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
2	KN4FG	805176	05/29/2008	WELL-176
2	KN4HA	805177	05/29/2008	WELL-177
1	KN4HE	805154	05/29/2008	WELL-154
2	KN4HF	805178A	05/29/2008	WELL-178
3	KN4HH	805703	05/29/2008	RINS BLANK
2	KN4HJ	805180	05/29/2008	WELL-180
2	KN4HL	805172	05/29/2008	WELL-172
2	KN4HM	805171	05/29/2008	WELL-171
1	KN4HO	805124	05/29/2008	WELL-124
1	KN4HP	805165	05/29/2008	WELL-165
1	KN4HQ	805104	05/29/2008	WELL-104
1	KN4HR	805131	05/29/2008	WELL-131
1	KN4HV	805128	05/29/2008	WELL-128
1	KN4HX	805126	05/29/2008	WELL-126

SAMPLE ID CODES

SAMPLE SUMMARY

RCRASTQ28B : A8E300228

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN5J9	001	805176	05/29/08	07:35
KN5KG	002	805177	05/29/08	08:10
KN5KH	003	805154	05/29/08	08:40
KN5KJ	004	805178 A,B,C	05/29/08	09:10
KN5KK	005	805703	05/29/08	09:35
KN5KL	006	805180	05/29/08	10:00
KN5KM	007	805172	05/29/08	10:35
KN5KN	008	805171	05/29/08	11:10
KN5KP	009	805165	05/29/08	12:10
KN5KQ	010	805104	05/29/08	12:45
KN5KR	011	805131	05/29/08	13:40
KN5KT	012	805128	05/29/08	14:15
KN5KW	013	805126	05/29/08	14:45
KN5KX	014	805124	05/29/08	15:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRASTQ28B

The following report contains the analytical results for twenty-one water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received June 03, 2008 and May 30, 2008, according to documented sample acceptance procedures.

This SDG consists of (2) laboratory ID's: A8E300228 and A8F030124.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson and Rob Hartman on June 27, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

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If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The matrix spike/matrix spike duplicate(s) for 805178 A,B,C had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8157285 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

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Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

RCRASTQ28B

LOT A8F030124

ANALYTICAL SUMMARY REPORT

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Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	WELL-113	WELL-113	FMC-RCRA Groundwater	4467.93	
1	WELL-114	WELL-114	FMC-RCRA Groundwater	4470.60	
1	WELL-115	WELL-115	FMC-RCRA Groundwater	4469.73	
1	WELL-148	WELL-148	FMC-RCRA Groundwater	4446.45	
1	WELL-166	WELL-166	FMC-RCRA Groundwater	4469.77	
1	WELL-168	WELL-168	FMC-RCRA Groundwater	4473.94	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-113	WELL-114	WELL-115	WELL-148	WELL-166	WELL-168	WELL-168
SAMPLE DATE	05/30/2008	05/30/2008	05/30/2008	05/29/2008	05/30/2008	05/29/2008	05/30/2008
SAMPLE TIME	07:25	09:45	08:50	18:10	08:10	17:35	17:55
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN8WE	KN8WL	KN8WK	KN8WF	KN8WJ	KN8WE	KN9RG
REMARKS							DUPLICATE
SAMPLE NUMBER	805113	805114	805115	805148	805166	805168	805603
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	72.76	75.38	74.69	51.08	74.81	78.78	
OXIDATION REDUCTION POTENTIAL	-30.6	-5.8	1.4	43.9	-18.2	156.4	
OXYGEN (O) (FLD) DIS	1.15	0.2	0.19	3.31	0.23	0.61	
PH (FLD)	7.03	7.02	7.07	7.51	6.94	7.3	
SC (UMHOS/CM AT 25 C) (FLD)	1257.0	1708.0	2342.0	1149.0	2115.0	1959.0	
TURBIDITY (NTU) (FLD)	3.1	0.7	0.7	0.3	0.7	0.8	
WATER TEMPERATURE (C) (FLD)	12.1	11.3	11.6	15.9	11.8	13.1	
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	16.8	16.4	8.85	10.6	23.7	10.6	9.47
	NE,J	NE,J	NE,J	NE,J	NE,J	NE,J	NE,J
SULFATE (SO4)	96.4	111.0	184.0	94.4	161.0	557.0	568.0
CHLORIDE (CL)	135.0	141.0	148.0	169.0	236.0	86.7	88.2
FLUORIDE (F)	0.5	0.5	0.3	0.8	0.7	5.0	5.1
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	1.4	<0.2	<0.2	<0.2	0.3	0.4
NITRATE (NO3-N)	9.5	<0.1	25.7	3.0	19.4	14.7	14.9
	,J	,J	,J	,J	,J	,J	,J
PHOSPHORUS (P) TOT	0.353	7.95	2.9	<0.5	0.57	<0.5	<0.5
	BNE,J	NE,J	NE,J	NE,J	NE,J	NE,J	NE,J
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT							<0.05
ARSENIC (AS) TOT	0.0211	0.116	0.242	<0.1	<0.1	0.0202	0.0306
	B					B	B
BORON (B) TOT							1.91
CADMIUM (CD) TOT	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MANGANESE (MN) TOT							0.152
							E
SELENIUM (SE) TOT	<0.05	<0.05	<0.05	<0.05	0.005	0.0335	0.0251
					B	B	B
VANADIUM (V) TOT							0.033
							B
-- OTHER PARAMETERS --							
TOTAL URANIUM							0.003
							B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect, Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

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SAMPLE NUMBER ORDER

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1	805114	KN8WL	05/30/2008	WELL-114
1	805115	KN8WK	05/30/2008	WELL-115
1	805148	KN8WF	05/29/2008	WELL-148
1	805166	KN8WJ	05/30/2008	WELL-166
1	805168	KN8WE	05/29/2008	WELL-168
1	805603	KN9RG	05/30/2008	WELL-168

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1	KN8WE	805168	05/29/2008	WELL-168
1	KN8WF	805148	05/29/2008	WELL-148
1	KN8WH	805113	05/30/2008	WELL-113
1	KN8WJ	805166	05/30/2008	WELL-166
1	KN8WK	805115	05/30/2008	WELL-115
1	KN8WL	805114	05/30/2008	WELL-114
1	KN9RG	805603	05/30/2008	WELL-168

SAMPLE ID CODES

SAMPLE SUMMARY

RCRASTQ28B : A8F030124

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN8WE	001	805168	05/29/08	17:35
KN8WF	002	805148	05/29/08	18:10
KN8WH	003	805113	05/30/08	07:25
KN8WJ	004	805166	05/30/08	08:10
KN8WK	005	805115	05/30/08	08:50
KN8WL	006	805114	05/30/08	09:45
KN9RG	007	805603	05/29/08	17:55

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

LABORATORY CASE NARRATIVE

CASE NARRATIVE
RCRASTQ28B

The following report contains the analytical results for twenty-one water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received June 03, 2008 and May 30, 2008, according to documented sample acceptance procedures.

This SDG consists of (2) laboratory ID's: A8E300228 and A8F030124.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson and Rob Hartman on June 27, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The matrix spike/matrix spike duplicate(s) for 805178 A,B,C had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8157285 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reprodncibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system conld lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) mnst be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

[redacted]

Chain of Custody Record

Contact

42 (8/07)

cwk 3480

RCRA SDG-2

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

St. Louis

FMC	Project Manager: Rob Hartman	Date: 6/2/08	Chain of Custody Number: 376066
PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 1
Pocatello, State: ID, Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mike Franks	
Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: FedEx Airbill # 8605 0511 7428		
Project/Purchase Order/Quote No.: RCRA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Other	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Other	Analysis (Attach list if more space is needed): T Metals uF HNO3									Special Instructions/ Conditions of Receipt
805168	5/29/08	1735		X						L					L					LP				see comments
805148	↓	1810		↓						↓					↓					↓				
805113	5/30/08	0725																						
805166	↓	0810																						
805115	↓	0850																						
805114	↓	0945		↓						↓					↓									
End of RCRA SDG-2 + sample event																								
805603 not on C-O-C 5/29 1745 SW 06.03.08																								

Sample Hazard Identification: Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turnaround Time Required: 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Normal

QC Requirements (Specify):

Relinquished By	Date	Time	Received By	Date	Time
Walter Crane	6/2/08	15:30	1. [signature]	06.03.08	0915
			2.		
			3.		

Comments: Routine RCRA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Lot #(s): A8F030124
- 3480 -

Condition Upon Receipt Form

Client: FMC
Quote No:
COC/RFA No: 376066
Initiated By:
Date: 06.03.08
Time: 0945

Shipping Information

Shipper Name: FedX
Shipping # (s):*
1. 8605 0511 7928
2.
3.
4.
5.
6.
7.
8.
9.
10.

Multiple Packages Y (N)
Sample Temperature (s):**
1. 2
2.
3.
4.
5.
6.
7.
8.
9.
10.

*Numbered shipping lines correspond to Numbered Sample Temp lines

**Sample must be received at 4°C ± 2°C- If not, note contents below. Temperature variance does NOT affect the following: Metals-Liquid or Rad tests- Liquid or Solids

Condition (Circle "Y" for yes, "N" for no and "N/A" for not applicable):

1.	(Y) N	Are there custody seals present on the cooler?	8.	(Y) (N)	Are there custody seals present on bottles?
2.	Y (N) N/A	Do custody seals on cooler appear to be tampered with?	9.	Y (N) (N/A)	Do custody seals on bottles appear to be tampered with?
3.	(Y) N	Were contents of cooler frisked after opening, but before unpacking?	10.	(Y) N N/A	Was sample received with proper pH[1]? (If not, make note below)
4.	(Y) N	Sample received with Chain of Custody?	11.	Y N	If N/A- Was pH taken by original TestAmerica lab?
5.	Y (N) N/A	Does the Chain of Custody match sample ID's on the container(s)?	12.	(Y) N	Sample received in proper containers?
6.	Y (N)	Was sample received broken?	13.	Y N (N/A)	Headspace in VOA or TOX liquid samples? (If Yes, note sample ID's below)
7.	(Y) N	Is sample volume sufficient for analysis?	14.	Y N	Was Internal COC/Workshare received?

[1] For DOE-AL (Pantex, LANL, Sandia) sites, pH of ALL containers received must be verified, EXCEPT VOA, TOX and soils.

Notes:

rec'd. but not on C-O-C,

LP for 805603.

Corrective Action:
- ☐ Client Contact Name:
- ☐ Sample(s) processed "as is"
- ☐ Sample(s) on hold until:

Informed by:
If released, notify:
Date: 6-5-08

Project Management Review: Stuart [illegible]

Nancy Campos

DATA VALIDATION/USABILITY SUMMARY

May 2008
CERCLA SDG Groundwater Samples
Metals, Wet Chemistry Parameters, and Radiological Parameters

Prepared for:

FMC Corporation
Pocatello, Idaho Plant
P.O. Box 4111
Pocatello, ID 83202

Prepared by:

Hydrometrics, Inc.
3020 Bozeman Avenue
Helena, MT 59601

and

Environmental Chemistry Consultants, Inc.
10146 Banner Rd., S.E.
Olalla, WA 98359

11 October 2008

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Data Validation/Usability Report

Groundwater Samples

FMC Corporation, Pocatello, Idaho

Second Quarter 2008

SDG CERCLAQ28A, CERSTLQ28A, CERCLAQ28B, AND CERSTLQ28B

11 October 2008

Prepared by: Bruce K. Wallin, PhD

1. INTRODUCTION

This memo summarizes the Site Chemist's usability evaluation of the technically reviewed groundwater results generated by TestAmerica Laboratories, Inc., N. Canton, Ohio, and St. Louis, Missouri (TAL) and DataChem Laboratory in Salt Lake City, Utah for the FMC Corporation second quarter 2008 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Calciner Ponds post-remedial action groundwater sampling event for the CERCLA Sample Delivery Groups (LOT[s]) listed above. The samples were collected on 20-28 May 2008. The samples were analyzed for total elements arsenic, selenium, potassium, antimony, boron, manganese, mercury, vanadium, phosphorus, wet chemistries chloride, fluoride, nitrate, ammonia, sulfate, cyanide, white phosphorus, and gross alpha, radium 226 and radium 228.

Laboratory analyses were performed in accordance with the U.S. Environmental Protection Agency (USEPA) SW-846 Method 6020 for all elements except mercury, 7470A for mercury; Method 7580 for white phosphorus; selected methods from Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983 for wet chemistries, and Methods 900, 903, and 904 for radionuclides. All of the above methods are hereafter referred to as "Methods". Wet chemistry analyses were conducted by TAL N. Canton, and the remainder of the parameters, with the exception of white phosphorus, were analyzed by TAL St. Louis. Elemental phosphorus was analyzed by DataChem Laboratory. A listing of parameters and analytical methods is provided in Table 1-1.

TABLE 1-1. SECOND QUARTER 2008
CERCLA MONITORING EVENT PARAMETERS AND ANALYTICAL METHODS

PARAMETER	MCAWW(1) METHOD	SW-846(2) METHOD	CFR(3) METHOD
elemental parameters	--	6020	--
total phosphorus	--	6020	--
mercury	--	7470A	--
white phosphorus	--	7580	--
ammonia - N	350.3	--	--
chloride	300.0A	--	--
nitrate	300.0A	--	--
fluoride	300.0A	--	--
sulfate	300.0A	--	--
total cyanide	335.4	--	--
gross alpha	--	--	900
radium-226	--	--	903.3
radium-228	--	--	904

NOTES:

(1) "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

(2) "Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods", Third Edition, November 1996.

(3) "Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

The data were technically reviewed based on method specifications, and laboratory-developed performance criteria by adapting the procedures set forth in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, USEPA Office of Solid Waste and Emergency Response, EPA 540-R-04-004, October 2004 (Guidelines).

For all parameters, a Level II technical review was performed which included a review/evaluation of all laboratory reporting forms, raw data, preparation logs, instrument printouts, notebook records and other forensic deliverables provided by the laboratory.

A detailed description and summary of these efforts is provided in the Technical Review Reports in Appendix A.

The following validation/usability report is the result of a collective assessment of all information associated with the analytical results available which includes project-specific data quality objectives (DQOs) specified in the Remedial Investigation / Feasibility Study (RI/FS) Sampling and Analysis Plan (SAP) for the Eastern Michaud Flats Site, prepared by Bechtel Environmental Inc., and Hydrometrics, Inc., July 1996, Appendix C, Quality Assurance Project Plan (QAPjP), the RI/FS SAP as amended for this 2nd Quarter 2008 special monitoring program (April 2008 SAP Addendum), the Calciner Ponds Remedial Action Groundwater Monitoring Plan, historical data, site knowledge, and the technical review results, as described in the Guidelines.

2. SUMMARY OF USABILITY ISSUES

The data technical review reports indicate which laboratory results are considered non-compliant when compared to the requirements set forth in the relevant documents. However these represent minor quality control problems and do not affect data usability. The cases where quality control problems affected usability are discussed in the following sections. In most cases these problems are typical analytical difficulties or are the result of sample matrix problems. A summary of data quality goals and observations is provided in Table 2-1.

DATA CONSIDERED UNUSABLE

No data were formally rejected due to any quality control issues or historical trend anomalies.

TABLE 2-1. DATA QUALITY SUMMARY FMC IDAHO CERCLA GROUNDWATER EVENT
SECOND QUARTER 2008 RCRA SAMPLING EVENT

DATA QUALITY INDICATOR	PURPOSE	METHOD OF MEASUREMENT & EVALUATION	GOAL	SUMMARY OF RESULTS
Precision	Reproducibility of results	1. Collocated samples	S & D >5RL, RPD <30, S &/or D <5RL, S-D <2RL	*All criteria were met - no flagging was required or deemed necessary.*
		2. Laboratory replicates	S & D >5RL, RPD <20, S &/or D <5RL, S-D <RL	*All criteria were met - no flagging was required or deemed necessary.*
Accuracy	Proximity of result to true value	1. Calibration	Meet method/guidance criteria	*All criteria were met - no flagging was required or deemed necessary.*
		2. Laboratory control samples	Meet lab-developed or method criteria	*All criteria were met - no flagging was required or deemed necessary.*
		3. Matrix spikes/Serial Dilutions	Meet lab-developed or method criteria	*B, total P, U, V slightly high, K slightly low MS/MSD. For B, total P, U, and V positive results flagged as estimated high (J+) and for K results flagged as estimated low (J-). Serial dilutions larger for Mn, total P, K, As. Results reported for these parameters flagged as estimated low (J-).*
Representativeness	Sample integrity and sampling precision	1. Collocated samples	S & D >5RL, RPD <30, S &/or D <5RL, S-D <2RL	*See Item 1 above.*
		2. Blanks	Sample results ND or >5X blank	*Prep. Blank and cal blank Sb, Mn, Se, V, results for several samples adjusted to not-detected at the reported values (U).*
		3. Holding times	Per method	*No deviations requiring actions.*
		4. Preservation	Per method	*All criteria were met - no flagging was required or deemed necessary.*
Comparability	Consistent practices	Use of and adherence to appropriate analytical methods	Compliance with required USEPA methods	*Method compliance achieved, goal met for all samples.*
Completeness	Obtain intended information from the event	Comparison of planned vs usable data obtained	>90% of planned	*Completeness 100%*
Consistency	Expansion of historical database	Comparison with historical statistics	Meet completeness objective	*Modest outliers, no significant trends apparent. Continue evaluation.*

3. DATA VALIDATION RESULTS

To determine the ultimate utility of data, the following indicators were evaluated:

3.1 PRECISION, ACCURACY, REPRESENTATIVENESS, COMPARABILITY, COMPLETENESS AND CONSISTENCY

3.1.1 PRECISION

Precision is a quantitative determination of the reproducibility of an analytical value. For this program, collocated samples are collected to assess overall precision of the sampling, preparation and analytical process, and matrix spike/matrix spike duplicates are required to address aliquoting reproducibility in order to provide information on matrix reproducibility otherwise unobtainable from samples reported below the reporting limits. Matrix spikes also provide an indication of the accuracy of native results: this will be discussed in the accuracy section.

The collocated samples further address the ability to obtain a representative sample of the medium studied, this will be discussed further in the representativeness section. For elemental parameters, the methods require the preparation of laboratory replicates at a specified frequency to address aliquoting precision.

For laboratory replicates the Guidelines specify the utilization of difference criteria for samples providing values below a limiting value and relative percent difference (RPD) criteria for samples providing values above a limiting value. The Guidelines utilize 5X the contract required detection limit (CRDL). These specifications are as follows:

When either one or both of the analyses provide results below the limiting value, the following criteria apply:

$$|S - R| \leq CRDL$$

Where: S = sample value
R = replicate sample value

When both of the analyses provide results above or equal to the limiting value, the following criteria apply:

$$RPD = (|S - R|/S + R)200 \leq 20$$

Where: RPD = Relative Percent Difference

The QAPjP provides an RPD specification of 20 percent for laboratory replicates for elements, but does not provide specific criteria for low level results or collocated samples. The Guidelines do not provide precision criteria for collocated samples. The technical reviewer utilized the 20 percent RPD criteria specified in the QAPjP and Guidelines and the low-level criteria above specified in the Guidelines with the substitution of the laboratory reporting limit (RL) for the CRDL where they differed. For collocated samples, the technical reviewer utilized the 2RL and RPD <30 criteria specified in the USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses, June 13, 1988.

For this event all replicate sample precision was within specification.

For this event the following are collocated samples:

SDG	SAMPLE	COLLOCATED SAMPLE
Q28A	805524	805601
Q28B	805136	805602

Note: The results were reported to RLs which approximate estimated quantitation limits (EQL) specified in the methods. The EQL also statistically approximate the CRDL. The technical reviewer utilized the RL values to conduct the precision analysis.

For these collocated sample pairs the above precision criteria were met for all parameters.

The laboratory reported all parameter levels to method detection limits (MDL). The Method Detection Limit (MDL) described in 40 CFR Part 136, Appendix B and incorporated by reference in SW-846, provides a precision of ± 100 percent. The RL values used by the laboratory approximate the EQL which is established at 5-10 times the MDL in SW-846. At five times the MDL the EQL precision is approximately ± 30 percent. As a result, all values reported below the RL, but above the MDL that are flagged B by the laboratory, have been flagged as estimated (J). ***The project manager is cautioned that these inherent imprecisions associated with the project-required reporting conventions must be taken into consideration when utilizing the data below the EQL.***

3.1.2 ACCURACY

Accuracy is the proximity of the reported analytical value to the true concentration in the sample. To estimate the proximity factor, laboratory control, laboratory blank and environmental samples are fortified with the parameter of interest, and for organics analysis, each sample is also fortified with surrogate indicators, and the level recovered, expressed as a percentage of the spiking level, is utilized. For laboratory control samples (LCS), the analytical values must be within either a published range or within laboratory or method established windows about the true concentration.

If these conditions are not met, the method is to be considered out of control, corrective action taken, and the entire process repeated with compliant LCS before the associated data can be reported. For elements, laboratory blanks are spiked with concentrations at 2X CRDL (CRI). According to the Guidelines associated analytical values must fall within ± 20 percent of the true value or all the potential impact on all environmental sample results associated with the non-compliant CRI must be evaluated during technical review using professional judgment. The technical reviewer has considered that all associated sample results reported at values <2RL or CRDL are evaluated: for CRI/CRA

recoveries <80 percent, both positive results and non-detects are flagged as estimated (J), and for CRI recoveries >120 percent, positive results only are flagged as estimated (J).

For the recovery of spiked parameter from environmental samples, the quantity of parameter matrix spiked (MS) must be large enough to be uniquely distinguishable from the level of native analyte present in the sample. When this condition exists, if the recovery value is outside established values, all associated environmental samples are flagged as estimated (J) with an indication of bias direction during technical review. The Guidelines establish that the native level of analyte must be less than four times the spiking level for valid accuracy estimation. The formula utilized is as follows:

Percent Recovery = ((SSC - USC)/CS))100
Where: SSC = Spiked Sample Concentration
USC = Unspiked Sample Concentration
CS = Concentration Spiked

For elements, the QAPjP establishes acceptance criteria at 70-130 percent which are less stringent than the 75-125 percent specified in the Guidelines. The QAPjP does not specify accuracy criteria for the water quality parameters. For elements, the technical reviewer has utilized the laboratory-established limits indicated in the SW-846 methods and defaulted to the 75-125 percent criteria specified in the QAPjP when laboratory-established limits were not provided. For wet chemistries default limits of 75-125% indicated in the method since some of the laboratory established limits were well in excess of these values.

For elements, the method requires assessment of matrix interferences by performing serial dilution analyses in addition to the matrix spike indicated above. The Guidelines suggest that, for samples containing sufficient signal in the undiluted sample (>50IDL) that the diluted result should be within 10 percent of the undiluted value to verify absence of interference. Note that the comparative values evaluated below are established for groundwater only since the reviewer is unaware of the statistical attenuation factors that

may be associated with any potential impact of the groundwater locations to surface water.

For SDG Q28A sample 805TW11 provided slightly elevated MS/MSD recoveries of boron and phosphorus and sample 805112 provided slightly elevated recoveries of phosphorus, uranium, and vanadium. The results reported positive for boron and phosphorus in samples 805TW12, 805517, 805TW9, 805111, 805146, and 805110 and uranium in samples 805173 and 805601 are flagged as estimated high (J+). ***These results are considered usable when the bias factors are taken into account. Doing so has no impact on the decision since the unadjusted results reported for boron and uranium are below the comparative values and no comparative value is established for total phosphorus in groundwater.***

For SDG Q28B sample 805136 provided MS/MSD recoveries of potassium slightly below the lower limit. The results reported for this element in associated samples 805136, 805139, 805164, 805169, 805161, and 805189 are flagged as estimated low (J-). ***These results are considered usable when the bias factor is taken into account. Doing so will have no impact on the decision since no comparative value is established for this element.***

For SDG Q28B the laboratory control sample associated with preparatory lot 8157285 provided a slightly elevated recovery for vanadium. The positive results reported for this element in associated samples 805101, 805102, 805143, and 805145 are flagged as estimated high (J+). ***These results are considered usable when the bias factor is taken into account. Doing so will have no impact on the decision since the unadjusted values are below the comparative value.***

For SDG Q28A sample 805145 provided serial dilution results for manganese, phosphorus, and potassium approximately 13-16% larger than the undiluted values and samples 805TW11 and 805112 provided serial dilution results for potassium

approximately 15-34% larger than the undiluted values. The results reported for these elements in all samples associated with the SDG are flagged as estimated low (J-). ***These results are considered usable when the bias factors are taken into account. Doing so has no impact on the decision since no groundwater comparative value is established for phosphorus and potassium and the adjusted values for manganese are below the comparative value.***

For SDG Q28B sample 805145 associated with preparatory lot 8157285 analyzed on 6-25 provided an ICP serial dilution result for phosphorus that was approximately 16% larger than the undiluted value. The results reported for this element in associated samples 805101, 805145, 805102, and 805143 are flagged as estimated low (J-). ***These results are considered usable when the bias factor is taken into account. Doing so has no impact on the decision since no groundwater comparative value is established for total phosphorus.***

For SDG Q28B sample 805145 associated with preparatory lot 8157285 analyzed on 8-22 provided ICP serial dilution results for arsenic, manganese, and potassium that were approximately 11-44% larger than the undiluted values. The results reported for these elements in associated samples 805101, 805145, 805102, and 805143 are flagged as estimated low (J-). ***These results are considered usable when the bias factors are taken into account. Doing so will have no impact on the decision since the unadjusted arsenic results for all samples and manganese in samples 805145 and 805143 are above the comparative values, the adjusted values for manganese in samples 805101 and 805102 are below the comparative value, and no comparative value is established for potassium.***

For SDG Q28B sample 805136 associated with preparatory lot 8163196 analyzed on 6-25 provided ICP serial dilution results for manganese, phosphorus, and potassium that were approximately 19-25% larger than the undiluted values. The results reported for manganese in associated sample 805602, phosphorus in associated samples 805136,

805602, 805139, 805164, 805169, 805134, 805161, and 805189 and potassium in associated samples 805602 and 805134 are flagged as estimated low (J-). ***These results are considered usable when the bias factors are taken into account. Doing so will have no impact on the decision since the unadjusted result for manganese is above the comparative value and no comparative value are established for total phosphorus and potassium.***

For SDG Q28B sample 805136 associated with preparatory lot 8163196 analyzed on 8-22 provided ICP serial dilution results for manganese and potassium that were approximately 33-39% larger than the undiluted values. The results reported for manganese in associated sample 805136, 805139, 805164, 805169, 805134, 805161, and 805189, 805161, and 805189 and potassium in associated samples 805136, 805139, 805164, 805169, 805161, and 805189 are flagged as estimated low (J-). ***These results are considered usable when the bias factors are taken into account. Doing so will have no impact on the decision since the unadjusted results for manganese in samples 805136, 805134, and 805189 are above the comparative value, the adjusted values for samples 805139, 805164, 805169, and 805161 are below the comparative value and no comparative value has been established for potassium.***

Initial and continuing calibrations are performed to verify instrument performance and stability prior to and during the analysis of environmental samples. The Methods require that the initial calibration linearity coefficients are $\geq$ 0.995, the continuing calibration stabilities are within 90-110 percent and, for elements, the Guidelines require consideration of blanks indicating a negative instrument drift >|IDL|. The technical reviewer has utilized the flagging criteria suggested in the Guidelines for lack of linearity and continuing calibration stability, and has utilized professional judgment for actions for non-compliant instrument drift associated with samples with levels reported at <5 IDL.

No calibration deviations from the above specifications were found for the SDG and no actions are necessary.

3.1.3 REPRESENTATIVENESS

To perform a valid environmental assessment, the samples, when analyzed, must be representative of the media under study. Factors influencing representativeness include preparation of wells prior to sampling to obtain aliquots of the groundwater strata of interest. This is accomplished through purging of standing water to constant temperature, conductivity and pH prior to collecting the sample. Collocated samples are also collected to provide information regarding the ability to reproducibly collect a sample. If reproducibility is not obtained, representativeness is not verified. The sample must be collected with uncontaminated equipment, placed in uncontaminated containers, and not contaminated throughout the transport, receipt, storage, preparation and analytical processes. Evaluation of the potential for contamination is conducted through collection of field blanks, and utilization of laboratory process blanks. Once the sample has been collected, it is maintained in such a state that changes are not expected to occur in its concentration of target parameters. This is accomplished by chemical and physical preservation, and minimization of time from collection to analysis.

Receipt logs indicated that preservation was intact at the time of receipt by the laboratory and no flagging was necessary.

Preparation and calibration blanks were reported with some elements present at concentrations that generated action levels resulting in the flagging of the positive results reported for several samples as not-detected at the reported value (U). ***These results are considered usable as maximum potential concentrations.***

On the basis of professional judgment no action was taken for target elements reported present in the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

3.1.4 COMPARABILITY

The characteristic of comparability reflects both the internal consistency of measurements and the expression of results in units which are consistent with other organizations reporting similar data. Each value reported for a given measurement should be similar to other values within the same data set and with other related data sets. Comparability was assured through the use of standardized sampling procedures and USEPA analytical methods.

3.1.5 COMPLETENESS

Completeness is a measure of the extent of attainment of usable data points from an investigation. For this program a completeness goal of 85 percent is established in the QAPjP. The ability to obtain a sample, (human) error and sample characteristics are major contributors to reduced completeness. For this investigation, all intended samples were collected and received by the laboratory. The laboratory analyzed all of the samples for all of the intended parameters. Completeness for this event is 100 percent.

3.1.6 CONSISTENCY

Consistency is a measure of the reasonableness of data to those that have been previously generated. For this program, an extensive data base has been developed that allows the evaluation of analytical results that may represent historical outliers. The statistical summary provided by Hydrometrics, Inc. is summarized as follows:

A few other sporadic differences were noted, however, the overall statistical trend is generally within the existing variance.

4. REFERENCES

Bechtel/Hydrometrics, 1996. Remedial Investigation/Feasibility Study Sampling and Analysis Plan for the Eastern Michaud Flats Site, prepared by Bechtel Environmental, Inc. and Hydrometrics, Inc., July 1996, as amended April 2008.

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USEPA, 1983. Methods for Chemical Analysis of Water and Wastes, EMSL, EPA-600/4-79-020, Revised March 1983.

USEPA, 1986. Test Methods for Evaluating Solid Waste, OSWER, SW-846, Third Edition, November 1986.

APPENDIX A

TECHNICAL REVIEW REPORTS

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Data Technical Review Report

Groundwater Samples

FMC Corporation

Second Quarter 2008

SDG CERCLAQ28A (LOTS A8E210129 AND A8E230136)

SDG CERSTLQ28A (LOTS A8E210213, A8E230288 AND A8E280159)

SDG CERCLAQ28B (LOTS A8E270127, A8E280154, A8E290146 AND A8E300119)

SDG CERSTLQ28B (LOTS A8E280171, A8E290264, AND A8E300221)

July 2008

Prepared by: Bruce K. Wallin, PhD

This memo summarizes the technical review of groundwater results generated by STL, for the FMC Corporation second quarter 2008 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Calciner Ponds post-Remedial Action groundwater monitoring event for the CERCLA Sample Delivery Groups (LOTs) listed above. The samples were collected on 20-28 May 2008. The samples were analyzed for total elements arsenic, selenium, potassium, antimony, boron, manganese, mercury, vanadium, phosphorus, wet chemistries chloride, fluoride, nitrate, ammonia, sulfate, cyanide, white phosphorus, and gross alpha, radium 226 and radium 228.

The data were technically reviewed based on method specifications, and laboratory-developed performance criteria by adapting the procedures set forth in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, USEPA Office of Solid Waste and Emergency Response, EPA-540-R-04-004, October 2004 (Guidelines).

TECHN1CAL REV1EW REPORT

SDG CERSTLQ28A

(LOTS A8E210213, A8E230288 AND A8E280159)

ELEMENTAL PARAMETERS

TECHNICAL REVIEW REPORT
SDG CERSTLQ28A
ELEMENTAL PARAMETERS

For antimony, arsenic, boron, manganese, phosphorus, potassium, selenium, uranium, and vanadium the data evaluation was based on USEPA SW-846 Method 6020, and for mercury the data evaluation was based on USEPA SW-846 Method 7470A (Method) and included the following parameters:

* - holding times
* - calibration
  - blanks
* - ICP interference check sample
  - matrix spike analysis
  - duplicate sample analysis
  - laboratory control sample analysis
  - ICP serial dilution analysis
  - detection limits
  - overall assessment

* All criteria were met for this parameter.

Table A-1 summarizes the technical review actions that are detailed below.

Data validation, described in the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

BLANKS:

1. Blanks providing results >IDL and their associated 5X action levels are tabulated below:

BLANK ID.	PARAMETER	CONC. (µg/L)	ACTION LEVEL (µg/L)
ICB 6/10 20:14	antimony	1.5	7.5
CCB 6/10 20:45	antimony	1.5	7.5
CCB 6/10 21:49	antimony	1.7	8.5
CCB 6/10 22:54	antimony	1.8	9.0
ICB 8/21 21:24	antimony	2.4	12
CCB 8/21 21:53	antimony	2.5	13
CCB 8/21 22:14	antimony	2.7	14
CCB 8/21 23:15	antimony	2.2	11
CCB 8/22 00:16	antimony	2.3	12
CCB 8/22 01:18	antimony	2.4	12
CCB 8/22 2:03	antimony	2.4	12
ICB 8/22 19:19	antimony	2.6	13
CCB 8/22 19:47	antimony	2.6	13
CCB 8/22 20:44	antimony	2.3	12
	cadmium	0.1	0.5
CCB 8/22 21:41	antimony	2.3	12
CCB 8/22 22:38	antimony	2.9	15
	uranium	0.9	5

BLANK ID.	PARAMETER	CONC. (µg/L)	ACTION LEVEL (µg/L)
CCB 8/22 23:07	antimony	12.5	62.5
	arsenic	3.8	19
	manganese	3.7*	18.5
	selenium	1.3	6.5
	uranium	4.2*	21
	vanadium	4.2	21
PB 8150141	antimony	3.8	19
PB 8154309	antimony	0.79	4.0
PB 8157285	antimony	2.1	11
805701	manganese	1.1	5.5
	potassium	49.1	246
805PB1	antimony	1.3	6.5
	boron	87.6	438
805CDI	antimony	0.73	3.7
	boron	86.7	434

Associated samples with positive values reported below the action level:

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES		
CCB 6/10 20:45	antimony	805173		
CCB 6/10 21:49	antimony	805173		
CCB 8/22 01:18	antimony	805112		
CCB 8/22 2:03	antimony	805112		
CCB 8/22 22:38	uranium	805TW12	805517	805502
CCB 8/22 23:07	selenium	805TW9	805111	805146
	vanadium	805TW9 805110	805111	805146
PB 8150141	antimony	805173	805112	
805701	manganese	805173	805601	

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES		
805PB1	antimony	805TW9	805173	805112
	boron	805TW12	805TW9	805111
		805146	805110	805173
		805112	805515	
805CDI	antimony	805TW9	805173	805112
	boron	805TW12	805TW9	805111
		805146	805110	805173
		805112	805515	

Action:

- Associated sample results for the element are flagged as not-detected at the reported value (U).

Comments:

The field blanks 805PB1 and 805CDI were reviewed with RCRA Lots A8E220216 and A8E230284.

On the basis of professional judgment no action was taken for the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike (MS)/MS duplicate (MSD) recoveries not within 75-125% when the native level is less than four times the spiking level are tabulated below:

SAMPLE ID. (Lot #-DATE)	ELEMENT	MS/MSD RECOVERY (%)
805TW11 (8154309-6/11)	boron	131.0/139.9
	phosphorus	126.6/138.4

SAMPLE ID. (Lot #-DATE)	ELEMENT	MS/MSD RECOVERY (%)
805112 (8150141-6/11)	phosphorus	141.7/135.5
	uranium	133.3/130.0
	vanadium	133.1/127.8

Associated samples:

LOT NO.	ELEMENT	ASSOCIATED SAMPLES		
8154309	boron	805TW12	805517	805TW9
		805111	805146	805110
	phosphorus	805TW12	805517	805TW9
		805111	805146	805110
8150141	uranium	805173	805601	

Action:

- For both MS and MSD recoveries above the upper limit, associated sample results reported positive for the element are flagged as estimated high (J+).

Comments:

The above actions are applied to <u>all</u> environmental samples associated with the Lots analyzed on the dates indicated in parenthesis.

For Lot 8157285 the laboratory control sample provided non-compliant recovery for vanadium with the indication of high bias. No action is taken since all associated sample results are either reported as not-detected or adjusted to not-detected due to blank contamination.

<u>DUPLICATE SAMPLE ANALYSIS</u>:

Field Duplicates.

Comments:

For this LOT, sample 805601 is collocated with sample 805525.

The QAPjP requires collection of collocated samples, but does not provide detailed specifications regarding precision objectives. The QAPjP provides objectives for laboratory duplicate precision as well as a discussion of the fact that the RPD objectives do not apply below limiting values; however, criteria are not specified for these conditions. As a result, the reviewer has utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various Regional guidance documents.

For this collocated sample pair the above precision criteria were met.

ICP SERIAL DILUTION ANALYSIS:

Samples containing greater than 50 IDL of analyte providing 5-fold serial dilution analysis values not within 10% of the undiluted value (%D) are tabulated below:

SAMPLE ID.	ELEMENT	%D
805145 (8157285)	manganese	12.7
	phosphorus	15.6
	potassium	15.3
805TW11 (8154309)	potassium	14.5
805112 (8150141)	potassium	33.7

Action:

- Associated sample results reported the elements are flagged as estimated low (J-).

Comments:

The above actions are applied to all samples in the same preparation lot associated with the SDG.

In all cases the diluted values were larger than the undiluted values therefore low bias is indicated.

DETECTION LIMITS:

For this SDG, the laboratory reported results to the method detection limits (MDL). For values below their reporting limits (RL) and above the MDL the laboratory affixed the "B" qualifier. The MDL (described in 40CFR Part 136, Appendix B and incorporated by reference in SW-846), provides an error band, by definition, of ± 100 percent. The Estimated Quantitation Limit (EQL), (indicated as the RL by the laboratory) is established at approximately 5-10X the MDL in SW-846, and will contain an error band of ± 30 percent at 5 MDL. The undiluted RL associated with this SDG are reasonable for the methodologies utilized by the laboratory. Any values below the RL contain an inherently increasing error band as the numbers become smaller. It is essential that the data user is aware of these statistical impacts on data quality.

Action:

- Associated levels below the laboratory RL but above the MDL (flagged B by the laboratory) are flagged as estimated (J).

OVERALL ASSESSMENT:

Calibration and/or preparation blanks were reported with antimony present at a concentration that generated an action level resulting in the flagging of the positive results reported for samples 805173 and 805112 as not-detected at the reported values (U).

Calibration and/or preparation blanks were reported with selenium, vanadium, and manganese present at concentrations that generated action levels resulting in the flagging of the positive results reported for selenium and vanadium in sample 805TW9, 805111, and 805146, vanadium in sample 805110, and manganese in samples 805173 and 805601 as not-detected at the reported values (U).

On the basis of professional judgment no action was taken for the target elements reported present in the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in

several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

Sample 805TW11 associated with preparatory lot 8154309 analyzed on 6/11 provided MS/MSD recoveries of boron and phosphorus slightly above the upper limit of 125%. The results reported positive for these elements in associated samples 805TW12, 805517, 805TW9, 805111, 805146, and 805110 are flagged as estimated high (J+).

Sample 805112 associated with preparatory lot 8150141 analyzed on 6/11 provided MS/MSD recoveries of phosphorus, uranium, and vanadium slightly above the upper limit of 125%. The positive results reported for uranium in associated samples 805173 and 805601 are flagged as estimated high (J+).

Sample 805TW11 associated with preparatory lot 8154309 provided an ICP serial dilution result for potassium that was approximately 15% larger than the undiluted value. The results reported for this element in associated samples 805TW12, 805517, 805TW9, 805111, 805146, 805110, 805TW11, and 805502 are flagged as estimated low (J-).

Sample 805112 associated with preparatory lot 8150141 provided an ICP serial dilution result for potassium that was approximately 34% larger than the undiluted value. The results reported for this element in associated samples 805173, 805523, 805524, 805525, 805112, and 805601 and 805502 are flagged as estimated low (J-).

Sample 805145 associated with preparatory lot 8157285 provided an ICP serial dilution result for potassium that was approximately 15% larger than the undiluted value. The results reported for this element in associated samples 805516, 805515, and 805501 are flagged as estimated low (J-).

Any values reported above the MDL but below the RL, which are flagged as estimated (J), are less accurate as the numbers become smaller. The data user should consider these statistical impacts on data quality.

All additional quality control criteria evaluated were compliant, and no further actions or qualifications were required or deemed necessary.

TABLE A-1.

TECHNICAL REVIEW ACTION SUMMARY

SDG CERSTLQ28A

Antimony	J1, J3, U1	Arsenic	J3
Boron	J1, J3	Manganese	J3, U1
Mercury	J3	Phosphorus	J1, j3
Potassium	J2	Selenium	J3, U1
Uranium	J1, J3	Vanadium	J1, J3, U1

J1 - Positive result is flagged as estimated high (J+) due to non-compliant MS/MSD recoveries.

J2 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

J3 - Positive result is flagged as estimated (J) due to uncertainty at the low level.

U1 - Positive result is adjusted to not-detected at the reported value (U) due to blank contamination.

TECHNICAL REVIEW REPORT

SDG CERSTLQ28B

(LOTS A8E280171, A8E290264, AND A8E300221)

ELEMENTAL PARAMETERS

TECHNICAL REVIEW REPORT
SDG CERSTLQ28B
ELEMENTAL PARAMETERS

For antimony, arsenic, boron, manganese, phosphorus, potassium, selenium, uranium, and vanadium the data evaluation was based on USEPA SW-846 Method 6020, and for mercury the data evaluation was based on USEPA SW-846 Method 7470A (Method) and included the following parameters:

* - holding times
* - calibration
  - blanks
* - ICP interference check sample
  - matrix spike analysis
  - duplicate sample analysis
  - laboratory control sample analysis
  - ICP serial dilution analysis
  - detection limits
  - overall assessment

* All criteria were met for this parameter.

Table A-2 summarizes the technical review actions that are detailed below.

Data validation, described in the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

BLANKS:

1. Blanks providing results >IDL and their associated 5X action levels are tabulated below:

BLANK ID.	PARAMETER	CONC. (µg/L)	ACTION LEVEL (µg/L)
ICB 6/24 18:31	antimony	2.5	13
	vanadium	2.3	12
CCB 6/24 19:12	antimony	0.9	5
	vanadium	2.9	15
CCB 6/25 00:22	vanadium	2.3	12
CCB 6/25 04:17	vanadium	2.9	15
ICB 8/22 19:19	antimony	2.6	13
CCB 8/22 19:47	antimony	2.6	13
CCB 8/22 20:44	antimony	2.3	12
CCB 8/22 21:41	antimony	2.3	12
CCB 8/22 22:38	uranium	0.9	5
PB8157285	antimony	2.1	11
PB8163196	antimony	0.85	4.3
805702	vanadium	35.5	178
805PB1	antimony	1.3	6.5
	boron	87.6	438
805CDI	antimony	0.73	3.7
	boron	86.7	434

Associated samples with positive values reported below the action level:

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES
CCB 8/22 20:44	antimony	805136

BLANK ID.	ELEMENT	ASSOCIATED SAMPLES		
CCB 8/22 21:41	antimony	805136	805134	805189
805PB1	antimony	805136	805134	805189
	boron	805143		
805CDI	antimony	805136	805134	805189
	boron	805143		
805702	vanadium	805101	805145	805102
		805143	805136	805602
		805139	805164	805169
		805134	805189	

Action:

- Associated sample results for the element are flagged as not-detected at the reported value (U).

Comments:

The field blanks 805PB1 and 805CDI were reviewed with RCRA Lots A8E220216 and A8E230284.

On the basis of professional judgment no action was taken for target elements reported present in the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

MATRIX SPIKE ANALYSIS:

Samples providing matrix spike (MS)/MS duplicate (MSD) recoveries not within 75-125% when the native level is less than four times the spiking level are tabulated below:

SAMPLE ID. (Lot #/DATE)	ELEMENT	MS/MSD RECOVERY (%)
805145 (8157285/6-25)	potassium	/125.6
805136 (8163196/8-22)	potassium	65/70
	vanadium	74/

Associated samples:

SAMPLE ID. (Lot #/DATE)	ELEMENT	ASSOCIATED SAMPLES	
805136 8163196/8-22)	potassium	805136	805139
		805164	805169
		805161	805189

Action:

- For both MS and MSD recoveries below the lower limit associated sample results reported for the element are flagged as estimated low (J-).

Comments:

No action is taken when only one of the MS/MSD pairs is out of specification.

DUPLICATE SAMPLE ANALYSIS:

Field Duplicates.

Comments:

For these LOTs, sample 805602 is collocated with sample 805136.

The QAPjP requires collection of collocated samples, but does not provide detailed specifications regarding precision objectives. The QAPjP provides objectives for laboratory duplicate precision as well as a discussion of the fact that the RPD objectives do not apply below limiting values; however, criteria are not specified for these conditions. As a result, the reviewer has utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or

both contain <5RL of analyte, which is promulgated in various Regional guidance documents.

For this collocated sample pair the above precision criteria were met.

LABORATORY CONTROL SAMPLE ANALYSIS:

Laboratory control samples (LCS) providing recoveries not within 85-115% are tabulated below:

LCS ID.	ELEMENT	LCS RECOVERY (%)
8157285	vanadium	117.7

Associated samples: 805101 805102 805143 805145

Action:

- For LCS recovery above the upper limit associated sample results reported positive for the element are flagged as estimated high (J+).

ICP SERIAL DILUTION ANALYSIS:

Samples containing greater than 50 IDL of analyte providing 5-fold serial dilution analysis values not within 10% of the undiluted value (%D) are tabulated below:

SAMPLE ID. (Lot #/DATE)	ELEMENT	%D
805145 (8157285/6-25)	manganese	12.7
	phosphorus	15.6
	potassium	15.3
805145 (8157285/8-22)	arsenic	11.4
	manganese	44.2
	potassium	39.7
805136 (8163196/6-25)	manganese	23.4
	phosphorus	24.9
	potassium	19.1
805136 (8163196/8-22)	manganese	39.0
	potassium	32.5

Associated samples:

LOT NO./DATE	ELEMENT	ASSOCIATED SAMPLES		
805145 (8157285/6-25)	phosphorus	805101 805143	805145	805102
805145 (8157285/8-22)	arsenic	805101 805143	805145	805102
	manganese	805101 805143	805145	805102
	potassium	805101 805143	805145	805102
805136 (8163196/6-25)	manganese	805602		
	phosphorus	805136 805164 805161	805602 805169 805189	805139 805134
	potassium	805602	805134	
805136 (8163196/8-22)	manganese	805136 805169 805189	805139 805134	805164 805161
	potassium	805136 805169	805139 805161	805164 805189

Action:

- Associated sample results reported for the elements are flagged as estimated low (J-).

Comments:

In all cases the diluted values were larger than the undiluted values therefore low bias is indicated.

DETECTION LIMITS:

For this SDG, the laboratory reported results to the method detection limits (MDL). For values below their reporting limits (RL) and above the MDL the laboratory affixed the "B" qualifier. The MDL (described in 40CFR Part 136, Appendix B and incorporated by reference in SW-846), provides an error band, by definition, of ± 100 percent. The Estimated Quantitation Limit (EQL), (indicated as the RL by the laboratory) is established at approximately 5-10X the MDL in SW-846, and will contain an error band of ± 30 percent at 5 MDL. The undiluted RL associated with this SDG are reasonable for the methodologies utilized by the laboratory. Any values below the RL contain an inherently increasing error band as the numbers become smaller. It is essential that the data user is aware of these statistical impacts on data quality.

Action:

- Associated levels below the laboratory RL but above the MDL (flagged B by the laboratory) are flagged as estimated (J).

OVERALL ASSESSMENT:

Calibration blanks were reported with antimony present at concentrations that generated action levels resulting in the flagging of the positive results reported in samples 805136, 805134, and 805189 as not-detected at the reported value (U).

On the basis of professional judgment no action was taken for target elements reported present in the field blanks. This judgment was based on the observation that the elements are reported as not-detected or well below the action levels for these blanks in several of the environmental samples associated with these Lots. It is recommended that an investigation be conducted to determine the source of these parameters in the blank water being utilized onsite.

The LCS associated with Lot No. 8157285 provided a slightly elevated recovery of vanadium. The results reported positive for vanadium in associated samples 805101, 805102, 805143, and 805145 are flagged as estimated high (J+).

Sample 805136 associated with preparatory lot 8163196 analyzed on 8-22 provided MS/MSD recoveries of potassium below the lower limit. The results reported for this element in associated samples 805136, 805139, 805164, 805169, 805161, and 805189 are flagged as estimated low (J-).

Sample 805145 associated with preparatory lot 8157285 analyzed on 6-25 provided an ICP serial dilution result for phosphorus that was approximately 16% larger than the undiluted value. The results reported for this element in associated samples 805101, 805145, 805102, and 805143 are flagged as estimated low (J-).

Sample 805145 associated with preparatory lot 8157285 analyzed on 8-22 provided ICP serial dilution results for arsenic, manganese, and potassium that were approximately 11-44% larger than the undiluted values. The results reported for these elements in associated samples 805101, 805145, 805102, and 805143 are flagged as estimated low (J-).

Sample 805136 associated with preparatory lot 8163196 analyzed on 6-25 provided ICP serial dilution results for manganese, phosphorus, and potassium that were approximately 19-25% larger than the undiluted values. The results reported for manganese in associated sample 805602, phosphorus in associated samples 805136, 805602, 805139, 805164, 805169, 805134, 805161, and 805189 and potassium in associated samples 805602 and 805134 are flagged as estimated low (J-).

Sample 805136 associated with preparatory lot 8163196 analyzed on 8-22 provided ICP serial dilution results for manganese and potassium that were approximately 33-39% larger than the undiluted values. The results reported for manganese in associated

samples 805136, 805139, 805164, 805169, 805134, 805161, and 805189, and potassium in samples 805136, 805139, 805164, 805169, 805161, and 805189 are flagged as estimated low (J-).

Any values reported above the MDL but below the RL, which are flagged as estimated (J), are less accurate as the numbers become smaller. The data user should consider these statistical impacts on data quality.

All additional quality control criteria evaluated were compliant, and no further actions or qualifications were required or deemed necessary.

TABLE A-2.

TECHNICAL REVIEW ACTION SUMMARY

SDG CERSTLQ28B

Antimony	J4, U1	Arsenic	J3, J4
Boron	J4	Manganese	J3, J4
Mercury	J4	Phosphorus	J3
Potassium	J2, J3	Selenium	J4
Uranium	J4	Vanadium	J1, J4

J1 - Positive result is flagged as estimated high (J+) due to non-compliant LCS recovery.

J2 - Result is flagged as estimated low (J-) due to non-compliant MS/MSD recoveries.

J3 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

J4 - Positive result is flagged as estimated (J) due to uncertainty at the low level.

U1 - Positive result is adjusted to not-detected at the reported value (U) due to blank contamination.

TECHNICAL REVIEW REPORT

SDG CERCLAQ28A

(LOTS A8E210129 AND A8E230136)

WET CHEMISTRIES

TECHNICAL REVIEW REPORT
SDG CERCLAQ28A
WET CHEMISTRIES

The data evaluation was based on the associated wet chemistry procedures set forth in the Methods and included the following parameters:

- holding times
- blanks
* - calibration
* - matrix spike sample analysis
* - standard reference material analysis
- duplicate sample analysis
- detection limits
- overall assessment

* All criteria were met for this parameter.

Data validation, described in the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

A glossary of data qualifier definitions is presented in Appendix B.

HOLDING TIMES:

Samples exceeding the holding times presented in the methods are tabulated below:

SAMPLE ID.	PARAMETER	HOLDING TIME (Days)
805515	nitrate-N	6
805516	nitrate-N	6
805501	nitrate-N	5

Action:

- None, see comments.

Comments:

The samples were originally analyzed within holding time and either the signal exceeded the calibration range or the analyses were associated with a non-compliant calibration verification bracket. Only the results from the reanalysis out of holding time should be used since these QA anomalies were not present and a keeping quality study conducted by FMC has shown that this parameter is stable in the environmental matrix considerable in excess of the method limit.

BLANKS:

Blanks providing positive results and their associated 5X action levels are tabulated below:

BLANK ID.	PARAMETER	CONC. (mg/L)	ACTION LEVEL (mg/L)
805701	chloride	0.20	1.0
MB8144386	total cyanide	0.013	0.065

Associated samples with positive results reported below the action level: NONE

DUPLICATE SAMPLE ANALYSIS:

Field Duplicates.

Comments:

For this LOT sample 805601 is collocated with sample 805525.

The QAPjP requires collection of collocated samples, but does not provide detailed specifications regarding precision objectives. The QAPjP provides objectives for laboratory duplicate precision as well as a discussion of the fact that the RPD objectives do not apply below limiting values; however, criteria are not specified for these

conditions. As a result, the reviewer has utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various Regional guidance documents.

For this collocated sample pair, the above precision criteria were met.

DETECTION LIMITS:

For this SDG, the laboratory was required to report results to their Method Detection Limits (MDL). For values below their reporting limits (RL) and above the MDL the laboratory affixed the "B" qualifier. The Method Detection Limit (described in 40CFR Part 136, Appendix B and incorporated by reference in SW-846), provides an error band, by definition, of ± 100 percent. The Estimated Quantitation Limit (EQL), (indicated as the RL by the laboratory) is established at approximately 5-10X the MDL in SW-846, and will contain an error band of ± 30 percent at 5 MDL. The RL associated with this SDG are reasonable for the methodologies utilized by the laboratory. Any values below the RL contain the inherently increasing error band as the numbers become smaller. It is essential that the data user is aware of these statistical impacts on data quality.

Action:

- Associated levels below the laboratory RL but above the MDL (flagged B by the laboratory) have been flagged as estimated (J).

OVERALL ASSESSMENT:

For the rinse blank 805701 the result for chloride that was reported above the MDL but below the RL, is flagged as estimated (J), to indicate that it contains an inherently increasing error band as the number becomes smaller. The data user should consider these statistical impacts on data quality.

All other quality control information evaluated was compliant, no additional actions or flagging were required or deemed necessary.

TECHNICAL REVIEW REPORT

SDG CERCLAQ28B

(LOTS A8E270127, A8E280154, A8E290146, AND A8E300119)

WET CHEMISTRIES

TECHNICAL REVIEW REPORT
SDG CERCLAQ28B
WET CHEMISTRIES

The data evaluation was based on the associated wet chemistry procedures set forth in the Methods and included the following parameters:

- holding times
- blanks
* - calibration
* - matrix spike sample analysis
* - standard reference material analysis
- duplicate sample analysis
- detection limits
- overall assessment

* All criteria were met for this parameter.

Data validation, described in the Guidelines, which includes an evaluation of the usability of technically reviewed results with respect to project Data Quality Objectives and site chemistry knowledge, is included in the Data Validation/Usability Report.

A glossary of data qualifier definitions is presented in Appendix B.

HOLDING TIMES:

Samples exceeding the holding times presented in the methods are tabulated below:

SAMPLE ID.	PARAMETER	HOLDING TIME (Days)
805101	nitrate-N	5
805102	nitrate-N	5

Action:

- None, see comments.

Comments:

The Chain-of-Custody Document indicates that the cooler containing samples 805101 and 805102 was received by the laboratory five days after it was relinquished to the carrier which accounts for the holding time exceedence. Also, this cooler temperature blank was recorded at 13.3°C which exceeds the 4°C specified in the Methods for preservation of nitrate, ammonia, sulfate and cyanide. No action is taken, however, the data user is cautioned that this observation may impact data defensibility.

For the holding time exceedence no action is taken since a keeping quality study conducted by FMC has shown that this parameter is stable in the environmental matrix considerable in excess of the method limit.

BLANKS:

Blanks providing positive results and their associated 5X action levels are tabulated below:

BLANK ID.	PARAMETER	CONC. (mg/L)	ACTION LEVEL (mg/L)
805702	chloride	0.30	1.5
	sulfate	1.5	7.5
MB8150153	chloride	0.10	0.50

Associated samples with positive results reported below the action level: NONE

DUPLICATE SAMPLE ANALYSIS

Field Duplicates.

Comments:

For this LOT sample 805602 is collocated with sample 805136.

The QAPjP requires collection of collocated samples, but does not provide detailed specifications regarding precision objectives. The QAPjP provides objectives for laboratory duplicate precision as well as a discussion of the fact that the RPD objectives do not apply below limiting values; however, criteria are not specified for these conditions. As a result, the reviewer has utilized the 30 percent RPD for situations where both samples contain >5RL of analyte and the 2RL difference criteria where either or both contain <5RL of analyte, which is promulgated in various Regional guidance documents.

For this collocated sample pair, the above precision criteria were met.

DETECTION LIMITS:

For this SDG, the laboratory was required to report results to their Method Detection Limits (MDL). For values below their reporting limits (RL) and above the MDL the laboratory affixed the "B" qualifier. The Method Detection Limit (described in 40CFR Part 136, Appendix B and incorporated by reference in SW-846), provides an error band, by definition, of ± 100 percent. The Estimated Quantitation Limit (EQL), (indicated as the RL by the laboratory) is established at approximately 5-10X the MDL in SW-846, and will contain an error band of ± 30 percent at 5 MDL. The RL associated with this SDG are reasonable for the methodologies utilized by the laboratory. Any values below the RL contain the inherently increasing error band as the numbers become smaller. It is essential that the data user is aware of these statistical impacts on data quality.

Action:

- Associated levels below the laboratory RL but above the MDL (flagged B by the laboratory) have been flagged as estimated (J).

OVERALL ASSESSMENT:

For the rinse blank 805702 the result for chloride that was reported above the MDL but below the RL, is flagged as estimated (J), to indicate that it contains an inherently

increasing error band as the number becomes smaller. The data user should consider these statistical impacts on data quality.

All other quality control information evaluated was compliant, no additional actions or flagging were required or deemed necessary.

APPENDIX B

DEFINITION OF DATA QUALIFIERS

GLOSSARY OF DATA QUALIFIERS

J - The associated value is an estimated quantity.

R - The data are unusable.

U - The parameter is not detected at the reported value.

B - The value is above the MDL or IDL but below the RL, or CRDL

APPENDIX C

GLOSSARY OF ACRONYMS

GLOSSARY OF ACRONYMS

SDG	-	Sample Delivery Group
USEPA	-	Unites States Environmental Protection Agency
DQO	-	Data Quality Objectives
QAPjP	-	Quality Assurance Project Plan
RPD	-	Relative Percent Difference
CRDL	-	Contract Required Detection Limit
RL	-	Reporting Limit
IDL	-	Instrument Detection Limit
MDL	-	Method Detection Limit
CLP	-	Contract Laboratory Program
ICP	-	Ion Coupled Plasma
MS	-	Matrix Spike
MSD	-	Matrix Spike Duplicate

TECHNICAL DATA REVIEW REPORT

CERCLA SDG Groundwater Samples Analyzed by Test America

FMC Corporation, Pocatello, Idaho

Prepared by:

W. N. Bishop

and

Frederick S. Ordway

August 7, 2008

TECHNICAL DATA REVIEW REPORT

CERCLA SDG Groundwater Samples Analyzed by Test America

FMC Corporation, Pocatello, Idaho

Prepared by:

W. N. Bishop

and

Frederick S. Ordway

August 7, 2008

1. INTRODUCTION

This memo summarizes the usability evaluation of the technically reviewed sample results generated by Test America Laboratories, Inc for FMC Corporation. The analyses were performed at the Test America St. Louis laboratory. The data were technically reviewed based on method specifications, and laboratory-developed performance criteria by adapting the procedures set forth in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, EPA402-R-97-016, Final, December 1997; USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, USEPA Office of Solid Waste and Emergency Response, EPA-540/R-94-013, February 1994 and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, USEPA office of Solid Waste and Emergency Response, EPA540/R-94/012, February 1994 (Guidelines).

The samples were water from wells at the Idaho site. The samples were processed in two SDGs, CERSTLQ28A and CERSTLQ28B. The SDG CERSTLQ28A consisted of three laboratory sets, A8E201213, A8E230288, and A8E280159. Sample set CERSTLQ28B consisted of two laboratory ID sets of A8E280171 and A8E290264. The FMC and laboratory sample numbers in each set are listed in Appendix A.

The samples were analyzed for gross alpha, radium-226, and radium-228 activity. Laboratory procedures were not included for review. The laboratory reports listed

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EPA methods 900 for gross alpha, 903.3 MOD for radium-226 and 904 MOD for radium-228.

The laboratory submitted separate reports for CERSTLQ28A and CERSTLQ28B. A summary report and a data report were submitted for each sample group. The summary reports contained a case narrative and a report page for each sample. The data report contained the following items:

Case narrative
Sample summary
Analytical results
Quality control results
Background measurements
Prep reports for Ra-226 and Ra-228
Run logs
Instrument calibrations for Ra-226 and Ra-228
Crosstalk Corrections Standards documentation
Shipping and receiving documents
Chain of custody records
Periodic instrument checks

A Level I technical review was performed on the information provided by the laboratory based on the criteria cited above and professional judgment.

2. RECALCULATION OF RESULTS

The gross alpha, radium-226, and radium-228 concentrations were recalculated for selected samples, laboratory control standards, matrix-spike standards and method blanks using the data submitted. The values for activity, counting uncertainty, and MDC were recalculated.

There were no significant differences between the reported and recalculated values for any of the quantities. It should be noted that the number of reported digits for radium-226 counting efficiency limited the ability to verify calculation accuracy. A comparison of the reported and recalculated values in the selected samples is contained in Appendix B.

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3. DATA REVIEW

The technical review included an evaluation of the following parameters:

- data completeness
- sample receipt
- chemical recovery
- laboratory control samples**
- laboratory duplicates
- matrix spikes**
- method blanks**
- standards and calibration**
- detection limits
- measurement uncertainties
- overall assessment

** Denotes all criteria for this parameter were met

DATA COMPLETENESS

The summary report did not include results for sample set A8E230288. The measurement results for these samples were included on the analytical results sheets of the data report on the CERSTLQ28A samples, but there was no cross reference between the laboratory ID numbers and the FMC sample numbers.

Even though the summary results for the one set were missing the information supplied in the data report was adequate for review. For the other samples the data in the laboratory reports was adequate for review.

SAMPLE RECEIPT:

Samples were water taken from wells at the Idaho site. Samples were collected between May 20 and May 28, 2008 and were shipped on the afternoon of collection or the next day. The samples were received at the laboratory on the morning after shipment. The chain-of-custody information indicated that most of the samples were received in good conditions. Several samples were received with the pH ~ 7. The chain of custody information after receipt at the laboratory was appropriate and did not indicate any problem.

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CHEMICAL RECOVERY:
The procedures for radium-226 and radium-238 include addition of known amount of carriers and weighing of the recovered precipitates to determine the recoveries for analysis.

Chemical yields for radium-226 ranged from 82% to 105%. The yields for radium-228 ranged from 80% to 96%. All of the recoveries were in the generally specified acceptance range of 50 - 125%. Some of the reported activities were calculated using recoveries that were greater than 100%.

LABORATORY CONTROL SAMPLE (LCS):
The recoveries for gross alpha in laboratory control samples ranged from 97% to 104%. The laboratory acceptance range is 50 – 121%. The recoveries for radium-226 ranged from 102% to 114%. The laboratory acceptance range is 73 – 122%. The recoveries for radium-228 ranged from 99% to 118%. The laboratory acceptance range is 50 – 121%.

All reported results were within acceptance ranges.

LABORATORY DUPLICATES:
The laboratory uses the Duplicate Error Ratio (DER) as a measure of agreement for duplicate samples. The DER is the ratio of the difference between sample and duplicate to the sum of the squares of the total propagated uncertainty (TPU) for the two measurements. The DER for pairs of duplicate gross alpha measurements ranged from 0.81 to 2.72. The results for radium-226 duplicates ranged from 0.13 to 0.33. The range for radium-228 duplicates was 0.07 to 1.35. With the exception of the 2.72 value for gross alpha, the duplicate results showed excellent agreement.

MATRIX SPIKES
The recoveries of gross alpha matrix spikes ranged from 55% to 85% compared to the laboratory acceptance limits of 44 – 150%. For radium-226 the matrix spikes recoveries ranged from 106% to 116% compared to the laboratory acceptance limits of 50 – 130%. For radium-228 the matrix spikes recoveries ranged from 112% to 128% compared to the laboratory acceptance limits of 54 – 150.

All reported results were within acceptance ranges.

METHOD BLANK:
The reported values for method blanks for gross alpha, radium-226, and radium-228 were all less than the reported errors and less than the reported values for MDC. The largest values were 0.29 for gross alpha, 0.10 for radium-226 and 0.11 for radium-228.

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All reported results were within acceptance ranges.

STANDARDS AND CALIBRATION

The laboratory provided copies of NIST certifications for the standards used. Appropriate documentation for preparation of the working standards and calibration of detectors was provided. A review of the information provided did not indicate any problem.

DETECTION LIMITS:

The detection limit is reported as minimum detectable concentration (MDC).
There are no applicable guidelines for gross alpha MDC. A value of 0.2 pCi/g for radium-226 will usually provide adequate sensitivity. The background activity for radium-228, a beta emitter, is typically about ten times greater than that for radium-226, an alpha emitter. Thus a sensitivity of 0.7 pCi/g for radium-228 should be equivalent to 0.2 for radium-226. A total of 30 samples from the FMC wells were analyzed. Of these, two values for MDC exceeded 0.2 for radium-226 and two exceeded 0.7 for radium-228.

PROBLEMS REPORTED BY TEST AMERICA

The laboratory reported no problems with these analyses. As noted above there were problems with the conditions of samples when received from the client.

DATA FLAGS

The laboratory report included the data flag, U, assigned to several results because the measured value for activity was less than the MDC. In addition the data flag M was assigned to results for samples when the MDC value was greater than 0.2 for radium-226 or 0.7 for radium-228, and the flag Y was assigned to results calculated using a chemical yield value exceeding 100%. The assignment of data flags and the definition of the flags are shown in Appendix C.

4. OVERALL ASSESSMENT

With the exceptions noted below the data were acceptable.

Several samples were received with the pH about 7. Because radium does not tend to hydrolyze and precipitate at pH 7, it is likely that there was no adverse impact on the results. The laboratory took appropriate action to adjust these samples to the proper pH.

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Radium-226 and radium-228 results were calculated using the measured chemical yields even when the yield was greater than 100%. It is not possible to recover more than all of a substance. It is better practice to use 100% recovery whenever the measured recovery exceeds 100%. The maximum reported yield was 105% thus the maximum discrepancy caused was no more than 5%.

The recoveries for laboratory control standards and matrix spike standards tended to be high. One LCS recovery for radium-228 was 99%. All other LCS and matrix spike recoveries were greater than 100%. The consistent recoveries greater than 100% could indicate a bias in the measurements.

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APPENDIX A
LIST OF SAMPLES

CONFIDENTIAL WORK PRODUCT PREPARED IN ANTICIPATION OF LITIGATION:
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TABLE A1. Samples from Report CERSTLQ28A

FMC Sample ID	Laboratory Sample ID
805TW11	A8E210213-001
805502	A8E210213-002
805TW12	A8E210213-003
805517	A8E210213-004
805TW9	A8E210213-005
805111	A8E210213-006
805146	A8E210213-007
805110	A8E210213-008
805112A,B,C	A8E230288-001
805523	A8E230288-002
805524	A8E230288-003
805701	A8E230288-004
805525	A8E230288-005
805601	A8E230288-006
805515	A8E280159-001
805516	A8E280159-002
805501	A8E280159-003

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TABLE A2. Samples from Report CERSTLQ28B

FMC Sample ID	Laboratory Sample ID
805101	A8E280171-001
805102	A8E280171-002
805143	A8E280171-003
805145A,B,C	A8E280171-004
805136	A8E290264-001
805602	A8E290264-002
805702	A8E290264-003
805139	A8E290264-004
805164	A8E290264-005
805169	A8E290264-006
805134	A8E290264-007
805161	A8E290264-008
805189	A8E290264-009

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APPENDIX B
RECALCULATION OF RESULTS

CONFIDENTIAL WORK PRODUCT PREPARED IN ANTICIPATION OF LITIGATION;
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TABLE B1. Recalculation of Results for Gross Alpha

Laboratory	FMC	Reported Values			Recalculated Values		
Sample ID	Sample ID	Activity	Error	MDC	Activity	Error	MDC
A8E210213-002	805502	3.3	1.9	2.1	3.3	1.9	2.0
A8E210213-007	805146	0.6	2.2	4.3	0.6	2.2	4.0
A8E280159-001	805515	15.8	4.5	3.3	15.8	4.5	3.0
A8E280171-004	805145A,B,C	7.0	12.4	21.6	7.0	12.4	20.1
A8E290264-002	805602	-2.9	11.4	25.1	-2.8	11.1	22.7
A8E290264-008	805161	325	53	28	325	53	26
F8E220000-320B	BLANK	-0.09	0.26	0.63	-0.80	0.26	0.63
F8E220000-320C	LCS	52.4	3.9	1.0	52.4	3.9	0.9
F8E300000-238B	BLANK	0.3	0.4	0.7	0.3	0.4	0.7
F8E300000-238C	LCS	38.4	3.5	1.3	38.8	3.5	1.0
A8E230288-001Sa	MAT SPK	52.6	6.5	2.3	52.6	6.5	2.1
AE8280171-004Sa	MAT SPK	612	67	24	612	67	23

Values are in picocuries/gram.

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TABLE B2. Recalculation of Results for Radium-226

Laboratory	FMC	Reported Values			Recalculated Values		
Sample ID	Sample ID	Activity	TPU	MDC	Activity	TPU	MDC
A8E210213-002	805502	0.16	0.11	0.14	0.16	0.12	0.13
A8E210213-007	805146	0.080	0.091	0.14	0.080	0.10	0.13
A8E280159-001	805515	0.086	0.073	0.10	0.086	0.083	0.10
A8E280171-004	805145A,B,C	0.30	0.13	0.13	0.30	0.14	0.12
A8E290264-002	805602	0.45	0.16	0.13	0.45	0.16	0.12
A8E290264-008	805161	0.16	0.13	0.18	0.17	0.15	0.17
F8E210000-398B	BLANK	-0.012	0.083	0.17	-0.012	0.109	0.16
F8E210000-398C	LCS	12.8	0.78	0.16	12.9	0.79	0.15
F8E280000-279B	BLANK	0.10	0.09	0.12	0.10	0.10	0.11
F8E280000-279C	LCS	11.5	0.68	0.14	11.8	0.70	0.13
A8E230288-001Sa	MAT SPK	13.50	0.72	0.12	13.6	0.73	0.11
AE8280171-004Sa	MAT SPK	13.0	0.76	0.15	13.3	0.78	0.14

Values are in picocuries/gram.

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TABLE B3. Recalculation of Results for Radium-228

Laboratory	FMC	Reported Values			Recalculated Values		
Sample ID	Sample ID	Activity	TPU	MDC	Activity	TPU	MDC
A8E210213-002	805502	0.07	0.41	0.70	0.07	0.48	0.53
A8E210213-007	805146	-0.26	0.25	0.48	-0.26	0.30	0.37
A8E280159-001	805515	0.35	0.35	0.58	0.35	0.41	0.44
A8E280171-004	805145A,B,C	0.90	0.30	0.40	0.90	0.32	0.31
A8E290264-002	805602	1.20	0.45	0.66	1.20	0.50	0.51
A8E290264-008	805161	0.41	0.38	0.61	0.41	0.44	0.47
F8E210000-399B	BLANK	-0.04	0.25	0.45	-0.04	0.30	0.34
F8E210000-399C	LCS	8.69	0.68	0.42	8.71	0.65	0.32
F8E280000-280B	BLANK	-0.42	0.21	0.44	-0.42	0.26	0.33
F8E280000-280C	LCS	7.81	0.60	0.37	7.82	0.57	0.28
A8E230288-001Sa	MAT SPK	9.6	0.76	0.66	9.6	0.75	0.50
AE8280171-004Sa	MAT SPK	10.4	0.75	0.44	10.4	0.71	0.34

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APPENDIX C
DATA FLAGS ASSIGNED TO RESULTS

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TABLE C1. Data Flags Assigned

Laboratory Sample ID	Data flags		
	Alpha	Ra-226	Ra-228
A8E210213-001		M U	
A8E210213-002		M	U
A8E210213-003	U	U	U
A8E210213-004	U	U	U
A8E210213-005	U	U	U
A8E210213-006	U		U
A8E210213-007	U	U	U
A8E210213-008	U	M U	U
A8E230288-001	U	U Y	M U
A8E230288-002		U	U
A8E230288-003		U	U
A8E230288-004	U	U	U
A8E230288-005		U	U
A8E230288-006		U	U
A8E280159-001		U	U
A8E280159-002		U	U
A8E280159-003		U	U
A8E280171-001		Y	U Y
A8E280171-002		Y	U Y
A8E280171-003	U	U Y	U Y
A8E280171-004	U		
A8E290264-001	U		
A8E290264-002	U		
A8E290264-003	U	U Y	U Y
A8E290264-004	U	U Y	U Y
A8E290264-005			
A8E290264-006	M U	U Y	U Y
A8E290264-007			
A8E290264-008		U	U
A8E290264-009			

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TABLE C2. Definition of Data Flags Assigned

M	Desired MDC is not met.
U	The result is less than the measured MDC.
Y	The chemical yield is greater than 100%. Measures yield was used to calculate sample activity.

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DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERCLAQ28A

LOT A8E210129

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	TW-9S	TW-9S	FMC-CERCLA Groundwater	4449.67	
1	TW-11S	TW-11S	FMC-CERCLA Groundwater	4426.18	
1	TW-12S	TW-12S	FMC-CERCLA Groundwater	4436.26	
1	WELL-110	WELL-110	FMC-CERCLA Groundwater	4450.57	
1	WELL-111	WELL-111	FMC-CERCLA Groundwater	4468.04	
1	WELL-146	WELL-146	FMC-CERCLA Groundwater	4459.30	
1	WELL-502	WELL-502	FMC-CERCLA Groundwater	4441.31	
2	WELL-517	WELL-517	Monitoring Wells		

Sample Type: FMC-CERCLA Groundwater

SITE CODE	TW-9S	TW-11S	TW-12S	WELL-110	WELL-111	WELL-146	WELL-502
SAMPLE DATE	05/20/2008	05/20/2008	05/20/2008	05/20/2008	05/20/2008	05/20/2008	05/20/2008
SAMPLE TIME	12:30	09:10	10:55	15:05	13:40	14:20	10:05
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNKHW	KNKHN	KNKHR	KNKH2	KNKHX	KNKHC	KNKHQ
SAMPLE NUMBER	805TW9S	805TW11S	805TW12S	805110	805111	805146	805502
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	64.9	42.37	52.19	66.27	76.37	70.24	57.06
OXIDATION REDUCTION POTENTIAL	-135.1	-138.1	-128.0	-96.4	-98.8	-95.2	-125.7
OXYGEN (O) (FLD) DIS	0.24	6.57	0.38	1.82	0.43	2.54	6.8
PH (FLD)	7.03	7.18	6.47	6.79	7.03	7.02	7.28
SC (UMHOS/CM AT 25 C) (FLD)	2277.0	845.0	1471.0	1958.0	2143.0	1882.0	1036.0
TURBIDITY (NTU) (FLD)	7.5	9.5	8.7	0.4	0.8	0.2	0.2
WATER TEMPERATURE (C) (FLD)	14.6	12.4	14.9	17.3	15.2	17.2	12.6
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	43.4	3.75	14.8	19.3	34.5	38.9	5.36
	,J	,J	,J	,J	,J	,J	,J
SULFATE (SO4)	166.0	49.7	147.0	197.0	166.0	138.0	64.9
CHLORIDE (CL)	193.0	19.9	52.2	94.4	176.0	144.0	44.3
FLUORIDE (F)	0.1	0.8	1.3	0.5	0.2	0.5	0.9
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	10.4	1.6	6.7	4.1	9.4	6.9	2.5
ELEMENTAL PHOSPHORUS (P4)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
PHOSPHORUS (P) TOT	2.42	<0.5	22.3	2.77	4.31	1.29	<0.5
	,J	,J	,J	,J	,J	,J	,J
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT	<0.05	<0.005	<0.005	0.0073	<0.05	<0.05	<0.005
ARSENIC (AS) TOT	0.0257	0.002	0.0203	0.0456	0.0228	0.0301	0.0026
BORON (B) TOT	0.432	<0.5	0.205	0.26	0.419	0.352	<0.5
	,J		,J	,J	,J	,J	
MANGANESE (MN) TOT	0.455	0.004	0.0464	<0.002	0.302	0.0421	<0.002
	,J	,J	,J	,J	,J	,J	,J
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	0.0031	<0.005	0.0051	0.0234	0.0039	0.0018	<0.005
	,U				,U	,U	
VANADIUM (V) TOT	0.0038	0.0026	0.0097	0.0124	0.0072	0.0053	0.0022
	,U			,U	,U	,U	
-- OTHER PARAMETERS --							
GROSS ALPHA (PCI/L)	2.2	2.7	2.1	4.1	3.1	0.6	3.3
	,U		,U	,U	,U	,U	
RADIUM 226 (PCI/L)	0.14	0.078	0.13	0.01	0.18	0.08	0.16
	,U	,M,U	,U	,M,U		,U	,M
RADIUM 228 (PCI/L)	0.14	0.4	0.15	0.44	-0.12	-0.26	0.07
	,U		,U	,U	,U	,U	,U
TOTAL URANIUM	<0.01	0.0029	0.0025	<0.01	<0.01	<0.01	0.0044
CYANIDE (CN) TOT	<0.01	<0.01	<0.01	<0.01	0.019	0.011	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UB1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: Monitoring Wells

SITE CODE	WELL-517
SAMPLE DATE	05/20/2008
SAMPLE TIME	11:50
LAB	TESTAMERIC
LAB NUMBER	KNKHT
SAMPLE NUMBER	805517
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	60.34
OXIDATION REDUCTION POTENTIAL	-95.9
OXYGEN (O) (FLD) DIS	2.69
PH (FLD)	6.93
SC (UMHOS/CM AT 25 C) (FLD)	2575.0
TURBIDITY (NTU) (FLD)	0.3
WATER TEMPERATURE (C) (FLD)	15.9
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	100.0
	,J
SULFATE (SO4)	189.0
CHLORIDE (CL)	198.0
FLUORIDE (F)	0.6
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	0.2
NITRATE (NO3-N)	11.1
ELEMENTAL PHOSPHORUS (P4)	<0.00005
PHOSPHORUS (P) TOT	0.924
	,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.0468
BORON (B) TOT	0.489
	,J
MANGANESE (MN) TOT	<0.002
	,J
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	0.0138
VANADIUM (V) TOT	0.0148
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	-1.1
	,U
RADIUM 226 (PCI/L)	0.06
	,U
RADIUM 228 (PCI/L)	0.16
	,U
TOTAL URANIUM	0.0005
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

INDEX

+---------- SAMPLE NUMBER ORDER ----------+

Page	Sample Number	Lab ##	Date	Site Code
1	805110	KNKH2	05/20/2008	WELL-110
1	805111	KNKHX	05/20/2008	WELL-111
1	805146	KNKHO	05/20/2008	WELL-146
1	805502	KNKHQ	05/20/2008	WELL-502
2	805517	KNKHT	05/20/2008	WELL-517
1	805TW11S	KNKHN	05/20/2008	TW-11S
1	805TW12S	KNKHR	05/20/2008	TW-12S
1	805TW9S	KNKHW	05/20/2008	TW-9S

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
1	KNKH2	805110	05/20/2008	WELL-110
1	KNKHN	805TW11S	05/20/2008	TW-11S
1	KNKHO	805146	05/20/2008	WELL-146
1	KNKHQ	805502	05/20/2008	WELL-502
1	KNKHR	805TW12S	05/20/2008	TW-12S
2	KNKHT	805517	05/20/2008	WELL-517
1	KNKHW	805TW9S	05/20/2008	TW-9S
1	KNKHX	805111	05/20/2008	WELL-111

SAMPLE ID CODES

SAMPLE SUMMARY

CERCLAQ28A : A8E210129

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNKHN	001	805TW11	05/20/08	09:10
KNKHQ	002	805502	05/20/08	10:05
KNKHR	003	805TW12	05/20/08	10:55
KNKHT	004	805517	05/20/08	11:50
KNKHW	005	805TW9	05/20/08	12:30
KNKHX	006	805111	05/20/08	13:40
KNKH0	007	805146	05/20/08	14:20
KNKH2	008	805110	05/20/08	15:05

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE

CERCLAQ28A

The following report contains the analytical results for seventeen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 21, 2008, May 23, 2008 and May 27, 2008, according to documented sample acceptance procedures.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 03, 2008, June 04, 2008, and June 05, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 0.6, 1.3, 0.8, and 13.3°C.

See TestAmerica's Cooler Receipt Form for additional information.

Sample(s) 805515, 805516, and 805501 were received in the laboratory after the holding time for the test, Nitrate, had expired. The samples were collected on 05/22/08 and 05/23/08. The samples were received 05/27/08.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The method blank for samples associated with batch(es) 8144386 cyanide samples contained the target analyte at a reportable level; however, all of the sample results are below the reporting limit, so no positive bias is suspected. Results are reported.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

[redacted]

Chain of Custody Record

CERCLA SDG-1

TAL-4142 (0907)

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

N Canton

Client: FMC	Project Manager: Rob Hartman	Date: 5/20/08	Chain of Custody Number: 376084
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number:	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loed	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: Fed Ex airbill #8605 0511 7803		
Contract/Purchase Order/Quote No.: CERCLA			

Analysis (Attach list if more space is needed): UF/Acid; UF/H_2SO_4; UF/NaOH; WQP; Ammonia; CN

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	WQP	Ammonia	CN	Special Instructions/ Conditions of Receipt
805TW11	5/20/08	09:10		X			L	500			250		L	500	250	see comments
805502		1005														
805TW12		1055														
805517		1150														
805TW9		1230														
805111		1340														
805146		1420														
805110		1505														

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Walter Crane	5/20/08	16:15	1. Received By: Alana Mangum	5/21/08	0920
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments: Special CERCLA Analysis N. Canton see attached sheet for parameters

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

15

TestAmerica Cooler Receipt Form/Narrative **Lot Number: A8E210129**
North Canton Facility

Client EMC Project _____ By: Maria Mangen
Cooler Received on 5/21/08 Opened on 5/21/08 (Signature)
FedEx [X] UPS [ ] DHL [ ] FAS [ ] Stetson [ ] Client Drop Off [ ] TestAmerica Courier [ ] Other _____
TestAmerica Cooler # L805 Multiple Coolers [ ] Foam Box [ ] Client Cooler [ ] Other _____

1. Were custody seals on the outside of the cooler(s)? Yes [X] No [ ] Intact? Yes [X] No [ ] NA [ ]
   If YES, Quantity 2
   Were custody seals on the outside of cooler(s) signed and dated? Yes [X] No [ ] NA [ ]
   Were custody seals on the bottle(s)? Yes [X] No [ ]
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes [X] No [ ]
3. Did custody papers accompany the sample(s)? Yes [X] No [ ] Relinquished by client? Yes [X] No [ ]
4. Were the custody papers signed in the appropriate place? Yes [X] No [ ]
5. Packing material used: Bubble Wrap [ ] Foam [ ] None [ ] Other packaging paper
6. Cooler temperature upon receipt 0.6 °C See back of form for multiple coolers/temps [ ]
   METHOD: IR [X] Other [ ] _____
   COOLANT: Wet Ice [X] Blue Ice [ ] Dry Ice [ ] Water [ ] None [ ]
7. Did all bottles arrive in good condition (Unbroken)? Yes [X] No [ ]
8. Could all bottle labels be reconciled with the COC? Yes [X] No [ ]
9. Were sample(s) at the correct pH upon receipt? Yes [X] No [ ] NA [ ]
10. Were correct bottle(s) used for the test(s) indicated? Yes [X] No [ ]
11. Were air bubbles >6 mm in any VOA vials? Yes [ ] No [ ] NA [X]
12. Sufficient quantity received to perform indicated analyses? Yes [X] No [ ]
13. Was a trip blank present in the cooler(s)? Yes [ ] No [X] Were VOAs on the COC? Yes [ ] No [X]

Contacted PM _____ Date _____ by _____ via Verbal [ ] Voice Mail [ ] Other [ ]
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
W11	<2 >12	5/21/08	am
SO2	<2 >12		
W12	<2 >12		
S12	<2 >12		
TW9	<2 >12		
T11	<2 >12		
146	<2 >12		
160	<2 >12		

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERCLAQ28A

LOT A7E230136

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
2	RINS BLANK-C	RINS BLANK CERCLA	MC-CERCLA Groundwater Q		
1	WELL-112	WELL-112	FMC-CERCLA Groundwater	4467.91	
1	WELL-523	WELL-523	FMC-CERCLA Groundwater	4452.98	
1	WELL-524	WELL-524	FMC-CERCLA Groundwater	4399.92	
1	WELL-525	WELL-525	FMC-CERCLA Groundwater	4399.61	

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-112	WELL-523	WELL-524	WELL-525	WELL-525
SAMPLE DATE	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/22/2008
SAMPLE TIME	11:10	12:15	14:00	14:35	15:00
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNQ2F	KNQ4K	KNQ4N	KNQ4Q	KNQ4R
REMARKS					DUPLICATE
SAMPLE NUMBER	805112A	805523	805524	805525	805601
-- PHYSICAL PARAMETERS --					
DEPTH TO WATER LEVEL (FEET)	73.94	58.46	17.06	16.72	
OXIDATION REDUCTION POTENTIAL	6.1	7.9	-25.7	-23.2	
OXYGEN (O) (FLD) DIS	5.82	4.02	6.81	7.89	
PH (FLD)	7.55	7.5	7.69	7.73	
SC (UMHOS/CM AT 25 C) (FLD)	841.0	907.0	511.0	515.0	
TURBIDITY (NTU) (FLD)	0.3	0.3	0.2	0.3	
WATER TEMPERATURE (C) (FLD)	14.4	13.4	12.4	11.8	
-- MAJOR CONSTITUENTS --					
POTASSIUM (K) TOT	6.92	7.41	3.57	3.58	3.71
	,J	,J	,J	,J	,J
SULFATE (SO4)	88.6	59.0	42.3	44.1	44.0
CHLORIDE (CL)	82.4	109.0	17.9	18.7	18.6
FLUORIDE (F)	0.9	0.6	0.7	0.8	0.8
-- NUTRIENTS --					
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	2.3	4.5	1.5	1.6	1.6
PHOSPHORUS (P) TOT	0.0842	0.0341	0.034	0.0391	<0.5
	,J	,J	,J	,J	,J
-- METALS & MINOR CONSTITUENTS --					
ANTIMONY (SB) TOT	0.0027	<0.005	<0.005	<0.005	<0.005
	,U				
ARSENIC (AS) TOT	0.0047	0.0036	0.0021	<0.01	<0.01
BORON (B) TOT	0.256	<0.5	<0.5	<0.5	<0.5
MANGANESE (MN) TOT	<0.002	<0.002	<0.002	<0.002	0.00068
	,J	,J	,J	,J	,U,J
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	0.0016	0.002	<0.005	<0.005	<0.005
VANADIUM (V) TOT	0.0043	0.0027	0.0032	0.0021	<0.1
-- OTHER PARAMETERS --					
GROSS ALPHA (PCI/L)	0.2	5.7	2.7	2.2	2.1
	,U				
RADIUM 226 (PCI/L)	0.054	0.085	0.11	0.095	0.11
	,U,Y	,U	,U	,U	,U
RADIUM 228 (PCI/L)	-0.45	0.32	0.25	0.4	0.12
	,M,U	,U	,U	,U	,U
TOTAL URANIUM	0.0025	0.0034	0.0021	0.0023	0.0027
					,J
CYANIDE (CN) TOT	<0.01	<0.01	<0.01	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: MC-CERCLA Groundwater QC

SITE CODE	RINS BLANK-C
SAMPLE DATE	05/22/2008
SAMPLE TIME	14:20
LAB	TESTAMERIC
LAB NUMBER	KNQ4P
REMARKS	BLANK
SAMPLE NUMBER	805701
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	0.0491
SULFATE (SO4)	<1.0
CHLORIDE (CL)	0.2
	B
FLUORIDE (F)	<0.1
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	<0.1
PHOSPHORUS (P) TOT	<0.5
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	<0.01
BORON (B) TOT	<0.5
MANGANESE (MN) TOT	0.0011
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	<0.005
VANADIUM (V) TOT	<0.1
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	0.33
	,U
RADIUM 226 (PCI/L)	0.026
	,U
RADIUM 228 (PCI/L)	1.13
	,U
TOTAL URANIUM	<0.01
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
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FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

INDEX

+---------- SAMPLE NUMBER ORDER ----------+

Page	Sample Number	Lab ##	Date	Site Code
1	805112A	KNQ2F	05/22/2008	WELL-112
1	805523	KNQ4K	05/22/2008	WELL-523
1	805524	KNQ4N	05/22/2008	WELL-524
1	805525	KNQ4Q	05/22/2008	WELL-525
1	805601	KNQ4R	05/22/2008	WELL-525
2	805701	KNQ4P	05/22/2008	RINS BLANK-C

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2	KNQ4P	805701	05/22/2008	RINS BLANK-C
1	KNQ4Q	805525	05/22/2008	WELL-525
1	KNQ4R	805601	05/22/2008	WELL-525

SAMPLE ID CODES

SAMPLE SUMMARY

CERCLAQ28A : A8E230136

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNQ2F	001	805112 A,B,C	05/22/08	11:10
KNQ4K	002	805523	05/22/08	12:15
KNQ4N	003	805524	05/22/08	14:00
KNQ4P	004	805701	05/22/08	14:20
KNQ4Q	005	805525	05/22/08	14:35
KNQ4R	006	805601	05/22/08	15:00

NOTE(S):

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(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE
CERCLAQ28A

The following report contains the analytical results for seventeen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 21, 2008, May 23, 2008 and May 27, 2008, according to documented sample acceptance procedures.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 03, 2008, June 04, 2008, and June 05, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperatures of the coolers upon sample receipt were 0.6, 1.3, 0.8, and 13.3°C.

See TestAmerica's Cooler Receipt Form for additional information.

Sample(s) 805515, 805516, and 805501 were received in the laboratory after the holding time for the test, Nitrate, had expired. The samples were collected on 05/22/08 and 05/23/08. The samples were received 05/27/08.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The method blank for samples associated with batch(es) 8144386 cyanide samples contained the target analyte at a reportable level; however, all of the sample results are below the reporting limit, so no positive bias is suspected. Results are reported.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4142 (0907)

CERCLA SDG-1

N. Canton

Client: FMC	Project Manager: Rob Hartman	Date: 5/22/08	Chain of Custody Number: 376079
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number:	Page 2 of 3
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loch	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: FedEx airbill #8605 0511 7814		
Contract/Purchase Order/Quote No.: CERCLA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis (Attach list if more space is needed): WBR UF/RAD	Ammonia UF/H2SO4	CN UF/NaOH									Special Instructions/ Conditions of Receipt
805112A	5/22/08	11:10		X				L	8			18			L	8	8									See comments
805112B	↓	↓		↓				↓	↓			↓			↓	↓	↓									
805112C	↓	↓		↓				↓	↓			↓			↓	↓	↓									

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify):

1. Relinquished By: Walter Crowe	Date: 5/22/08	Time: 16:00	1. Received By: [signature]	Date: 5-23-08	Time: 0930
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Special CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

18

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CERCLA SDG-1

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/22/08	Chain of Custody Number: 376080
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 3 of 3
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: Fed Ex Airbill #8605 0511 7814		
Contract/Purchase Order/Quote No.: CERCLA			

Analysis (Attach list if more space is needed): WQP uF/Reg; Ammonia uF/H_2SO_4; CN uF/NaOH

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	WQP uF/Reg	Ammonia uF/H_2SO_4	CN uF/NaOH	Special Instructions/ Conditions of Receipt
805523	5/22/08	1215		X			L	φ			25		L	φ	25	see comments
805524		1400														
805701		1420														
805525		1435														
805601		1500														

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Walter Crane	5/22/08	16:00	1. Received By: [signature]	5-23-08	0930
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments: Special CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

TestAmerica Cooler Receipt Form/Narrative Lot Number: 180230134
North Canton Facility

Client EMC Project _____ By: [illegible]
Cooler Received on 5-23-08 Opened on 5-23-08 (Signature)
FedEx ☑ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # _____ Multiple Coolers ☑ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☑ No ☐ Intact? Yes ☑ No ☐ NA ☐
   If YES, Quantity _____
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☑ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☐ No ☑
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes ☑ No ☐
3. Did custody papers accompany the sample(s)? Yes ☑ No ☐ Relinquished by client? Yes ☑ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☑ No ☐
5. Packing material used: Bubble Wrap ☑ Foam ☐ None ☐ Other _____
6. Cooler temperature upon receipt _____ °C See back of form for multiple coolers/temps ☑
   METHOD: IR ☑ Other ☐ _____
   COOLANT: Wet Ice ☑ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☑ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☑ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☑ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☑ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☑
12. Sufficient quantity received to perform indicated analyses? Yes ☑ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☑ Were VOAs on the COC? Yes ☐ No ☑

Contacted PM _____ Date _____ by _____ via Verbal ☐ Voice Mail ☐ Other ☐
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
173	<2 >12	5-23-08	[illegible]
174	<2 >12		
175	<2 >12		
147	<2 >12		
149	<2 >12		
127	<2 >12		
167	<2 >12		
112	<2 <2 <2 >12 >12 >12		

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials
523	<2 >12	5-23-08	US
524	<2 >12		
701	<2 >12		
525	<2 >12		
601	<2 >12		

Cooler #	Temp. °C	Method	Coolant
L862	1.3	IR	ICE
L815	0.8		

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERCLAQ28B

LOT A8E270127

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
2	WELL-101	WELL-101	FMC-CERCLA Groundwater	4472.00	
1	WELL-102	WELL-102	FMC Deep Wells	4471.68	

Sample Type: FMC Deep Wells

SITE CODE	WELL-102
SAMPLE DATE	05/23/2008
SAMPLE TIME	08:40
LAB	TESTAMERIC
LAB NUMBER	KNWQT
SAMPLE NUMBER	805102
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	75.98
OXIDATION REDUCTION POTENTIAL	-70.3
OXYGEN (O) (FLD) DIS	7.24
PH (FLD)	7.35
SC (UMHOS/CM AT 25 C) (FLD)	834.0
TURBIDITY (NTU) (FLD)	4.0
WATER TEMPERATURE (C) (FLD)	13.8
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	6.7
	NE,J
SULFATE (SO4)	56.5
CHLORIDE (CL)	133.0
FLUORIDE (F)	0.4
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	1.9
PHOSPHORUS (P) TOT	<0.5
	NE,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.0127
	,J
BORON (B) TOT	<0.5
MANGANESE (MN) TOT	0.0064
	BE,J
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	<0.005
VANADIUM (V) TOT	<0.01
	B,J
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	4.2
RADIUM 226 (PCI/L)	0.19
	,Y
RADIUM 228 (PCI/L)	0.43
	,U,Y
TOTAL URANIUM	0.0028
	B
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-101
SAMPLE DATE	05/23/2008
SAMPLE TIME	09:10
LAB	TESTAMERIC
LAB NUMBER	KNWQR
SAMPLE NUMBER	BC5101
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	76.24
OXIDATION REDUCTION POTENTIAL	-64.6
OXYGEN (O) (FLD) DIS	7.5
PH (FLD)	7.37
SC (UMHOS/CM AT 25 C) (FLD)	915.0
TURBIDITY (NTU) (FLD)	0.2
WATER TEMPERATURE (C) (FLD)	13.4
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	6.76
	NE,J
SULFATE (SO4)	87.3
CHLORIDE (CL)	144.9
FLUORIDE (F)	0.4
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	2.3
PHOSPHORUS (P) TOT	<0.5
	NE,C
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.0125
	B
BORON (B) TOT	<0.5
MANGANESE (MN) TOT	<0.002
	E,J
MERCURY (HG) TOT	0.000083
	B
SELENIUM (SE) TOT	<0.005
VANADIUM (V) TOT	<0.01
	B,J
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	5.4
RADIUM 226 (PCI/L)	0.3
	,Y
RADIUM 228 (PCI/L)	0.54
	,U,Y
TOTAL URANIUM	0.0031
	B
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

INDEX

SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
2	805101	KNWQR	05/23/2008	WELL-101
1	805102	KNWQT	05/23/2008	WELL-102

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
2	KNWQR	805101	05/23/2008	WELL-101
1	KNWQT	805102	05/23/2008	WELL-102

SAMPLE ID CODES

SAMPLE SUMMARY

A8E270127

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNWQR	001	805101	05/23/08	09:10
KNWQT	002	805102	05/23/08	08:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

LABORATORY CASE NARRATIVE

CASE NARRATIVE

CERCLAQ28B

The following report contains the analytical results for fifteen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 27, 2008, May 28, 2008, May 29, 2008 and May 30, 2008, according to documented sample acceptance procedures.

This SDG consists of (4) laboratory ID's: A8E270127, A8E280154, A8E290146, and A8E300119.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 05, 2008, on June 06, 2008, and Jim Sieverson, Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The coolers were received at temperatures ranging from 1.0 to 13.3°C.

Sample(s) 805101 and 805102 were received in the laboratory after the recommended holding time for the Nitrate test had expired. The samples were collected on May 22, 2008 and May 23, 2008 and received in the laboratory on May 27, 2008.

See TestAmerica's Cooler Receipt Form for additional information.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The sample(s) that contained concentrations of target analyte(s) at a reportable level in the associated Method Blank(s) were flagged with "J". Refer to the sample report pages for the affected analytes(s).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805145 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(es) 8154246 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for batch(es) 8154247 and 8156307 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

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Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

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The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

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METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CERCLA SDG-1 & SDG-2

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/23/08	Chain of Custody Number: 376076
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: Fed Ex Airbill # 8605 0511 7847		
Contract/Purchase Order/Quote No.: CERCLA			

Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	LWDP UF/Radium	Ammonia UF/H2SO4	CN UF/NaOH	Special Instructions/ Conditions of Receipt
805515	5/22/08	17:20		X			L	50			50		L	50	50	see comments
CERCLA 805516	↓	1755														
End SDG-1 805501	5/23/08	0740														End of CERCLA SDG-1
Start SDG-2 805101		0910														Start of CERCLA SDG-2
CERCLA 805102	↓	0840					↓	↓			↓		↓	↓	↓	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Walter Crane	5/23/08	10:00	1. Received By: [signature]	5/27/08	0830
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments: Special CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

22

TestAmerica Cooler Receipt Form/Narrative Lot Number: KBE270127

North Canton Facility

Client FMC Project _____ By [signature] (Signature)

Cooler Received on 5/27/08 Opened on 5/27/08

FedEx ☐ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____

TestAmerica Cooler # LBB7 Multiple Coolers ☐ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☒ No ☐ Intact? Yes ☒ No ☐ NA ☐
   If YES, Quantity 2
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☒ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☒ No ☐
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes ☒ No ☐
3. Did custody papers accompany the sample(s)? Yes ☒ No ☐ Relinquished by client? Yes ☒ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☒ No ☐
5. Packing material used: Bubble Wrap ☐ Foam ☐ None ☒ Other _____
6. Cooler temperature upon receipt 13.3 °C See back of form for multiple coolers/temps ☐
   METHOD: IR ☒ Other ☐ _____
   COOLANT: Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ Water ☒ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☒ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☒ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☒ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☒ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☒
12. Sufficient quantity received to perform indicated analyses? Yes ☒ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☒ Were VOAs on the COC? Yes ☐ No ☒

Contacted PM MJL Date 5/27 by DM via Verbal ☒ Voice Mail ☐ Other ☐

Concerning Temp

14. CHAIN OF CUSTODY

The following discrepancies occurred:

SAMPLES RECEIVED ON 5/27/08, OUT OF RECOMMENDED HOLD TIME. PER CLIENT REQUEST, THE LAB IS TO PROCEED WITH ANALYSIS. CONTACTED ERICKA VALENCIA 5/27/08 11:00AM MJL

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.

Sample(s) _____ were received in a broken container.

Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*

What time was preservative added to sample(s)? _____

Client ID	pH		Date	Initials
515	<2	>12	5/27	DM
516	<2	>12		
501	<2	>12		
101	<2	>12		
102	<2	>12	—	—

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler #	Temp. °C	Method	Coolant

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERCLAQ28B

LOT A8E280154

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
5	RINS BLANK-C	RINS BLANK CERCLA	MC-CERCLA Groundwater Q		
1	WELL-136	WELL-136	FMC-CERCLA Groundwater	4479.55	
1	WELL-139	WELL-139	FMC-CERCLA Groundwater	4467.66	
1	WELL-143	WELL-143	FMC-CERCLA Groundwater	4496.31	
3	WELL-145	WELL-145	FMC Shallow Well	4478.26	

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-136	WELL-139	WELL-143
SAMPLE DATE	05/27/2008	05/27/2008	05/27/2008
SAMPLE TIME	15:35	16:25	13:55
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN0DP	KN0D3	KN0C4
SAMPLE NUMBER	805136	805139	805143
-- PHYSICAL PARAMETERS --			
DEPTH TO WATER LEVEL (FEET)	87.73	72.9	103.63
OXIDATION REDUCTION POTENTIAL	33.7	62.2	114.4
OXYGEN (O) (FLD) DIS	0.51	1.13	0.31
PH (FLD)	5.41	6.9	5.98
SC (UMHOS/CM AT 25 C) (FLD)	5820.0	4589.0	3191.0
TURBIDITY (NTU) (FLD)	0.3	0.3	0.4
WATER TEMPERATURE (C) (FLD)	15.3	12.8	14.5
-- MAJOR CONSTITUENTS --			
POTASSIUM (K) TOT	33.0	26.8	16.5
	E,J	E,J	NE,J
SULFATE (SO4)	2600.0	938.0	587.0
CHLORIDE (CL)	144.0	792.0	484.0
	J	J	J
FLUORIDE (F)	0.5	1.1	0.5
-- NUTRIENTS --			
TOTAL AMMONIA (NH3+NH4 AS N)	1.8	<0.2	2.0
NITRATE (NO3-N)	2.4	38.2	15.3
PHOSPHORUS (P) TOT	75.9	<0.5	1.1
	NE,J	NE,J	NE,J
-- METALS & MINOR CONSTITUENTS --			
ANTIMONY (SB) TOT	<0.005	<0.005	<0.005
	,U		
ARSENIC (AS) TOT	0.347	<0.01	0.098
			B,J
BORON (B) TOT	0.819	0.9	0.25
			B
MANGANESE (MN) TOT	1.06	<0.002	0.349
	E,J	E,J	E,J
MERCURY (HG) TOT	<0.0002	0.00018	0.000068
		B	B
SELENIUM (SE) TOT	0.0332	0.0303	0.0653
	B	B	
VANADIUM (V) TOT	0.0185	<0.01	0.0619
	B		B,J
-- OTHER PARAMETERS --			
GROSS ALPHA (PCI/L)	8.0	7.0	13.2
	,U	,U	,U
RADIUM 226 (PCI/L)	0.4	0.106	0.14
		,U,Y	,U,Y

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-136	WELL-139	WELL-143
SAMPLE DATE	05/27/2008	05/27/2008	05/27/2008
SAMPLE TIME	15:35	16:25	13:55
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN0DP	KN0D3	KN0C4
SAMPLE NUMBER	805136	805139	805143
-- OTHER PARAMETERS --			
RADIUM 228 (PCI/L)	1.06	0.41	0.21
		,U,Y	,U,Y
TOTAL URANIUM	<0.001	0.0066	0.008
		B	B
CYANIDE (CN) TOT	<0.01	0.022	0.035

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC Shallow Well

SITE CODE	WELL-145
SAMPLE DATE	05/27/2008
SAMPLE TIME	14:50
LAB	TESTAMERIC
LAB NUMBER	KN0DJ
SAMPLE NUMBER	805145A
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	86.97
OXIDATION REDUCTION POTENTIAL	54.7
OXYGEN (O) (FLD) DIS	0.44
PH (FLD)	5.44
SC (UMHOS/CM AT 25 C) (FLD)	5600.0
TURBIDITY (NTU) (FLD)	4.5
WATER TEMPERATURE (C) (FLD)	15.3
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	37.7
	NE,J
SULFATE (SO4)	2400.0
CHLORIDE (CL)	154.0
	J
FLUORIDE (F)	0.5
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	2.5
NITRATE (NO3-N)	4.5
PHOSPHORUS (P) TOT	57.3
	NE,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.298
	,J
BORON (B) TOT	0.674
MANGANESE (MN) TOT	1.16
	E,J
MERCURY (HG) TOT	0.000066
	B
SELENIUM (SE) TOT	0.0608
VANADIUM (V) TOT	0.0147
	B,J
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	7.0
	,U
RADIUM 226 (PCI/L)	0.3
RADIUM 228 (PCI/L)	0.9
TOTAL URANIUM	<0.001
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-136
SAMPLE DATE	05/27/2008
SAMPLE TIME	16:00
LAB	TESTAMERIC
LAB NUMBER	KN0D0
REMARKS	DUPLICATE
SAMPLE NUMBER	B05602
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	35.1
	E,J
SULFATE (SO4)	2590.0
CHLORIDE (CL)	145.0
	J
FLUORIDE (F)	0.5
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	1.6
NITRATE (NO3-N)	2.4
PHOSPHORUS (P) TOT	73.0
	NE,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.05
ARSENIC (AS) TOT	0.31
BORON (B) TOT	0.751
MANGANESE (MN) TOT	1.29
	E,J
MERCURY (HG) TOT	0.00008
	B
SELENIUM (SE) TOT	0.0295
	B
VANADIUM (V) TOT	0.0318
	B
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	-3.0
	,U
RADIUM 226 (PCI/L)	0.45
RADIUM 228 (PCI/L)	1.2
TOTAL URANIUM	<0.01
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: MC-CERCLA Groundwater QC

SITE CODE	RINS BLANK-C
SAMPLE DATE	05/27/2008
SAMPLE TIME	16:15
LAB	TESTAMERIC
LAB NUMBER	KNOD1
REMARKS	BLANK
SAMPLE NUMBER	805702
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	<1.0
	E
SULFATE (SO4)	1.5
CHLORIDE (CL)	0.3
	B J
FLUORIDE (F)	<0.1
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	<0.1
PHOSPHORUS (P) TOT	<0.5
	NE
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.05
ARSENIC (AS) TOT	<0.1
BORON (B) TOT	<0.5
MANGANESE (MN) TOT	<0.02
	E
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	<0.05
VANADIUM (V) TOT	0.0355
	B
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	0.01
	,U
RADIUM 226 (PCI/L)	0.07
	,U,Y
RADIUM 228 (PCI/L)	0.31
	,U,Y
TOTAL URANIUM	<0.01
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

INDEX

+---------- SAMPLE NUMBER ORDER ----------+

Page	Sample Number	Lab ##	Date	Site Code
1	805136	KN0DP	05/27/2008	WELL-136
1	805139	KN0D3	05/27/2008	WELL-139
1	805143	KN0C4	05/27/2008	WELL-143
3	805145A	KN0DJ	05/27/2008	WELL-145
4	805602	KN0D0	05/27/2008	WELL-136
5	805702	KN0D1	05/27/2008	RINS BLANK-C

+---------- LAB NUMBER ORDER ----------+

Page	Lab ##	Sample Number	Date	Site Code
1	KN0C4	805143	05/27/2008	WELL-143
4	KN0D0	805602	05/27/2008	WELL-136
5	KN0D1	805702	05/27/2008	RINS BLANK-C
1	KN0D3	805139	05/27/2008	WELL-139
3	KN0DJ	805145A	05/27/2008	WELL-145
1	KN0DP	805136	05/27/2008	WELL-136

SAMPLE ID CODES

SAMPLE SUMMARY

A8E280154

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN0C4	001	805143	05/27/08	13:55
KN0DJ	002	805145 A,B,C	05/27/08	14:50
KN0DP	003	805136	05/27/08	15:35
KN0D0	004	805602	05/27/08	16:00
KN0D1	005	805702	05/27/08	16:15
KN0D3	006	805139	05/27/08	16:25

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

LABORATORY CASE NARRATIVE

CASE NARRATIVE
CERCLAQ28B

The following report contains the analytical results for fifteen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 27, 2008, May 28, 2008, May 29, 2008 and May 30, 2008, according to documented sample acceptance procedures.

This SDG consists of (4) laboratory ID's: A8E270127, A8E280154, A8E290146, and A8E300119.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 05, 2008, on June 06, 2008, and Jim Sieverson, Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The coolers were received at temperatures ranging from 1.0 to 13.3°C.

Sample(s) 805101 and 805102 were received in the laboratory after the recommended holding time for the Nitrate test had expired. The samples were collected on May 22, 2008 and May 23, 2008 and received in the laboratory on May 27, 2008.

See TestAmerica's Cooler Receipt Form for additional information.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The sample(s) that contained concentrations of target analyte(s) at a reportable level in the associated Method Blank(s) were flagged with "J". Refer to the sample report pages for the affected analytes(s).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805145 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(es) 8154246 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for batch(es) 8154247 and 8156307 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

Special CERCLA SDG-2

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4142 (0907)

N. Canton

Client: FMC	Project Manager: Rob Hartman	Date: 5/28/08	Chain of Custody Number: 376074
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: Fed Ex Airbill #8605 0511 7870		
Contract/Purchase Order/Quote No.: CERCLA			

Analysis (Attach list if more space is needed): WQP UF Raw; Ammonia UF H_2SO_4; CN UF NaOH

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	WQP UF Raw	Ammonia UF H_2SO_4	CN UF NaOH	Special Instructions/ Conditions of Receipt
805143	5/27/08	13:55		X			L	✓			✓		L	✓	✓	see comments
805145A		1450														
805145B		1450														
805145C		1450														
805136		1535														
805602		1600														
805702		1615														
805139		1625														

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Normal

QC Requirements (Specify)

	Date	Time		Date
1. Relinquished By: Walter Crane	5/28/08	17:00	1. Received By: Deana Mangum	5/28/08
2. Relinquished By			2. Received By	
3. Relinquished By			3. Received By	

Comments: Special CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

25

TestAmerica Cooler Receipt Form/Narrative **Lot Number:** 180180154
North Canton Facility

Client FMC Project _____ By: Alaina Mangum (Signature)
Cooler Received on 5/28/08 Opened on 5/28/08
FedEx [X] UPS [ ] DHL [ ] FAS [ ] Stetson [ ] Client Drop Off [ ] TestAmerica Courier [ ] Other _____
TestAmerica Cooler # L364 Multiple Coolers [ ] Foam Box [ ] Client Cooler [ ] Other _____

1. Were custody seals on the outside of the cooler(s)? Yes [X] No [ ] Intact? Yes [X] No [ ] NA [ ]
   If YES, Quantity 2
   Were custody seals on the outside of cooler(s) signed and dated? Yes [X] No [ ] NA [ ]
   Were custody seals on the bottle(s)? Yes [X] No [ ]
   If YES, are there any exceptions? No
2. Shippers' packing slip attached to the cooler(s)? Yes [X] No [ ]
3. Did custody papers accompany the sample(s)? Yes [X] No [ ] Relinquished by client? Yes [X] No [ ]
4. Were the custody papers signed in the appropriate place? Yes [X] No [ ]
5. Packing material used: Bubble Wrap [ ] Foam [ ] None [ ] Other plastic bag ice
6. Cooler temperature upon receipt 2.2 °C See back of form for multiple coolers/temps [ ]
   METHOD: IR [X] Other [ ] _____
   COOLANT: Wet Ice [X] Blue Ice [ ] Dry Ice [ ] Water [ ] None [ ]
7. Did all bottles arrive in good condition (Unbroken)? Yes [X] No [ ]
8. Could all bottle labels be reconciled with the COC? Yes [X] No [ ]
9. Were sample(s) at the correct pH upon receipt? Yes [X] No [ ] NA [ ]
10. Were correct bottle(s) used for the test(s) indicated? Yes [X] No [ ]
11. Were air bubbles >6 mm in any VOA vials? Yes [ ] No [ ] NA [X]
12. Sufficient quantity received to perform indicated analyses? Yes [X] No [ ]
13. Was a trip blank present in the cooler(s)? Yes [ ] No [X] Were VOAs on the COC? Yes [ ] No [X]

Contacted PM _____ Date _____ by _____ via Verbal [ ] Voice Mail [ ] Other [ ]
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
143	<2 >12	5/28/08	am
145	<2 <2 <2 >12 >12 >12		
186	<2, >12		
602	<2 >12		
702	<2 >12		
139	<2 >12		

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler #	Temp. °C	Method	Coolant

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERCLAQ28B

LOT A8E290146

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
2	WELL-134	WELL-134	PMC-CERCLA Groundwater	4478.93	
2	WELL-142	WELL-142	PMC-CERCLA Groundwater	4564.47	
2	WELL-161	WELL-161	PMC-CERCLA Groundwater	4668.41	
2	WELL-164	WELL-164	PMC-CERCLA Groundwater	4588.09	
1	WELL-169	WELL-169	PMC-RCRA Groundwater	4474.40	
2	WELL-189	WELL-189	PMC-CERCLA Groundwater	4560.72	

Sample Type: FMC-RCRA Groundwater

SITE CODE	WELL-169
SAMPLE DATE	05/28/2008
SAMPLE TIME	07:45
LAB	TESTAMERIC
LAB NUMBER	KN2C6
SAMPLE NUMBER	805169
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	77.35
OXIDATION REDUCTION POTENTIAL	114.4
OXYGEN (O) (FLD) DIS	8.08
PH (FLD)	8.13
SC (UMHOS/CM AT 25 C) (FLD)	434.0
TURBIDITY (NTU) (FLD)	2.1
WATER TEMPERATURE (C) (FLD)	14.4
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	6.48
	E,J
SULFATE (SO4)	27.0
CHLORIDE (CL)	36.7
FLUORIDE (F)	0.7
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	1.3
PHOSPHORUS (P) TOT	<0.5
	NB,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	<0.01
BORON (B) TOT	<0.5
MANGANESE (MN) TOT	<0.002
	E,J
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	<0.005
VANADIUM (V) TOT	0.0109
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	0.7
	,M,U
RADIUM 226 (PCI/L)	0.18
	,U,Y
RADIUM 228 (PCI/L)	0.43
	,U,Y
TOTAL URANIUM	0.0016
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-134	WELL-142	WELL-161	WELL-164	WELL-189
SAMPLE DATE	05/28/2008	05/13/2008	05/28/2008	05/27/2008	05/28/2008
SAMPLE TIME	08:30	09:45	13:10	18:35	14:00
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN2C9	KN2DH	KN2DD	KN2C2	KN2DE
SAMPLE NUMBER	805134	805142	805161	805164	805189
-- PHYSICAL PARAMETERS --					
DEPTH TO WATER LEVEL (FEET)	85.18	144.83	109.67	154.62	167.98
OXIDATION REDUCTION POTENTIAL	99.0	54.5	13.8	2.1	11.4
OXYGEN (O) (FLD) DIS	0.24	1.71	0.5	0.34	0.26
PH (FLD)	6.73	6.31	6.29	6.2	5.83
SC (UMHOS/CM AT 25 C) (FLD)	2805.0	3740.0	4380.0	5417.0	5837.0
TURBIDITY (NTU) (FLD)	1.2	0.3	0.3	0.2	0.5
WATER TEMPERATURE (C) (FLD)	16.9	15.9	16.9	16.0	15.8
-- MAJOR CONSTITUENTS --					
POTASSIUM (K) TOT	153.0	20.5	18.8	14.9	28.5
	E,J		E,J	E,J	E,J
SULFATE (SO4)	325.0	1270.0	1800.0	2260.0	2730.0
CHLORIDE (CL)	287.0	140.0	177.0	192.0	148.0
FLUORIDE (F)	0.2	0.1	0.1	0.1	0.5
-- NUTRIENTS --					
TOTAL AMMONIA (NH3+NH4 AS N)	0.5	<0.2	<0.2	<0.2	1.9
NITRATE (NO3-N)	21.2	2.9	5.4	4.4	2.7
PHOSPHORUS (P) TOT	19.8	2.86	<0.5	43.4	81.8
	NE,J		NE,J	NE,J	NE,J
-- METALS & MINOR CONSTITUENTS --					
ANTIMONY (SB) TOT	<0.005		<0.005	<0.005	<0.005
	,U				,U
ARSENIC (AS) TOT	0.0982	0.0582	<0.01	0.227	0.36
	B	B			
BORON (B) TOT	0.897		<0.5	0.608	0.831
MANGANESE (MN) TOT	2.34		0.0043	0.0038	0.871
	E,J		E,J	E,J	E,J
MERCURY (HG) TOT	0.000068		0.00028	0.000062	<0.0002
				B	
SELENIUM (SE) TOT	<0.05	0.0087	0.0051	0.0144	0.0341
		B		B	B
VANADIUM (V) TOT	0.0138		<0.01	0.0165	0.0186
	B			B	
-- OTHER PARAMETERS --					
GROSS ALPHA (PCI/L)	1.5		325.0	36.0	4.0
RADIUM 226 (PCI/L)	0.29		0.16	0.57	0.35
			,U		
RADIUM 228 (PCI/L)	0.89		0.41	0.85	0.98
			,U		
TOTAL URANIUM	<0.01		0.257	0.0129	<0.001

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-134	WELL-142	WELL-161	WELL-164	WELL-189
SAMPLE DATE	05/28/2008	05/13/2008	05/28/2008	05/27/2008	05/28/2008
SAMPLE TIME	08:30	09:45	13:10	18:35	14:00
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KN2C9	KN2DH	KN2DD	KN2C2	KN2DE
SAMPLE NUMBER	805134	805142	805161	805164	805189
-- OTHER PARAMETERS --					
CYANIDE (CN) TOT	0.049		<0.01	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

INDEX

SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
2	805134	KN2C9	05/28/2008	WELL-134
2	805142	KN2DH	05/13/2008	WELL-142
2	805161	KN2DD	05/28/2008	WELL-161
2	805164	KN2C2	05/27/2008	WELL-164
1	805169	KN2C6	05/28/2008	WELL-169
2	805189	KN2DE	05/28/2008	WELL-189

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
2	KN2C2	805164	05/27/2008	WELL-164
1	KN2C6	805169	05/28/2008	WELL-169
2	KN2C9	805134	05/28/2008	WELL-134
2	KN2DD	805161	05/28/2008	WELL-161
2	KN2DE	805189	05/28/2008	WELL-189
2	KN2DH	805142	05/13/2008	WELL-142

SAMPLE ID CODES

SAMPLE SUMMARY

A8E290146

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN2C2	001	805164	05/27/08	18:35
KN2C6	002	805169	05/28/08	07:45
KN2C9	003	805134	05/28/08	08:30
KN2DD	004	805161	05/28/08	13:10
KN2DE	005	805189	05/28/08	14:00
KN2DH	006	805142	05/28/08	09:45

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

LABORATORY CASE NARRATIVE

CASE NARRATIVE
CERCLAQ28B

The following report contains the analytical results for fifteen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 27, 2008, May 28, 2008, May 29, 2008 and May 30, 2008, according to documented sample acceptance procedures.

This SDG consists of (4) laboratory ID's: A8E270127, A8E280154, A8E290146, and A8E300119.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 05, 2008, on June 06, 2008, and Jim Sieverson, Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The coolers were received at temperatures ranging from 1.0 to 13.3°C.

Sample(s) 805101 and 805102 were received in the laboratory after the recommended holding time for the Nitrate test had expired. The samples were collected on May 22, 2008 and May 23, 2008 and received in the laboratory on May 27, 2008.

See TestAmerica's Cooler Receipt Form for additional information.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The sample(s) that contained concentrations of target analyte(s) at a reportable level in the associated Method Blank(s) were flagged with "J". Refer to the sample report pages for the affected analytes(s).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805145 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(es) 8154246 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for batch(es) 8154247 and 8156307 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

[redacted]

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CERCLA SDG-2

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/28/08	Chain of Custody Number: 376060
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208)241-8216	Lab Number	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: FedEx Airbill #8605 0511 7880		
Contract/Purchase Order/Quote No.: CERCLA			

Analysis (Attach list if more space is needed): WQ P UF/Raw; Ammonia UF/H2SO4; CN UF/NaOH

Special Instructions/Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	WQ P UF/Raw	Ammonia UF/H2SO4	CN UF/NaOH	Special Instructions/Conditions of Receipt
805164	5/28/08	18:35		X			L	80			80		L	80	80	see comments
805169	5/28/08	07:45														Special CERCLA
805134		0830														
805161		1310														
805189		1400														
805142		0945									80 NO					Regular CERCLA
805190																we 5/28/08

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Walter Crane	5/28/08	14:30	1. Received By: Alana Marquez	5/29/08	980
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments: Regular + Special CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

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TestAmerica Cooler Receipt Form/Narrative **Lot Number:** 180290140
North Canton Facility

Client FMC Project _____ By: Dawna Mangan (Signature)
Cooler Received on 5/29/08 Opened on 5/29/08
FedEx [X] UPS [ ] DHL [ ] FAS [ ] Stetson [ ] Client Drop Off [ ] TestAmerica Courier [ ] Other _____
TestAmerica Cooler # L136 Multiple Coolers [ ] Foam Box [ ] Client Cooler [ ] Other _____

1. Were custody seals on the outside of the cooler(s)? Yes [X] No [ ] Intact? Yes [X] No [ ] NA [ ]
   If YES, Quantity 2
   Were custody seals on the outside of cooler(s) signed and dated? Yes [X] No [ ] NA [ ]
   Were custody seals on the bottle(s)? Yes [X] No [ ]
   If YES, are there any exceptions? NONE
2. Shippers' packing slip attached to the cooler(s)? Yes [X] No [ ]
3. Did custody papers accompany the sample(s)? Yes [X] No [ ] Relinquished by client? Yes [X] No [ ]
4. Were the custody papers signed in the appropriate place? Yes [ ] No [ ]
5. Packing material used: Bubble Wrap [ ] Foam [ ] None [ ] Other Air Bags/packing paper
6. Cooler temperature upon receipt 3.6 °C See back of form for multiple coolers/temps [ ]
   METHOD: IR [X] Other [ ] _____
   COOLANT: Wet Ice [X] Blue Ice [ ] Dry Ice [ ] Water [ ] None [ ]
7. Did all bottles arrive in good condition (Unbroken)? Yes [X] No [ ]
8. Could all bottle labels be reconciled with the COC? Yes [X] No [ ]
9. Were sample(s) at the correct pH upon receipt? Yes [X] No [ ] NA [ ]
10. Were correct bottle(s) used for the test(s) indicated? Yes [X] No [ ]
11. Were air bubbles >6 mm in any VOA vials? Yes [ ] No [ ] NA [X]
12. Sufficient quantity received to perform indicated analyses? Yes [X] No [ ]
13. Was a trip blank present in the cooler(s)? Yes [ ] No [X] Were VOAs on the COC? Yes [ ] No [X]

Contacted PM _____ Date _____ by _____ via Verbal [ ] Voice Mail [ ] Other [ ]
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
164	<2 >12	5/29/08	an
169	<2 >12		
134	<2 >12		
161	<2 >12		
189	<2 >12		
142	<2		

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler #	Temp. °C	Method	Coolant

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERCLAQ28B

LOT A8E300119

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	WELL-190	WELL-190	FMC-CERCLA Groundwater	4541.56	

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-190
SAMPLE DATE	05/28/2008
SAMPLE TIME	18:25
LAB	TESTAMERIC
LAB NUMBER	KN4DV
SAMPLE NUMBER	805190
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	147.73
OXIDATION REDUCTION POTENTIAL	6.4
OXYGEN (O) (FLD) DIS	2.73
PH (FLD)	6.57
SC (UMHOS/CM AT 25 C) (FLD)	1709.0
TURBIDITY (NTU) (FLD)	1.7
WATER TEMPERATURE (C) (FLD)	16.5
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	4.63
SULFATE (SO4)	243.0
CHLORIDE (CL)	231.0
FLUORIDE (F)	1.3
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	8.4
PHOSPHORUS (P) TOT	0.543
-- METALS & MINOR CONSTITUENTS --	
ARSENIC (AS) TOT	0.0231
	B
SELENIUM (SE) TOT	0.0129
	B

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

INDEX

SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
1	805190	KN4DV	05/28/2008	WELL-190

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1	KN4DV	805190	05/28/2008	WELL-190

SAMPLE ID CODES

SAMPLE SUMMARY

A8E300119

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN4DV	001	805190	05/28/08	18:25

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

LABORATORY CASE NARRATIVE

CASE NARRATIVE
CERCLAQ28B

The following report contains the analytical results for fifteen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 27, 2008, May 28, 2008, May 29, 2008 and May 30, 2008, according to documented sample acceptance procedures.

This SDG consists of (4) laboratory ID's: A8E270127, A8E280154, A8E290146, and A8E300119.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson on June 05, 2008, on June 06, 2008, and Jim Sieverson, Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The coolers were received at temperatures ranging from 1.0 to 13.3°C.

Sample(s) 805101 and 805102 were received in the laboratory after the recommended holding time for the Nitrate test had expired. The samples were collected on May 22, 2008 and May 23, 2008 and received in the laboratory on May 27, 2008.

See TestAmerica's Cooler Receipt Form for additional information.

GENERAL CHEMISTRY

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

The sample(s) that contained concentrations of target analyte(s) at a reportable level in the associated Method Blank(s) were flagged with "J". Refer to the sample report pages for the affected analytes(s).

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for 805145 A,B,C due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

Matrix spike recovery and relative percent difference (RPD) data were not calculated for some analytes for batch(es) 8154246 due to the sample concentration reading greater than four times the spike amount. See the Matrix Spike Report for the affected analytes which will be flagged with "NC, MSB".

The matrix spike/matrix spike duplicate(s) for batch(es) 8154247 and 8156307 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy. QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

CHAIN-OF-CUSTODY

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CERCLA SDG-2

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/29/08	Chain of Custody Number: 376061
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello, ID	Carrier/Waybill Number: Fed Ex Airbill # 8605 0511 7906		
Contract/Purchase Order/Quote No.: CERCLA			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis (Attach list if more space is needed): WQP WF/Raw	Ammonia via UV/Hg SD4	Special Instructions/ Conditions of Receipt
805190	5/28/08	1825		X			L 500						L 500		see comments
End of CERCLA SDG-2															

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other ____

QC Requirements (Specify)

1. Relinquished By: Walter Crane	Date: 5/29/08	Time: 16:00	1. Received By: Alma Manguin	Date: 5/30/08	Time: 0930
2. Relinquished By	Date	Time	2. Received By	Date	Time: 0945
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Regular CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

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TestAmerica Cooler Receipt Form/Narrative **Lot Number:** ABE350119
North Canton Facility

Client EMC Project _____ By: Alma Morgan
Cooler Received on 5/30/08 Opened on 5/30/08 (Signature)
FedEx ☐ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # _____ Multiple Coolers ☐ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☒ No ☐ Intact? Yes ☒ No ☐ NA ☐
   If YES, Quantity 3
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☒ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☒ No ☐
   If YES, are there any exceptions? No
2. Shippers' packing slip attached to the cooler(s)? Yes ☒ No ☐
3. Did custody papers accompany the sample(s)? Yes ☒ No ☐ Relinquished by client? Yes ☒ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☒ No ☐
5. Packing material used: Bubble Wrap ☒ Foam ☐ None ☐ Other Air Bags
6. Cooler temperature upon receipt _____ °C See back of form for multiple coolers/temps ☒
   METHOD: IR ☒ Other ☐ _____
   COOLANT: Wet Ice ☒ Blue Ice ☐ Dry Ice ☐ Water ☐ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☒ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☒ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☒ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☒ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☒
12. Sufficient quantity received to perform indicated analyses? Yes ☒ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☒ Were VOAs on the COC? Yes ☐ No ☒

Contacted PM _____ Date _____ by _____ via Verbal ☐ Voice Mail ☐ Other ☐
Concerning _____

14. CHAIN OF CUSTODY

The following discrepancies occurred:

_____

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH	Date	Initials
190	<2	5/30/08	[illegible]

TestAmerica Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler #	Temp. °C	Method	Coolant
Clt. Cir #1	2.8	IR	wetice
L244	1.0	↓	↓

Discrepancies Cont'd:

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERSTLQ28A

LOT A8E210213

ANALYTICAL SUMMARY REPORT

TECHNICAL REVIEW ACTION SUMMARY
SDG CERSTLQ28A

Antimony	J1, J3, U1	Arsenic	J3
Boron	J1, J3	Manganese	J3, U1
Mercury	J3	Phosphorus	J1, j3
Potassium	J2	Selenium	J3, U1
Uranium	J1, J3	Vanadium	J1, J3, U1

J1 - Positive result is flagged as estimated high (J+) due to non-compliant MS/MSD recoveries.

J2 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

J3 - Positive result is flagged as estimated (J) due to uncertainty at the low level.

U1 - Positive result is adjusted to not-detected at the reported value (U) due to blank contamination.

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	TW-9S	TW-9S	FMC-CERCLA Groundwater	4449.67	
1	TW-11S	TW-11S	FMC-CERCLA Groundwater	4426.18	
1	TW-12S	TW-12S	FMC-CERCLA Groundwater	4436.26	
1	WELL-110	WELL-110	FMC-CERCLA Groundwater	4450.57	
1	WELL-111	WELL-111	FMC-CERCLA Groundwater	4468.04	
1	WELL-146	WELL-146	FMC-CERCLA Groundwater	4459.30	
1	WELL-502	WELL-502	FMC-CERCLA Groundwater	4441.31	
2	WELL-517	WELL-517	Monitoring Wells		

Sample Type: FMC-CERCLA Groundwater

SITE CODE	TW-9S	TW-11S	TW-12S	WELL-110	WELL-111	WELL-146	WELL-502
SAMPLE DATE	05/20/2008	05/20/2008	05/20/2008	05/20/2008	05/20/2008	05/20/2008	05/20/2008
SAMPLE TIME	12:30	09:10	10:55	15:05	13:40	14:20	10:05
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNKHW	KNKHN	KNKHR	KNKH2	KNKHX	KNKHO	KNKHQ
SAMPLE NUMBER	805TW9S	805TW11S	805TW12S	805110	805111	805146	805502
-- PHYSICAL PARAMETERS --							
DEPTH TO WATER LEVEL (FEET)	64.9	42.37	52.19	66.27	76.37	70.24	57.06
OXIDATION REDUCTION POTENTIAL	-135.1	-138.1	-128.0	-96.4	-98.8	-95.2	-125.7
OXYGEN (O) (FLD) DIS	0.24	6.57	0.38	1.82	0.43	2.54	6.8
PH (FLD)	7.05	7.18	6.47	6.79	7.03	7.02	7.28
SC (UMHOS/CM AT 25 C) (FLD)	2277.0	845.0	1471.0	1958.0	2143.0	1882.0	1036.0
TURBIDITY (NTU) (FLD)	7.5	9.5	8.7	0.4	0.8	0.2	0.2
WATER TEMPERATURE (C) (FLD)	14.6	12.4	14.9	17.3	15.2	17.2	12.6
-- MAJOR CONSTITUENTS --							
POTASSIUM (K) TOT	43.4	3.75	14.8	19.3	34.5	38.9	5.36
	,J	,J	,J	,J	,J	,J	,J
SULFATE (SO4)	166.0	49.7	147.0	197.0	156.0	138.0	64.9
CHLORIDE (CL)	193.0	19.9	52.2	94.4	176.0	144.0	44.3
FLUORIDE (F)	0.1	0.8	1.3	0.5	0.2	0.5	0.9
-- NUTRIENTS --							
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	0.8	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	10.4	1.6	6.7	4.1	9.4	6.9	2.5
ELEMENTAL PHOSPHORUS (P4)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
PHOSPHORUS (P) TOT	2.42	<0.5	22.3	2.77	4.31	1.29	<0.5
	,J	,J	,J	,J	,J	,J	,J
-- METALS & MINOR CONSTITUENTS --							
ANTIMONY (SB) TOT	<0.05	<0.005	<0.005	0.0073	<0.05	<0.05	<0.005
ARSENIC (AS) TOT	0.0257	0.002	0.0203	0.0456	0.0228	0.0301	0.0026
BORON (B) TOT	0.432	<0.5	0.205	0.26	0.419	0.352	<0.5
	,J		,J	,J	,J	,J	
MANGANESE (MN) TOT	0.455	0.004	0.0464	<0.002	0.302	0.0421	<0.002
	,J	,J	,J	,J	,J	,J	,J
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	0.0031	<0.005	0.0051	0.0234	0.0039	0.0018	<0.005
	,U				,U	,U	
VANADIUM (V) TOT	0.0038	0.0026	0.0097	0.0124	0.0072	0.0053	0.0022
	,U			,U	,U	,U	
-- OTHER PARAMETERS --							
GROSS ALPHA (PCI/L)	2.2	2.7	2.1	4.1	3.1	0.6	3.3
	,U		,U	,U	,U	,U	
RADIUM 226 (PCI/L)	0.14	0.078	0.13	0.01	0.18	0.08	0.16
	,U	,M,U	,U	,M,U		,U	,M
RADIUM 228 (PCI/L)	0.14	0.4	0.15	0.44	-0.12	-0.26	0.07
	,U		,U	,U	,U	,U	,U
TOTAL URANIUM	<0.01	0.0029	0.0025	<0.01	<0.01	<0.01	0.0044
CYANIDE (CN) TOT	<0.01	<0.01	<0.01	<0.01	0.019	0.011	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: Monitoring Wells

SITE CODE	WELL-517
SAMPLE DATE	05/20/2008
SAMPLE TIME	11:50
LAB	TESTAMERIC
LAB NUMBER	KNKHT
SAMPLE NUMBER	805517
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	60.34
OXIDATION REDUCTION POTENTIAL	-95.9
OXYGEN (O) (FLD) DIS	2.69
PH (FLD)	6.93
SC (UMHOS/CM AT 25 C) (FLD)	2575.0
TURBIDITY (NTU) (FLD)	0.3
WATER TEMPERATURE (C) (FLD)	15.9
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	100.0
	,J
SULFATE (SO4)	189.0
CHLORIDE (CL)	198.0
FLUORIDE (F)	0.6
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	0.2
NITRATE (NO3-N)	11.1
ELEMENTAL PHOSPHORUS (P4)	<0.00005
PHOSPHORUS (P) TOT	0.924
	,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.0468
BORON (B) TOT	0.489
	,J
MANGANESE (MN) TOT	<0.002
	,J
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	0.0138
VANADIUM (V) TOT	0.0148
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	-1.1
	,U
RADIUM 226 (PCI/L)	0.06
	,U
RADIUM 228 (PCI/L)	0.16
	,U
TOTAL URANIUM	0.0005
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

FMCW01 - FMC - ALL DATA ANALYSES SUMMARY REPORT

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SAMPLE NUMBER ORDER

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1	805111	KNKHX	05/20/2008	WELL-111
1	805146	KNKHO	05/20/2008	WELL-146
1	805502	KNKHQ	05/20/2008	WELL-502
2	805517	KNKHT	05/20/2008	WELL-517
1	805TW11S	KNKHN	05/20/2008	TW-11S
1	805TW12S	KNKHR	05/20/2008	TW-12S
1	805TW9S	KNKHW	05/20/2008	TW-9S

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1	KNKH2	805110	05/20/2008	WELL-110
1	KNKHN	805TW11S	05/20/2008	TW-11S
1	KNKHO	805146	05/20/2008	WELL-146
1	KNKHQ	805502	05/20/2008	WELL-502
1	KNKHR	805TW12S	05/20/2008	TW-12S
2	KNKHT	805517	05/20/2008	WELL-517
1	KNKHW	805TW9S	05/20/2008	TW-9S
1	KNKHX	805111	05/20/2008	WELL-111

SAMPLE ID CODES

SAMPLE SUMMARY

CERSTLQ28A : A8E210213

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNK5D	001	805TW11	05/20/08	09:10
KNK5X	002	805502	05/20/08	10:05
KNK52	003	805TW12	05/20/08	10:55
KNK54	004	805517	05/20/08	11:50
KNK55	005	805TW9	05/20/08	12:30
KNK56	006	805111	05/20/08	13:40
KNK57	007	805146	05/20/08	14:20
KNK58	008	805110	05/20/08	15:05

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE

CERSTLQ28A

The following report contains the analytical results for seventeen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 21, 2008, May 23, 2008 and May 28, 2008, according to documented sample acceptance procedures.

This SDG consists of (3) laboratory ID's: A8E210213, A8E230288, and A8E280159.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson and Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes flagged with "E".

The matrix spike/matrix spike duplicate(s) for 805TW11, 805502, 805TW12, 805517, 805TW9, 805111, 805146, 805110, 805112 A,B,C, 805523, 805524, 805701, 805525, and 805601 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8157285 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERSTLQ28A

LOT A8E230288

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
2	RINS BLANK-C	RINS BLANK CERCLA	MC-CERCLA Groundwater Q		
1	WELL-112	WELL-112	FMC-CERCLA Groundwater	4467.91	
1	WELL-523	WELL-523	FMC-CERCLA Groundwater	4452.98	
1	WELL-524	WELL-524	FMC-CERCLA Groundwater	4399.92	
1	WELL-525	WELL-525	FMC-CERCLA Groundwater	4399.61	

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-112	WELL-523	WELL-524	WELL-525	WELL-525
SAMPLE DATE	05/22/2008	05/22/2008	05/22/2008	05/22/2008	05/22/2008
SAMPLE TIME	11:10	12:15	14:00	14:35	15:00
LAB	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNQ2F	KNQ4K	KNQ4N	KNQ4Q	KNQ4R
REMARKS					DUPLICATE
SAMPLE NUMBER	805112A	805523	805524	805525	805601
-- PHYSICAL PARAMETERS --					
DEPTH TO WATER LEVEL (FEET)	73.94	58.46	17.06	16.72	
OXIDATION REDUCTION POTENTIAL	6.1	7.9	-25.7	-23.2	
OXYGEN (O) (FLD) DIS	5.82	4.02	6.81	7.89	
PH (FLD)	7.55	7.5	7.69	7.73	
SC (UMHOS/CM AT 25 C) (FLD)	841.0	907.0	511.0	515.0	
TURBIDITY (NTU) (FLD)	0.3	0.3	0.2	0.3	
WATER TEMPERATURE (C) (FLD)	14.4	13.4	12.4	11.8	
-- MAJOR CONSTITUENTS --					
POTASSIUM (K) TOT	6.92	7.41	3.57	3.58	3.71
	,J	,J	,J	,J	,J
SULFATE (SO4)	88.6	59.0	42.3	44.1	44.0
CHLORIDE (CL)	82.4	109.0	17.9	18.7	18.6
FLUORIDE (F)	0.9	0.6	0.7	0.8	0.8
-- NUTRIENTS --					
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2	<0.2	<0.2	<0.2
NITRATE (NO3-N)	2.3	4.5	1.5	1.6	1.6
PHOSPHORUS (P) TOT	0.0842	0.0341	0.034	0.0391	<0.5
	,J	,J	,J	,J	,J
-- METALS & MINOR CONSTITUENTS --					
ANTIMONY (SB) TOT	0.0027	<0.005	<0.005	<0.005	<0.005
	,U				
ARSENIC (AS) TOT	0.0047	0.0036	0.0021	<0.01	<0.01
BORON (B) TOT	0.256	<0.5	<0.5	<0.5	<0.5
MANGANESE (MN) TOT	<0.002	<0.002	<0.002	<0.002	0.00068
	,J	,J	,J	,J	,U,J
MERCURY (HG) TOT	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
SELENIUM (SE) TOT	0.0016	0.002	<0.005	<0.005	<0.005
VANADIUM (V) TOT	0.0043	0.0027	0.0032	0.0021	<0.1
-- OTHER PARAMETERS --					
GROSS ALPHA (PCI/L)	0.2	5.7	2.7	2.2	2.1
	,U				
RADIUM 226 (PCI/L)	0.054	0.085	0.11	0.095	0.11
	,J,Y	,U	,U	,U	,U
RADIUM 228 (PCI/L)	-0.45	0.32	0.25	0.4	0.12
	,M,U	,U	,U	,U	,U
TOTAL URANIUM	0.0025	0.0034	0.0021	0.0023	0.0027
					,J
CYANIDE (CN) TOT	<0.01	<0.01	<0.01	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

Sample Type: MC-CERCLA Groundwater QC

SITE CODE	RINS BLANK-C
SAMPLE DATE	05/22/2008
SAMPLE TIME	14:20
LAB	TESTAMERIC
LAB NUMBER	KNQ4P
REMARKS	BLANK
SAMPLE NUMBER	805701
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	0.0491
SULFATE (SO4)	<1.0
CHLORIDE (CL)	0.2
	B
FLUORIDE (F)	<0.1
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	<0.1
PHOSPHORUS (P) TOT	<0.5
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	<0.01
BORON (B) TOT	<0.5
MANGANESE (MN) TOT	0.0011
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	<0.005
VANADIUM (V) TOT	<0.1
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	0.33
	,U
RADIUM 226 (PCI/L)	0.026
	,U
RADIUM 228 (PCI/L)	1.13
	,U
TOTAL URANIUM	<0.01
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

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SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
1	805112A	KNQ2F	05/22/2008	WELL-112
1	805523	KNQ4K	05/22/2008	WELL-523
1	805524	KNQ4N	05/22/2008	WELL-524
1	805525	KNQ4Q	05/22/2008	WELL-525
1	805601	KNQ4R	05/22/2008	WELL-525
2	805701	KNQ4P	05/22/2008	RINS BLANK-C

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1	KNQ2F	805112A	05/22/2008	WELL-112
1	KNQ4K	805523	05/22/2008	WELL-523
1	KNQ4N	805524	05/22/2008	WELL-524
2	KNQ4P	805701	05/22/2008	RINS BLANK-C
1	KNQ4Q	805525	05/22/2008	WELL-525
1	KNQ4R	805601	05/22/2008	WELL-525

SAMPLE ID CODES

SAMPLE SUMMARY

CERSTLQ28A : A8E230288

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNTJJ	001	805112 A,B,C	05/22/08	11:10
KNTJ4	002	805523	05/22/08	12:15
KNTJ7	003	805524	05/22/08	14:00
KNTJ8	004	805701	05/22/08	14:20
KNTJ9	005	805525	05/22/08	14:35
KNTKA	006	805601	05/22/08	15:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

(Continued on next page)

LABORATORY CASE NARRATIVE

CASE NARRATIVE
CERSTLQ28A

The following report contains the analytical results for seventeen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 21, 2008, May 23, 2008 and May 28, 2008, according to documented sample acceptance procedures.

This SDG consists of (3) laboratory ID's: A8E210213, A8E230288, and A8E280159.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson and Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes flagged with "E".

The matrix spike/matrix spike duplicate(s) for 805TW11, 805502, 805TW12, 805517, 805TW9, 805111, 805146, 805110, 805112 A,B,C, 805523, 805524, 805701, 805525, and 805601 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8157285 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERSTLQ28A

LOT A8E280159

ANALYTICAL SUMMARY REPORT

INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
2	WELL-501	WELL-501	Monitoring Wells		
1	WELL-515	WELL-515	FMC-CERCLA Groundwater	4450.35	
2	WELL-516	WELL-516	Monitoring Wells	4445.50	

Sample Type: FMC-CERCLA Groundwater

SITE CODE	WELL-515
SAMPLE DATE	05/22/2008
SAMPLE TIME	17:20
LAB	TESTAMERIC
LAB NUMBER	KNWP4
SAMPLE NUMBER	805515
-- PHYSICAL PARAMETERS --	
DEPTH TO WATER LEVEL (FEET)	58.32
OXIDATION REDUCTION POTENTIAL	111.0
OXYGEN (O) (FLD) DIS	4.77
PH (FLD)	7.52
SC (UMHOS/CM AT 25 C) (FLD)	1206.0
TURBIDITY (NTU) (FLD)	0.8
WATER TEMPERATURE (C) (FLD)	13.4
-- MAJOR CONSTITUENTS --	
POTASSIUM (K) TOT	6.95
	,J
SULFATE (SO4)	127.0
CHLORIDE (CL)	183.0
FLUORIDE (F)	0.7
-- NUTRIENTS --	
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2
NITRATE (NO3-N)	2.8
PHOSPHORUS (P) TOT	<0.5
	,J
-- METALS & MINOR CONSTITUENTS --	
ANTIMONY (SB) TOT	<0.005
ARSENIC (AS) TOT	0.0035
BORON (B) TOT	0.181
MANGANESE (MN) TOT	<0.002
	,J
MERCURY (HG) TOT	<0.0002
SELENIUM (SE) TOT	0.00091
VANADIUM (V) TOT	<0.01
-- OTHER PARAMETERS --	
GROSS ALPHA (PCI/L)	15.8
RADIUM 226 (PCI/L)	0.086
	,U
RADIUM 228 (PCI/L)	0.35
	,U
TOTAL URANIUM	0.014
CYANIDE (CN) TOT	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;
R:Rejected.

Sample Type: Monitoring Wells

SITE CODE	WELL-501	WELL-516
SAMPLE DATE	05/23/2008	05/22/2008
SAMPLE TIME	07:40	17:55
LAB	TESTAMERIC	TESTAMERIC
LAB NUMBER	KNWP8	KNWP7
SAMPLE NUMBER	805501	805516
-- PHYSICAL PARAMETERS --		
DEPTH TO WATER LEVEL (FEET)	67.54	60.67
OXIDATION REDUCTION POTENTIAL	-113.3	37.9
OXYGEN (O) (FLD) DIS	4.45	6.38
PH (FLD)	7.32	7.63
SC (UMHOS/CM AT 25 C) (FLD)	967.0	754.0
TURBIDITY (NTU) (FLD)	0.2	0.3
WATER TEMPERATURE (C) (FLD)	12.4	13.6
-- MAJOR CONSTITUENTS --		
POTASSIUM (K) TOT	6.5	6.09
	,J	,J
SULFATE (SO4)	78.9	68.6
CHLORIDE (CL)	119.0	81.0
FLUORIDE (F)	0.6	0.7
-- NUTRIENTS --		
TOTAL AMMONIA (NH3+NH4 AS N)	<0.2	<0.2
NITRATE (NO3-N)	4.2	2.1
PHOSPHORUS (P) TOT	<0.5	<0.5
	,J	,J
-- METALS & MINOR CONSTITUENTS --		
ANTIMONY (SB) TOT	<0.005	<0.005
ARSENIC (AS) TOT	0.0027	0.0038
BORON (B) TOT	<0.5	<0.5
MANGANESE (MN) TOT	<0.002	<0.002
	,J	,J
MERCURY (HG) TOT	0.0001	<0.0002
SELENIUM (SE) TOT	0.0021	0.0013
VANADIUM (V) TOT	0.0039	0.0029
-- OTHER PARAMETERS --		
GROSS ALPHA (PCI/L)	0.0	2.8
RADIUM 226 (PCI/L)	0.058	0.087
	,U	,U
RADIUM 228 (PCI/L)	0.02	0.43
	,U	,U
TOTAL URANIUM	0.0033	0.0027
CYANIDE (CN) TOT	<0.01	<0.01

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance; R:Rejected.

INDEX

SAMPLE NUMBER ORDER

Page	Sample Number	Lab ##	Date	Site Code
2	805501	KNWP8	05/23/2008	WELL-501
1	805515	KNWP4	05/22/2008	WELL-515
2	805516	KNWP7	05/22/2008	WELL-516

LAB NUMBER ORDER

Page	Lab ##	Sample Number	Date	Site Code
1	KNWP4	805515	05/22/2008	WELL-515
2	KNWP7	805516	05/22/2008	WELL-516
2	KNWP8	805501	05/23/2008	WELL-501

SAMPLE ID CODES

SAMPLE SUMMARY

CERSTLQ28A : A8E280159

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KN0EX	001	805515	05/22/08	17:20
KN0E8	002	805516	05/22/08	17:55
KN0FD	003	805501	05/23/08	07:40

NOTE(S):

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- Results noted as "ND" were not detected at or above the stated limit.
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SAMPLE SUMMARY

CERCLAQ28A : A8E270126

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KNWP4	001	805515	05/22/08	17:20
KNWP7	002	805516	05/22/08	17:55
KNWP8	003	805501	05/23/08	07:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
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LABORATORY CASE NARRATIVE

CASE NARRATIVE

CERSTLQ28A

The following report contains the analytical results for seventeen water samples submitted to TestAmerica North Canton by FMC Idaho LLC from the FMC Pocatello ID Site. The samples were received May 21, 2008, May 23, 2008 and May 28, 2008, according to documented sample acceptance procedures.

This SDG consists of (3) laboratory ID's: A8E210213, A8E230288, and A8E280159.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Jim Sieverson and Rob Hartman on June 16, 2008. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

Any reference within this document to Severn Trent Laboratories, Inc. or STL, should be understood to refer to TestAmerica Laboratories, Inc. (formerly known as Severn Trent Laboratories, Inc.)

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes flagged with "E".

The matrix spike/matrix spike duplicate(s) for 805TW11, 805502, 805TW12, 805517, 805TW9, 805111, 805146, 805110, 805112 A,B,C, 805523, 805524, 805701, 805525, and 805601 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8157285 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

[redacted]

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

CERCLA SDG-1 + SDG-2

N. Canton

TAL-4142 (0907)

Client: FMC	Project Manager: Rob Hartman	Date: 5/23/08	Chain of Custody Number: 376076
Address: PO Box 4111	Telephone Number (Area Code)/Fax Number: (208) 241-8216	Lab Number	Page 1 of 1
City: Pocatello; State: ID; Zip Code: 83202	Site Contact: Rob Hartman	Lab Contact: Mark Loeb	
Project Name and Location (State): FMC Pocatello ID	Carrier/Waybill Number: Fed Ex Airbill # 8605 0511 7847		
Contract/Purchase Order/Quote No.: CERCLA			

Analysis (Attach list if more space is needed): UF/RCN; UF/Ammonia; UF/H2SO4; UF/NaOH

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Special Instructions/ Conditions of Receipt
805515	5/22/08	17:20		X			L	250			250		see comments
CERCLA 805516	↓	1755											
End SDG-1 805501	5/23/08	0740											End of CERCLA SDG-1
Start SDG-2 805101		0910											Start of CERCLA SDG-2
CERCLA 805102	↓	0840											

UF/RCN	L	250	250
UF/Ammonia	L	250	250
UF/H2SO4	L	250	250
UF/NaOH	L	250	250

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Normal

QC Requirements (Specify)

1. Relinquished By: Walter Crane	Date: 5/23/08	Time: 10:00	1. Received By: [signature]	Date: 5/27/08	Time: 0830
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments: Special CERCLA Analysis see enclosed parameter sheet

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

North Canton

22

TestAmerica Cooler Receipt Form/Narrative **Lot Number:** 180-70126
North Canton Facility

Client FMC Project _____ By W. Mitchell
Cooler Received on 5/27/08 Opened on 5/27/08 (Signature)
FedEx ☒ UPS ☐ DHL ☐ FAS ☐ Stetson ☐ Client Drop Off ☐ TestAmerica Courier ☐ Other _____
TestAmerica Cooler # 6887 Multiple Coolers ☐ Foam Box ☐ Client Cooler ☐ Other _____

1. Were custody seals on the outside of the cooler(s)? Yes ☒ No ☐ Intact? Yes ☒ No ☐ NA ☐
   If YES, Quantity 2
   Were custody seals on the outside of cooler(s) signed and dated? Yes ☒ No ☐ NA ☐
   Were custody seals on the bottle(s)? Yes ☒ No ☐
   If YES, are there any exceptions? _____
2. Shippers' packing slip attached to the cooler(s)? Yes ☒ No ☐
3. Did custody papers accompany the sample(s)? Yes ☒ No ☐ Relinquished by client? Yes ☒ No ☐
4. Were the custody papers signed in the appropriate place? Yes ☒ No ☐
5. Packing material used: Bubble Wrap ☐ Foam ☐ None ☒ Other _____
6. Cooler temperature upon receipt 13.3 °C See back of form for multiple coolers/temps ☐
   METHOD: IR ☒ Other ☐ _____
   COOLANT: Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ Water ☒ None ☐
7. Did all bottles arrive in good condition (Unbroken)? Yes ☒ No ☐
8. Could all bottle labels be reconciled with the COC? Yes ☒ No ☐
9. Were sample(s) at the correct pH upon receipt? Yes ☒ No ☐ NA ☐
10. Were correct bottle(s) used for the test(s) indicated? Yes ☒ No ☐
11. Were air bubbles >6 mm in any VOA vials? Yes ☐ No ☐ NA ☒
12. Sufficient quantity received to perform indicated analyses? Yes ☒ No ☐
13. Was a trip blank present in the cooler(s)? Yes ☐ No ☒ Were VOAs on the COC? Yes ☐ No ☒

Contacted PM MJL Date 5/27 by DLM via Verbal ☒ Voice Mail ☐ Other ☐
Concerning Temp

14. CHAIN OF CUSTODY

The following discrepancies occurred:
SAMPLES RECEIVED ON 5/27/08, OUT OF RECOMMENDED HOLD TIME.
PER CLIENT REQUEST, THE LAB IS TO PROCEED WITH ANALYSIS.
CONTACTED ERICKA VALENCIA 5/27/08 11:00AM MJL

15. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

16. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot# 113007-HNO_3; Sulfuric Acid Lot# 071707-H_2SO_4; Sodium Hydroxide Lot# 073007 -NaOH; Hydrochloric Acid Lot# 092006-HCl; Sodium Hydroxide and Zinc Acetate Lot# 050205-CH_3COO_2ZN/NaOH.*
What time was preservative added to sample(s)? _____

Client ID	pH		Date	Initials
515	<2	>12	5/27	DLM
516	<2	>12		
501	<2	>12		
101	<2	>12		
102	<2	>12		

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERSTLQ28B

LOT A8E280171

ANALYTICAL SUMMARY REPORT

TECHNICAL REVIEW ACTION SUMMARY
SDG CERSTLQ28B

Antimony	J4, U1	Arsenic	J3, J4
Boron	J4	Manganese	J3, J4
Mercury	J4	Phosphorus	J3
Potassium	J2, J3	Selenium	J4
Uranium	J4	Vanadium	J1, J4

J1 - Positive result is flagged as estimated high (J+) due to non-compliant LCS recovery.

J2 - Result is flagged as estimated low (J-) due to non-compliant MS/MSD recoveries.

J3 - Result is flagged as estimated low (J-) due to non-compliant serial dilution reproducibility.

J4 - Positive result is flagged as estimated (J) due to uncertainty at the low level.

U1 - Positive result is adjusted to not-detected at the reported value (U) due to blank contamination.

LABORATORY CASE NARRATIVE

CASE NARRATIVE
CERSTLQ28B

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This SDG consists of (3) laboratory ID's: A8E280171, A8E290264, and A8E300221.

All analyses were performed at the TestAmerica St. Louis laboratory.

TestAmerica utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. A summary of QC data for these analyses is included at the back of the report.

TestAmerica North Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

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Please refer to the Quality Control Elements Narrative following this case narrative for additional quality control information.

If you have any questions, please call the Project Manager, Mark J. Loeb, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT."

CASE NARRATIVE (continued)

SUPPLEMENTAL QC INFORMATION

METALS

The sample(s) that contain results between the MDL and the RL were flagged with "B". There is the possibility of false positive or mis-identification at these quantitation levels. The acceptance criteria for the ICB, CCB, and Method Blank are +/- the standard reporting limit (SRL).

Serial dilution of a sample in this lot indicates that physical and chemical interferences were present. Refer to the sample report pages for the affected analytes flagged with "E".

The matrix spike/matrix spike duplicate(s) for 805145 A,B,C and 805136 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

The matrix spike/matrix spike duplicate(s) for batch(es) 8163199 had recoveries outside acceptance limits. However, since the associated method blank(s) and laboratory control sample(s) were in control, no corrective action was necessary.

QUALITY CONTROL ELEMENTS NARRATIVE

TestAmerica North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. TestAmerica North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples.

For SW846/RCRA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

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For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERSTLQ28B

LOT A8E290264

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CERSTLQ28B

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DATA PACKAGE REPORT

SAMPLE DELIVERY GROUP

CERSTLQ28B

LOT A8E300221

LABORATORY CASE NARRATIVE

CASE NARRATIVE

CERSTLQ28B

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For 600 series/CWA methods, QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE (MS). An MS is prepared and analyzed at a 10% frequency for GC Methods and at a 5% frequency for GC/MS methods.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. Multi peak responders may not be included in the target spike list due to co-elution. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. Comparison of only the failed parameters from the first batch are evaluated. The only exception to the rework requirement is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed in the table.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals ICP-MS	Metals ICP Trace
Methylene Chloride, Acetone, 2-Butanone	Phthalate Esters	Copper, Iron, Zinc, Lead, Calcium, Magnesium, Potassium, Sodium, Barium, Chromium, Manganese	Copper, Iron, Zinc, Lead

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

For certain methods (600 series methods/CWA), a Matrix Spike is required in place of a Matrix Spike/Matrix Spike Duplicate (MS/MSD) or Matrix Spike/Sample Duplicate (MS/DU).

The acceptance criteria do not apply to samples that are diluted.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepared and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide and PCB methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria. The second surrogate must have a recovery of 10% or greater.

TECHNICAL DATA REVIEW REPORT

20-21 May 2008
Groundwater Sampling
Elemental Phosphorous (P4) Analyses

Prepared for:
FMC Idaho LLC

Pocatello, Idaho Plant

Prepared by:
Ordway and Associates
and
Environmental Chemistry Consultants, Inc.

June 9, 2008

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Data Validation/Usability Report
Groundwater Samples
20-21 May 2008 Groundwater Monitoring Event

FMC Idaho LLC, Pocatello, Idaho

DCL Set ID #: 08E-0395-01

Prepared by: Frederick S. Ordway

INTRODUCTION

This memo summarizes the Site Chemist's usability evaluation of the technically reviewed groundwater results generated by Data Chem Laboratories, Inc., for the SDG listed above. The samples were collected on 20 and 21 May 2008. Elemental Phosphorous (P4) laboratory analyses were performed in accordance with the U.S. Environmental Protection Agency (USEPA) SW-846 Method 7580 as described in the laboratory SOP.

The laboratory has modified Method 7580. Method 7580 provides for two different levels of sensitivity for determining P4 in water samples. One method has a sensitivity of 0.01 ug/L and consists of extracting a 500 mL water sample into in to 50 mL of diethyl ether and then back extracting with water to a final volume of 1.0 mL of diethyl ether. The other method provides sensitivity on the order of 0.1 ug/L and consists of extracting 30 mL of water into 3 mL of isooctane. The laboratory has modified the method to extract 120 mL of water into 3 mL of isooctane with a reported sensitivity of 0.0234. ug/L based on the reported MDL with a concomitant reporting limit of 0.05 ug/L. The impacts of the modifications performed by the laboratory are detailed below.

A Level II technical review was performed for this SDG, which included a review/evaluation of all laboratory reporting forms, raw data, preparation logs, instrument printouts, notebook records and forensic deliverables provided by the laboratory. The data were technically reviewed based on method specifications, and laboratory-developed performance criteria by adapting the procedures set forth in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, USEPA Office of Solid Waste and Emergency Response, EPA-540/R-94-013, February 1994 and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, USEPA office of Solid Waste and Emergency Response, EPA540/R-94/012, February 1994 (Guidelines).

For elemental phosphorous, the data were evaluated for USEPA SW-846 Method 7580 which included the following parameters:

- data completeness,
- holding times,
- calibration,
- blanks,**
- laboratory control sample**,
- matrix spike/matrix spike duplicate**,
- compound quantitation and reported detection limits, and
- overall assessment,

** Denotes all criteria for this parameter were met

COMPLETENESS

Not all of the pages in the report are paginated. A sample preparation log lists details for the standards and QC samples. Preparation details for individual samples are not provided. The date the standard, samples and QC samples were prepared is also not documented. Page one of the Case Narrative states the samples were prepared by extracting 120 mL of sample with 3 mL of isooctane.

HOLDING TIMES

Holding times could not be verified due to the lack of an extraction log. Per the information provided on the Form 1s, all samples were prepared on 23 May 2008 within the method recommended five day holding time. Per the information provided on the raw data the samples were analyzed on 27 and 28 May, 2008 within the method requirements of 30 days after extraction for isooctane extracts.

CALIBRATION:

Initial Calibration:

The laboratory performed the initial calibration on 14 May 2008 and utilized a 1/x weighted quadratic regression model based on peak area for evaluating the data. Based on the validator's recalculation this data fits a linear regression (first order regression, non-weighted, non-zero intercept) model with a corresponding correlation coefficient of 0.9995. The samples were analyzed on 27 and 28 May, 2008. A number of issues are associated with these observations:

1) The samples were not analyzed within the 12 hour time limit specified in the method.

> Per Method 7580: "Prior to the analysis of any sample extracts, the analyst must perform an initial five point calibration that meets the performance specifications in Sec. 7.2.3. This initial calibration must be repeated at the beginning of each 12-

hour analytical shift during which samples are analyzed. The initial calibration must be performed using the same solvent as the sample extracts to be analyzed, i.e., separate initial calibrations are required for diethyl ether and isooctane."[1]

2) Choice of calibration model:

It should be noted that:

"EPA believes that most instruments and analytical systems are linear over a range large enough to preclude the need for second order or higher calibration. If the linear range of any of these systems is limited, sample dilution and reanalysis should be performed to bring the concentration within the linear range, rather than extend the calibration into a nonlinear region of the instrument response. EPA discourages use of higher than first-order calibration because responses in the nonlinear region of the instrument response can mask curvature in the response that may be attributable to preparation of an inaccurate standard. EPA requires that all calculations of concentrations of analytes in blanks, field samples, QC samples, and samples prepared for other purposes be based on an averaged RR, RF, or CF, or on a calibration curve."[2]

Additionally Method 8000B states:

- "The choice of a specific calibration model should be made in one of two ways. The first is to begin with the simplest approach, the linear model through the origin, and progressing through the other options until the calibration acceptance criteria are met. The second approach is to use a priori knowledge of the detector response to choose the calibration model. Such knowledge may come from previous experience, knowledge of the physics of the detector, or specific manufacturer's recommendations."[2]

- "The option for non-linear calibration may be necessary to achieve low detection limits or to address specific instrumental techniques. However, it is not EPA's intent to allow non-linear calibration to be used to compensate for detector saturation at higher concentrations or to avoid proper instrument maintenance."[3]

Note: An FPD detector was utilized for this analysis. The detection principle for an FPD is the formation of excited Sulfur (S2*) and HPO* species in a reducing

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[1] Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846) through Update III, Method 7580, Revision 0, December 1996, Section 8.3

[2] Guide to Method Flexibility and Approval of EPA Water Methods, December 1996, Chapter 3 Quality Control Requirements, Section 3.3.1

[3] Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846) through Update III, Method 8000B Revision 2, December 1996, Section 7.5

flame. The detector response to phosphor is linear, whereas the response to sulfur depends on the square of the concentration.

Evaluation of response factors:
As noted above the laboratory has extended the calibration range associated with its analysis in isooctane. A review of the response factors provided below shows that the non-linearity is associated with the lower portion of the curve.

Response Factors for ICAL of 05/14/2008		
y = As	x = Cs (ug/mL)	CF (=y/x)
7752	0.002	3876000
15287	0.005	3057400
21538	0.01	2153800
50861	0.02	2543050
134921	0.05	2698420
260261	0.1	2602610

A concentration of 0.02 ug/L or greater results in a linear portion of the curve. At concentrations of 0.02 ug/L and below non-linearity is evident as evidenced by the increasing area per unit mass response as the concentration decreases. The laboratory has utilized a second order regression to account of the non-linearity at the lower level as opposed to performing the more sensitive analysis described in the method.

3) Impact of Regression Model on Reporting Limits:

Per Method 8000B, "The lowest concentration calibration standard that is analyzed during an initial calibration establishes the method quantitation limit based on the final volume of extract (or sample) described in the preparative method or employed by the laboratory."[4]

The laboratory reporting limit is 0.05 ug/L. Utilizing the first order regression non-weighted model (r = 0.9995), the low standard (0.002 ug/L) is equivalent to a sample concentration of 0.071 ug/L. For the second order 1/x weighted regression (validator calculated COD = 0.998) utilized by the laboratory the low standard response is equivalent to 0.055 ug/L. (Note the calibration failed the RSD criteria (RSD < 20%) for utilizing an average calibration factor).

Standard Integration:
None of the standards were manually integrated. The validator does not agree with the integration of the two lowest standards. The integrations as performed incorporate more

[4] Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846) through Update III, Method 8000B Revision 2, December 1996, Section 7.4.1.2

area than would occur with proper integration technique. The laboratory should have performed a manual integration of these standards.

Initial Calibration Verification:
The laboratory utilized a single source for the preparation of the calibration standards and the initial calibration verification (ICV) standard. However, the ICV was prepared by a second analyst utilizing a different dilution scheme than was utilized for the preparation of the continuing calibration verification (CCV) standard.

Continuing Calibration
The continuing calibration verification standards that are equivalent to the second highest standard (0.05 ug/L). This level is one-half the concentration of the curve and provides information regarding the precision and accuracy of the data at the upper end of the curve. No information is provided regarding the continued precision and accuracy at the lower end or the reporting limit equivalent on the curve.

Impact on data reporting:
An example of the effect of the calibration model regarding positive samples calculated by both methods shows varying degrees of disagreement. For sample (Lab I.D. 08E2596) the calculated concentration is 0.0946 ug/L as reported by the lab and 0.1069 as calculated utilizing a first order regression (%D = 13.1). For sample (Lab I.D. 08E2591) 1:10 dilution the calculated concentration is 29.9755 ug/L as reported by the lab and 30.6272 ug/L as calculated utilizing a first order regression (%D = 2.17).

All sample analyses associated with this initial calibration are qualified as estimated (J1) based on the initial calibration not being contemporaneous with the analysis of the samples as defined by the method and (J2) for the use of second order 1/x weighted curve.

LABORATORY CONTROL SAMPLE
The preparation of aqueous stock solution of P4 should result in a concentration of approximately 3 mg/L is prepared in accordance with method 7580. Per the laboratory documentation the concentration of the aqueous stock solution is 0.671 mg/L.

MATRIX SPIKE/MATRIX SIKE DUPLICATE
Sample 805123 was utilized for the matrix spike and matrix pike duplicate analysis. With recoveries of 68.6 and 86.7 respectively, and an RPD of 23. These are within the laboratory posted limits of 65-135% for recovery and 50% for the RPD but outside the method limits of 75-125% for recovery and 25% for the RPD.

REPORTING LIMIT
As discussed above, depending on the calibration model that is deemed appropriate reporting should be either 0.055 ug/L or 0.071 ug/L based on the low standard response. Additionally, per SW-846 the estimated quantitation limit (a.k.a. reporting limit) should be five to ten times the method detection limit. Utilizing the reported method detection

limit of 0.0234 ug/L, any value reported as less than five times this limit (i.e., less than 0.117 ug/L) is qualified as estimated. Samples 805112 and 805156 are qualified as estimated (J).

OVERALL ASSESSMENT:

All samples were extracted in isooctane utilizing a modified less sensitive extraction procedure.

Samples 805108 and 805600 are field duplicates which had laboratory reported concentrations of 30 ug/L and 30.7 ug/L respectively resulting in a relative percent difference of 2.3. No action is required.

Sample 805700 is the Rinse Blank. The rinse blank was non-detect. No action is required.

Due to the initial calibration not being contemporaneous with the sample analysis (i.e., method requires initial calibration every 12 hours and the initial calibration for this data set was analyzed one month prior to the samples) the sample results have been estimated (J1). The sample results have also been estimated (J2) for the use of a second order 1/x weighted curve. Sample results less than 5 times the MDL have been qualified as estimated (J3).

APPENDIX A
DEFINITION OF DATA QUALIFIERS

GLOSSARY OF DATA QUALIFIERS

J	-	The associated value is an estimated quantity.
R	-	The data are unusable.
U	-	The parameter is not detected at the reported value.

APPENDIX B
GLOSSARY OF ACRONYMS

GLOSSARY OF ACRONYMS

SDG	-	Sample Delivery Group
USEPA	-	Unites States Environmental Protection Agency
DQO	-	Data Quality Objectives
QAPjP	-	Quality Assurance Project Plan
RPD	-	Relative Percent Difference
CRDL	-	Contract Required Detection Limit
RL	-	Reporting Limit
GFAA	-	Graphite Furnace Atomic Absorption
IDL	-	Instrument Detection Limit
MDL	-	Method Detection Limit
CLP	-	Contract Laboratory Program
ICP	-	Ion Coupled Plasma
MS	-	Matrix Spike
MSD	-	Matrix Spike Duplicate

APPENDIX G

4.4 GROUNDWATER

This section describes the nature and extent of impacted groundwater with respect to potential sources within the EMF study area. It compares the concentrations of constituents detected in samples from wells within the EMF study area with representative concentrations of these constituents to assess the general magnitude of site-related impacts. It also describes the areal dimensions of impacted groundwater.

Section 4.4.1 presents a characterization of groundwater quality unaffected by potential releases from the EMF facilities. This is referred to as representative groundwater quality. Sections 4.4.2 through 4.4.5 continue with a discussion of the nature and extent of impacted groundwater organized by geographic areas within the EMF study area; these areas encompass groups of potential sources. Section 4.4.2 discusses groundwater quality beneath two parts of the FMC facility. The former ponds in the southwestern FMC facility area are discussed as an area distinct from the central FMC facility area. This is done because groundwater emanating from the area of the former ponds in the southwestern area flows beneath the central FMC area.

The next area discussed (in Section 4.4.3) is the eastern and central Simplot facility. This area includes most of the upper gypsum stack, the lower gypsum stack, and the former east overflow pond. The joint fenceline area—an area including land on both the FMC and Simplot facilities properties—is discussed in Section 4.4.4. This area is discussed separately because of the commingling of flow patterns and constituents within the relatively complex hydrogeologic setting in this area. The final geographic area is the offsite area, which encompasses the area beyond the facilities' north fencelines (Section 4.4.5).

Further evaluation of the hydraulic influence of potential sources and onsite pumping wells on groundwater flow patterns is in progress. The results of this study will be included in the RI report. Until this evaluation is completed, it is premature to draw conclusions regarding the relative level of contribution from potential sources to the observed levels of constituents in offsite wells or in areas where flows from several areas have commingled.

Figures 4.4-1 through 4.4-5 illustrate the distribution of arsenic, orthophosphate, pH, sulfate, and total phosphorus in groundwater throughout the EMF study area. These figures provide an overview of the nature of site-related constituents that will be described in greater detail in Sections 4.4.2 through 4.4.5. Figure 4.4-6 outlines the five geographical areas referred to throughout this section.

An overview of Section 4.4 is provided on the following page.

Overview of Section 4.4
Nature and Extent of Constituents of Potential Concern in Groundwater

Representative Groundwater Quality *(Section 4.4.1):*	▪ Sixteen upgradient wells define representative concentrations. ▪ Three hydrogeochemical regimes are present. ▪ Constituent levels are low.
Characteristics of Onsite Groundwater Quality	**FMC Facility** *Section 4.4.2* · **Simplot Facility** *Section 4.4.3* · **Joint Fenceline Area** *Section 4.4.4* ▪ Organic compounds are largely not present, and most metals are within representative concentrations. ▪ Shallow groundwater has been impacted by releases from unlined waste management units at both facilities. ▪ Primary site-related constituents of potential concern appear to be arsenic, chloride, fluoride, nitrate, selenium, sodium, and sulfate. ▪ Areas of impact at FMC are in the vicinity of former unlined ponds (phossy waste, kiln and calciner scrubbers) and slag pit. ▪ Areas of impact at Simplot are the gypsum stacks and former east overflow pond. ▪ Several potential sources may contribute constituents within the joint fenceline area. ▪ Closures of unlined waste management units at both facilities have greatly reduced constituent releases; this will quickly lead to improved groundwater quality.
Characteristics of Offsite Groundwater Quality *(Section 4.4.5):*	▪ Impact on groundwater offsite is limited, due to natural attenuation, dilution, and the influence of onsite production wells at Simplot. ▪ Groundwater that escapes the influence of Simplot's production wells may discharge, in part, at two springs near the Portneuf River (Batiste Spring and Swanson Road Spring). It appears that both facilities contribute flow to these springs. The relative contribution of constituents has not been determined.

Overview of Findings

Representative Groundwater

After piezometric g roundwater contour maps were evaluated for the site during Phase I of the field investigation, 16 upgradient or crossgradient wells were selected as representative wells. Through an evaluation of the water chemistry in these wells using Stiff and Piper diagrams, three distinct water chemistries (uninfluenced by EMF facility activities) were identified in the aquifer. These have been designated the Michaud Flats, Bannock Range, and Portneuf River Valley hydrogeochemical regimes.

While there are some differences between these regimes in their trace metal content, the primary differences are in general water quality parameters (sodium, potassium, calcium, magnesium, chloride, bicarbonate, and sulfate). The groundwater in the Michaud Flats regime is more saline (higher chloride and sodium content) than the other two regimes. The Bannock Range regime, which underlies most of the facilities area, has a calcium-bicarbonate chemistry and has the lowest ionic strength of the group. The Portneuf River Valley regime is also a calcium-bicarbonate system but is higher in bicarbonate.

The constituents detected in these 16 wells over multiple sampling events have been used to define groundwater quality that has not been influenced by potential releases from sources within the EMF facilities.

The term representative has been chosen instead of background in recognition of the fact that the shallow aquifer in this region has been impacted by anthropogenic activities other than those conducted by the facilities. This is especially evident in the Portneuf River Valley regime where higher nitrates and sulfates as well as a low-level tetrachloroethene plume are evidence of upgradient sources of constituents originating in the valley to the southeast (upgradient) of the EMF facilities.

FMC Southwestern and Central Areas

Groundwater has been impacted in the southwestern and central areas at the FMC facility. Eleven former, unlined ponds are located in the southwestern area. Five of the former phossy waste ponds (Ponds 00S, 0S, 1S, 2S, and 3S) and the main plant area are located in the central area.

Impacted groundwater in the southwestern area appears to migrate north, transported by Bannock Range flow. However, this flow merges with a more east to-northeast-flowing Michaud Flats groundwater. The result is a mixing of the unimpacted—but more saline—Michaud Flats water with the impacted Bannock

Range water. This mixing has a diluting effect, as well as causing a general change in flow direction of the impacted groundwater toward the northeast. This confluence also has the net effect of preventing impacted water from leaving the site to the north. The constituents found in the impacted water at above-representative concentrations were arsenic, chloride, fluoride, orthophosphate, potassium, total phosphorus, and sodium. In addition, gross alpha, gross beta, sulfate, ammonia, boron, calcium, cobalt, lithium, magnesium, selenium, and nitrate were detected at above-representative concentrations in some groundwater samples collected within these areas. The primary constituents of potential concern appear to be arsenic, selenium, fluoride, nitrate, sulfate, chloride, and sodium.

Impacted groundwater from the southwestern area commingles with part of the impacted groundwater present in the central area and appears to migrate beyond the facility fenceline near Well 111, just north of the main plant area. This commingled impacted groundwater continues northeast to east and may explain the presence of the arsenic detected in samples collected from the Old Pilot House well. At Well 111, arsenic was detected at a maximum concentration of 0.055 mg/l. Chloride was detected at a maximum concentration of 358 mg/l, and nitrate at a maximum concentration of 19.8 mg/l. These values are considerably lower than those found near the old pond sources and show the effects of attenuation and dilution that occur within the facility boundary.

Monitoring at the Old Pilot House well began in 1973 and continued through this investigation. This monitoring has shown that the quality of the groundwater has improved over the years. Arsenic values detected in samples collected between June 1992 and September 1993 ranged from 0.035 to 0.050 mg/l; chloride and nitrate values ranged from 250 to 263 mg/l and 9.6 to 18.4 mg/l, respectively.

Impacted groundwater in the central area has the same constituents of interest as the southwestern area except that trichloroethene was detected in some wells at very low levels (0.001 to 0.005 mg/l). Also, there are higher temperatures in the groundwater caused by the heating of soils from the slag pit operations. The higher temperature created by the slag pit operation creates a thermal plume that can be used to trace the pattern of groundwater flow. This impacted groundwater appears to migrate beyond the facility boundary in the vicinity of Well 146. There is a higher-than-expected temperature in Well 517 to the northeast. It appears that the groundwater thermal plume is drawn beyond the central area into the cone of depression and captured by the Simplot production wells.

Eastern and Central Simplot Area

Two sources of groundwater impact were identified at Simplot: the unlined gypsum stacks and the former, unlined east overflow pond. The former east overflow pond was active during the period of investigation and periodically

received discharges of plant process water during plant upset conditions. The impact of these discharges during an upset event could be detected in downgradient monitoring Well 318. This unlined pond was replaced with a lined unit in August 1993.

The constituents present at above-representative concentrations in groundwater beneath both the upper and lower gypsum stacks were ammonia, arsenic, bicarbonate, boron, calcium, lithium, magnesium, orthophosphate, potassium, reduced pH, total phosphorus, selenium, sodium, sulfate, and gross beta. Groundwater beneath the upper gypsum stack also contained elevated levels of gross alpha. Groundwater beneath the lower gypsum stack also contained elevated concentrations of fluoride and nitrate. The primary constituents of potential concern appear to be arsenic, selenium, fluoride, nitrate, sulfate, and sodium.

In the area of the former east overflow pond, constituents detected at above-representative concentrations were aluminum, ammonia, arsenic, beryllium, bicarbonate, boron, cadmium, calcium, total chromium, cobalt, copper, fluoride, lithium, magnesium, manganese, nickel, nitrate, orthophosphate, reduced pH, potassium, selenium, sodium, sulfate, thallium, and zinc.

Impacted groundwater originating from the gypsum stacks appeared to be largely captured by the Simplot production wells, which had a long-term average pumping rate of between 4,000 and 5,000 gpm. Based on preliminary analysis, it appears that some portion may have escaped capture by the production wells and flowed offsite. Further analysis using analytical modeling techniques is in progress to better understand the influence of the production wells on flow patterns. The results of this analysis will be included in the RI report.

Joint Fenceline Area

In the joint fenceline area, groundwater from the the western part of the gypsum stack flows in a gently northwesterly sweeping arc across the Simplot property boundary near the top (south) of the stack, passes under the calciner pond and former kiln scrubber overflow pond, and then flows back east toward the Simplot production wells. This "clockwise" flow appears to be paralleled to the north of the joint fenceline area by the flow pattern of the high-temperature groundwater originating beneath the FMC slag pit, which can be traced from Well 146 to Well 517. The groundwater in the joint fenceline area appears to commingle with constituents from the former (southwestern) ponds, and appears to be captured by the Simplot production wells.

While groundwater in some of the deeper wells within the facilities' property has shown impacts from facility operations, these impacts appear to be highly localized.

Offsite Area

There are site-related impacts to the north of the EMF facilities. These impacts do not extend beyond Interstate Highway 86 (I-86) to the north and west of FMC, but may appear in subdued form at Batiste Spring and Swanson Road Spring in the eastern portion of the EMF study area. There has also been impact at the Old Pilot House well, which was removed from service in 1976.

Historic data indicate that Batiste Spring and the Old Pilot House well water quality have improved as both facilities have changed their waste and byproduct handling practices. During the RI, arsenic was detected at a maximum concentration of 0.057 mg/l at Batiste Spring, while most of the samples contained arsenic below 0.025 mg/l, within the range of representative concentrations. The maximum arsenic concentration at Old Pilot House well during the RI was 0.050 mg/l; the minimum value was 0.037 mg/l.

Data Presentation Conventions

Several methods have been used in reporting the characteristics of analytical results in this section. These are as follows:

- Representative groundwater concentrations have been identified by the mean concentration plus or minus two standard deviations of each constituent among the 16 representative wells. This corresponds approximately to the 95th percentile of the arithmetic mean. This approach was also used to describe representative surface and subsurface soils, and is consistent with EPA Region 10 policy.
- For each representative well, the mean concentration of each constituent was calculated using only analytical results that were not flagged with a "U" (nondetect) qualifier during data validation. For example, if the results of two out of 10 sampling events were reported with a U qualifier, only eight data points were used to calculate the mean; the nondetect samples were not replaced with zeros or one-half the detection level. This approach provides a better description of the concentrations of constituents present in representative groundwater than would the inclusion of sporadic nondetect values.
- It was sometimes necessary to compare the mean concentration of a constituent detected in samples collected from a single well with the analytical detection limits for that constituent. In these cases, a characteristic detection limit was calculated for each constituent that was not detected in one or more samples. To do this, the results with the U qualifier for each of these constituents for samples collected from Wells 101 and 102 were averaged to identify the mean sample detection limit for each constituent. Wells 101 and 102 were used because they are representative wells.

This 'method was chosen over the method in which the detection limit is divided by two (EPA, 1989) because of a lack of consistency in reported sample detection limits. The instrument detection limit (IDL) for inorganic parameters cited in the EMF/RI/FS Sampling and Analysis Plan (Bechtel, 1992b) was not always achieved or was not appropriate due to a variety of field-, laboratory-, and blank-related issues. Consequently, reported sample detection limits (i.e., values at which a U qualifier was assigned) for one or more parameters for a given sample during a given sampling round were often well above the IDL and, in many instances, were above unqualified analytical results for the same parameter in previous or subsequent rounds of sampling.

4.4.1 Representative Groundwater Chemistry

The representative groundwater chemistry must be well defined prior to assessing the nature and delineating the extent of site impacts. Typically, wells upgradient from a potential source area are sufficient to describe the representative groundwater chemistry. In the EMF study area, there are several distinct natural hydrogeologic areas and associated water chemistries, as well as a number of potential sources. This complicates the definition of representative groundwater chemistry because there are mixing zones where these hydrogeologic areas and water chemistries meet. Thus, several distinct hydrogeochemical regimes may be upgradient from a given potential source. In addition, several potential sources may lie along a groundwater flowpath, resulting in one source being upgradient of another. Thus, an assessment of the potential impact of a release from the more-downgradient source cannot be made until the potential impact of the more-upgradient source is identified.

Because there are other anthropogenic activities that impact groundwater quality in the EMF study area (e.g., the presence of a National Priorities List [NPL] site upgradient from the EMF facilities along the Portneuf River Valley), the term "background" is not used to describe groundwater chemistry unimpacted by EMF site-related activities. Rather, the term "representative" is used to describe constituent concentrations that reflect non-EMF site-related groundwater quality but that may reflect constituent levels contributed by offsite sources.

4.4.1.1 Selection of 16 Representative Wells

In light of the presence of three hydrogeologic areas, various offsite groundwater impacts, and other factors, the following criteria were used to select representative wells:

- The group of wells must be representative of the three different hydrogeologic areas delineated in Section 3.3.

- The well group must represent groundwater from the different lithologies described in Section 3.1.

  The wells must be located upgradient or crossgradient from known or suspected EMF source areas, as defined by horizontal and/or vertical hydraulic gradients.
- Inorganic geochemistry must be consistent for wells within the group; if significant outliers exist, there must be a plausible explanation for these outliers that relates them to known non-EMF sources and activities.

On the basis of these criteria, an initial set of 16 wells was selected (Figure 4.4-7). These wells comprise a representative cross-section of the different geologic and hydrogeologic conditions that exist in the EMF study area. Although there are other wells in the study area that are not impacted by site-specific activities, they were not used to define representative concentrations in the early part of the analysis because it was not clear at that time that they were upgradient (or crossgradient) of potential sources. It was only after results from wells sampled during Phase II of the RI were available that it could be shown that these wells were clearly upgradient.

The initial set of 16 wells and associated hydrogeochemical regimes are:

- Michaud Flats: Wells 101, 102, TW-10S, 147
- Bannock Range: Wells 130,120,106, Idaho Power, 301, PEI-I, 305
- Portneuf River Valley: Wells PEI-6, 510, 511, 512, 513

When evaluating representative concentrations of certain constituents in groundwater, it is also important to have a time series of data to define the representative values. Time-series data provide a better estimate of concentrations because seasonal and long-term trends can be evaluated. In addition, the overall variability of the groundwater chemistry is depicted better by long-term monitoring. Several wells in the group have 10 or more data points over a period of 3 years. The 500- and 300-series wells were installed in 1992 and have four data points associated with them.

Time-series data of groundwater elevations are also important when defining wells that are upgradient and crossgradient from a potential source. In Section 3.3, the overall consistency of the groundwater gradients, both vertical and horizontal, was demonstrated. This consistency is critical for increasing the certainty of defining hydraulic relationships between wells and potential sources.

As shown in Figure 4.4-7, Wells 120, 130,301, PEI-I, and 305 are close to existing or former waste management facilities. Because these wells are close to potential sources, the chemical and physical groundwater parameters of these wells were compared to other representative wells in the same hydrogeologic area. The

comparison confirmed that these wells were unaffected by facility activities, and Wells 120, 130,301, PEI-I, and 305 were retained in the representative well network.

Wells 301 and PEI-1 were included because groundwater elevations in these wells indicated there was a significant interval (60 feet) of unsaturated soil and bedrock between any gypsum stack water and the groundwater in these wells. In addition, the water in these wells is hydraulically upgradient from wells along the north of the gypsum stack, further indicating that these wells are truly upgradient from the gypsum stack.

Well 130 is screened in the deeper saturated unit and is separated from the upper saturated gravels by a silt aquitard that is approximately 46 feet thick. Well construction details indicate the solid casing penetrates former Pond 6E. There is a well seal consisting of bentonite-cement grout and a bentonite seal above the filter pack. These seals should prevent vertical migration of constituents downward, into Well 130. The vertical head differences between Well 130 and the nearby shallow Wells 129 and 137 indicate vertical hydraulic gradients are very low. The direction of vertical gradient is variable; during some periods, downward vertical gradients are observed and at other times, upward vertical gradients are measured (Figures 3.3-5A to 3.3-5E). Overall, the vertical separation between the upper saturated gravel and the deeper gravel monitored by Well 130 indicates that groundwater quality in Well 130 should not be impacted by past or current facility activities.

Well 130 was selected at the beginning of the RI because there was a long groundwater sampling record for this well. In Phase II, Well 158 was installed Further upgradient from the former ponds area. Water levels in Well 158 are 2 to 3 Feet higher than water levels in Well 130 (Figure 3.3-3E). Water chemistry results from Well 158 are similar to those from Well 130. However, Well 158 was not substituted for Well 130 as a representative well because it had only been sampled once before preparation of this report.

Well 120 is located crossgradient from Pond 8S, about 140 feet from the northeastern edge of the pond. Well 120 is screened in the upper saturated gravel unit. This portion of the aquifer has been impacted by releases from Pond 8S, as evidenced by analytical results for samples from Wells 150 and 152. The water chemistry from Well 120 is markedly different from that of these two wells, showing much lower concentrations of metals, major ions, and other parameters. These lower concentrations reflect unimpacted representative groundwater flowing through this area. Well 158 is located upgradient from Well 120 and exhibits similar water chemistry, with only subtle differences.

In conclusion, Wells 120 and 130 are located very near known areas of impacted groundwater but contain lower metal, nutrient, and major ion concentrations than wells immediately downgradient from these areas. Concentrations of all parameters measured in Wells 120 and 130 are similar to concentrations detected in other

representative wells. On the basis of this information, the groundwater analytical data from these wells were used to define representative groundwater chemistry. When additional groundwater data become.available for Well 158, this well may replace Wells 120 and 130, or Well 158 may be added to the representative groundwater database. Wells 514,515, and 516 (which were also installed during Phase II) may also be added to the network of representative groundwater wells after additional sampling results become available.

Well 305 is crossgradient from the gypsum stack and lies on the east side of a draw within the Bannock Range area. The groundwater from Well 305 is representative of deeper Bannock Range groundwater, unaffected by'gypsum stack activities.

4.4.1.2 Characteristics of Representative Groundwater Quality

Major Ions. In the evaluation of the major ion chemistry, three hydrogeochemical regimes have been defined within the shallow saturated zone. These are:

- Michaud Flats groundwater, which has a calcium-chloride water chemistry; higher concentrations of all common ions, except bicarbonate, than Bannock Range groundwater; and higher concentrations of calcium, chloride, potassium, and sodium than Portneuf River groundwater.
- Bannock Range groundwater, which has a calcium-bicarbonate water chemistry with lower overall ionic concentrations than the other two regimes.
- Portneuf River Valley groundwater, which has a calcium-bicarbonate water chemistry with a higher proportion of bicarbonate ion than the other two regimes.

The areas of these three regimes are plotted in Figure 3.3-1. This figure also illustrates the hydrogeologic areas defined previously in Section 3.3. "Hydrogeologic areas" are defined by geologic and hydrogeologic physical properties such as hydraulic conductivity; "hydrogeochemical regimes" are defined by general water chemistry parameters.

Groundwater in the Bannock Range hydrogeochemical regime can be separated into high- and low-chloride subgroups. For the low-chloride Bannock Range subgroup, concentrations of most common ions are lower than those for the other two hydrogeochemical regimes. High-chloride Bannock Range water chemistry may represent mixing of Michaud Flats and low-chloride Bannock Range groundwater. Concentrations of common ions are generally higher in the high-chloride Bannock Range water than in the low-chloride Bannock Range water (Table 4.4-1).

For Portneuf River groundwater, the concentrations of common ions are less variable than in the other two hydrogeochemical regimes. Calcium and sodium

concentrations are similar to those found in Michaud Flats and Bannock Range groundwater. Chloride and potassium concentrations tend to be low, and magnesium and sulfate concentrations tend to be greater than those found in the Michaud Flats and Bannock Range regimes (Table 4.41).

The mean concentrations of common ions from the 16 representative wells (Table 4.4-1) were used to prepare Piper and Stiff diagrams of common ion proportions. With these diagrams, characteristic common ion balance (or common ion water chemistry) of the three hydrogeochemical regimes can be distinguished.

Piper diagrams (Figure 4.4-8) present cation/anion ratios in percent milliequivalents per liter (mEq/l). In the Piper diagram, the two triangles present cation (calcium, magnesium, and sodium plus potassium) and anion (bicarbonate plus carbonate, sulfate, and chloride) ratios.

All three regimes cluster tightly in the cation triangle, showing the similarity in cation ratios among the three hydrogeochemical regimes. The clear separation of the Michaud Flats water from the other two regimes in the anion triangle demonstrates the calcium-chloride chemistry of this hydrogeochemical regime compared with the calcium-bicarbonate chemistry of the Bannock Range and Portneuf River hydrogeochemical regimes. In the quadrilateral portion of the Piper diagram, the clustering of points into three groups demonstrates the overall water chemistry similarity within each regime.

Figure 4.49 presents Stiff diagrams for the Michaud Flats, Bannock Range, and Portneuf hydrogeochemical regimes. The Stiff diagrams for all three regimes show calcium is the dominant cation. Chloride is the dominant anion in Michaud Flats groundwater.

Michaud Flats representative Wells TW-10S and 147 have higher concentrations of sodium, potassium, and chloride than representative wells to the east and south (e.g., Wells 101 and 102). Goldstein (1981) examined springs and wells in the Pocatello and Michaud Hats area. Data reported for the Crockett well, located approximately 2.5 miles (4 km) north and west of the EMF facilities, had even greater concentrations of salts than Wells 147 and TW-10S (Goldstein, 1981). This suggests that salinity (sodium, potassium, and chloride) increases toward the west and north in Michaud Flats groundwater.

As a criterion to compare representative concentrations with impacted groundwater concentrations of common ions, mean concentrations and standard deviations were calculated using the entire data set for the 16 representative wells (Table 4.4-1). A range for representative concentrations was then calculated for each ion based on the mean plus or minus two times the standard deviation (2XSD).

Physical Parameters. Previous investigations within the EMF study area have included characterization of physical parameters as a means of identifying sources of water. Data were collected and analyzed for samples from all wells in the RI program for the following parameters:

- pH
- Specific conductance
- Temperature
- Total dissolved solids
- Reduction/oxidation potential (redox)

The means and ranges of the physical parameters for the 16 representative wells are presented in Table 4.41. Means and ranges were also calculated for the entire data set and for each of the three hydrogeochemical regimes.

Groundwater was generally neutral to slightly alkaline (pH range from 6.9 to 8.9). Evaluation of the time series of pH values obtained from Well PEI-1, which had the highest pH value (9.4), indicates that this value is an outlier. Other physical parameters show more variability among the three hydrogeochemical regimes.

Michaud Flats groundwater had a higher range of specific conductance (621 to 1,059 µmhos/cm) and total dissolved solids (209 to 876 mg/l) and generally low mean temperature compared with the other regimes (14.2°C). It had both positive and negative redox values (-38 to 156 mV). Higher specific conductance and total dissolved solids values were consistent with the overall higher ionic concentrations for groundwater in the Michaud Flats.

Reduction/oxidation potential (redox) is the ability of the groundwater to bring about oxidation or reduction; it is commonly given the symbol Eh (in mV). Redox was measured only during one sampling round (March 1993); Eh ranged from -38 to 255 during this sampling event among the 16 representative wells. Well TW-10S, which was constructed with a mild steel casing, was the only well with a negative redox value.

Low-chloride Bannock Range groundwater was characterized by low specific conductance (286 to 708 µmhos/cm) and total dissolved solids (163 to 468 mg/l), higher temperatures (16.1°C), and a wide range of positive redox values (41 to 104). High-chloride Bannock Range groundwater was characterized by specific conductance and total dissolved solids intermediate between Michaud Flats and low-chloride Bannock Range groundwaters.

The Portneuf River regime was characterized by intermediate specific conductance (611 to 933 µmhos/cm) and total dissolved solids (394 to 591 mg/l), lower

temperatures (13.2°C), and a narrower range of positive redox values (83 to 137) than the other regimes.

Nutrients and Fluoride. Data have been collected and analyzed for samples from representative wells in the RI program for the following parameters (Table 4.4-2):

- Ammonia
- Nitrate
- Orthophosphate
- Total phosphorus
- Fluoride

The nutrients and fluoride occur naturally to some degree in groundwaters but are also contributed by numerous anthropogenic activities such as septic systems, livestock raising, fertilizer application, and other activities. In addition, certain soil and rock types may leach phosphorus, present as a naturally occurring element in the minerals. These constituents were also identified in the EMF feedstock, byproduct, and wastestreams.

Ammonia (NH_3 as N) concentrations were negligible in the representative wells. The mean 'concentration of ammonia ranged from nondetect (ND) to 0.8 mg/l. Maximum concentrations were: fluoride, 0.8 mg/l; nitrate, 4.8 mg/l; orthophosphate, 2.7 mg/l; and total phosphorus, 3.2 mg/l. Wells 130 and 120 had the highest orthophosphate and total phosphorus concentrations. The Michaud Flats regime generally had higher nutrient concentrations than the other two hydrogeochemical regimes; the Portneuf River regime generally had lower nutrient concentrations, with the exception of nitrate. The mean concentration of nitrate in the Portneuf River regime was 2.6 mg/l, and the mean plus or minus two standard deviations ranged from 0.9 to 4.3 mg/l (Table 4.42).

For some parameters (e.g., ammonia) there were no samples with an analytical result reported above the detection limit for any round of sampling conducted for some wills. Table 4.4-2 documents this information by reporting NH (no hits) rather than ND, the mean sample detection limit.

Metals. Representative groundwater was analyzed for 22 alkali metals, alkaline earths, and trace metals (hereafter referred to as metals) (Table 4.4-3). The results are discussed in this section.

Most metals (16 of 22) were not detected in representative groundwater or were detected in only a few samples, or from a few wells and in low concentrations. Mean concentrations were below detection or negligible (detected in only a few wells or a few samples at levels very dose to the detection limit) in all three

hydrogeochemical regimes for antimony, beryllium, cadmium, manganese, mercury, molybdenum, nickel, selenium, silver, and thallium. Mean representative concentrations were low in all three hydrogeochemical regimes for aluminum (0.18 mg/l), chromium (0.005 mg/l), cobalt (0.018 mg/l), lead (0.002 mg/l), lithium (0.031 mg/l), mercury (0.0006 mg/l), and vanadium (0.024 mg/l).

Arsenic, barium, and boron were found consistently in representative groundwater for all three hydrogeochemical regimes. Arsenic was detected in representative groundwater at mean concentrations from 0.004 to 0.032 mg/l. Barium was found in representative groundwater at mean concentrations from 0.04 to 0.23 mg/l. Boron was found in representative groundwater at mean concentrations from 0.04 to 0.26 mg/l.

The presence of iron, copper, and zinc in representative groundwater was not consistent over time or among the three regimes. Iron was found in representative groundwater at mean concentrations from below the detection limit to 2.00 mg/l. Measurements over 1.0 mg/l were generally limited to initial rounds of sampling for wells such as 512,101, and 102. In the case of Wells 512 and 101, iron was not detected in subsequent rounds of sampling after initial measurements of 2.00 and 1.98 mg/l, respectively.

Copper and zinc were found generally only in the Bannock Range regime. Copper was detected at mean concentrations up to 0.014 mg/l. Mean zinc concentrations were either below the mean detection limit (0.017 mg/l) or at much higher concentrations (0.269 to 0.287 mg/l). These two higher readings were detected at Idaho Power and PEI-1. The average for PEI-1 may be an artifact attributable to one very high outlier (0.72 mg/l), one nondetect, and two samples under 0.1 mg/l (0.07 and 0.018 mg/l). Hence zinc concentrations were probably not as high as these values would indicate (Table 4.4-3).

Radiological Parameters. A summary of the activities for radiological parameters—gross alpha, gross beta, radium-226, and radium-228—for the 16 representative wells is presented in Table 4.4-4. Activities are presented in picocuries per liter (pCi/l). Due to the variability inherent in the analytical method used for radiological parameters, a detailed statistical analysis was not conducted.

Representative gross alpha activities in the Michaud Flats regime ranged from ND to 7.34 ± 2.38 pCi/l. Gross alpha activities for the Bannock Range groundwater ranged from ND to 4.94 ± 1.06 pCi/l for Well 301 in March 1993. Gross alpha activities for representative wells in the Portneuf River regime ranged from ND to 4.6 ± 2.3 pCi/l for Well PEI-6 in June 1992.

The representative range for all three regimes was ND to 7.34 ± 2.38 pCi/l. Gross alpha activities were detected more consistently and at slightly higher levels in the

Michaud Flats regime and were detected less frequently and at slightly lower levels in the Portneuf River regime.

Gross beta activities in representative groundwater in the three hydrogeochemical regimes ranged from ND to 45.8 ± 2.65 pCi/l. The gross beta activities were comparatively higher in the Michaud Flats regime, intermediate in the Bannock Range regime, and lowest in the Portneuf River regime.

Gross beta activities for the Michaud Flats regime ranged from 4.1 ± 2.9 pCi/l to 45.8 ± 2.65 pCi/l (Table 4.4-4). Gross beta activities for the Bannock Range regime ranged from ND to 30 ± 5.12 pCi/l. Gross beta activities for the Portneuf River regime ranged from ND to 9.3 ± 0.88 pCi/l (Table 4.4-4).

Radium-226 was not detected in 11 of the 16 representative wells. In the remaining five wells, radium-226 was detected during only one sampling event. In Wells TW-10S and 147 in the Michaud Flats, and Wells 120,301, and 305 in the Bannock Range, activities ranged from 1.55 ± 0.42 to 6.35 ± 0.57 pCi/l.

Radium-228 was not detected in 5 of the 16 representative wells. For nine of the remaining 11 representative wells, radium-228 was detected during only one sampling event. For these nine wells, activities ranged from 1.00 ± 0.80 to 7.20 ± 1.00 pCi/l. Radium-228 was detected during two sampling events for Well 102 and for three sampling events for Well 301. Activity ranges for these two wells were 1.8 ± 0.9 to 6.5 ± 1.2 pCi/l and 1 ± 0.6 to 2.7 ± 1 pCi/l, respectively (Table 4.4-4).

Organic Compounds. Samples were analyzed for volatile and semivolatile organic compounds from selected wells during the RI program. Analyses for organic compounds were first conducted during the September 1992 round of sampling. The results from the 16 representative wells are presented in this section.

Actual values for organic compounds detected in representative wells are presented in Table 4.4-5. Analyses were performed for samples from 9 of the 16 representative wells. Organic compounds were detected sporadically in these representative wells.

Of the 11 volatile or semivolatile organic compounds reported in representative well samples, most or all may not have been present in groundwater. Several compounds are common laboratory contaminants, including methylene chloride, acetone, and plasticizers (phthalates). Compounds reported infrequently and at low concentrations, such as 2-butanone, may represent an aberration in the analytical methodology and may not actually have been present in the sample.

One compound, tetrachloroethene, was detected during all three rounds of sampling at Well 511, but was not detected in any other representative well. Tetrachloroethene was encountered at low concentrations (0.001 to 0.003 mg/l) in this well. The presence of this compound most likely represents a source in or

along the Portneuf River above the EMF facilities. Studies at an NPL site upstream (and upgradient) of the EMF facilities have documented the presence of chlorinated solvents in the groundwater.

4.4.13 Method for Defining Groundwater Impacted by EMF-Related Constituents

After the mean values and variability were defined for each constituent and parameter in representative groundwater, a method was established to use this information to characterize the nature and extent of EMF-related constituents in groundwater.

One of the first things noticed when inspecting groundwater chemistry from other wells at the EMF facilities was the marked increase in common ion concentrations observed in wells immediately downgradient from former ponds and the gypsum stacks. On the basis of these observations, common ion chemistry for all wells was compared to the representative common ion chemistry. This comparison yielded a number of wells associated with known or suspected sources that were classified as having been impacted by EMF-related activities.

Metal concentrations were also compared with representative groundwater concentrations. This comparison found that most or all wells with common ion concentrations within the ranges defined by representative groundwater did not have elevated metal concentrations relative to representative ranges. For the most part, these comparisons were used to develop a well classification of "impacted" versus "unimpacted." Impacted refers to a well that contains groundwater with chemistry outside the representative ranges and that appears to reflect an EMF-related source. Unimpacted refers to a well that contains common ion and metal concentrations within the representative ranges.

In many cases, the comparison of common ion concentrations was not sufficient to classify a well and a final comparison using metal and nutrient concentrations was needed before deciding if samples collected from a well exhibited impact by EMF-related activities.

The wells characterized as impacted or unimpacted by EMF facility activities are identified in each of the following sections. The ranges of constituents detected in unimpacted and impacted wells for the EMF study are presented in Tables 4.4-6 and 4.4-7.

As with all classification schemes, there are exceptions. The primary cause for this is the criterion that all representative wells within a given hydrogeologic area have similar chemistry. This criterion artificially reduced the degree of variability used to characterize representative groundwater chemistry. For instance, there is evidence that Michaud Flats groundwater has highly variable common ion concentrations.

These exceptions are also noted in the following sections. A detailed discussion of constituents detected in unimpacted groundwater beyond the range found in the 16 representative wells is provided in Appendix M.

4.4.2 Characterization of Groundwater Quality at FMC

The nature and extent of site-related constituents beneath the FMC facility focuses on the southwestern and central areas of the facility (Figures 4.4-6, 4.4-10, and 4.4-11). Groundwater in the easternmost portion of the FMC facility, near the FMC-Simplot joint fenceline area, may be influenced by commingling of impacted groundwater from multiple potential sources. The eastern FMC area is included in the discussion of the joint fenceline area in Section 4.4.4.

This section begins with a brief overview of findings, continues with a detailed discussion of the nature of site-related constituents, and concludes with a description of the extent of these constituents beneath the southwestern and central areas of the FMC facility.

4.4.2.1 Overview of Findings

Southwestern FMC Area. The groundwater beneath the former ponds begins its flowpath in either the Bannock Range area or the Michaud Flats, and converges in an area immediately northwest of the former ponds (Figure 4.4-10).

It appears that residual levels of constituents in silts beneath the former ponds in the southwestern FMC area contributed detectable concentrations of 17 parameters to groundwater; constituents from Pond 8S (which still had a sustained hydraulic head during the investigation) were also present in the groundwater. The constituents are ammonia, arsenic, boron, calcium, chloride, cobalt, fluoride, lithium, magnesium, nitrate, orthophosphate, potassium, selenium, sodium, sulfate, gross alpha, and gross beta. Most of these parameters were found in enriched concentrations in the process water held in the former unlined ponds. The primary constituents of potential concern appear to be arsenic, chloride, fluoride, nitrate, selenium, sodium, and sulfate.

As groundwater flows through the former ponds area, concentrations of many of the above-mentioned 17 constituents increase. Wells immediately downgradient of Pond 8S, the only unlined pond still containing water at the time of the investigation (Pond 8S was being closed in the fall of 1993), contained the highest concentrations of most constituents emanating from the former ponds. Wells located immediately downgradient of former ponds no longer containing a hydraulic head had lower concentrations of these constituents. Where there was no hydraulic head in the former ponds, the constituents may have been released from the silts in the saturated zone underlying the former ponds (Figures 4.2.3-4 through

TABLES

Table 4.4-1
Common Ions and Physical Parameters in Representative EMF Groundwater

Parameter	REPRESENTATIVE CONCENTRATIONS		CALCIUM-CHLORIDE WATER CHEMISTRY						CALCIUM-BICARBONATE WATER CHEMISTRY																		
			Michaud Flats Hydrogeochemical Regime						Bannock Range Hydrogeochemical Regime													Portneuf River Hydrogeochemical Regime						
									High-chloride Subgroup				Low-chloride chloride Subgroup														
	16 Wells		Well 101	Well 102	TW-105	Well 147	Group		Well 130	Well 120	Subgroup		Idaho Power	Well 106	Well 301	PEI-1	Well 305	Subgroup		Group		PEI-6	Well 510	Well 511	Well 512	Well 513	Group	
	Mean	Range (2 S.D.)(a)	Mean	Mean	Mean	Mean	Mean	Range (2 S.D.)	Mean	Mean	Mean	Range (2 S.D.)	Mean	Mean	Mean	Mean	Mean	Mean	Range (2 S.D.)	Mean	Range (2 S.D.)	Mean	Mean	Mean	Mean	Mean	Mean	Range (2 S.D.)
COMMON IONS (in mg/l)																												
Alkalinity, bicarbonate	195	75 to 315	145	148	156	194	155	122 to 187	209	216	212	184 to 241	165	150	138	182	134	157	118 to 196	181	115 to 246	324	281	285	273	281	298	226 to 370
Alkalinity, carbonate	1.2	ND to 5	2.5	2.5	1.7	0.0	1.9	ND to 7	2.5	1.7	2.0	ND to 7	NH	2.5	0.0	0.0	0.0	0.8	ND to 5	1.4	ND to 6	0.0	0.0	0.0	0.5	0.0	0.1	ND to 1
Calcium	72.6	40 to 105	85.5	77.7	85.7	100	85.0	66 to 104	80.4	68.0	74.2	52 to 97	45.7	59.5	42.6	58.7	48.6	53.7	35 to 73	62.4	33 to 91	79.0	79.7	81.9	66.1	64.1	75.4	50 to 101
Chloride	87.2	ND to 177	139	112	167	165	142	89 to 196	90.6	81.7	86.1	71 to 101	45.9	47.2	43.0	39.3	46.9	44.6	35 to 54	62.7	19 to 106	62.0	60.8	59.1	40.9	26.6	52.9	23 to 82
Magnesium	26.5	11 to 42	31.6	27.9	27.9	30.2	29.3	24 to 34	32.8	27.5	30.1	23 to 37	17.1	20.9	11.1	15.4	11.6	16.8	ND to 35	22.5	3 to 42	32.5	31.0	30.2	27.8	31.2	31.0	23 to 39
Potassium	8.3	4 to 13	8.5	8.0	10.3	11.6	9.3	5 to 13	10.3	8.8	9.5	6 to 13	8.1	9.7	5.9	6.2	5.5	7.7	4 to 12	8.5	4 to 13	6.5	6.3	6.2	6.5	6.8	6.5	5 to 8
Sodium	35.2	7 to 64	32.0	29.3	57.2	64.6	42.5	11 to 74	26.9	46.5	36.7	15 to 58	24.7	22.8	22.5	14.0	16.9	20.4	10 to 31	27.5	5 to 50	39.7	40.0	36.2	52.1	35.9	40.5	25 to 56
Sulfate	46	14 to 79	65	49	36	66	52	26 to 78	62	50	56	39 to 73	24	36	12	16	32	26	6 to 47	39	4 to 74	53	53	48	50	72	55	35 to 74
PHYSICAL PARAMETERS																												
Specific conductance, at 25°C (in µmhos/cm)	720	387 to 1052	832.8	750.3	881.8	975.5	840	621 to 1059	781.0	745.8	763	686 to 841	592.4	521.1	442.3	409.8	486.0	497	286 to 708	610	296 to 924	769.8	799.3	825.0	729.3	740.0	772	611 to 933
pH(b)		6.9 to 9.4	7.5	7.6	7.5	7.4		7.2 to 8.5	7.4	7.2		7.0 to 7.9	7.6	7.6	7.2	8.0	7.4		6.9 to 9.4		6.9 to 9.4	7.7	7.2	7.2	7.3	7.3		7.1 to 8.9
			8.5 max	8.5 max	7.8 max	7.5 max			7.9 max	7.4 max			7.9 max	7.7 max	7.4 max	9.4 max	7.4 max					8.9 max	7.9 max	7.2 max	7.3 max	7.3 max		
			5.8 min	7.4 min	7.2 min	7.2 min			7.3 min	7.0 min			7.3 min	7.4 min	6.9 min	7.4 min	7.3 min					7.1 min	7.1 min	7.1 min	7.2 min	7.3 min		
Temperature (in C°)	14.7	11.4 to 17.9	13.4	13.9	14.3	16.7	14.2	11 to 17	14.5	15.6	15.0	13 to 17	15.4	16.8	14.5	16.5	16.3	16.1	13 to 19	15.6	13 to 18	13.7	13.1	13.2	13.1	12.6	13.2	12 to 15
Total dissolved solids (in mg/l)	461	175 to 746	512	479	544	773 (594)	542 (516)	209 to 876 (390 to 641)	501	475	488	362 to 614	322	333	303	324 (795)	357	315	163 to 468	389	166 to 611	534	497	487	443	447	493	394 to 591
Redox (mV) (c)			156	141	-38	42			255	69			41	104	61	NM	66					104	131	137	76	83		

(a) S.D. = Standard Deviation. Range is mean ± two times Standard Deviation.

(b) Range is actual values rather than two times Standard Deviation.

(c) Single Measurement.

ND = Below Detection Limit, NH = Not Detected in any sample, NM = Not Measured.

Table 4.4-2
Nutrients and Related Parameters in Representative EMF Groundwater

Parameter	Sample Detection Limit (Mean)	REPRESENTATIVE CONCENTRATIONS (16 WELLS)		CALCIUM-CHLORIDE WATER CHEMISTRY						CALCIUM-BICARBONATE WATER CHEMISTRY																		
				Michaud Flats Hydrogeochemical Regime						Bannock Range Hydrogeochemical Regime													Portneuf River Hydrogeochemical Regime						
										High-Chloride Subgroup				Low-Chloride Subgroup														
				Well 101	Well 102	TW-10S	Well 147	Group		Well 130	Well 120	Subgroup		Idaho Power	Well 106	Well 301	PEI-1	Well 305	Subgroup		Group		PEI-6	Well 510	Well 511	Well 512	Well 513	Group	
		Mean	Range (2 SD)(a)	Mean	Mean	Mean	Mean	Mean	Range (2 SD)	Mean	Mean	Mean	Range (2 SD)	Mean	Mean	Mean	Mean	Mean	Mean	Range (2 SD)	Mean	Range (2 SD)	Mean	Mean	Mean	Mean	Mean	Mean	Range (2 SD)
(in mg/l)																													
Ammonia (NH_3 as N)	0.3	0.2	ND to 0.8	NH	0.8	NH	NH	0.8	ND to 0.8	0.3	NH	0.3	ND to 0.3	NH	NH	NH	0.1	NH	0.1	ND to 0.2	0.1	ND to 0.3	0.2	NH	NH	NH	NH	0.2	ND to 0.9
Nitrate (NO_3 as N)		2.1	ND to 4.5	1.7	1.8	4.8	2.5	2.8	ND to 5.7	1.9 (48.3)	1.6	1.8	0.8 to 2.7	1.3	1.0	0.8	0.8	0.9	1.0	0.3 to 1.7	1.3	0.2 to 2.4	1.8	3.3	2.3	3.6	3.3	2.6	0.9 to 4.3
Orthophosphate (PO_4 as P)	0.03	0.37	ND to 1.8	0.06	0.06	0.06	NH	0.06	ND to 0.14	0.61	2.50	1.56	ND to 3.68	0.03	0.05	0.04	0.21	0.06	0.09	ND to 0.33	0.59	ND to 2.5	0.24	0.03	0.03	0.04	0.03	0.11	ND to 0.39
(RI data only)				0.03	0.03	0.07	NH			0.62	2.72			0.03	0.04	0.04	0.18	0.06					0.13	0.03	0.03	0.04	0.03		
Phosphorus, Total	0.03	0.67	ND to 3.1	0.43	0.44	0.07	0.03	0.32	ND to 1.9	0.78	3.26	2.02	ND to 4.94	0.06	0.14	0.04	0.05	0.02	0.09	ND to 0.31	1.1	ND to 4.0	0.09	0.04	0.04	0.04	0.05	0.05	ND to 0.13
(RI data only)				0.03	0.04	NH	0.03			0.68	3.23			0.03	0.04	0.04	0.05	0.02					0.09	0.04	0.04	0.04	0.05		
Fluoride		0.4	0.03 to 0.7	0.4	0.4	0.5	0.8	0.5	0.2 to 0.7	0.3	0.2	0.2	0.1 to 0.3	0.4	0.5	0.7	0.4	0.5	0.5	0.1 to 0.8	0.4	0.003 to 0.7	0.2	0.2	0.2	0.2	0.4	0.2	0.1 to 0.4

(a) SD = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.

ND = Below detection limit.
NH = Not detected in any sample ("No hits").
NM = Not measured.
NA = Not available.

Table 4.4-3
Metals in Representative EMF Groundwater

Parameter	IDL	Sample Detection Limit (Mean)	REPRESENTATIVE CONCENTRATIONS (16 WELLS)		CALCIUM-CHLORIDE WATER CHEMISTRY						CALCIUM-BICARBONATE WATER CHEMISTRY												
					Michaud Flats Hydrogeochemical Regime						Bannock Range Hydrogeochemical Regime												
											High-Chloride Subgroup				Low-Chloride Subgroup								
					Well 101	Well 102	Well TW-105	Well 147	Group		Well 130	Well 120	Subgroup		Idaho Power	Well 106	Well 301	PEI-1	Well 305	Subgroup		Group	
			Mean	Range (2 SD)(a)	Mean	Mean	Mean	Mean	Mean	Range (2 SD)	Mean	Mean	Mean	Range (2 SD)	Mean	Mean	Mean	Mean	Mean	Mean	Range (2 SD)	Mean	Range (2 SD)
Aluminum	0.05	0.05	0.18	ND to 0.68	NH	NH	NH	NH	ND	ND to ND	0.02	NH	0.02	ND to 0.02	NH	0.50	0.07	0.14	NH	0.16	ND to 0.54	0.15	ND to 0.52
Antimony	0.03	0.08	0.12	0.04 to 0.20	NH	NH	NH	NH	ND	ND to ND	NH	NH	ND	ND to ND	NH	NH	NH	0.10	0.17	0.14	0.04 to 0.23	0.14	0.04 to 0.23
Arsenic	0.001	0.011	0.013	ND to 0.032	0.013	0.013	0.004	0.005	0.010	0.002 to 0.019	0.032	0.020	0.027	0.015 to 0.039	0.015	0.004	0.010	0.005	0.018	0.008	ND to 0.021	0.017	ND to 0.039
Barium	0.002	0.14	0.12	0.02 to 0.22	0.15	0.10	0.18	0.23	0.16	0.07 to 0.24	0.07	0.09	0.08	0.06 to 0.10	0.04	0.12	0.06	0.07	0.06	0.09	0.02 to 0.16	0.08	0.03 to 0.14
Beryllium	0.003	0.001	0.002	0.0007 to 0.003	NH	NH	NH	NH	ND	ND to ND	NH	NH	ND	ND to ND	NH	NH	0.002	0.002	NH	0.002	0.002 to 0.002	0.002	0.002 to 0.002
Boron	NA	0.17	0.17	ND to 0.36	0.11	0.09	0.12	0.13	0.11	0.04 to 0.19	0.21	0.22	0.22	0.03 to 0.40	0.11	0.06	0.04	0.26	0.09	0.14	ND to 0.39	0.17	ND to 0.40
Cadmium	0.010	0.004	0.003	0.001 to 0.006	0.004	0.004	0.004	NH	0.004	0.003 to 0.005	0.004	0.004	0.004	0.003 to 0.005	0.003	0.003	0.0001	0.0001	NH	0.003	ND to 0.006	0.003	0.001 to 0.006
Chromium	0.001	0.006	0.005	ND to 0.012	0.006	0.007	0.006	0.007	0.006	0.001 to 0.012	0.006	0.005	0.006	0.002 to 0.009	0.003	0.005	0.002	0.001	0.002	0.003	ND to 0.008	0.004	ND to 0.009
Cobalt	0.007	0.009	0.018	0.002 to 0.033	0.015	NH	NH	NH	0.015	0.015 to 0.015	0.027	NH	0.027	0.025 to 0.030	NH	NH	NH	0.010	NH	0.010	ND to 0.010	0.023	0.006 to 0.040
Copper	0.006	0.004	0.007	ND to 0.022	0.008	0.004	0.004	NH	0.005	ND to 0.016	0.006	0.008	0.007	ND to 0.022	0.004	0.006	NH	0.014	NH	0.008	ND to 0.027	0.007	ND to 0.024
Iron	0.007	0.03	0.21	ND to 1.1	0.29	0.15	0.24	NH	0.22	ND to 1.3	0.12	0.19	0.15	ND to 0.80	0.74	0.16	0.06	0.10	NH	0.19	ND to 0.86	0.17	ND to 0.81
Lead	0.001	0.001	0.002	ND to 0.006	0.001	0.001	0.002	NH	0.001	ND to 0.004	0.001	0.002	0.001	ND to 0.004	0.003	0.001	NH	0.007	NH	0.003	ND to 0.008	0.002	ND to 0.006
Lithium	0.005	0.019	0.031	ND to 0.062	NH	NH	0.042	0.058	0.050	0.028 to 0.072	0.027	0.027	0.027	0.008 to 0.046	NH	0.012	NH	0.007	0.009	0.008	0.003 to 0.013	0.017	ND to 0.040
Manganese	0.002	0.004	0.015	ND to 0.078	0.013	0.016	0.010	NH	0.012	ND to 0.057	0.007	0.013	0.010	ND to 0.053	0.006	0.012	NH	0.007	0.016	0.011	ND to 0.047	0.011	ND to 0.050
Mercury	0.0002	0.0002	0.0006	ND to 0.0013	0.0012	NH	NH	NH	0.0012	ND to 0.0012	NH	NH	ND	ND to ND	0.0002	0.0009	0.0002	0.0004	NH	0.0004	ND to 0.0011	0.0004	ND to 0.0011
Molybdenum	NA	0.02	0.03	ND to 0.07	NH	NH	NH	NH	ND	ND to ND	0.02	0.02	0.02	0.02 to 0.02	NH	NH	NH	0.02	NH	0.02	ND to 0.02	0.02	0.02 to 0.02
Nickel	0.015	0.01	0.01	0.01 to 0.01	NH	NH	NH	NH	ND	ND to ND	0.00	NH	ND	ND to ND	NH	NH	NH	0.01	NH	0.01	ND to 0.01	0.01	ND to 0.01
Selenium	0.002	0.004	0.003	ND to 0.007	0.003	0.003	0.003	0.003	0.003	0.0005 to 0.006	0.004	0.003	0.004	ND to 0.010	0.003	0.002	NH	0.004	0.001	0.002	0.0002 to 0.005	0.003	ND to 0.008
Silver	0.007	0.003	0.004	0.002 to 0.006	0.004	0.004	0.004	0.002	0.004	0.001 to 0.006	0.004	0.004	0.004	0.002 to 0.006	0.004	0.004	NH	0.002	0.007	0.004	0.001 to 0.01	0.004	0.002 to 0.01
Thallium	0.040	0.002	0.040	0.04 to 0.040	NH	NH	NH	NH	ND	ND to ND	NH	NH	ND	ND to ND	NH	NH	NH	0.040	NH	0.040	ND to 0.040	0.040	ND to 0.040
Vanadium	0.008	0.046	0.024	ND to 0.124	0.008	0.008	0.005	0.004	0.007	0.003 to 0.011	0.008	0.007	0.008	0.004 to 0.012	0.007	0.007	0.006	0.097	NH	0.026	ND to 0.103	0.017	ND to 0.073
Zinc	0.002	0.017	0.059	ND to 0.397	0.014	0.009	0.008	NH	0.010	ND to 0.029	0.008	0.010	0.009	0.001 to 0.018	0.287	0.008	NH	0.269	NH	0.166	ND to 0.794	0.088	ND to 0.551

Parameter	CALCIUM-BICARBONATE WATER CHEMISTRY						
	Portneuf River Hydrogeochemical Regime						
	PEI-6	Well 510	Well 511	Well 512	Well 513	Group	
	Mean	Mean	Mean	Mean	Mean	Mean	Range (2 SD)
Aluminum	0.28	0.08	0.02	NH	NH	0.22	ND to 0.9
Antimony	0.10	NH	NH	NH	NH	0.10	ND to 0.10
Arsenic	0.004	0.007	0.007	0.005	0.004	0.005	0.001 to 0.009
Barium	0.14	0.16	0.13	0.14	0.08	0.13	0.07 to 0.19
Beryllium	0.002	NH	NH	0.003	0.001	0.002	0.0004 to 0.004
Boron	0.22	0.16	0.17	0.17	0.16	0.19	ND to 0.37
Cadmium	0.001	NH	NH	NH	0.0003	0.001	ND to 0.002
Chromium	0.008	0.003	0.001	0.002	0.001	0.004	ND to 0.015
Cobalt	0.010	0.017	NH	0.009	0.016	0.013	0.005 to 0.021
Copper	0.014	NH	NH	NH	NH	0.014	ND to 0.036
Iron	0.32	NH	NH	NH	NH	0.32	ND to 1.2
Lead	0.005	0.002	NH	0.002	0.001	0.003	ND to 0.008
Lithium	0.035	0.031	0.027	0.030	0.029	0.031	0.020 to 0.043
Manganese	0.174	NH	NH	NH	NH	0.174	ND to ND
Mercury	0.0009	0.0003	0.0001	NH	NH	0.0005	ND to 0.0013
Molybdenum	0.02	NH	0.03	0.03	0.07	0.04	ND to 0.08
Nickel	NH	NH	NH	NH	NH	ND	ND to ND
Selenium	0.002	0.005	0.004	0.003	0.002	0.003	0.0001 to 0.005
Silver	0.003	NH	NH	NH	NH	0.003	ND to 0.003
Thallium	0.040	NH	NH	NH	NH	0.040	ND to ND
Vanadium	0.165	0.015	NH	NH	0.015	0.115	ND to 0.331
Zinc	0.129	0.008	0.005	NH	NH	0.088	ND to 0.269

Notes:
(a) 2 SD = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.
ND = Below Detection Limit.
NH = Not detected in any sample.
NM = Not measured.
NA = Not available.
IDL = Instrument Detection Limit

Table 4.4-4
Activities for Radiological Parameters in Representative EMF Groundwater

	CALCIUM-CHLORIDE WATER CHEMISTRY				CALCIUM-BICARBONATE WATER CHEMISTRY											
	Michaud Flats Hydrogeochemical Regime				Bannock Range Hydrogeochemical Regime							Portneuf River Hydrogeochemical Regime				
					High-Chloride Subgroup		Low-Chloride Subgroup									
Radiological Parameter (pCi/l)	Well 101	Well 102	TW-10S	Well 147	Well 130	Well 120	Idaho Power	Well 106	Well 301	PEI-1	Well 305	PEI-6	Well 510	Well 511	Well 512	Well 513
Gross alpha																
Jun-92	2.6±1.9	ND	3.4±3	ND	3.7±2.4	ND	ND	ND	RS	2.4±1.3	RS	4.6±2.3	RS	RS	RS	RS
Sep-92	4.4±2.45	2.28±1.87	3.45±0.36	2.66±0.4	ND	ND	2.65±0.58	4.59±1.95	4.57±0.89	2.78±0.41	3.08±0.45	3.39±0.35	ND	ND	2.21±0.64	2.07±0.73
Dec-92	7.34±2.38	4.5±1.72	5.36±2.52	5.18±1.14	3.74±1.94	ND	3.31±0.99	3.76±0.96	2.66±0.55	NS	2.98±1.02	2.31±0.59	ND	ND	ND	ND
Mar-93	2.94±1.6	3.94±1.24	5.82±2.07	4.39±1.05	3.14±1.08	3.5±3.89	4.78±1.48	ND	4.94±1.06	NS	3.93±1.37	3.56±1.48	2.88±0.853	2.24±0.932	2.59±1.33	3.48±1.44
Gross beta																
Jun-92	4.1±2.9	6.5±3	6.1±3.4	20.6±3.5	7.6±3.5	3.8±3.5	14±3.1	ND	RS	11±3.7	RS	9.1±2.9	RS	RS	RS	RS
Sep-92	8.11±1.81	6.97±1.74	8.27±0.39	14.3±0.48	8.9±1.8	9.53±1.75	10.9±0.91	9.04±1.82	6.29±0.82	7.95±0.49	6.89±0.52	4.44±0.46	6.11±0.7	ND	7.64±0.73	9.3±0.88
Dec-92	9.77±1.35	9.53±1.46	10.1±1.49	10.8±0.94	7.66±1.37	5.22±0.41	7.17±0.88	8.43±0.757	5.87±0.72	NS	5.57±0.95	4.04±0.56	ND	ND	ND	ND
Mar-93	45.8±2.65	7.61±0.98	7.05±0.96	9.85±1.01	7.3±1.72	30±5.12	ND	7.18±1.15	ND	NS	6.67±1.23	ND	7.44±1.45	7.47±1.42	ND	ND
Radium-226																
Jun-92	NA	NA	NA	NA	NA	NA	NA	NA	RS	NH	RS	NA	RS	RS	RS	RS
Sep-92	ND	ND	6.35±0.57	ND	ND	1.55±0.42	ND	ND	1.65±0.53	ND	ND	ND	ND	ND	ND	ND
Dec-92	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS	3.41±0.29	ND	ND	ND	ND	ND
Mar-93	ND	ND	ND	1.82±0.26	ND	ND	ND	ND	ND	NS	ND	ND	ND	ND	ND	ND
Radium-228																
Jun-92	ND	ND	ND	ND	ND	ND	ND	ND	RS	NH	RS	ND	RS	RS	RS	RS
Sep-92	1.2±0.8	1.8±0.9	4.2±1	ND	ND	ND	1.2±0.7	1±0.8	2.7±1	ND	ND	ND	ND	ND	ND	2.1±0.5
Dec-92	ND	6.5±1.2	ND	ND	ND	1.3±0.7	ND	ND	1±0.6	NS	2±1	ND	ND	ND	ND	ND
Mar-93	ND	ND	ND	ND	ND	ND	ND	ND	1±0.7	NS	ND	5.4±1	ND	7.2±1	ND	ND

Notes:
NA - Not analyzed.
ND - Not detected.
NH - No hits.
NS - Not sampled.
RS - Rejected sample.

90-1477c.0a6f/SF/dw/wo/R3

Table 4.4-5

Organic Compounds Reported in Groundwater from Representative Wells

		CALCIUM-CHLORIDE WATER CHEMISTRY Michaud Flats Hydrogeochemical Regime			CALCIUM-BICARBONATE WATER CHEMISTRY Bannock Range Hydrogeochemical Regime, Low-Chloride Subgroup			CALCIUM-BICARBONATE WATER CHEMISTRY Portneuf River Hydrogeochemical Regime		
Parameter	**Sample Event**	**Well 101**	**Well 102**	**TW-10S**	**Well 106**	**Well 301**	**PEI-1**	**PEI-6**	**Well 511**	**Well 513**
2-Butanone	Sep-92						0.003J			0.004J
	Mar-93									
Acetone	Sep-92					0.361J	0.524J		0.044	0.1J
	Dec-92					0.12				
Bis(2-ethylhexyl) -phthalate	Sep-92							0.001J	0.017	
	Dec-92	0.004J	0.002J	0.004J	0.005J	0.026		0.013	0.013	0.003J
	Dec-92									0.001J
	Mar-93					0.054		0.025	0.012	
Carbon disulfide	Sep-92								0.027J	0.033J
Chlorobenzene	Sep-92	0.001J								
Di-n-butyl phthalate	Mar-93					0.001J			0.002	
Ethyl benzene	Sep-92					0.001				
Methylene chloride	Sep-92									
Tetrachloroethene	Sep-92								0.003J	
	Dec-92								0.001J	
	Mar-93								0.003	
Trichloroethene	Sep-92							0.005		
Xylenes, total	Sep-92					0.008	0.006			
	Mar-93			0.001J						

J = Validation qualifier indicating estimated quantity.

Table 4.4-6
Ranges of Common Ion Concentrations, Physical Parameters, Nutrient, and Fluoride Concentrations for All EMF Monitoring Wells

PARAMETER	UNIMPACTED WELLS																					IMPACTED WELLS									REPRESENTATIVE CONCENTRATIONS (2 S.D.) (a)
	FMC Wells									Simplot Wells						Offsite Wells						FMC Wells			Simplot Wells			Offsite Wells			
	Michaud Flats Regime			Well 139			Bannock Range Regime			Bannock Range Regime			Portneuf River Regime			Michaud Flats Regime			Bannock Range Regime			Portneuf River Regime									
	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	
COMMON IONS (mg/l)																															
Alkalinity, bicarbonate	181	136 to 253		191	175 to 204		188	142 to 256		159	132 to 218		284	256 to 308		205	162 to 300		176	126 to 266		280	241 to 304		559	196 to 1560		830	1 to 1860		284	189 to 355		315
Calcium	95	62.2 to 156		377	332 to 432		61.2	41.4 to 89.6		51.4	34.1 to 77		72.1	47.0 to 91.7		86.2	45.8 to 120		49.4	15.4 to 77		76.1	44.0 to 99.1		146	29.8 to 531		378	70.4 to 795		98.9	52.7 to 163		105
Chloride	167	108 to 284		1062	853 to 1660		74.3	11.2 to 244		42.4	24.0 to 60		62	52.6 to 72.1		167	103 to 276		34.3	16.0 to 104		50.5	20.0 to 70.7		220	50 to 644		122	41.0 to 206		118.7	34.9 to 274		177
Magnesium	31.3	23.2 to 49		140	130 to 155		22	12.9 to 59.3		13.7	9.5 to 22.1		30.4	26.9 to 34.5		31.5	20.8 to 45.3		17	10.3 to 32.0		30.2	23.8 to 35.6		74.4	10.6 to 330		173	19.9 to 694		40.4	19.9 to 65.0		42
Potassium	11.4	4.9 to 31.0		35.3	30.7 to 38.9		9.2	4.6 to 20.2		5.6	3.5 to 6.8		6.1	4.7 to 6.7		9	4.7 to 13.6		5.1	2.9 to 8.8		6.4	4.3 to 7.4		168	5.5 to 1400		68.2	26.8 to 258		44.6	6.4 to 138		13
Sodium	73.1	27.4 to 187		245	211 to 271		46.7	22.5 to 92.7		26.4	12.6 to 48.6		34.1	20.9 to 44.7		82.3	33.7 to 154		33.3	15.4 to 81		41.4	30.9 to 53.5		253	25 to 1110		359	31.1 to 752		92	34.9 to 175		64
Sulfate	84	36 to 159		570	551 to 579		53	0.8 to 91		41	8.0 to 109		50	41 to 65		111	70 to 186		45	15 to 95		55	41 to 90		371	81 to 1840		1613	101 to 3510		183	61 to 574		79
PHYSICAL PARAMETERS																															
pH		6.98 to 7.64			6.82 to 7.02			6.93 to 8.99			6.91 to 9.40			7.03 to 9.40			7.09 to 9.00			7.10 to 10.11			7.04 to 9.30			5.95 to 7.80			1.61 to 7.70			6.32 to 7.33		6.9 to 9.4(b)
Specific conductance (µmhos/cm)	1056	731 to 1601		4047	3861 to 4247		697	413 to 982		519	402 to 760		829	700 to 1037		1176	639 to 1759		581	403 to 1110		776	593 to 855		2443	819 to 6656		4008	752 to 11147		1256	596 to 1956		1052
Temperature (°C)	14.4	12.1 to 16.8		13.5	13.2 to 13.7		15.8	12.3 to 19.7		15.6	13.3 to 17.1		13.7	12.4 to 16.9		12.1	8.0 to 15.3		14	10.5 to 22.8		13.6	12.1 to 17.6		16.1	10.5 to 30.0		17.1	13.3 to 19.8		14.4	10.0 to 18.1		11.4 to 17.9
TDS (mg/l)	643	350 to 1420		2873	2700 to 3170		438	190 to 840		358	260 to 480		507	390 to 600		700	–70 to 1120		325	160 to 570		485	420 to 580		1775	500 to 5220		3743	450 to 14400		850	370 to 1340		746
Redox (mV)	131	–38 to 243		294	294 to 294		92	–107 to 255		87	61 to 130		92	74 to 104		70	56 to 83		59	–28 to 122		120	76 to 154		64	–306 to 442		117	80 to 307		37	–117 to 137		
NUTRIENTS & FLUORIDE (mg/l)																															
Ammonia (NH3 as N)	0.8	0.8 to 0.8		ND	ND to 0.0		0.6	0.3 to 0.9		0.5	0.5 to 0.5		0.5	0.5 to 0.5		0.5	0.4 to 0.5		0.5	0.5 to 0.5		0.5	0.4 to 0.5		4.7	0.3 to 13		6.7	0.2 to 70		5.6	0.20 to 72		0.8
Nitrate (NO3 as N)	2.9	1.3 to 6.3		34.9	29.5 to 43.5		1.2 8.3	0.4 to 2.6 0.4 to 466		0.8	0.6 to 1.1		2.1 6.6	1.5 to 3.1 1.5 to 78		3.3	1.6 to 7.7		1.4	0.5 to 4.6		2.9	1.7 to 4.6		7.9	0.1 to 32		12	0.1 to 82		7.1	1.5 to 33		4.5
Orthophosphate (PO4 as P)	0.16	0.02 to 0.39		0.1	0.08 to 0.1		0.82	0.02 to 3.1		0.06	0.02 to 0.24		0.06	0.02 to 0.21		0.03	0.02 to 0.04		0.03	0.02 to 0.07		0.04	0.02 to 0.12		35	0.03 to 428		218	0.02 to 4730		6.68	0.06 to 72		1.8
Phosphorus, total	0.17	0.02 to 0.48		0.13	0.12 to 0.2		0.85	0.02 to 3.7		0.03	0.02 to 0.07		0.07	0.02 to 0.23		0.03	0.02 to 0.05		0.15	0.02 to 4.6		9.04	0.02 to 0.15		60	0.02 to 679		187	0.02 to 2890		7.33	0.06 to 77		3.1
Fluoride	0.5	0.2 to 1.0		0.9	0.8 to 1.0		0.6	0.1 to 1.2		0.7	0.2 to 3.1		0.2	0.1 to 0.3		0.5	0.4 to 0.6		0.7	0.2 to 1.0		0.2	0.2 to 0.4		1.6	0.1 to 11		77	0.1 to 2730		0.6	0.2 to 1.3		0.7

(a) 2 S.D. = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.

(b) 9.4 pH is thought to be an outlier. 8.9 pH is the upper representative value.

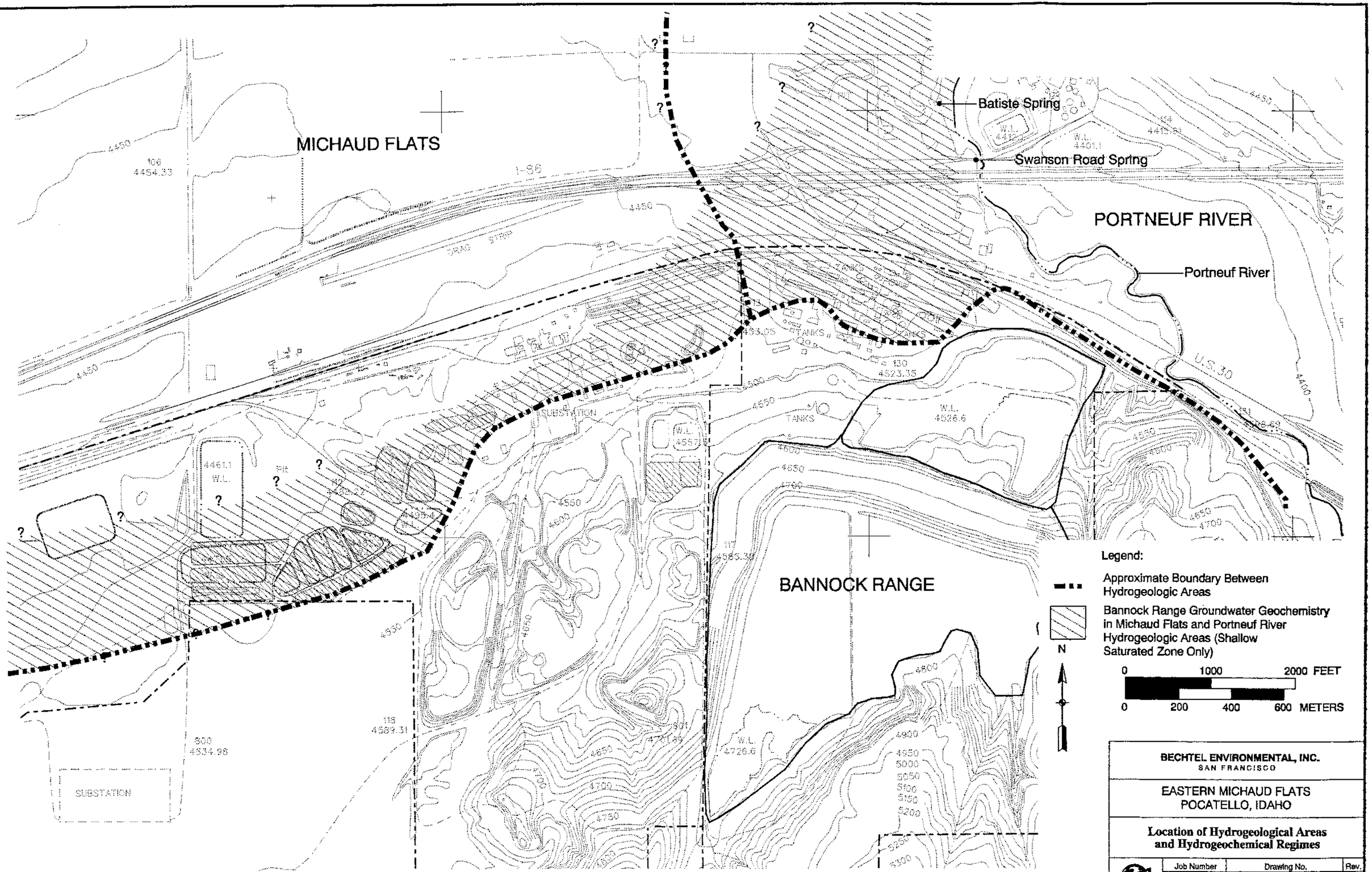
Table 4.4-7
Ranges of Metals Concentrations for All EMF Monitoring Wells

Parameter (mg/l)		Unimpacted Wells																Representative Concentrations
		FMC Wells						Simplot Wells				Offsite Wells						
		Michaud Flats Regime		Well 126		Bannock Range Regime		Bannock Range Regime		Portneuf River Regime		Michaud Flats Regime		Bannock Range Regime		Portneuf River Regime		
		Mean	Min Max	Mean	Min Max	Mean	Min Max	Mean	Min Max	Mean	Min Max	Mean	Min Max	Mean	Min Max	Mean	Min Max	Upper Limit (2 S.D.) (a)
Aluminum,	total	0.07	0.05 to 0.11	ND	ND to ND	0.15	0.02 to 0.50	0.09	0.02 to 0.40	0.59	0.02 to 1.9	0.04	0.02 to 0.07	0.03	0.02 to 0.06	0.10	0.02 to 0.93	0.68
	dissolved	ND	ND to ND	ND	ND to ND	0.20	0.20 to 0.20	0.02	0.02 to 0.02	ND	ND to ND	ND	ND to ND	0.05	0.05 to 0.05	ND	ND to ND	
Arsenic,	total	0.016	0.004 to 0.092	0.012	0.008 to 0.018	0.015	0.002 to 0.038	0.012	0.002 to 0.028	0.004	0.002 to 0.007	0.007	0.004 to 0.011	0.007	0.002 to 0.020	0.005	0.002 to 0.009	0.032
	dissolved	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.005	0.005 to 0.005	ND	ND to ND	ND	ND to ND	0.007	0.007 to 0.007	ND	ND to ND	
Barium,	total	0.14	0.05 to 0.27	0.10	0.04 to 0.23	0.16	0.05 to 2.2	0.06	0.04 to 0.08	0.15	0.12 to 0.20	0.43	0.11 to 2.2	0.07	0.04 to 0.11	0.13	0.06 to 0.18	0.22
	dissolved	ND	ND to ND	ND	ND to ND	0.08	0.08 to 0.08	0.06	0.06 to 0.06	ND	ND to ND	ND	ND to ND	0.06	0.05 to 0.07	ND	ND to ND	
Beryllium,	total	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.001	0.001 to 0.002	0.001	0.001 to 0.002	0.001	0.001 to 0.001	0.001	0.001 to 0.002	0.001	0.001 to 0.003	0.003
	dissolved	ND	ND to ND	ND	ND to ND	0.004	0.004 to 0.004	0.001	0.001 to 0.001	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Boron,	total	0.25	0.05 to 0.63	0.77	0.64 to 0.99	0.21	0.05 to 0.53	0.10	0.04 to 0.19	0.14	0.09 to 0.25	0.19	0.07 to 0.41	0.11	0.06 to 0.18	0.15	0.09 to 0.25	0.36
	dissolved	ND	ND to ND	ND	ND to ND	0.29	0.11 to 0.46	0.04	0.04 to 0.04	ND	ND to ND	ND	ND to ND	0.08	0.08 to 0.08	ND	ND to ND	
Cadmium,	total	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.001	0.000 to 0.001	0.001	0.000 to 0.001	0.001	0.001 to 0.001	0.001	0.000 to 0.001	0.001	0.000 to 0.001	0.006
	dissolved	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.001	0.001 to 0.001	ND	ND to ND	ND	ND to ND	0.001	0.001 to 0.001	0.001	0.000 to 0.001	
Chromium,	total	0.005	0.001 to 0.009	0.007	0.006 to 0.009	0.003	0.001 to 0.016	0.003	0.001 to 0.010	0.004	0.001 to 0.019	0.003	0.003 to 0.004	0.002	0.000 to 0.005	0.002	0.001 to 0.003	0.012
	dissolved	ND	ND to ND	ND	ND to ND	0.002	0.002 to 0.002	0.001	0.001 to 0.001	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Cobalt,	total	0.008	0.006 to 0.015	0.043	0.042 to 0.045	0.021	0.003 to 0.034	0.003	0.003 to 0.003	0.003	0.003 to 0.003	0.007	0.003 to 0.014	0.005	0.003 to 0.014	0.006	0.003 to 0.017	0.033
	dissolved	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.003	0.003 to 0.003	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Copper,	total	ND	ND to ND	0.011	0.011 to 0.011	0.004	0.003 to 0.005	0.004	0.004 to 0.004	0.005	0.004 to 0.009	0.042	0.004 to 0.083	0.005	0.004 to 0.010	0.005	0.004 to 0.012	0.022
	dissolved	ND	ND to ND	ND	ND to ND	0.005	0.005 to 0.005	0.004	0.004 to 0.004	ND	ND to ND	ND	ND to ND	0.002	0.002 to 0.002	ND	ND to ND	
Iron,	total	0.05	0.01 to 0.17	0.10	0.08 to 0.11	0.36	0.01 to 2.5	0.10	0.06 to 0.30	0.38	0.03 to 1.3	0.06	0.05 to 0.07	0.59	0.05 to 4.4	0.30	0.07 to 2.00	1.1
	dissolved	ND	ND to ND	ND	ND to ND	0.16	0.16 to 0.16	0.07	0.07 to 0.07	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Lithium,	total	0.056	0.036 to 0.071	0.118	0.090 to 0.137	0.043	0.012 to 0.077	0.028	0.005 to 0.064	0.035	0.031 to 0.039	0.048	0.026 to 0.074	0.039	0.013 to 0.075	0.029	0.022 to 0.039	0.062
	dissolved	ND	ND to ND	ND	ND to ND	0.059	0.048 to 0.070	0.006	0.006 to 0.006	ND	ND to ND	ND	ND to ND	0.041	0.040 to 0.042	ND	ND to ND	
Manganese,	total	0.008	0.002 to 0.028	0.013	0.003 to 0.023	0.282	0.001 to 1.46	0.006	0.001 to 0.016	0.051	0.001 to 0.174	0.003	0.001 to 0.006	0.011	0.001 to 0.081	0.002	0.001 to 0.004	0.078
	dissolved	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.002	0.002 to 0.002	ND	ND to ND	ND	ND to ND	0.004	0.003 to 0.006	ND	ND to ND	
Mercury,	total	0.0012	0.0012 to 0.0012	0.0005	0.0005 to 0.0005	0.0003	0.0001 to 0.0009	0.0002	0.0001 to 0.0007	0.0008	0.0002 to 0.0024	0.0004	0.0001 to 0.0009	0.0004	0.0001 to 0.0020	0.0003	0.0001 to 0.0015	0.0013
	dissolved	ND	ND to ND	ND	ND to ND	0.0002	0.0002 to 0.0002	0.0001	0.0001 to 0.0001	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Nickel,	total	0.02	0.02 to 0.02	ND	ND to ND	0.03	0.03 to 0.03	0.01	0.01 to 0.01	0.01	0.01 to 0.01	0.01	0.01 to 0.01	0.01	0.01 to 0.01	0.01	0.01 to 0.02	0.01
	dissolved	ND	ND to ND	ND	ND to ND	0.03	0.03 to 0.03	0.01	0.01 to 0.01	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Selenium,	total	0.003	0.001 to 0.008	0.018	0.012 to 0.028	0.003	0.001 to 0.009	0.002	0.001 to 0.005	0.002	0.002 to 0.004	0.003	0.002 to 0.005	0.003	0.001 to 0.006	0.003	0.001 to 0.005	0.007
	dissolved	ND	ND to ND	ND	ND to ND	0.001	0.001 to 0.001	0.002	0.002 to 0.002	ND	ND to ND	ND	ND to ND	0.002	0.002 to 0.002	ND	ND to ND	
Thallium,	total	0.001	0.001 to 0.001	ND	ND to ND	ND	ND to ND	0.001	0.001 to 0.001	0.001	0.001 to 0.001	0.001	0.001 to 0.001	0.001	0.001 to 0.001	0.001	0.001 to 0.005	0.040
	dissolved	ND	ND to ND	ND	ND to ND	ND	ND to ND	0.001	0.001 to 0.001	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	
Vanadium,	total	0.005	0.003 to 0.009	0.006	0.006 to 0.006	0.009	0.002 to 0.060	0.003	0.002 to 0.006	0.002	0.002 to 0.002	0.003	0.002 to 0.006	0.004	0.002 to 0.020	0.002	0.002 to 0.002	0.124
	dissolved	ND	ND to ND	ND	ND to ND	0.060	0.060 to 0.060	0.002	0.002 to 0.002	ND	ND to ND	ND	ND to ND	0.005	0.005 to 0.005	ND	ND to ND	
Zinc,	total	0.011	0.011 to 0.011	ND	ND to ND	0.022	0.004 to 0.044	0.012	0.005 to 0.027	0.034	0.004 to 0.116	0.053	0.005 to 0.115	0.030	0.002 to 0.126	0.010	0.003 to 0.023	0.397
	dissolved	ND	ND to ND	ND	ND to ND	0.037	0.030 to 0.044	0.007	0.007 to 0.007	ND	ND to ND	ND	ND to ND	ND	ND to ND	ND	ND to ND	

Notes:
ND = Not Detected
(a) 2 S.D. = Mean for 16 representative wells plus two times Standard Deviation for the 16 wells.

93-1477c.127/DW/sh/R1/1

FIGURES



BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Location of Hydrogeological Areas and Hydrogeochemical Regimes

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-1	

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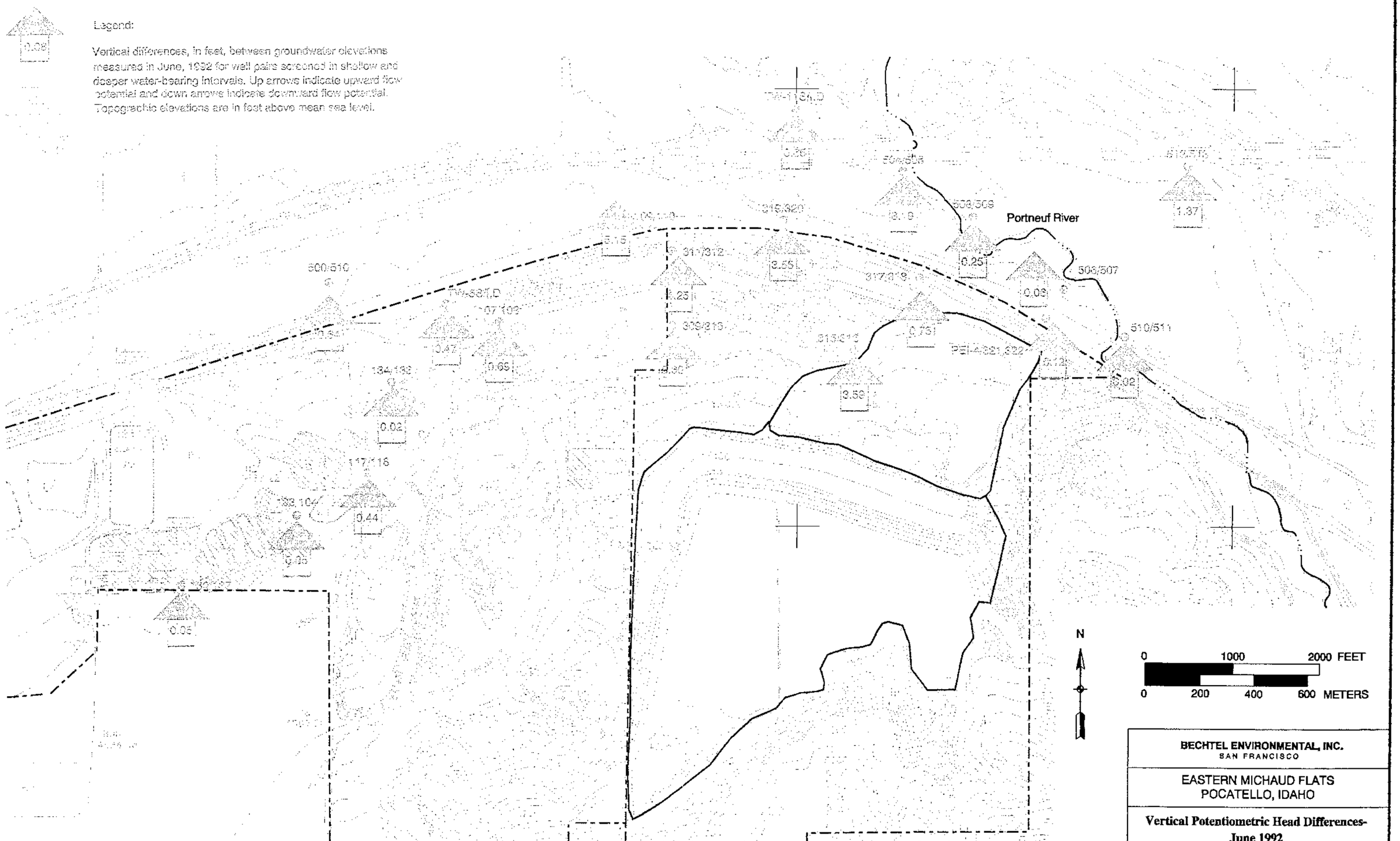
BF earthgeo0.dgn 1/10/94



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SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Vertical Potentiometric Head Differences-June 1992

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-5A	

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EMF amfhead2.dgn Jay 20 11/14/93

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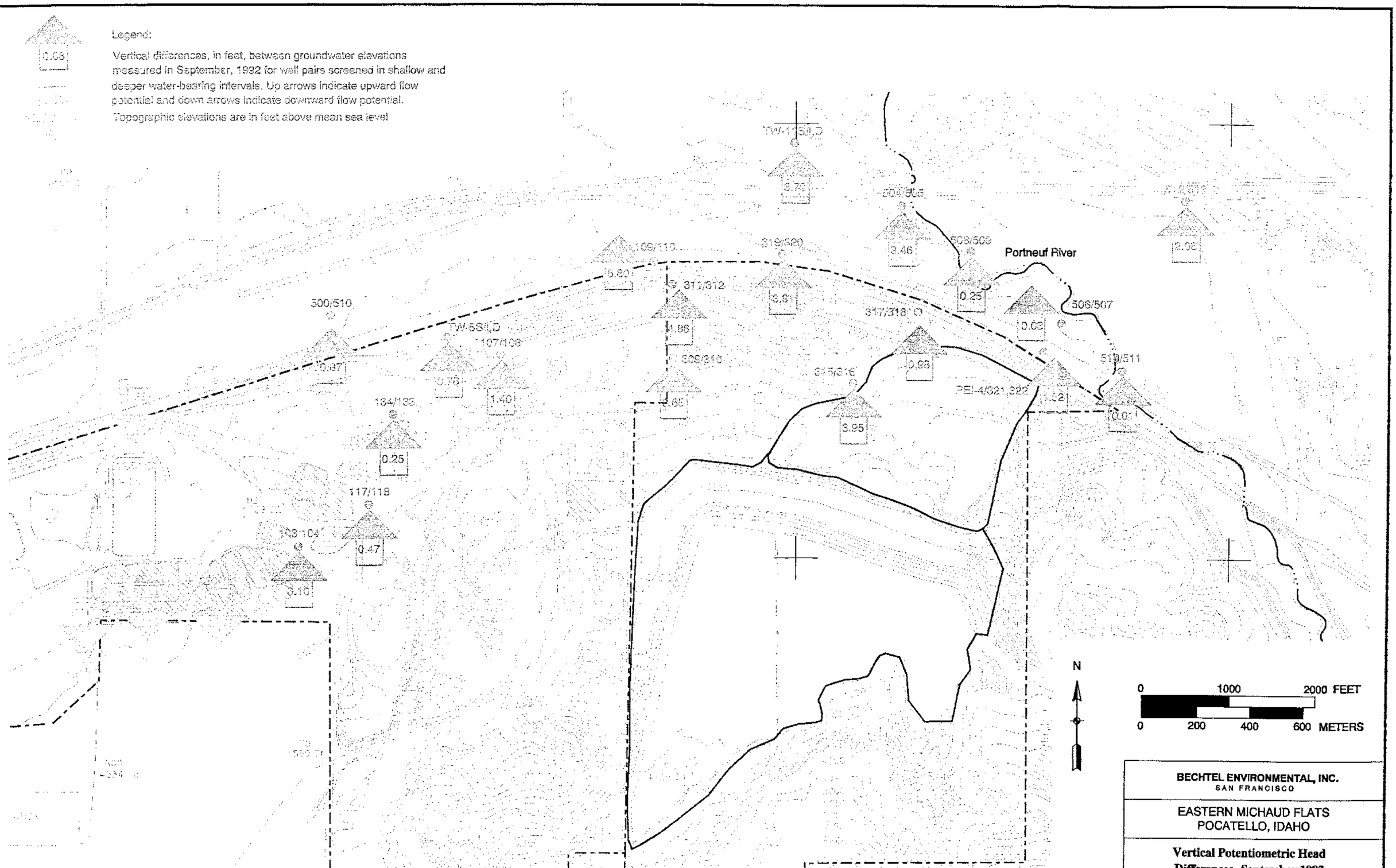

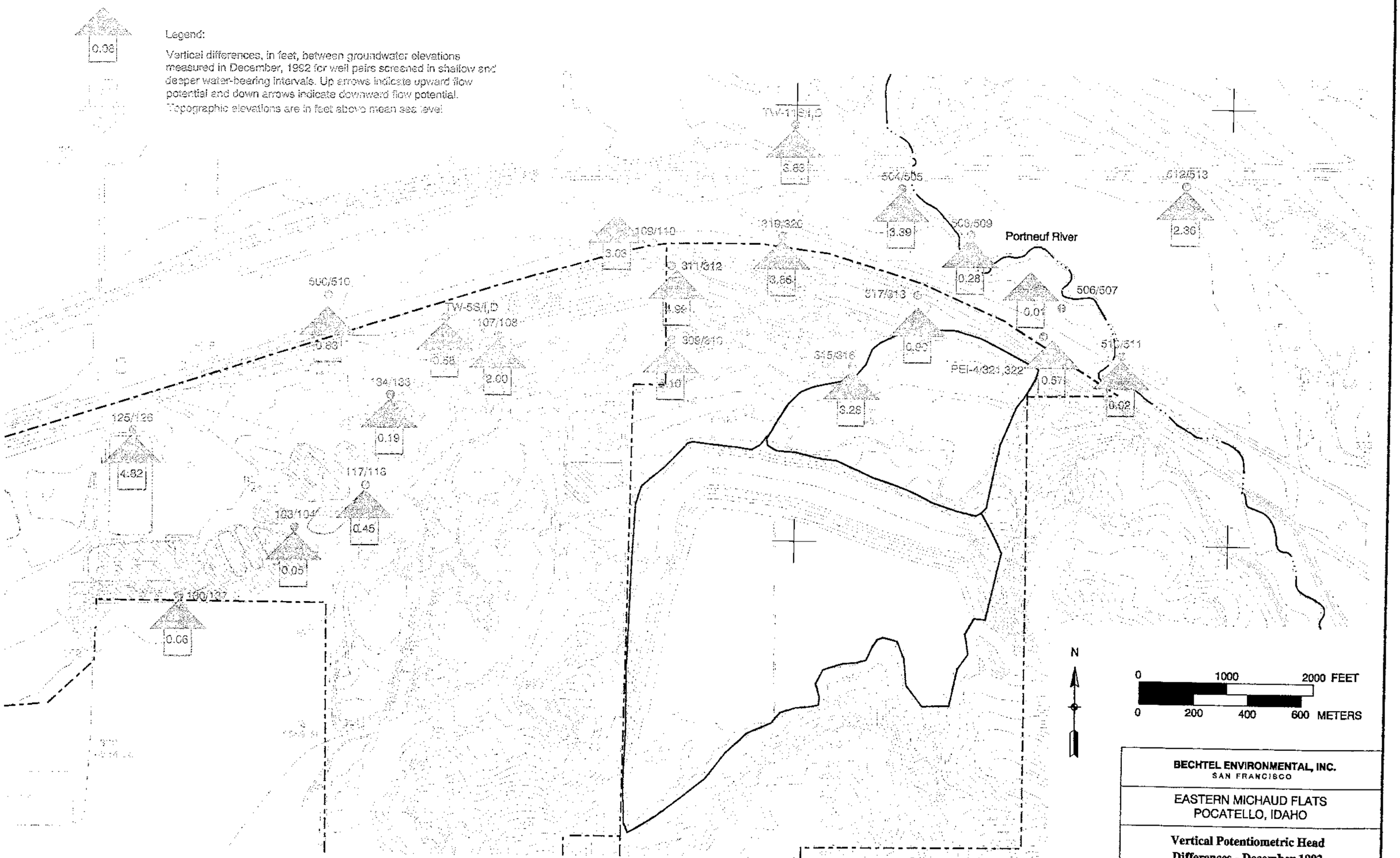

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EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Vertical Potentiometric Head Differences - December 1992

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-5C	

EMF emfhead2.dgn lev.22 11/14/93

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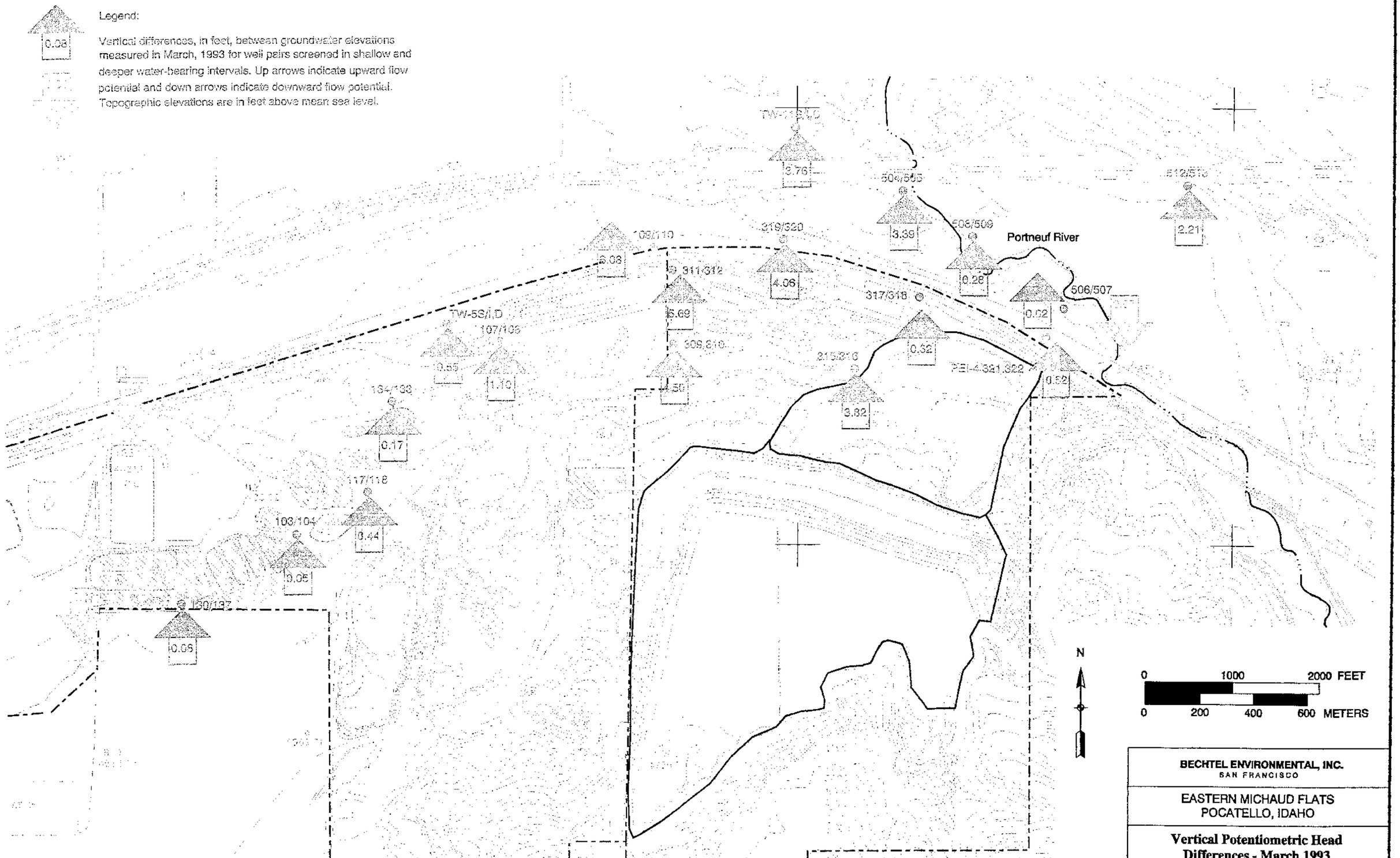

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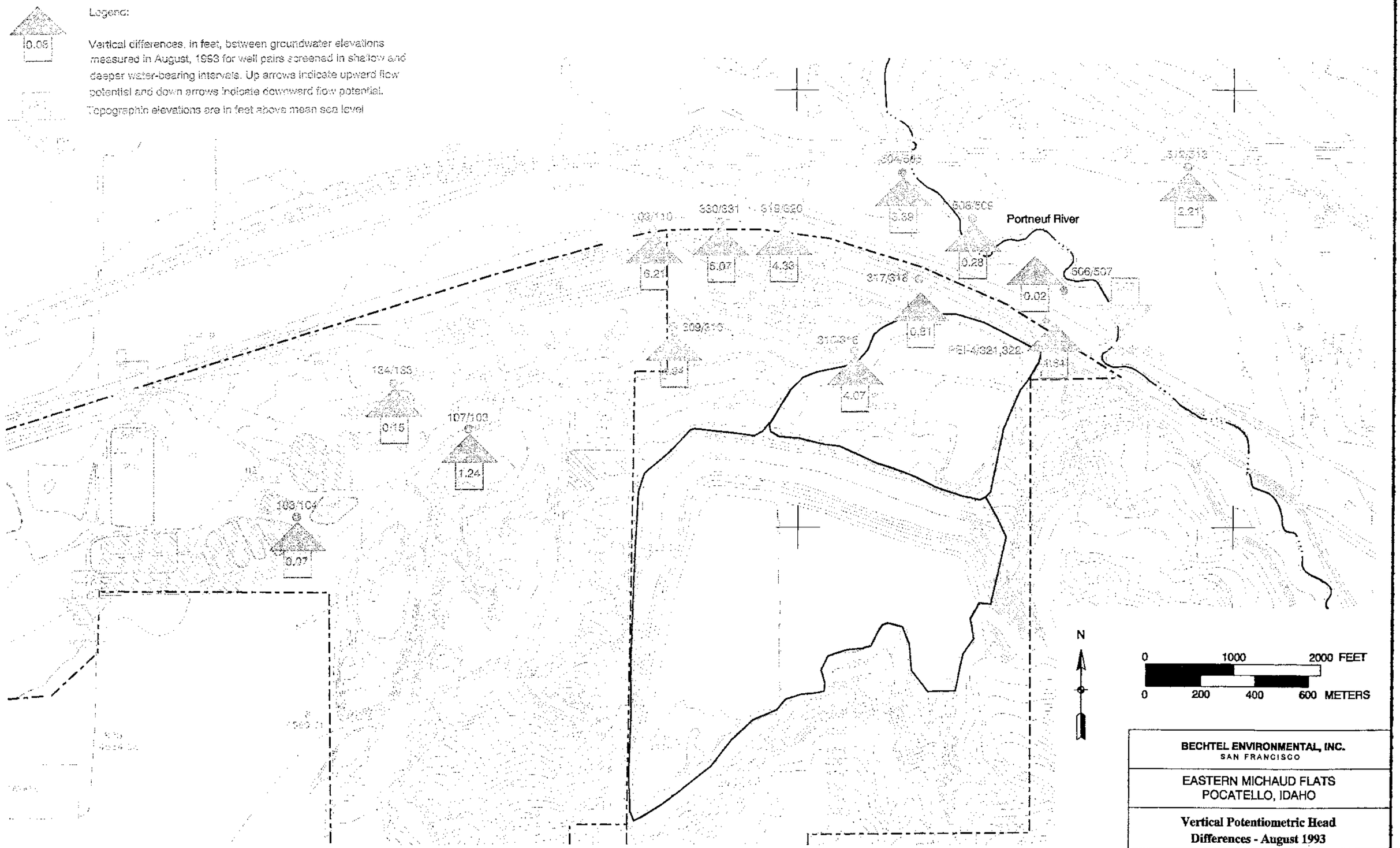
EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Vertical Potentiometric Head Differences - March 1993

Job Number	Drawing No.	Rev.
21372	FIGURE 3.3-5D	

EMF emfhead2.dgn lev.23 11/14/93



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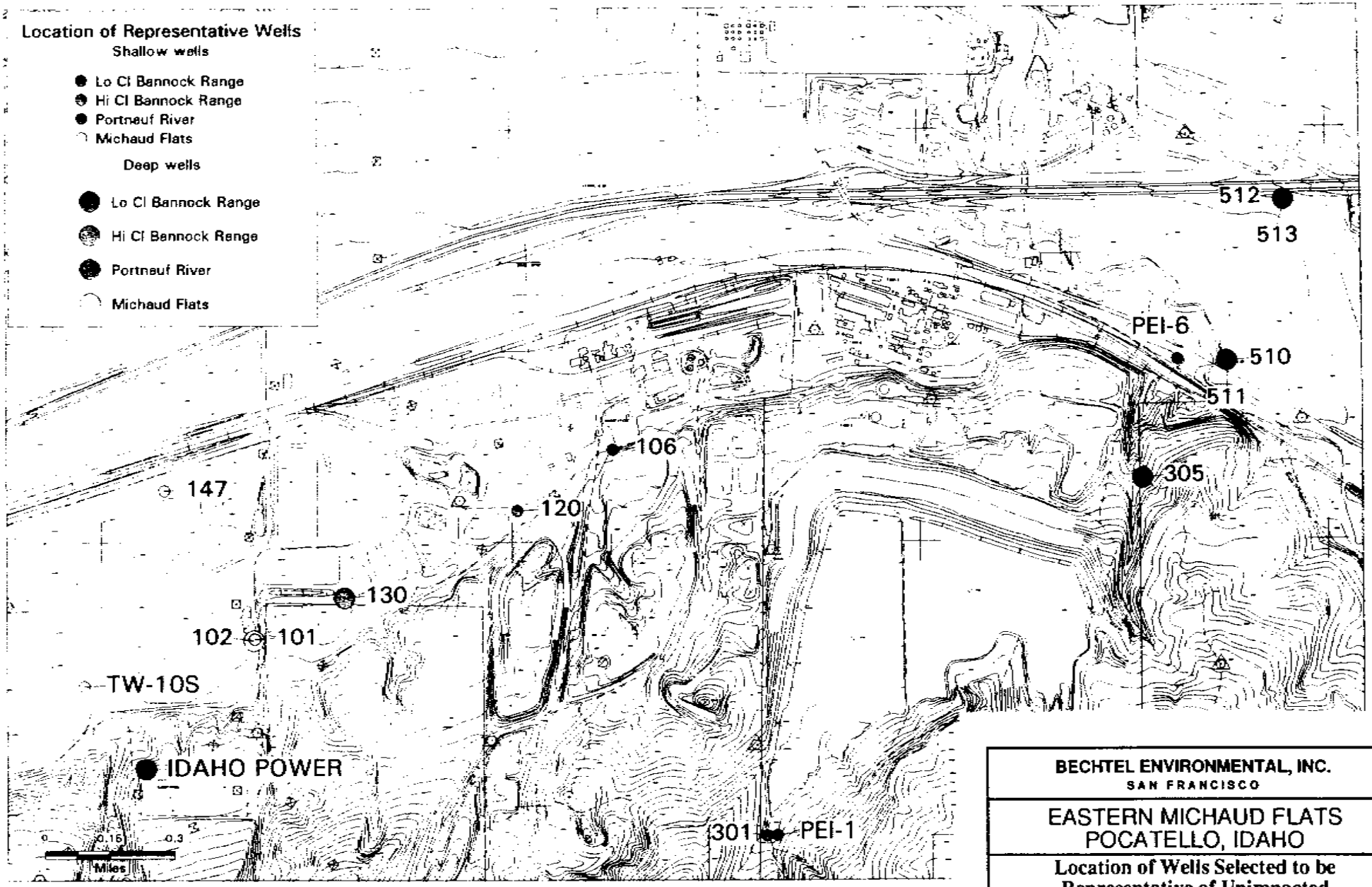

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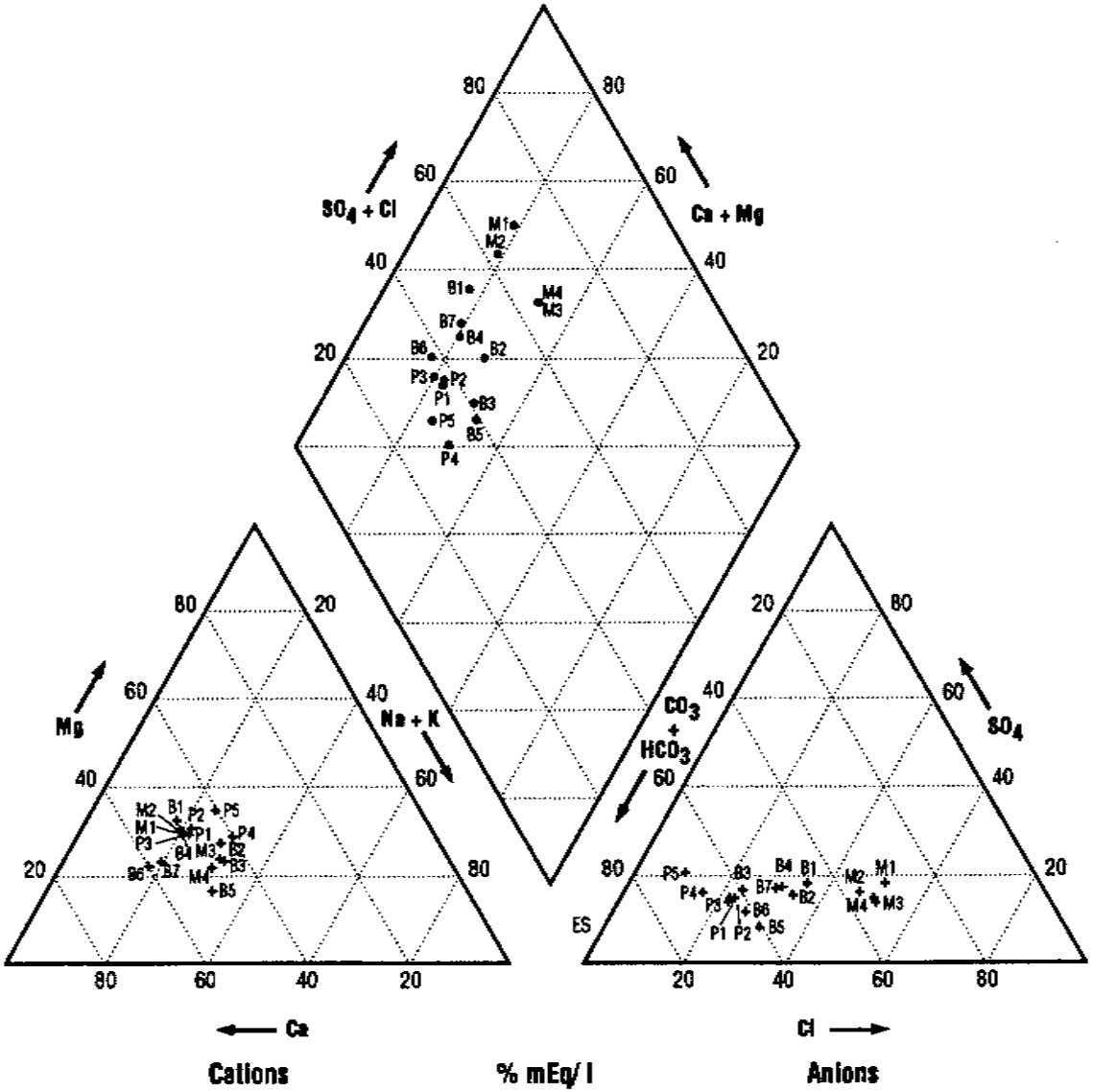
EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Location of Wells Selected to be Representative of Unimpacted Groundwater Quality

JOB No.	DRAWING NO.	REV
21372	FIGURE 4.4-7	

93-1477b.086fp



		No.	Well
Michaud Flats Regime		M1	101
		M2	102
		M3	TW-10S
		M4	147
Bannock Range Regime	High-chloride subgroup	B1	130
		B2	120
	Low-chloride subgroup	B3	Idaho Power
		B4	106
		B5	301
		B6	PEI-1
		B7	305
Portneuf River Regime		P1	PEI-6
		P2	510
		P3	511
		P4	512
		P5	513

BECHTEL ENVIRONMENTAL, INC.
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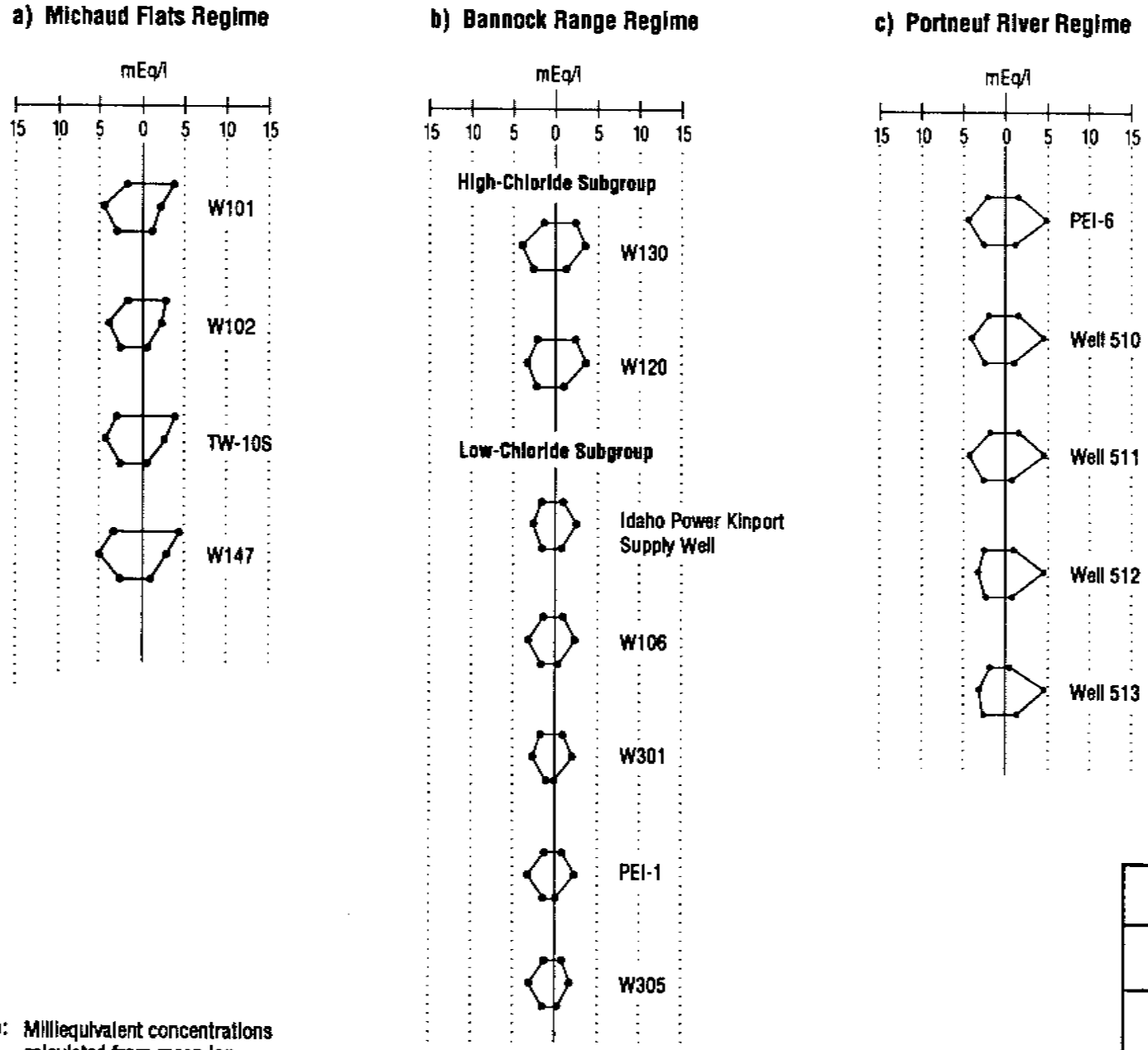
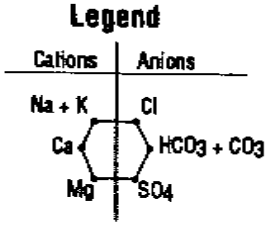
EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Piper Diagram for Representative Wells

JOB No.	DRAWING NO.	REV.
21372	FIGURE 4.4-8	

93-1477b.082
10-12-93 mhh 2





Note: Milliequivalent concentrations calculated from mean ion concentrations for data collected between 10/90 and 6/93.

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Stiff Diagrams for Representative Wells

JOB No.	DRAWING NO.	REV.
21372	FIGURE 4.4-9	

93-1477b.083 ns/vk : 3 10-14-93

United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

ka
Idaho
Oregon
Washington

4.1.1.3

EPA

APR 5 1994

Reply To
Attn Of: HW-113

APR 1994
Received
Environmental
Department/FMC

Steve Curreri
J.R. Simplot Company
Box 912
Pocatello, Idaho 83202

Ron Hosking
FMC Corporation
Phosphorus chemicals Division
Box 4111
Pocatello, Idaho 83202

Re: Comments of the January 1994 Preliminary Site characterization Summary for the Eastern Michaud Flats Site

Dear Messrs. Curreri and Hosking:

We have completed our review of the above document and attached our draft general and specific comments. The PSCS contains a large amount of information to be summarized and evaluated, and on the whole, does a good job of describing the work that was done. However, in several areas we disagree with your conclusions and interpretations of this data.

I have provided our draft comments in order for you to identify any specific items that may require further agency clarification, are ambiguous, or are no longer particularly relevant, EPA's final comments will be prepared based on your input, or lack thereof, within 45 days of this letter.

I suggest that we discuss this issue further during our meeting in Pocatello on April 13, 1994. In the meantime, if you have any questions, contact me at (206) 553-2806.

Sincerely,

Bill Adams

Bill Adams
Project Manager

cc: EMF TAG
Art Day, Bechtel

EPA COMMENTS ON THE JANUARY 1994 PRELIMINARY SITE CHARACTERIZATION SUMMARY FOR THE EMF SITE

GENERAL COMMENTS

1. Numerous conclusions and interpretations are presented throughout this report, and many appear at several locations in the report and are incorporated into summary sections. EPA disagrees with some of these conclusions and interpretations and has provided comments at appropriate points; however, the agency has not attempted to note every occurrence of points with which it disagrees. EPA expects the PRPs to make appropriate revisions to the report in response to the comments provided and to propagate the revisions throughout the report as necessary,

2. The Simplot production wells create a cone of depression which intercepts a large portion of the site generated groundwater contaminants. If the wells were to cease production or reduce pumpage rate, the contaminants are likely to migrate to the Portneuf River, The effects of reduced (eliminated) pumpage must be considered by the ongoing groundwater modeling work. A reduced flow and corresponding lower water levels in the Portneuf River also should be considered because such a scenario would steepen the hydraulic gradient from the site to the river.

3. The report states that those waste sources which do not have an associated ''sustained head" from site sources should not be considered subject to migration may not be correct. Infiltration and percolation of precipitation may represent a sufficient driving force to move site contaminants to the groundwater in a pulsed fashion.

4. Sediment transport probably is a minor component of the surface water contaminant migration pathway. Although some sediment is migrating through the FMC outfall ditch, groundwater discharge is the primary mechanism,

5. EPA has some disagreement with the way site ground water was compared to background ground water in this report (upgradient wells not impacted by the site are referred to as "representative" rather than "background" wells in the PSCR, a convention that will be followed in the remainder of our comments for the sake of consistency,) There are several aspects of this analysis that are questionable as presented in the PSCR. They are: (1) the selection of wells to be included in the pool of "'representative" wells, (2) the determination of which representative wells each site well will be compared to, and (3) the statistical analysis used to make the comparisons. These are discussed separately below as well as in specific comments:

(1) Selection of representative wells, The wells selected as "representative* must be free of potential contaminant contributions from the site. The inclusion of Wells 120 and 130 is questionable for the reasons described *in* the PSCR (primarily the proximity of the wells to potential sources.) *The* arsenic content of these two wells .stands out from the rest of *the* wells selected as representative. They are also elevated in orthophosphate and total phosphorous (additional site-related constituents) compared to the other wells in the representative group.

Furthermore, their elevated chloride content was used to separate them geochemically from the other Bannock Hills wells-- but impacted wells in the former ponds area at FMC are also elevated in chloride. Wells 120 and 130 are *the* only two wells in the high-chloride subgroup. Because chloride is one *of* the most mobile constituents in the wastes found in the old pond area, the elevated chloride content in wells 120 and 130, along with other constituents discussed above, may be an indication *that* they have been impacted by the site rather than that they belong to a separate geochemical regime.

(2) Comparison of representative wells to site wells. Combining the three different geochemical regimes into one qroup is not justified in the report. Potentially impacted site wells should be compared with the representative wells from the appropriate geochemical regime. In areas where mixing of waters from two regimes occurs, the comparison can be made with both, *(See* the specific comment below regarding "lumping" of hydrogeochemical regimes.)

(3) Statistical analysis used for comparisons between site wells and representative wells Page 4.4- - 6, The mean plus two standard deviations is used to approximate the 95th percentile of the representative samples and is described as being "consistent with EPA Region 10 policy." We do not know of any "Region 10 policy" on this subject. This method is not the appropriate approach at a site such as Eastern Michaud Flats where we have adequate data to compute the 95th percentile directly. Furthermore, the mean plus *two* standard deviations is only an approximation of the 95th percentile when the population is normally distributed. Environmental concentration data are often lognormally distributed. We did not see any discussion of distributions in the PSCR and could not tell whether or not this fundamental assumption was even tested.

A more rigorous approach to the use of the 95th percentile as a definition of background ground water concentrations can be found in EPA's Interim Final Guidance "*Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities*" dated February 1989 and the Addendum to the guidance dated July, 1992. (*See* the section on tolerance intervals.) The guidance also contains specific recommendations for testing the population distribution.

6. Future rounds of sampling at the site should employ "low-flow" sampling techniques, Some of the ground water samples have apparently been taken from turbid water. Less turbid, more representative samples can probably be obtained with a slightly different sampling protocol, EPA does not yet have a final document describing these techniques, but they are currently being used at other nearby sites and have resulted in significant decreases in turbidity.

7. The ecological scoping component of the PSCS perpetuates the flawed assumptions that were presented in the original work. EPA recognizes that the PSCS was being prepared as these issues were being discussed and therefore were not incorporated into the PSCS. The revision of the PSCS shall adequately characterize the most recent information on the ecological work *at* the site.

8. EPA was expecting that the PSCS would contain a simplified mass balance discussion for the major contaminants of concern through the process into the environment. This should include a full discussion *of* radionuclides including information on secular equilibrium and the mechanism for conveyance into the environment (gas phase, small particulate phase, larger particles, or a combination?).

9. The PSCS does not address may of the parameters listed in the EPA ReOpt™ printout provided to you. The shortage of this information could dictate more treatability testing to determine the appropriateness of each technology. The following list of information is helpful when evaluating technologies, but are not found in the PSCS:

Contaminant distribution by particle *size*
This information can be important for the evaluation of separation technologies such as soil washing.

it does, as shown by the posted concentrations. The arsenic concentration of 0.04 mg/l used as the blue/no color breakpoint has no particular significance. A breakpoint of 0.01 mg/l would be in keeping with the pattern established by the other breakpoint used in the figure; the background concentration in wells around the periphery of the site appears to be about 0.002 to 0.006 mg/l; the MCL is 0.05 mg/l, and the 10^{-4} risk concentration for drinking water is 0.004 mg/l. Revise the figure to avoid the misleading impression.

87. Page 4.4-6, 3rd Bullet

From the description provided, it is not clear how the mean detection limit values were used; however, basing them on the detection limits obtained in only two wells seems inappropriate. Describe how these values were used and justify the decision to use only two wells in deriving them.

88. Table 4.4-3

Explain how the mean sample detection limits can be lower than the instrument detection limits for cadmium, copper, iron, silver, and thallium,

89. section 4.4.1 Representative Groundwater Chemistry

summary: There are several problems with the way representative groundwater chemical concentrations have been determined. First, omission of nondetect values from the calculation of mean concentrations in the wells used to define the representative concentrations may have lead to some artificially high mean concentrations being reported in Tables 4.4-1 through 4.4-3. Second, at least two of the representative wells, wells 120 and 130, have levels of characteristic site contaminants that indicate they are impacted by the site and cannot be used to define representative concentrations. Several additional wells, wells 101, 102, 305, Idaho Power, PEI-1 and PEI-6, have concentrations that make them suspect, but some of these values may have been artificially elevated by the omission of nondetect values. Third, the use of the 95th percentile value as the representative concentration is fine, but use of the mean + 2SQ to approximate the 95th percentile is inappropriate because the data sets for many of the parameters include large percentages of nondetect values. This grossly violates the assumption that the data are normally or lognormally distributed and renders any standard deviation calculated from those data sets meaningless. The mean + 2SD

calculated from such data is unlikely ta correspond to the 95th percentile of the data set.

90. Calculation of Mean Concentrations for Each Well (Page 4.4-6, 2nd Bullet)

Omission of "U" flagged values would appear to be a conservative approach to determining mean concentrations, but it appears to have lead to some artificially high values being reported as mean concentrations in Tables 4.4-1 through 4.4-3. This makes it appear that a number of the wells designated as "representative" have elevated concentrations of one or more *site-related* contaminants that will disqualify them from that use. For determining exposure point concentrations, RAGS (Part A) (Section 5.3.2,3) recommends replacing the reported SQL for nondetect values with one half the SQL. If the SQL for a particular sample is elevated above the usual SQL for that parameter and inclusion of one half of that value in the mean calculation results in a value higher than that actually detected in any sample in the group, RAGS recommends that the elevated value be omitted from the mean calculation. This approach has the advantage of utilizing most of the available data while preventing samples with elevated detection limits from distorting the estimate of the mean value. The results for individual wells should be resummarized using this approach.

91. Section 4.4.1.1, Selection of Representative Wells

The location of a well with respect to a potential source area in a hydrogeographic regimen, and a well's general chemistry, are important qualifying considerations when selecting wells to represent the general water quality around a hazardous waste site. However, the main reason for defining the representative groundwater chemistry is to have a set of benchmarks to use in determining the nature and extent of contamination at a site. Therefore, an even more important consideration is the level of characteristic site contaminants in a candidate well, particularly when a well is close to, and potentially impacted by, suspected source areas. Several of the 16 wells selected as representative in this section fail the latter test and cannot be considered representative.

As noted in the PSCS, many inorganic chemicals are present at elevated concentrations in various potential source materials and in the soils at the site, Of those, the chemicals that are the most mobile in the subsurface, and therefore most likely to appear in the groundwater, are the alkaline metals and *the* transition elements that form oxyanions because these chemical species are

attenuated little, *if* at all, by the alkaline soils at the site. Arsenic, boron, and phosphorus are transition elements that form oxyanions, and arsenic and phosphorus also have been identified in the PSCS as indicator chemicals for the site. Wells 120 and 130 have mean concentrations of ortho-phosphate and total phosphorus 50 and 10 times higher than the other representative wells. Arsenic concentrations in these wells are two to six times higher and boron concentrations are two to four times higher than in the adjacent groundwater regimens (Michaud Flats and Bannock Range). These data indicate that wells 120 and 130 have been influenced by site-related contamination and cannot be used to determine representative groundwater chemistry,

several other wells, 101, *102, 305,* Idaho Power, PEI-1, and PEI-6, also have mean concentrations for one or more chemicals that are substantially higher than *the* concentrations for the remaining representative wells, which also makes these wells suspect. Some of these values may be artifacts of the way mean concentrations were calculated, and many of the mean concentrations (aluminum, boron, copper, iron, manganese, mercury, thallium, vanadium, and *zinc)* in Table 4.4-3 for PEI-1 and PEI-6 appear to be inconsistent with the results for individual samples reported in Appendix H. The suspect concentrations for all of these wells must be resolved before these wells can be used to determine representative groundwater chemistry.

The wells included in the representative groundwater database should *be* reviewed and expanded to include as many wells that are clearly not affected by the site as possible. A number of new wells around the periphery of the site appear to be unaffected *by the* site and probably could be added to the database. A database that is broadly based spatially as well as temporally will better account for the natural variability in the groundwater chemistry.

92. Page 4.4-9

Well 158 is suggested as a potential future substitute for Wells 120 and 130 in the representative group, but is not shown on Figure 4.4-6. Is it plotted on another figure?

93. Calculation of Representative Groundwater Concentrations (Page 4.4-6, *1st* Bullet and Page 4.4-11, Last Paragraph)

It is not clear from the description in the last paragraph on Page 4.4-11 how this calculation was made. Was the representative mean for each parameter calculated as the mean of the mean values for individual wells, or were individual samples used? If the

latter, were all of the samples used, or just the hits, as was the case for individual well means? If the representative mean is the mean of individual well means, or if only individual samples with hits were used, the calculated '*representative" mean will overestimate the true mean. This will lead to an artificially high representative range, which will result in wells that may actually be impacted by the site falling within this erroneous representative range and being incorrectly classified as unimpacted.

When a data set contains a high proportion of nondetect values, as many of the representative groundwater data sets do, the data are said to be highly "censored" and exhibit neither a normal nor a lognormal distribution. For a normally distributed dataset, the mean + and - 2SDs encompass about 95% of the data. However, when a data set is highly censored, the standard deviation is often inflated, and the mean + 2SD value bears no particular relationship to the data set.

The simplest way to determine the 95th percentile of a highly censored data set is to rank the values from smallest to largest then either select the 95th percentile value directly or interpolate if the 95th percentile falls between values. This is an empirical, nonparametric approach and is not affected by the distribution of the data or by nondetects, unless more than 95% of the values are nondetect. Many of the commercial statistical packages can provide nonparametric percentiles of a data set.

94. Table 4.4-4

Please explain why the gross beta values in the Mar-93 samples from wells 101 and 120 are two to three times higher than in other samples from these wells or any of the other representative well samples.

95. section 4.4.1

Add a subsection that briefly summarizes the Goldstein and Jacobson data an groundwater quality presented in Appendix A. A single larger figure combining the information presented in Figures A-6, A-8, and A-9 would provide a good overview of the historical information on the groundwater quality in the area,

96. Section 4.4.1.3

Comparisons with representative groundwater chemistry must encompass all of the parameters investigated, not just common ions

APPENDIX H

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

August 18, 2008

Reply To: OEA-095

MEMORANDUM

SUBJECT: Review comments, the *EMF Groundwater Representative Arsenic Concentration Review and Reevalauation, July 2008, FMC*

FROM: Bernie Zavala, Hydrogeologist
Office of Environmental Assessment

TO: Kira Lynch, Remedial Project Manager
Office of Environmental Cleanup

The following are combined comments from Bernie Zavala, EPA and Dennis Beal, Statistician, SAIC regarding the above mentioned document on the use of the arsenic data from monitoring wells 101 and 102 for evaluating arsenic background. Overall, it is recommended that the arsenic data from monitoring well 101 and 102 be removed prior to performing the evaluation of background for total arsenic for the EMF Superfund site. The following is the rationale from the two reviewers for EPA. After reviewing EPA's comments a conference call is needed to discuss the next step for this evaluation.

Analysis of the arsenic ground water data from MW-101 and 102 for use in the evaluation of background for arsenic, Bernie Zavala, Hydrogeologist, EPA

FMC has stated that the commons ion data at locations of MW-101 &102 do not show any impact of contaminated ground water. The common ion data which is being used for this line of evidence may not be sensitive enough. This data (common ions) is measured in 10's to 100's of parts per million (mg/l). The arsenic concentration data are in the range of 5 to 15 parts per billion (µg/l). The change of the common ion data at a range of 10 part per million may be unaffected when measuring arsenic changes in the range of tens of part per billion. The location near MW-101&102 is near the intersection of the Michaud and Bannock types of groundwater. Looking at figures 1 and 6 (FMC July 2008, White Paper) and the general up-gradient ground water flow direction which is coming from the southeast near the area of an existing landfill and near the location of MW-138. The below figure (1) is a surfer plot of ground water elevation data from June

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1994. The landfill is located between MW-301 and MW-101. Table 1 also shows arsenic ground water data for MW-101, 165 (26.9 µg/l), 137 (77 µg/l), 167 (42.9 µg/l) and 158 (14 µg/l). It appears that MW-101 & 102 and monitoring wells northeast of MW-101 has elevated concentrations of arsenic from an up-gradient area from these monitoring wells or within the FMC OU.

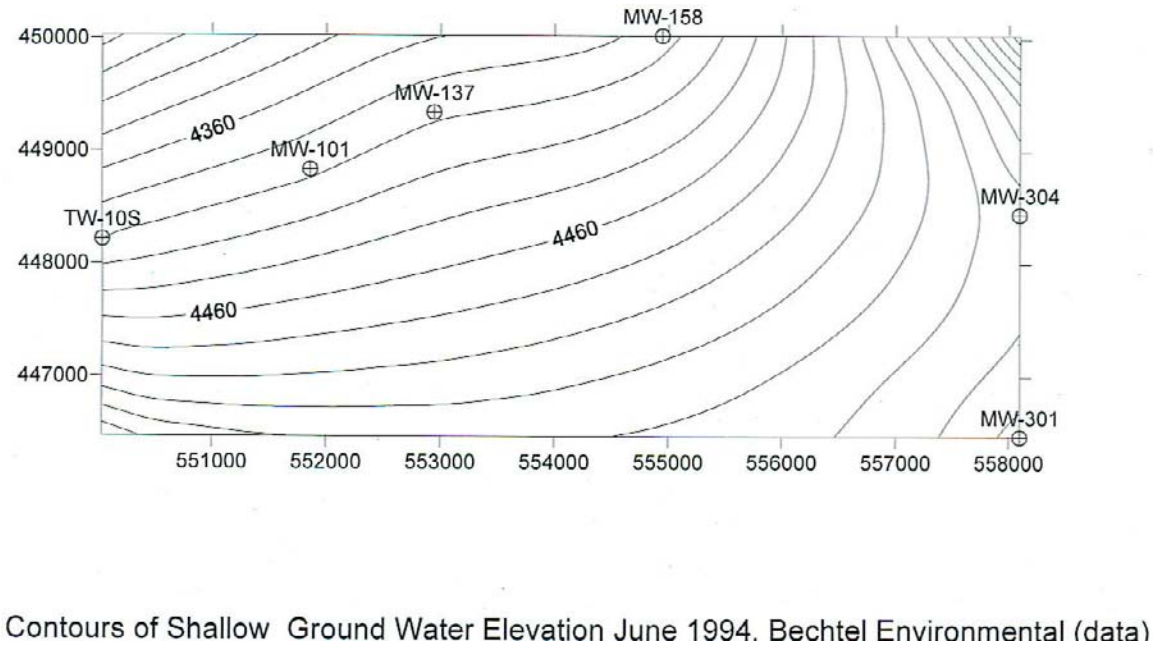


Figure 1 Contours of Shallow Ground Water Elevation, June 1994, Bechtel Environmental data.

Table 1.0 Shallow Ground Water Elevations & Arsenic Concentrations, June 1994

Well No.	**Easting**	**Northing**	**Ground Water Elevation (ft)**	**Arsenic concentrations (ug/l)**
TW-10S	550035.8	448217.2	4397.60	4 (July 93)
MW-169				7.2
MW-101	551859.2	448838.90	4396.02	8.9
MW102				9.2
MW-165				26.9 (June 96)
MW-137	552945.9	449345.5	4395.79	77
MW-167				42.9 (June 96)
MW-158	554944.7	450027.90	4396.35	14
MW-304	558096	448442.4	4620.27	1.0 (Aug.93)
MW-301	558098	446467.8	4620.27	3.1 (July 94)

Another line of evidence or a way to compare the arsenic data of MW-101 &102 with both Michaud and Bannock wells would be to plot up the concentrations versus the number of times the water sample was collected. As an illustration, the arsenic data for the MW 101&102 was compared with the Michaud groundwater for arsenic, see figure 2. Both of these data sets MW-101&102 and the Michaud wells data was plotted up by the number of samples collected. The arsenic concentration data was placed from lowest to highest or in ascending order. Figure 2 below shows that MW-101&102 was at least a factor of ten higher when comparing the arsenic concentration with the Michaud wells background wells.

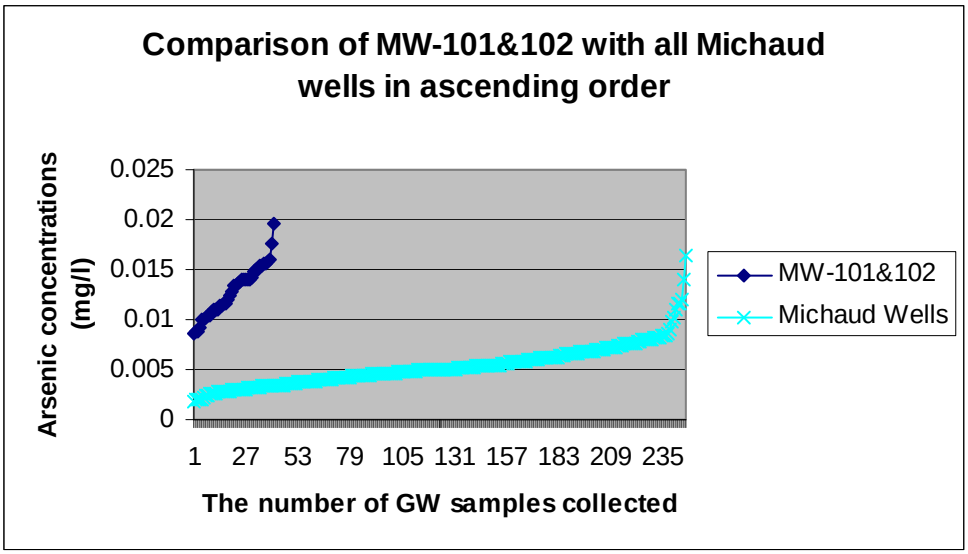


Figure 2 Comparison of MW-101&102 with all Michaud Wells in ascending order.

The data was then compared to the Bannock wells, figure 3. Again the MW-101&102 data were placed in ascending order along with the Bannock wells and it appears that the arsenic concentrations in ground water are different then the Bannock wells.

Based on the above evaluation the weight of evidence does suggest that MW-101&102 are influenced by FMC-impacted groundwater. The EPA will be removing the MW-101&102 data for the evaluation of background for arsenic for the FMC OU.

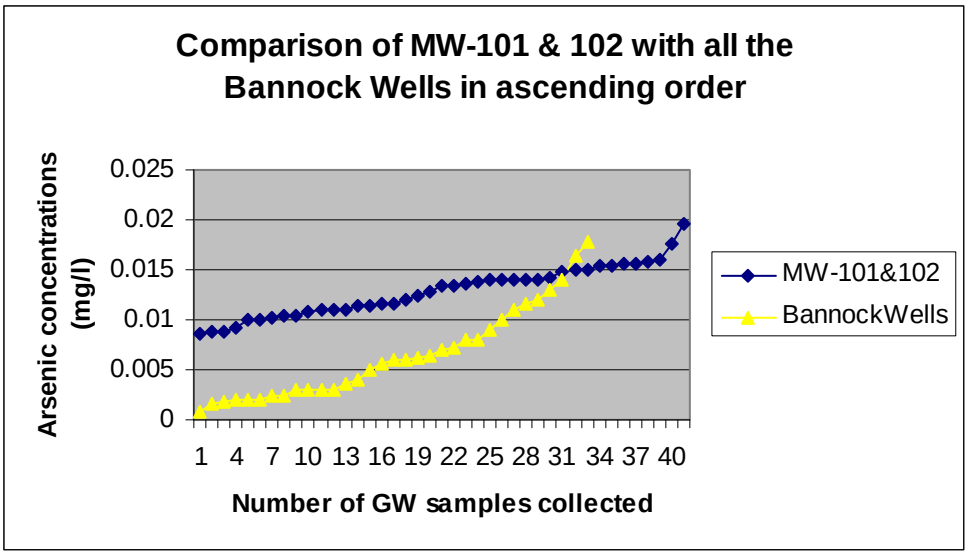


Figure 3 Comparison of MW-101&102 with the Bannock Wells in ascending order.

Analysis of the arsenic ground water data from MW-101 and 102 for use in the evaluation of background for arsenic, Dennis Beal, Statistician, SAIC

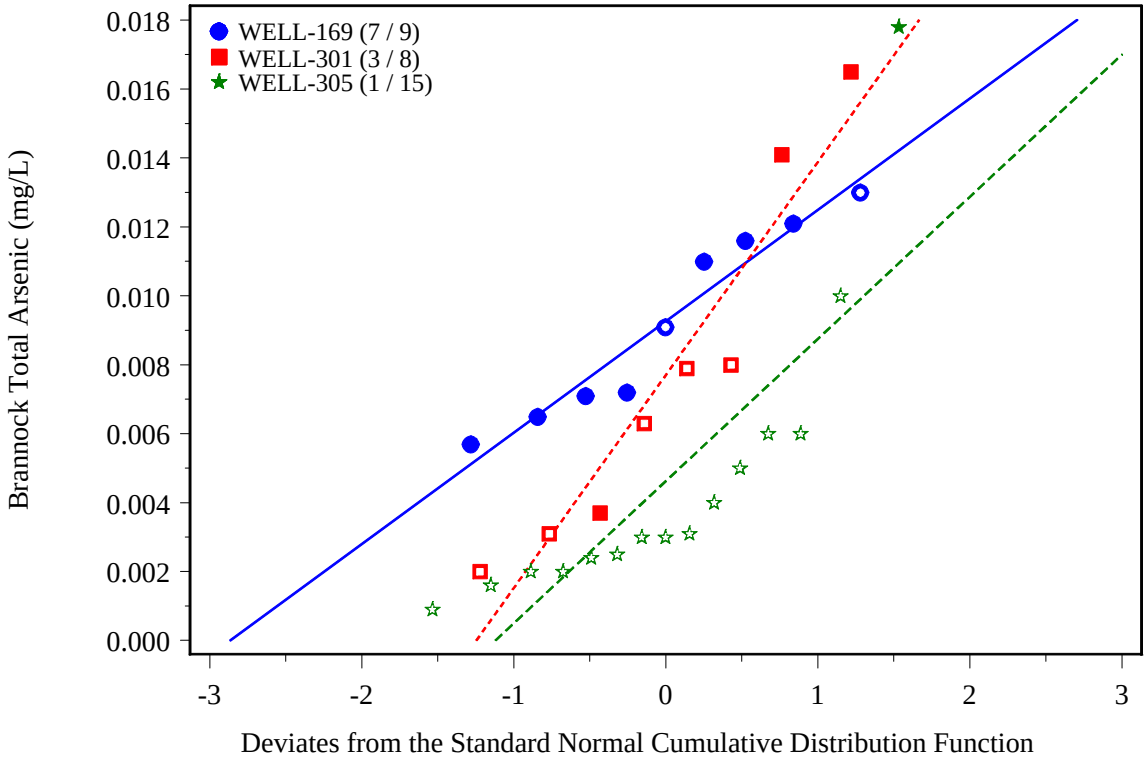
I have finished looking at your background arsenic data. Attached are a Word file with several plots and an Excel file with an accompanying table. A brief narrative is at the end of the Word file that describes my methods and conclusions.

Basically, wells 101 and 102 have statistically higher total arsenic concentrations than the other wells in the Michaud regime. The 10 Michaud wells cluster into 3 distinct well groupings. The wells have been sampled over a wide range of timeframes beginning in 1990. You really need to examine whether this old data still accurately reflects current background conditions.

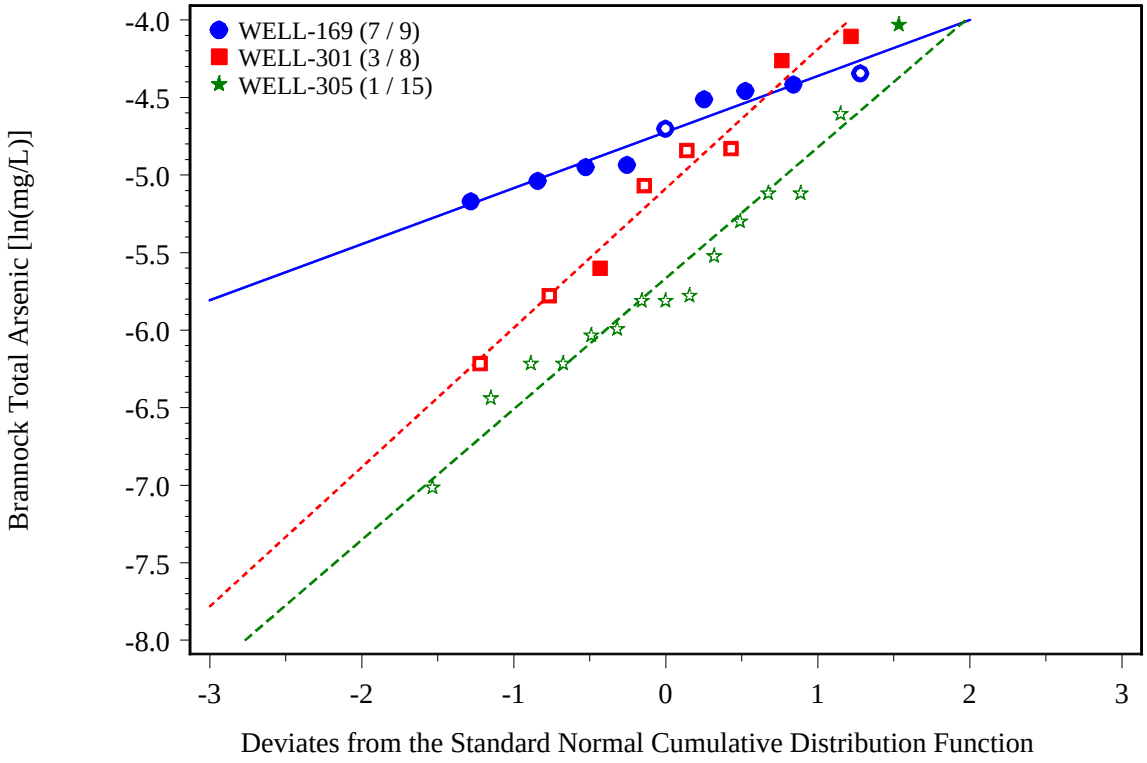
Let me know if you have other questions or comments.

Thanks,

Dennis

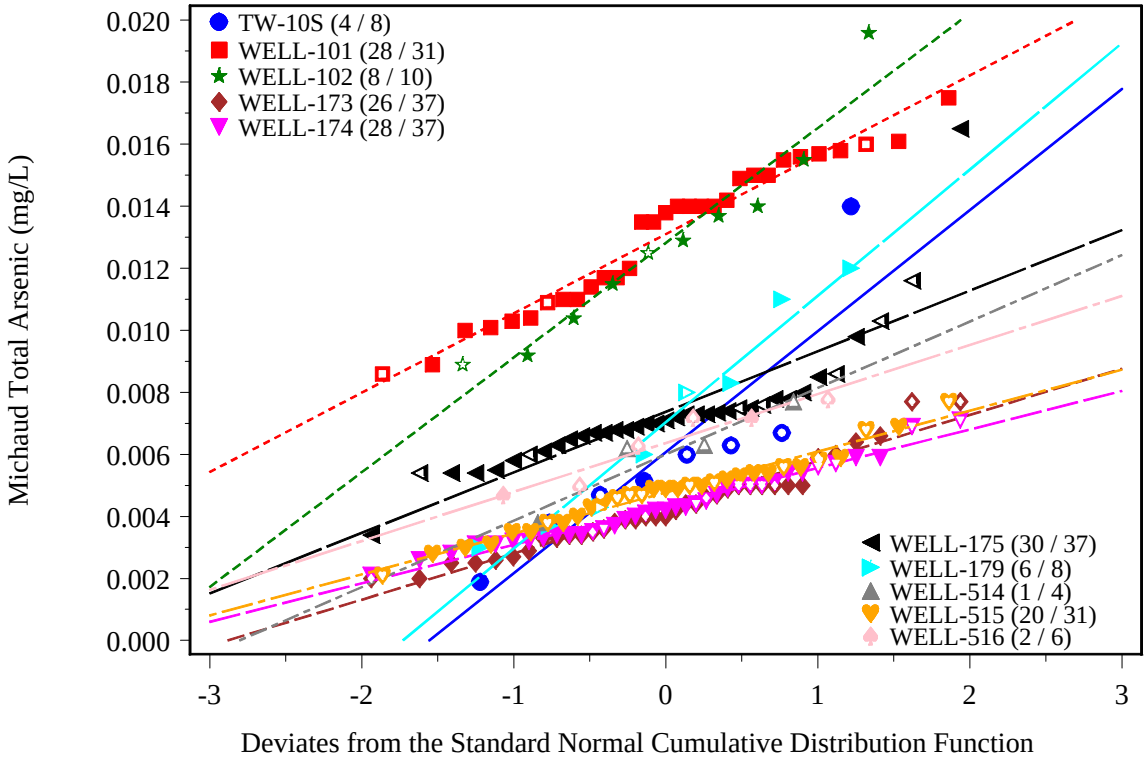


Open symbols denote non-detects. Closed symbols denote detected concentrations.

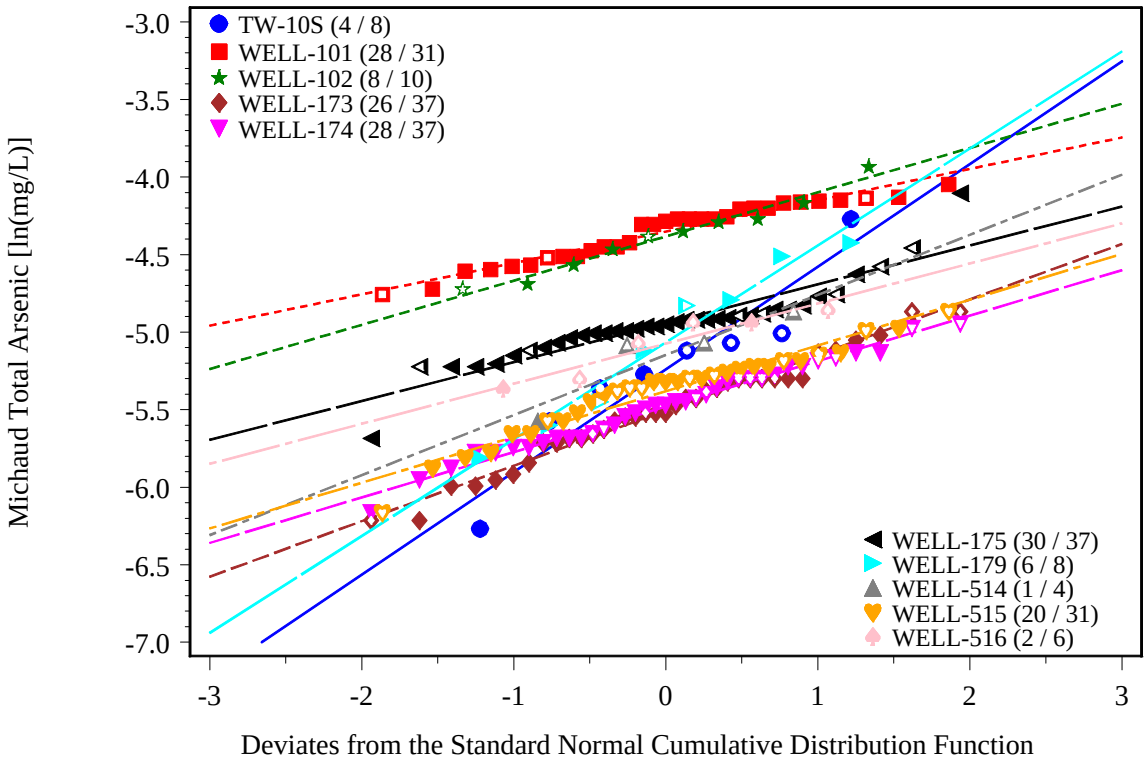


Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 1. Normal and lognormal probability plots of total arsenic in the Brannock regime.

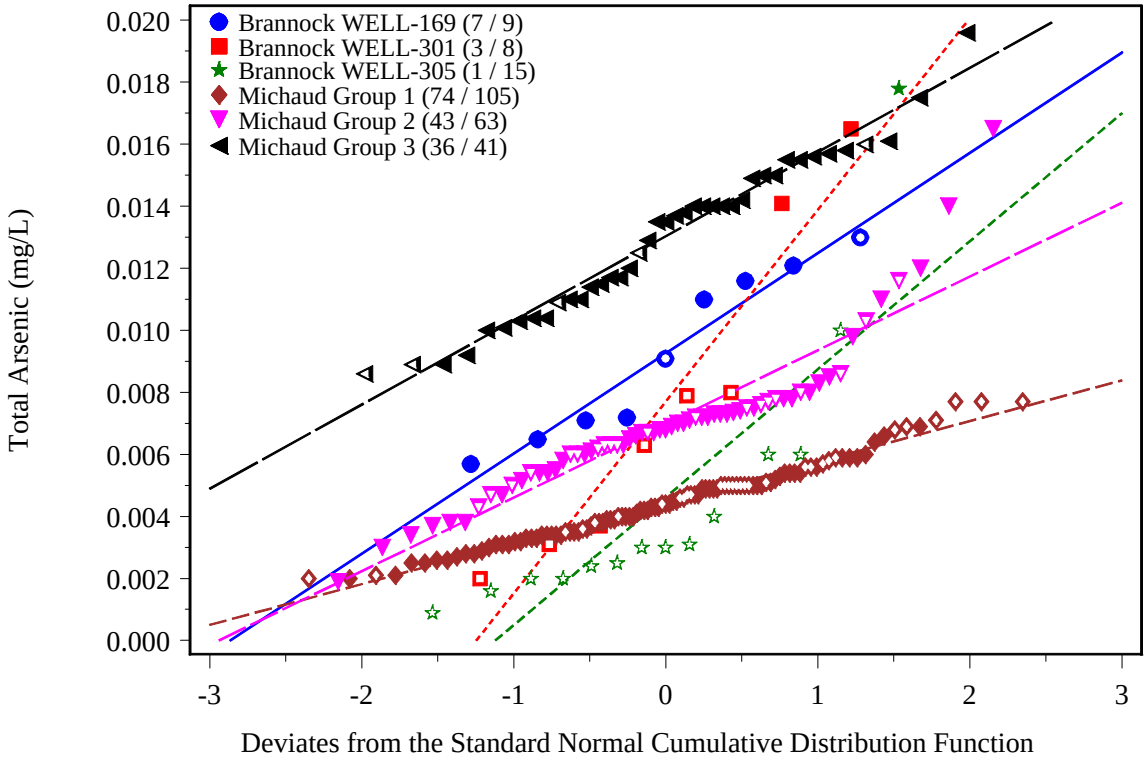


Open symbols denote non-detects. Closed symbols denote detected concentrations.

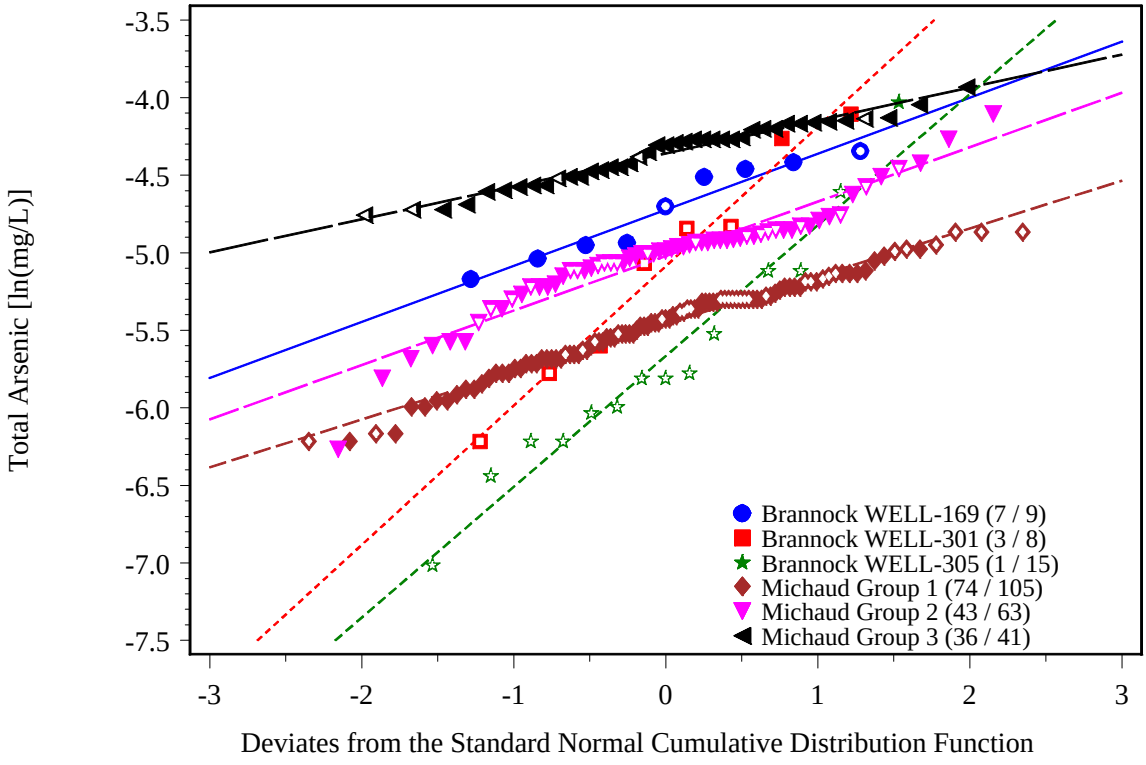


Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 2. Normal and lognormal probability plots of total arsenic in the Michaud regime.



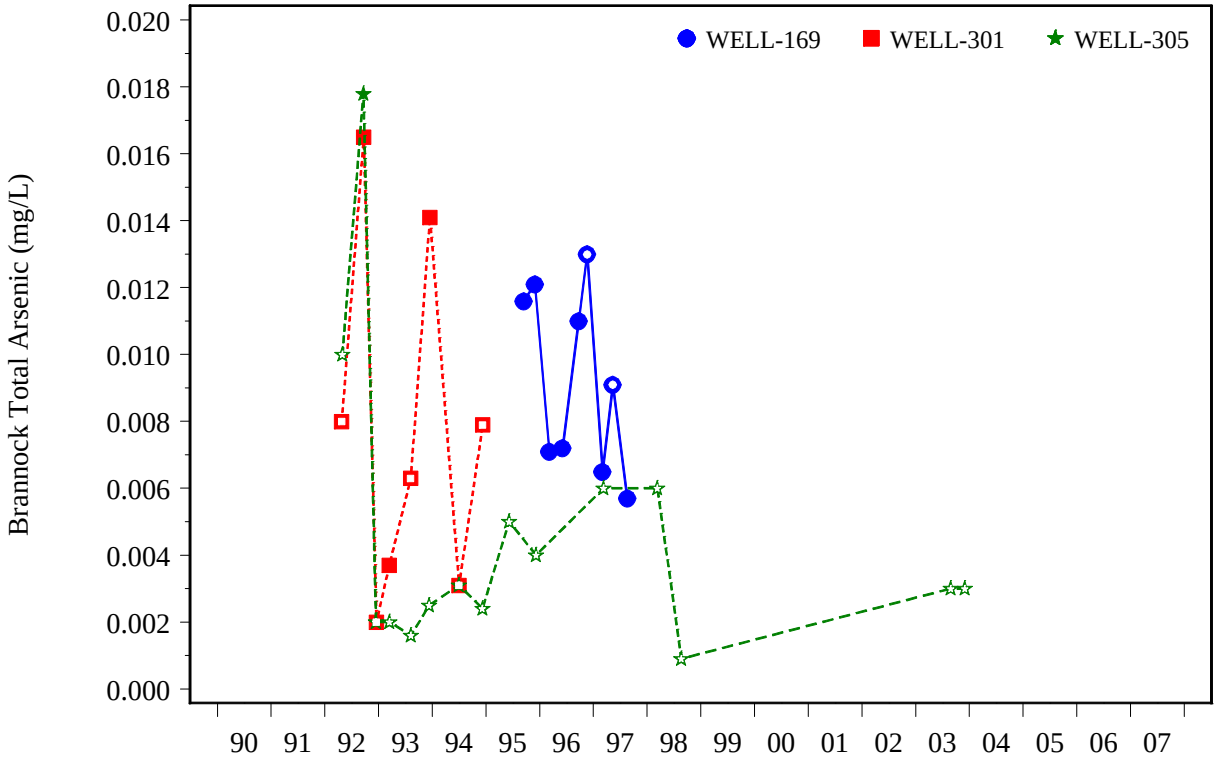
Open symbols denote non-detects. Closed symbols denote detected concentrations.



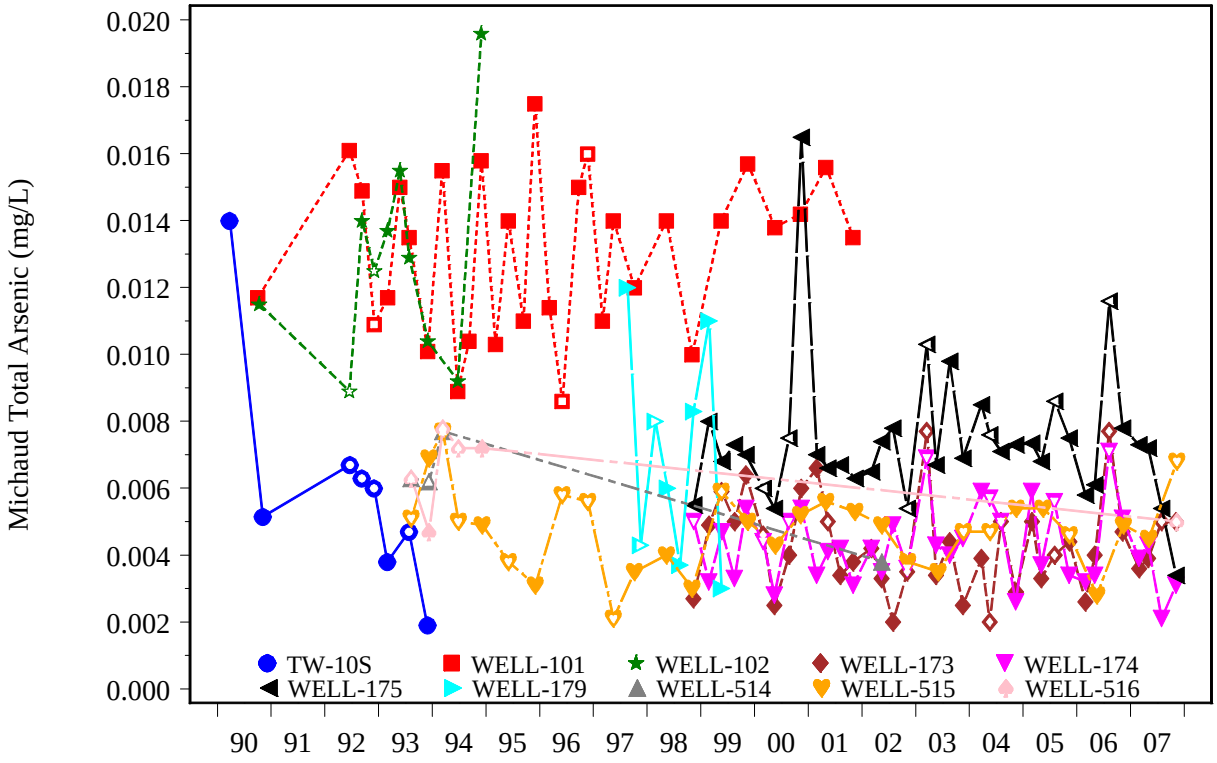
Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 3. Normal and lognormal probability plots of total arsenic by well groups where

Michaud group 1 (173, 174, 515), group 2 (TW-10S, 175, 179, 514, 516), and group 3 (101, 102).



Open symbols denote non-detects. Closed symbols denote detected concentrations.



Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 4. Concentration plots across time of total arsenic for the Brannock and Michaud regimes.

Narrative

The background total arsenic data were reduced according to the rules used in document. However, for Well-101 sample F212480 (0.0109 U mg/L) collected on 12/2/1992 was used instead of sample F212412 (0.011 U mg/L) since the rules on p. 8 specify that when there are two non-detects, the smaller detection limit is used. It is not clear why the document's own rules were not applied here. Well-101 sample 611101 (0.016 U mg/L) collected 11/22/1996 was kept because graphs of the data show the result easily fall within the range of the data. It is not clear why it was excluded because of its "high order, nondetected value in the initial ProUCL calculation run" in the document's Table 5 footnote. Well-305 sample S212406A (0.0113 U mg/L) collected on 12/13/1992 was excluded because its primary sample in sample S212404A (0.002 U mg/L) had a lower detection limit, per the rules on page 8. The data for Well-147 were not available in the Excel spreadsheet provided me, though it is listed as a well on page 5 of the document.

After the data were reduced to one total arsenic result per well and date collected, normal and lognormal probability plots were generated. Fig. 1 shows probability plots for the 3 Brannock regime wells, while Fig. 2 shows probability plots for the 10 Michaud regime wells. All figures show non-detects with hollow symbols, while detected results are shown with solid symbols. Fig. 1 shows the 3 Brannock regime wells exhibit different standard deviations (slope of the regression line) and means. Fig. 2 shows Michaud wells 101 and 102 look very similar and exhibit significantly larger means than the other Michaud regime wells. Similarly, wells 173, 174, and 515 have similar means and standard deviations. The middle 5 wells TW-10S, 179, 175, 514, and 516 show similar means and standard deviations.

Table 1 in the attached Excel file shows all the statistical tests that were performed to determine quantitatively whether the wells have statistically equal mean or median arsenic concentrations. Wells 101 and 102 were shown to have statistically equal means and were grouped into Michaud well grouping 3. Wells TW-10S, 179, 175, 514, and 516 were shown to have statistically equal means and were grouped into Michaud well grouping 2. Wells 173, 174, and 515 were shown to have statistically equal means and were grouped into Michaud well grouping 1.

Fig. 3 shows the three Michaud well groupings with the Brannock wells. Brannock well 301 and Michaud well group 2 have statistically equal means, while Brannock well 305 and Michaud well group 1 have statistically equal means. Analysis of variance was used to test for equality of means when data are normally distributed. A parametric T-test was used to check for equality of variances between the wells and equality of means for normally distributed data. Nonparametric methods for multiple sample comparisons were the Kruskal-Wallis test and the Wilcoxon Rank Sum test.

Fig. 4 shows concentration plots of total arsenic across time for each of the 13 wells by regime. The sampling duration for the wells varies widely. Some wells have not been sampled since the mid-1990s, while other wells were sampled sporadically with several years between samples (e.g., wells 305 and 516).

Conclusions

Since several background wells have non-overlapping sampling periods, with some wells having very old data from the early 1990s, the historical background data need to be examined to see if this old data should be combined with the newer data. For example, the laboratory detection or

reporting limits likely have changed over the 18 years the data have been collected. Were the same laboratory methods used to analyze the data over the 18 years? Were different laboratories used to analyze the data over 18 years? Do the wells represent several aquifers, zones, or water depth levels? We want to be sure the data are sufficiently comparable and generated under essentially the same conditions before combining it for the purpose of calculating background concentrations.

The data should also be examined to determine why the 10 Michaud wells cluster into three distinct groupings. Is there a hydrogeological reason for this clustering? Given the location of each well and the history of contamination at the site, is there reason to believe some wells are no longer upgradient from the site? Once these and other technical questions have been addressed, the background data set may be parsed to create a more homogeneous data set that would better represent the current state of background.

Michaud wells 101 and 102 have statistically higher total arsenic concentrations than the other wells in the Michaud regime. Brannock Well-169 cannot be combined with any Michaud well or well grouping.

Also, attached is Table 1. Statistical tests comparing background data:

Attachment

Table 1. Statistical tests comparing background data

Wells compared	Statistical test	Dist.	Equal variances?	p-value	Conclusion
101 vs. 102	T-test	N vs. N	Yes	0.7689	Means of Wells 101 and 102 are statistically equal
173, 174, 515	ANOVA	N, N, N	Yes	0.2444	Means of Wells 173, 174, and 515 are statistically equal
TW-10S vs. 179	T-test	N vs. N	Yes	0.5842	Means of Wells TW-10S and 179 are statistically equal
175, 514, 516	ANOVA	X, D, N	Yes	0.2726	Means of Wells 175, 514, and 516 are statistically equal
	K-W	X, D, N	Yes	0.2706	Medians of Wells 175, 514, and 516 are statistically equal
TW-10S, 179, 175, 514, 516	ANOVA	N, N, X, D, N	Yes	0.5449	Means of Wells TW-10S, 179, 175, 514, and 516 are statistically equal
	K-W	N, N, X, D, N	Yes	0.1806	Medians of Wells TW-10S, 179, 175, 514, and 516 are statistically equal
TW-10S, 179, 175, 514, 516, 173, 174, 515	ANOVA	N, N, X, D, N, N, N, N	Yes	<0.0001	Means of Wells TW-10S, 179, 175, 514, 516, 173, 174, and 515 are NOT statistically equal
	K-W	N, N, X, D, N, N, N, N	Yes	<0.0001	Medians of Wells TW-10S, 179, 175, 514, 516, 173, 174, and 515 are NOT statistically equal
173, 174, 515 vs.	T-test	N vs. X	No	<0.0001	Means of group 1 wells (173, 174, 515) and group 2 wells (TW-10S, 179, 175, 514, 516) are NOT statistically equal
TW-10S, 179, 175, 514, 516	WRS	N vs. X	No	<0.0001	Medians of group 1 wells (173, 174, 515) and group 2 wells (TW-10S, 179, 175, 514, 516) are NOT statistically equal
TW-10S, 179, 175, 514, 516 vs.101, 102	T-test	X vs. N	Yes	<0.0001	Means of group 3 wells (101, 102) and group 2 wells (TW-10S, 179, 175, 514, 516) are NOT statistically equal
	WRS	X vs. N	Yes	<0.0001	Medians of group 3 wells (101, 102) and group 2 wells (TW-10S, 179, 175, 514, 516) are NOT statistically equal
Well groups 1, 2, 3	ANOVA	N, X, N	No	<0.0001	Means of group 1 wells (173, 174, 515), group 3 wells (101, 102), and group 2 wells (TW-10S, 179, 175, 514, 516) are NOT statistically equal
	K-W	N, X, N	No	<0.0001	Medians of group 1 wells (173, 174, 515), group 3 wells (101, 102), and group 2 wells (TW-10S, 179, 175, 514, 516) are NOT statistically equal

Table 1. Statistical tests comparing background data

Wells compared	Statistical test	Dist.	Equal variances?	p-value	Conclusion
Wells 169, 301, 305	ANOVA	N, N, L	No	0.0359	Means of Brannock wells 169, 301, and 305 are marginally not statistically equal using $\alpha = 0.05$
	K-W	N, N, L	No	0.0073	Medians of Brannock wells 169, 301, and 305 are NOT statistically equal
169 vs. 301	T-test	N vs. N	Yes	0.4451	Means of Brannock wells 169 and 301 are statistically equal
301 vs. 305	T-test	N vs. L	Yes	0.1438	Means of Brannock wells 301 and 305 are statistically equal
	WRS	N vs. L	Yes	0.0948	Medians of Brannock wells 301 and 305 are statistically equal
169 vs. 305	T-test	N vs. L	Yes	0.0087	Means of Brannock wells 169 and 305 are NOT statistically equal
	WRS	N vs. L	Yes	0.0058	Medians of Brannock wells 169 and 305 are NOT statistically equal
Michaud Group 2 vs. Brannock 169	T-test	X vs. N	Yes	0.0114	Means of Michaud Group 2 and Brannock 169 are NOT statistically equal
	WRS	X vs. N	Yes	0.036	Medians of Michaud Group 2 and Brannock 169 are marginally not statistically equal using $\alpha = 0.05$
Michaud Group 3 vs. Brannock 169	T-test	N vs. N	Yes	0.0003	Means of Michaud Group 3 and Brannock 169 are NOT statistically equal
Michaud Group 2 vs. Brannock 301	T-test	X vs. N	No	0.7111	Means of Michaud Group 2 and Brannock 301 are statistically equal
	WRS	X vs. N	No	0.935	Medians of Michaud Group 2 and Brannock 301 are statistically equal
Michaud Group 1 vs. Brannock 305	T-test	N vs. L	No	0.8767	Means of Michaud Group 1 and Brannock 305 are statistically equal
	WRS	N vs. L	No	0.0811	Medians of Michaud Group 2 and Brannock 301 are statistically equal

WRS = Nonparametric Wilcoxon Rank Sum test for comparing the medians of two distributions.
ANOVA = Parametric analysis of variance for comparing the means of several distributions (assumes normality).
K-W = Nonparametric Kruskal-Wallis test for comparing the medians of several distributions when all distributions are not normal.
Dist. = Distributions (N = normal, L = lognormal, X = neither normal nor lognormal, D = distribution cannot be determined with fewer than 5 results) using the Shapiro-Wilk test .

Lynch.Kira@epamail.epa.gov
09/03/2008 10:44 AM

To Skinner.Susan@epamail.epa.gov, Masarik.Mark@epamail.epa.gov, Zavala.Bernie@epamail.epa.gov,
cc
bcc
Subject Fw: evaluation of background total arsenic from EMF site

History: This message has been replied to and forwarded.

Hi Rob

Attached is some additional analysis performed on the EMF groundwater As background data. Are you and your statistics expert available for a call this Friday 9/5 at 9 pacific? I would like to finalize our discussions on groundwater background calculations so it can be documented in the FMC groundwater conditions report. Kira

Kira Lynch
US EPA Region 10
1200 Sixth Avenue, Suite 900
Office of Environmental Cleanup (ECL-113)
Seattle WA 98101
phone: 206-553-2144
cell: 206-850-4323
fax: 206-553-0124
----- Forwarded by Kira Lynch/R10/USEPA/US on 09/03/2008 09:39 AM -----

"Beal, Dennis J." <DENNIS.J.BEAL@saic.com>
08/29/2008 12:33 PM

To Bernie Zavala/R10/USEPA/US@EPA, Kira Lynch/R10/USEPA/US@EPA
cc
Subject RE: evaluation of background total arsenic from EMF site

Attached is a Word file that discusses the calculation of the UCL for the 12 wells excluding 101 and 102. I also calculated the UCL for all 14 wells for comparison purposes. EPA software ProUCL 4.00.02 software was used to calculate these UCLs and check the distributions. The UCL95 = 0.005 mg/L using the 12 wells, while the UCL95 = 0.0062 using all 14 wells.

Also attached is an Excel file that contains the output from ProUCL.

If you have any questions please let me know.

Dennis

-----Original Message-----
From: Zavala.Bernie@epamail.epa.gov
[mailto:Zavala.Bernie@epamail.epa.gov]
Sent: Monday, August 25, 2008 5:19 PM
To: Lynch.Kira@epamail.epa.gov
Cc: Beal, Dennis J.
Subject: RE: evaluation of background total arsenic from EMF site

Kira,:

Dennis and I just got off the phone and discussed the next step or support from SAIC re: the evaluation of background for total arsenic from the EMF site. We agreed to use the combined data set (12-wells) not including MW-101 and 102 using ProUCL. The ProUCL does the evaluation in a nonparametric method. Dennis will also check the data: for normality (after removing the data MW-101 &102) with his usual approach and then forward his evaluation to us either at the end of this week or early next week. Again, the background data set for this evaluation are the following wells:
147, 173,174,175, 179, TW-10S, 514, 515, 516, 169, 301 and 305.

We also discussed using the later data set (1998 to the present) but that discussion should take place with FMC.

Dennis, if I forgot something important from our discussion please add, thanks.

Bernie.
****
Bernie Zavala, Hydrogeologist
US EPA, Region 10
Office of Environmental Assessment
1200 6th Avenue, OEA-095
Seattle, Wa 98101
Phone: 206-553-1562; Fax: 206-553-0119
Zavala.Bernie@EPA.GOV
****

Kira
Lynch/R10/USEPA/
US
08/20/2008 12:00
PM

To
"Beal, Dennis J."
<DENNIS.J.BEAL@saic.com>
cc
Bernie Zavala/R10/USEPA/US@EPA
Subject
RE: evaluation of background
total arsenic from EMF site
(Document link: Bernie Zavala)

Thanks Dennis

Bernie and I will discuss and send you an e-mail Friday.
Kira Lynch
US EPA Region 10
1200 Sixth Avenue, Suite 900
Office of Environmental Cleanup (ECL-113)
Seattle WA 98101
phone: 206-553-2144
cell: 206-850-4323
fax: 206-553-0124

"Beal, Dennis J." <DENNIS.J.BEAL@saic.com>		To
	Kira Lynch/R10/USEPA/US@EPA	
		cc
08/19/2008 09:25 AM	Bernie Zavala/R10/USEPA/US@EPA	
		Subject
	RE: evaluation of background total arsenic from EMF site	

Yes, I can do that. Just let me know the details of which well or date combinations you are interested in.

-----Original Message-----
From: Lynch.Kira@epamail.epa.gov [mailto:Lynch.Kira@epamail.epa.gov]
Sent: Monday, August 18, 2008 1:01 PM
To: Beal, Dennis J.
Cc: Zavala.Bernie@epamail.epa.gov
Subject: Re: evaluation of background total arsenic from EMF site

Hi Dennis

Would it be possible for you to do some proUCL runs for us without well 101 and 102 data? Kira
Kira Lynch
US EPA Region 10?
1200 Sixth Avenue, Suite 900
Office of Environmental Cleanup (ECL-113)
Seattle WA 98101
phone: 206-553-2144
cell: 206-850-4323
fax: 206-553-0124

"Beal, Dennis J." <DENNIS.J.BEAL@saic.com>
08/13/2008 12:51 PM

To Kira Lynch/R10/USEPA/US@EPA
cc Bernie Zavala/R10/USEPA/US@EPA
Subject evaluation of background total arsenic from EMF site

I have finished looking at your background arsenic data. Attached are a Word file with several plots and an Excel file with an accompanying table. A brief narrative is at the end of the Word file that describes my methods and conclusions.

Basically, wells 101 and 102 have statistically higher total arsenic concentrations than the other wells in the Michaud regime. The 10 Michaud wells cluster into 3 distinct well groupings. The wells have been sampled over a wide range of timeframes beginning in 1990. You really need to examine whether this old data still accurately reflects current background conditions.

Let me know if you have other questions or comments.

Thanks,

Dennis,

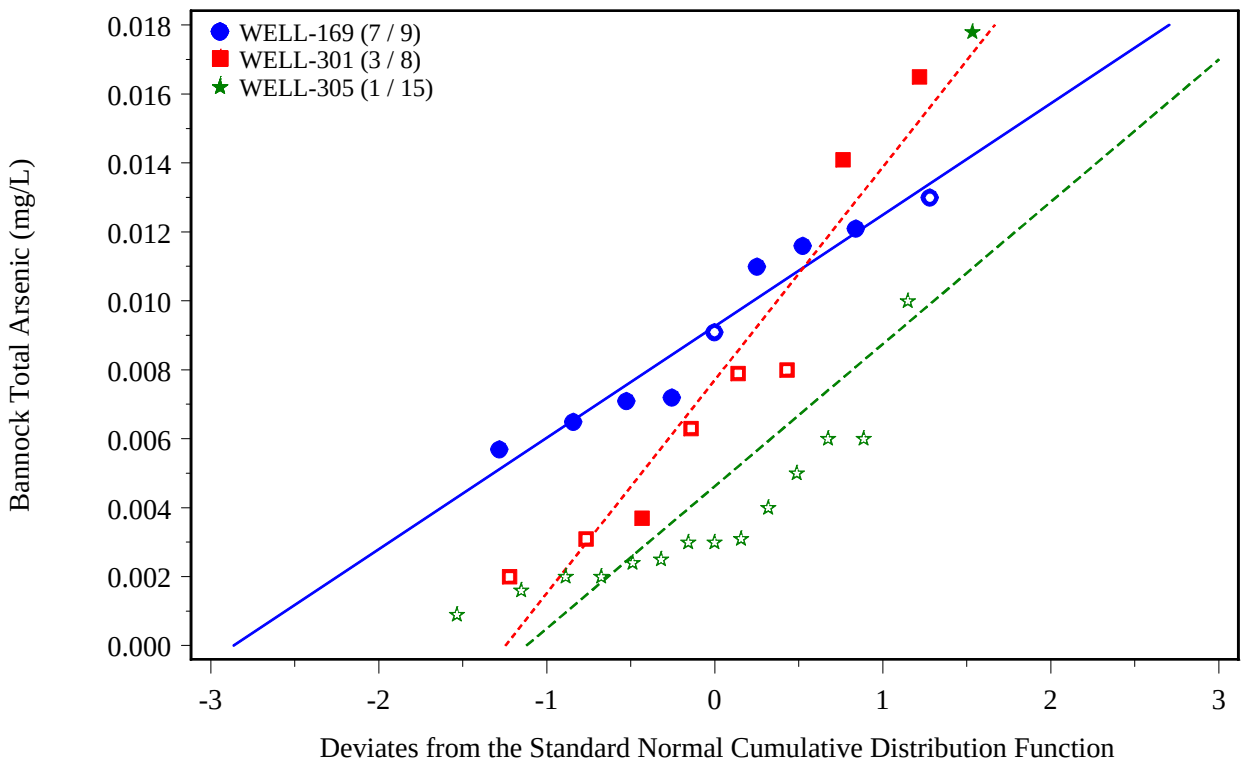
— DISCLAIMER —

The Statistical QA Support service is operated by Science Applications International Corporation (SAIC) under contract to the EPA Office of Environmental Information.

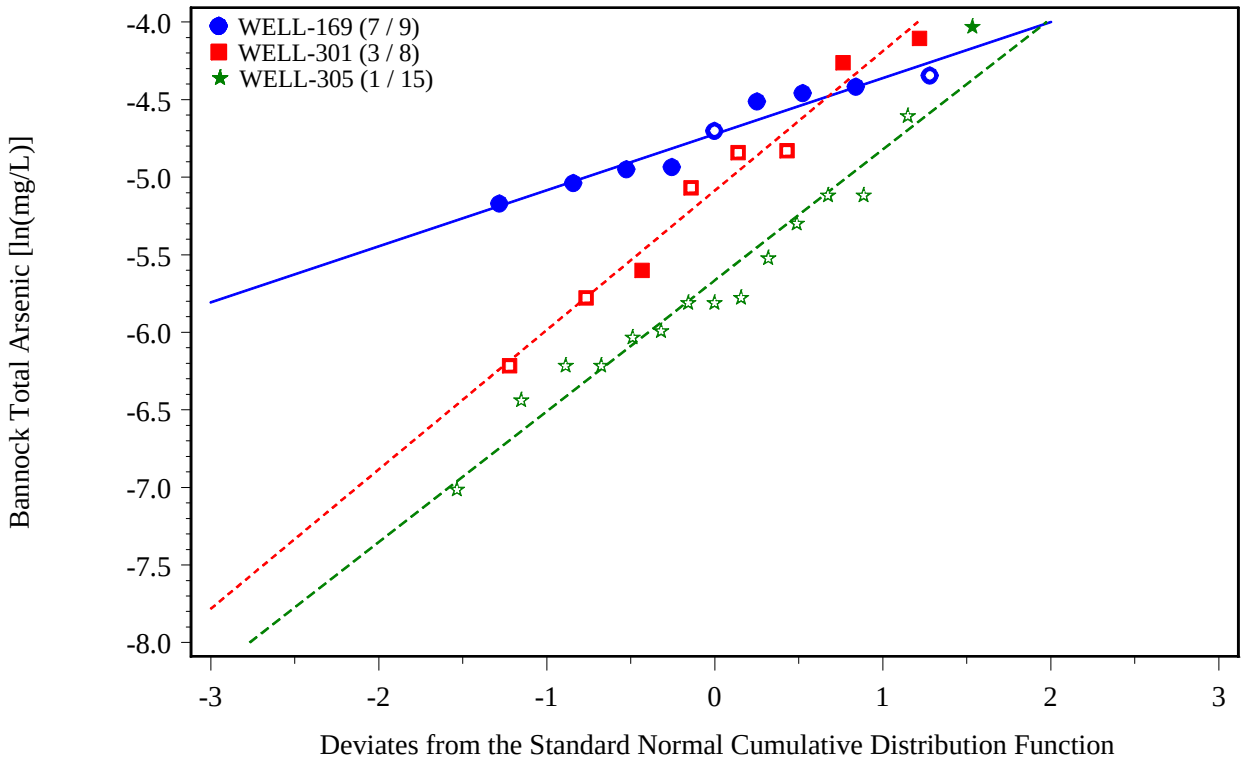
All Statistical QA Support service staff are contractors. As such, they do not create or interpret EPA policies. The role of the service is to provide statistical support to the EPA Regions.
(See attached file: Statistical test results.xls)(See attached file: probability plots of total arsenic by well.doc)(See attached file: probability plots of total arsenic by well v2.doc)(See attached file: ProUCL output for 12 and 14 wells.xls)

probability plots of total arsenic by well v2.doc

ProUCL output for 12 and 14 wells.xls

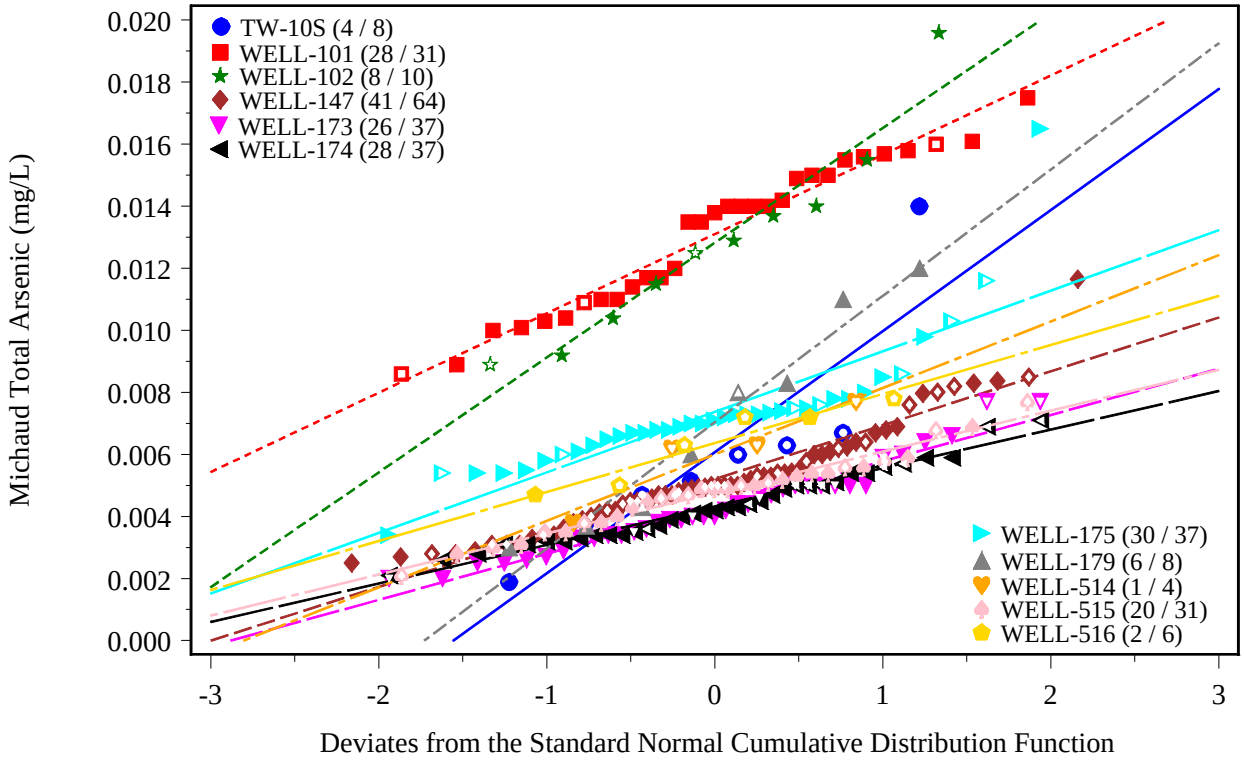


Open symbols denote non-detects. Closed symbols denote detected concentrations.

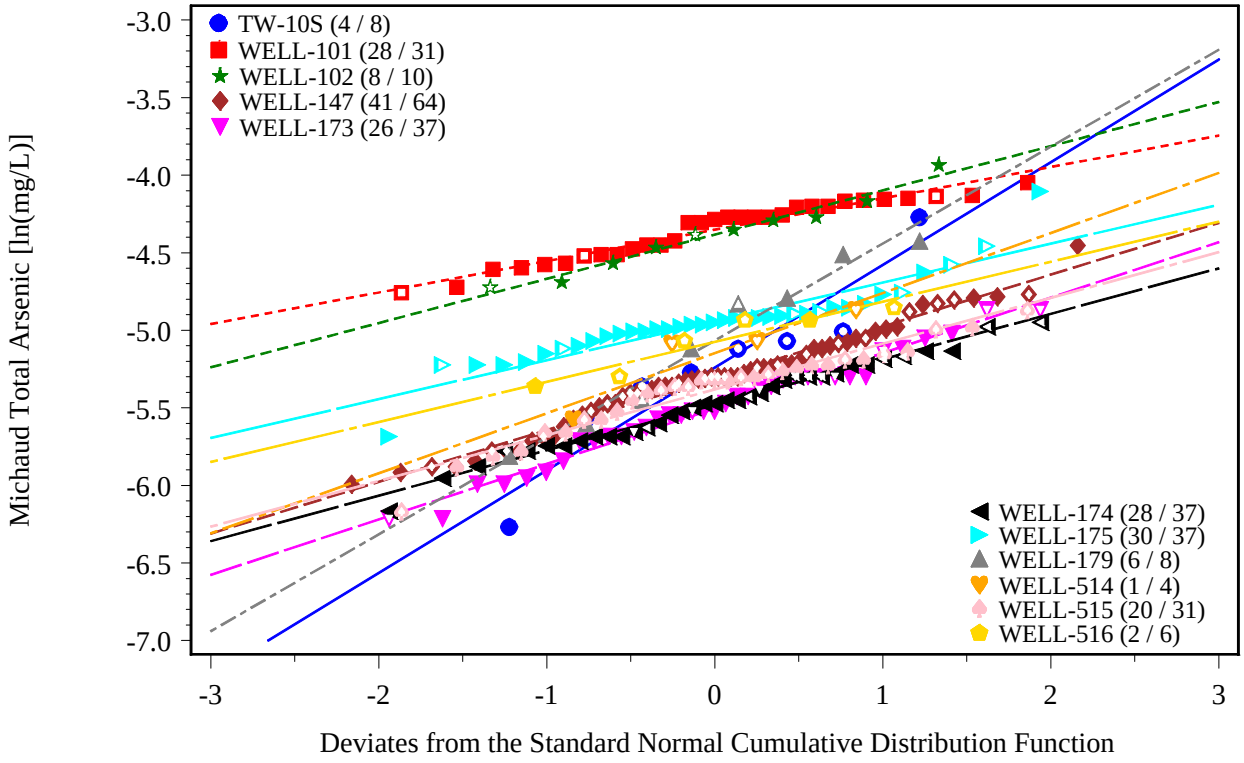


Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 1. Normal and lognormal probability plots of total arsenic in the Bannock regime.

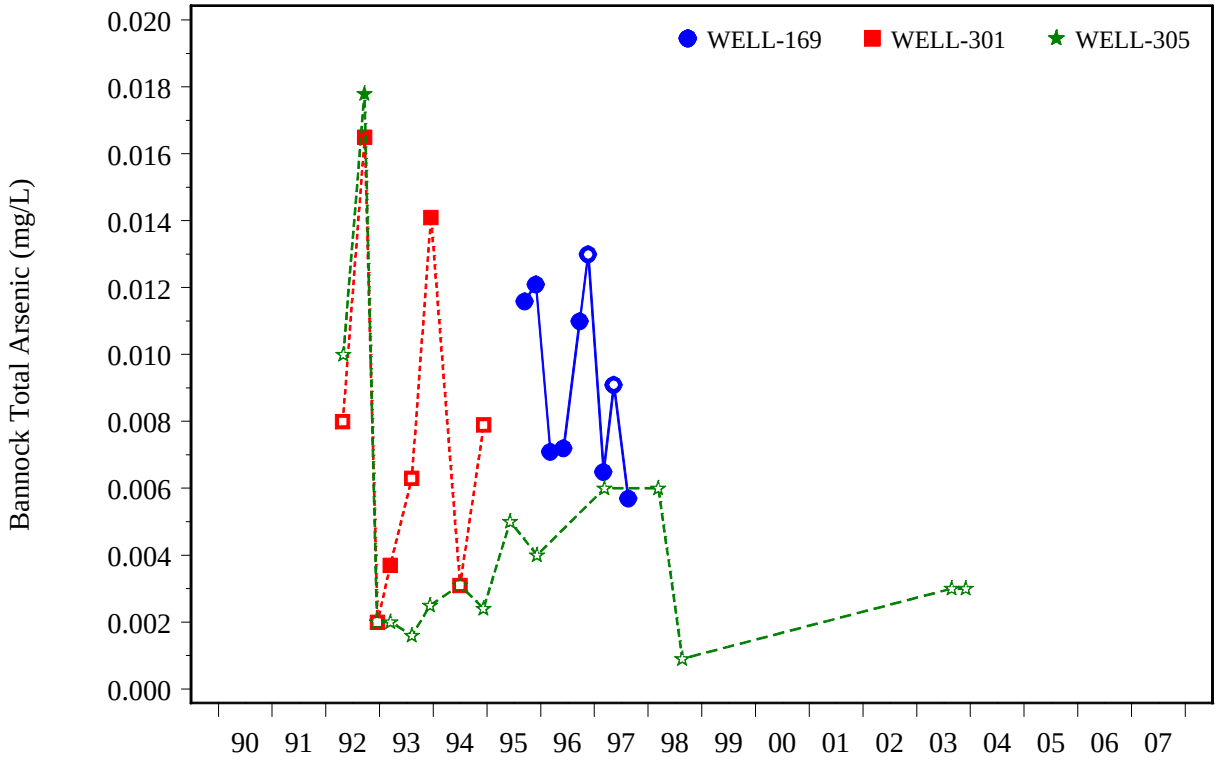


Open symbols denote non-detects. Closed symbols denote detected concentrations.

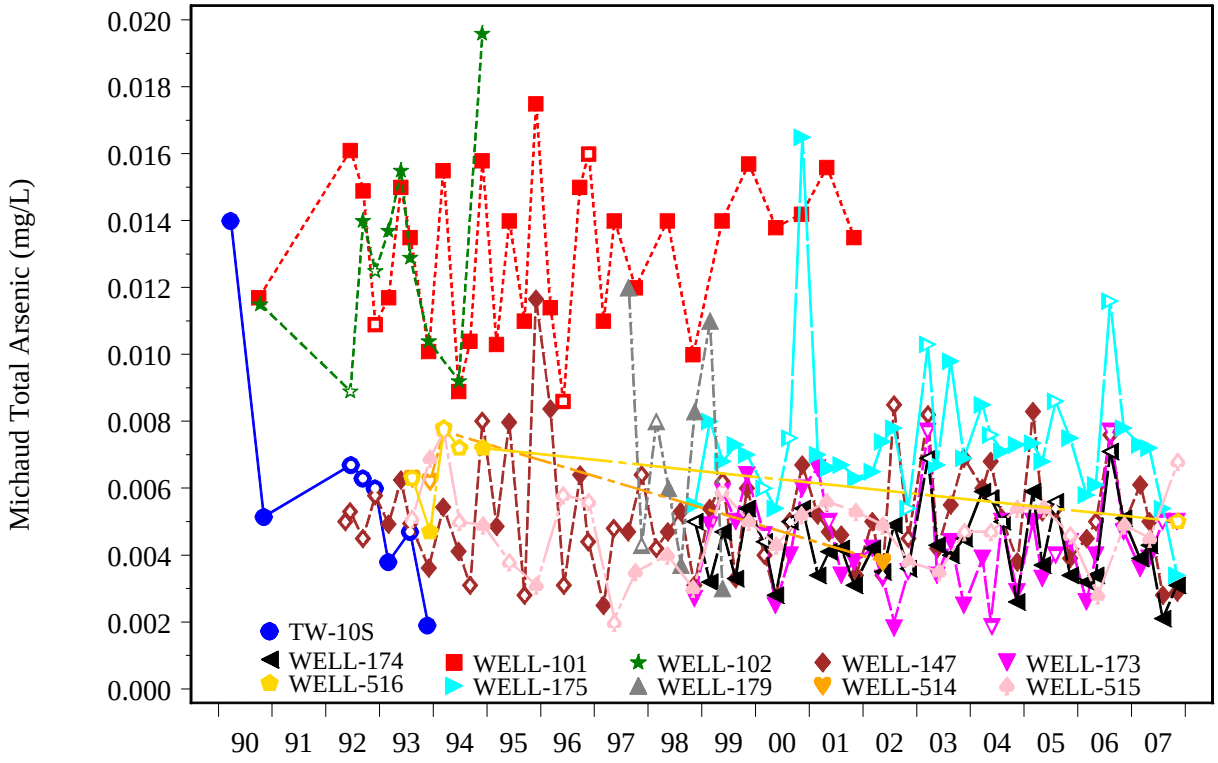


Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 2. Normal and lognormal probability plots of total arsenic in the Michaud regime.

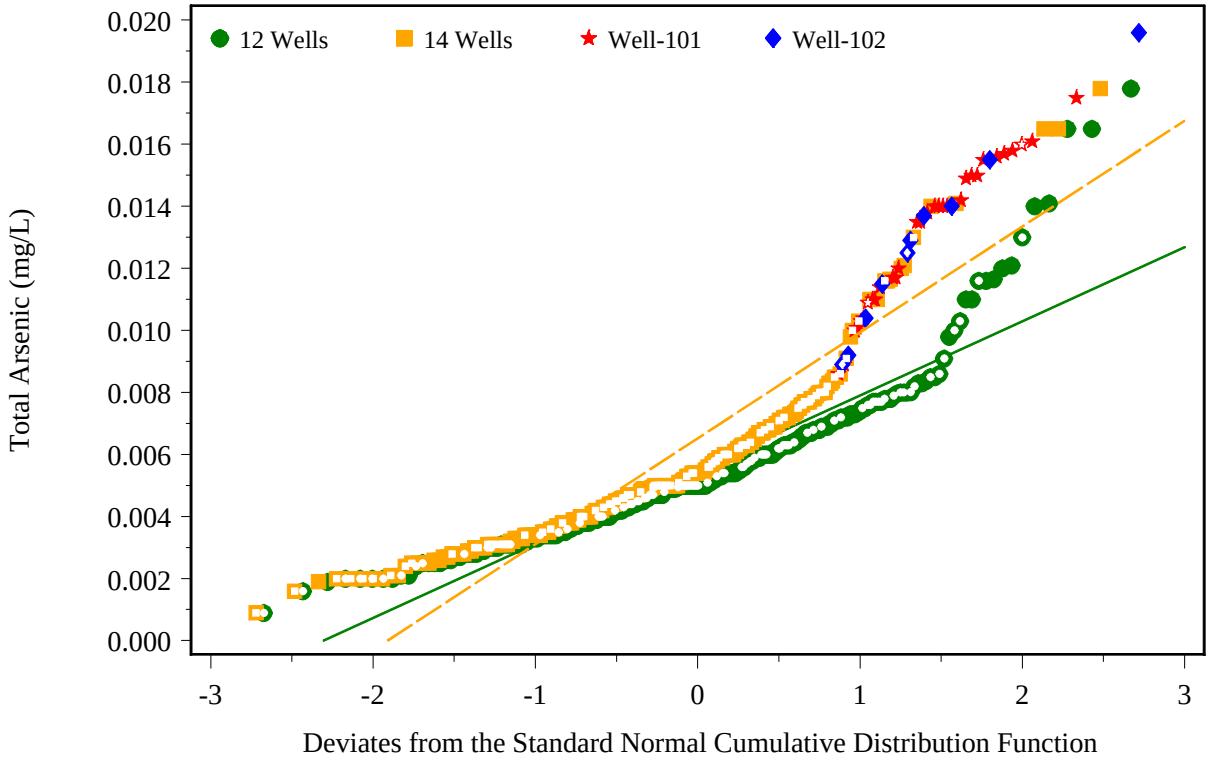


Open symbols denote non-detects. Closed symbols denote detected concentrations.

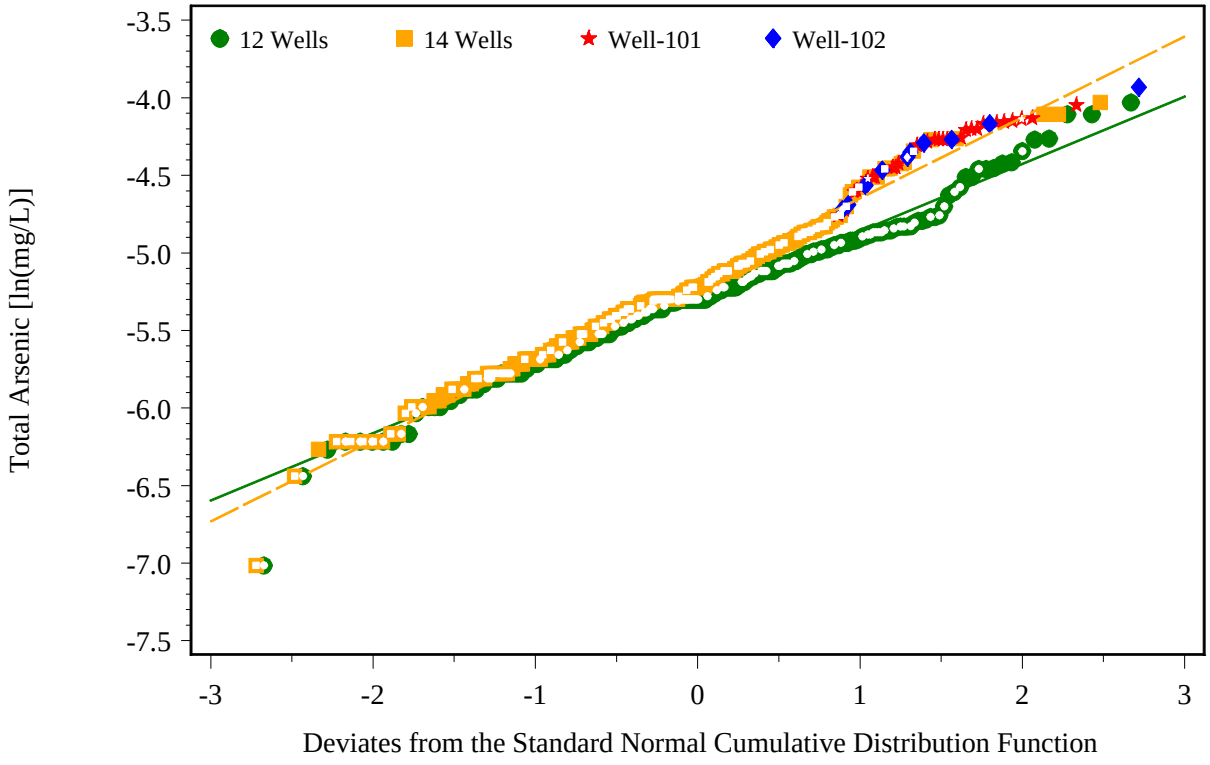


Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 3. Concentration plots across time of total arsenic for the Bannock and Michaud regimes.



Open symbols denote non-detects. Closed symbols denote detected concentrations.



Open symbols denote non-detects. Closed symbols denote detected concentrations.

Fig. 4. Normal and lognormal probability plots of total arsenic with and without wells 101 and 102.

<u>Narrative</u>

The background total arsenic data were reduced according to the rules used in document. However, for Well-101 sample F212480 (0.0109 U mg/L) collected on 12/2/1992 was used instead of sample F212412 (0.011 U mg/L) since the rules on p. 8 specify that when there are two non-detects, the smaller detection limit is used. It is not clear why the document's own rules were not applied here. Well-101 sample 611101 (0.016 U mg/L) collected 11/22/1996 was kept because graphs of the data show the result easily fall within the range of the data. It is not clear why it was excluded because of its "high order, nondetected value in the initial ProUCL calculation run" in the document's Table 5 footnote. Well-305 sample S212406A (0.0113 U mg/L) collected on 12/13/1992 was excluded because its primary sample in sample S212404A (0.002 U mg/L) had a lower detection limit, per the rules on page 8. The data for Well-147 were included in this revised analysis.

After the data were reduced to one total arsenic result per well and date collected, normal and lognormal probability plots were generated. Fig. 1 shows probability plots for the 3 Bannock regime wells, while Fig. 2 shows probability plots for the 11 Michaud regime wells. All figures show non-detects with hollow symbols, while detected results are shown with solid symbols. Fig. 1 shows the 3 Bannock regime wells exhibit different standard deviations (slope of the regression line) and means. Fig. 2 shows Michaud wells 101 and 102 look very similar to each other and exhibit significantly larger means than the other Michaud regime wells. Similarly, wells 147, 173, 174, and 515 have similar means and standard deviations. The middle 5 wells TW-10S, 179, 175, 514, and 516 show similar means and standard deviations.

Fig. 3 shows concentration plots of total arsenic across time for each of the 14 wells by regime. The sampling duration for the wells varies widely. Some wells have not been sampled since the mid-1990s, while other wells were sampled sporadically with several years between samples (e.g., wells 305 and 516). Well-147 has the longest continuous sampling period from 1992 to the present.

UCLs

The 95% upper confidence limit (UCL95) on the mean was calculated by combining all 14 wells together across all dates sampled and also using only 12 wells (excluding wells 101 and 102). Fig. 4 shows probability plots of the 14 wells combined with different symbols for wells 101 and 102, and the 12 wells excluding wells 101 and 102. The total arsenic concentrations from wells 101 and 102 are all in the right tail of the distribution since the data from these two wells are statistically higher than the other wells across both regimes.

Table 1 shows the summary statistics for all 14 wells and 12 wells excluding wells 101 and 102. The data are neither normal nor lognormal for all 14 wells, while the 12 wells are lognormal. The UCL95 was calculated using the EPA software ProUCL 4.00.02. The ProUCL software recommended a Kaplan-Meier (KM) bias corrected accelerated (BCA) bootstrap method UCL. The data used and the ProUCL output are attached in an Excel file.

Table 1. Summary statistics of total arsenic by well groupings

Well	Freq. of		Non-detects					Detected			
Grouping	Detection	Units	Min	Max	Mean[a]	Median[a]	S.D.[a]	Min	Max	Dist.	UCL95
12 Wells	169 / 264	mg/L	0.0009	0.013	0.0045	0.0039	0.0026	0.0019	0.0178	L	0.0050
14 Wells	205 / 305	mg/L	0.0009	0.016	0.0056	0.0043	0.0038	0.0019	0.0196	X	0.0062

[a] This summary statistic is calculated from both detects and non-detects. Half the reported values were used for non-detects.

Dist. = distribution. Distribution flags are defined as L = lognormal, X = neither normal nor lognormal.

S.D. = standard deviation.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total Arsenic

General Statistics

Number of Valid Data	264	Number of Detected Data	169
Number of Distinct Detected Data	76	Number of Non-Detect Data	95
		Percent Non-Detects	35.98%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0019	Minimum Detected	-6.266
Maximum Detected	0.0178	Maximum Detected	-4.029
Mean of Detected	0.00552	Mean of Detected	-5.292
SD of Detected	0.00269	SD of Detected	0.419
Minimum Non-Detect	9.00E-04	Minimum Non-Detect	-7.013
Maximum Non-Detect	0.013	Maximum Non-Detect	-4.343

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	259
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	5
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	98.11%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.137	Lilliefors Test Statistic	0.0544
5% Lilliefors Critical Value	0.0682	5% Lilliefors Critical Value	0.0682
Data not Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00452	Mean	-5.543
SD	0.00262	SD	0.546
95% DL/2 (t) UCL	0.00479	95% H-Stat (DL/2) UCL	0.00483

Maximum Likelihood Estimate(MLE) Method	N/A	Log ROS Method	
MLE method failed to converge properly		Mean in Log Scale	-5.457
		SD in Log Scale	0.437
		Mean in Original Scale	0.00473
		SD in Original Scale	0.00246
		95% Percentile Bootstrap UCL	0.00498
		95% BCA Bootstrap UCL	0.00499

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	5.422	Data appear Lognormal at 5% Significance Level
Theta Star	0.00102	
nu star	1833	

		Nonparametric Statistics	
A-D Test Statistic	1.874		
5% A-D Critical Value	0.755	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.755	Mean	0.00475
5% K-S Critical Value	0.0718	SD	0.00251
Data not Gamma Distributed at 5% Significance Level		SE of Mean	1.62E-04
		95% KM (t) UCL	0.00502
Assuming Gamma Distribution		95% KM (z) UCL	0.00502
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.00501
Minimum	0.00107	95% KM (bootstrap t) UCL	0.00505
Maximum	0.0178	95% KM (BCA) UCL	0.00503
Mean	0.00537	95% KM (Percentile Bootstrap) UCL	0.00503
Median	0.00519	95% KM (Chebyshev) UCL	0.00546
SD	0.00234	97.5% KM (Chebyshev) UCL	0.00576
k star	6.214	99% KM (Chebyshev) UCL	0.00636
Theta star	8.64E-04		
Nu star	3281	**Potential UCLs to Use**	
AppChi2	3149	**95% KM (BCA) UCL**	**0.00503**
95% Gamma Approximate UCL	0.0056		
95% Adjusted Gamma UCL	0.0056		

Note: DL/2 is not a recommended method.

General UCL Statistics for Data Sets with Non-Detects

User Selected Options	
From File	WorkSheet.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total Arsenic

General Statistics

Number of Valid Data	305	Number of Detected Data	205
Number of Distinct Detected Data	99	Number of Non-Detect Data	100
		Percent Non-Detects	32.79%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	0.0019	Minimum Detected	-6.266
Maximum Detected	0.0196	Maximum Detected	-3.932
Mean of Detected	0.00688	Mean of Detected	-5.125
SD of Detected	0.00397	SD of Detected	0.532
Minimum Non-Detect	9.00E-04	Minimum Non-Detect	-7.013
Maximum Non-Detect	0.016	Maximum Non-Detect	-4.135

Note: Data have multiple DLs - Use of KM Method is recommended	Number treated as Non-Detect	299
For all methods (except KM, DL/2, and ROS Methods),	Number treated as Detected	6
Observations < Largest ND are treated as NDs	Single DL Non-Detect Percentage	98.03%

UCL Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Lilliefors Test Statistic	0.17	Lilliefors Test Statistic	0.0803
5% Lilliefors Critical Value	0.0619	5% Lilliefors Critical Value	0.0619
Data not Normal at 5% Significance Level		Data not Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	0.00557	Mean	-5.396
SD	0.00382	SD	0.644
95% DL/2 (t) UCL	0.00593	95% H-Stat (DL/2) UCL	0.00598

Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	0.00854	Mean in Log Scale	-5.331
SD	0.00362	SD in Log Scale	0.562
95% MLE (t) UCL	0.00888	Mean in Original Scale	0.00573
95% MLE (Tiku) UCL	0.0133	SD in Original Scale	0.0037
		95% Percentile Bootstrap UCL	0.00608
		95% BCA Bootstrap UCL	0.0061

Gamma Distribution Test with Detected Values Only		Data Distribution Test with Detected Values Only
k star (bias corrected)	3.531	Data do not follow a Discernable Distribution (0.05)
Theta Star	0.00195	
nu star	1448	

		Nonparametric Statistics	
A-D Test Statistic	4.281		
5% A-D Critical Value	0.758	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.758	Mean	0.00576
5% K-S Critical Value	0.0634	SD	0.00371
Data not Gamma Distributed at 5% Significance Level		SE of Mean	2.18E-04
		95% KM (t) UCL	0.00612
Assuming Gamma Distribution		95% KM (z) UCL	0.00612
Gamma ROS Statistics using Extrapolated Data		95% KM (jackknife) UCL	0.00611
Minimum	1.00E-09	95% KM (bootstrap t) UCL	0.00613
Maximum	0.0196	95% KM (BCA) UCL	0.0062
Mean	0.00656	95% KM (Percentile Bootstrap) UCL	0.00613
Median	0.0059	95% KM (Chebyshev) UCL	0.00671
SD	0.00354	97.5% KM (Chebyshev) UCL	0.00712
k star	2.781	99% KM (Chebyshev) UCL	0.00793
Theta star	0.00236		
Nu star	1696	**Potential UCLs to Use**	
AppChi2	1601	**95% KM (BCA) UCL**	**0.0062**
95% Gamma Approximate UCL	0.00694		
95% Adjusted Gamma UCL	0.00694		

Note: DL/2 is not a recommended method.

APPENDIX I

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 2	F027

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
FMC Corporation	N 447,598.0 E 555,051.0	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-14-92	9-15-92	Layne Environmental	AP-1000	10"	133.0	7.3	140.3

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
/na	0	13	na	4553.0	▽ / na ▼ / na	133.0/4420.0

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140 lbs. / 30 in.	none	L. R. West

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							4553.0				0 - 21 ft. **SILT**: Brownish yellow (10 YR 6/4).	Dual-wall percussion drilling with reverse air circulation. Inner pipe = 6" diameter Outer pipe = 9-3/4" diameter Logged from drill cuttings and split-spoon samples using Munsell color chart.
								5				
SS	1.5	1.5	20-24-17					10				
								15				
SS	1.0	*	18-50				4532.0	20			21 - 55 ft. **SILT**: Brownish yellow (10 YR 6/4); contains scattered rock fragments.	
								25			At 21 feet: Basalt fragments	
SS	1.5	*	14-24-18					30			At 30.5 - 31 feet: Basalt boulder	
								35			At 35 - 40 feet: Black basalt gravel	
SS	1.5	1.5	12-14-15					40				
								45				
SS	1.5	1.3	31-31-24					50			At 50 - 50.5 feet: Black basalt gravel	
							4498.0	55			55 - 63 ft. **GRAVELLY SILT**: Yellowish brown (10 YR 6/4); gravel is angular weathered basalt.	
SS	1.0	1.0	17-50					60				
							4490.0	65			63 - 131 ft. **SILT**: Yellowish brown (10 YR 6/4); contains scattered rock fragments.	

SS = SPLIT SPOON; ST = SHELBY TUBE
D= DENNISON P = PITCHER O = OTHER

SITE	Last Update:	HOLE NO.
FMC Corporation	01-27-93	F027

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 2	F027

(Template: BCHTLLS)

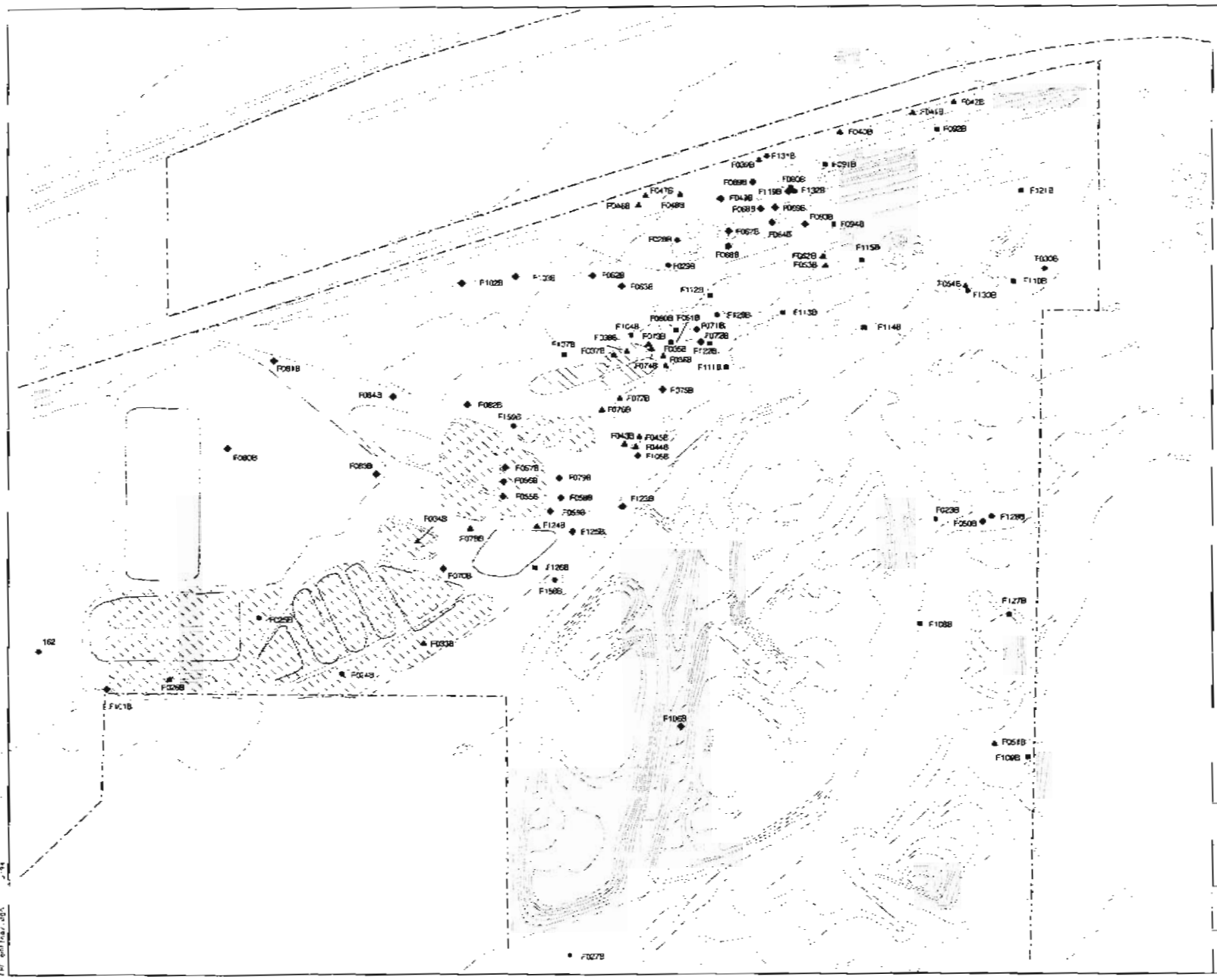
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	1.5	13-19-28									
								75			At 75 feet: Rock fragments	
SS	1.5	1.5	28-39-31					80			At 80 feet: Rock fragments	
								85				
SS	1.5	1.5	14-25-31					90				
								95				
											At 98 feet: Rock fragments	
SS	1.5	*	21-32-30					100				
								105			At 103 feet: Rock fragments	
											At 108 feet: Rock fragments	
SS	1.5	1.5	21-24-31					110				
								115				
SS	1.5	1.5	23-31-39					120				
								125				
								130			At 129 - 131 feet: Highly weathered gravel	
SS	0.5	0.4	50				4422.0					
							4420.0				131 - 133 ft. **SILTY GRAVEL**: Dark grayish brown (2.5 YR 4/2).	
								135			133 - 140.3 ft. **TUFF**: Light gray (N7).	
SS	0.3	0.0	50/3"				4412.7	140			TOTAL DEPTH : 140.3 FEET	Hole grouted from bottom with cement-bentonite grout mix.
												* Sample collected, recovery not recorded

SS = SPLIT SPOON; ST = SHELBY TUBE
D= DENNISON P = PITCHER O = OTHER

SITE: FMC Corporation

Last Update: 01-27-93

HOLE NO. F027



Legend:

Maximum Sample Depth

- 0 - 2.5
- 2.5 - 10
- 10 - 50
- to groundwater
- Former pond location
- FMC Property Lines

Note:

Borings F127B, F128B, F129S, F130B, F131B, F132S, F158B, and F159B are Phase II borings.

Boring 162 is a Phase III boring.

N

0 600 1200 FEET

0 100 200 300 400 METERS

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

EASTERN MICHAUD FLATS
POCATELLO, IDAHO

Soil Boring Locations - FMC Facility

Job Number	Drawing No.	Rev.
21372	FIGURE 2.1-1	

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	1 OF 3	138

SITE	COORDINATES and/or STATIONINGS	ANGLE FROM HORIZ	BEARING
North of Landfill	N 447,575.4 E 554,886.3	Vertical	------

BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-24-90	10-25-90	Layne Environmental	AP-1000	10"	140.0	28.0	168.0

CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
3.5/78		3			/ DRY /	140.0/

SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH	LOGGED BY:
140-lbs / 30-in	No well installed.	Garret Day

(Template: BCHTLLS)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6" / % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											0 - 15 ft. **SILT (ML)**: Yellowish brown (10 YR 6/2), dry, 90% slightly plastic, calcareous clayey silt, 10% medium-to-coarse grained subrounded sand.	Dual-wall percussion drilling with reverse air circulation to a depth of 152 ft., reverse-air rotary with down-hole percussion hammer to a depth of 165 ft., then resume dual-wall percussion drilling with reverse air circulation to a total depth of 168 ft. Air-water mist (<1 gpm) used where needed to restore circulation. Logged from drill cuttings and from split-spoon samples using the Unified Soil Classification System and the GSA Rock Color Chart.
SS	1.5	1.0	6 10 11					5			5 ft: roots, moderately dense and brittle, dry.	
								10			10 ft: dark yellowish brown (10 YR 4/2), 100% clayey silt with calcareous nodules.	
								15			15 - 25 ft. **GRAVELLY SILT (ML)**: Pale yellowish brown (10 YR 4/2), dry, 60% clayey silt, 30% subrounded poorly-graded gravel (diameter ≤ 0.5 in.), 10% subrounded medium-to-coarse-grained sand, trace cobbles (diameter ≤ 4 in.)	
								20				
								25			25 - 40 ft. **SILT (ML)**: Pale yellowish brown (10 YR 6/2) to dark yellowish brown (10 YR 4/2), dry, 90% slightly plastic, calcareous silt with 10% subrounded medium-grained sand to gravel (diameter ≤ 1 in.).	
SS	1.5	1.0	40 50*					30			30 ft: clayey silt, hard.	* = refusal
								35			33 - 35 ft: silt with 20% sand and gravel.	
								40			40 - 45 ft. **SILTY GRAVEL WITH SAND (GM) TO GRAVELLY SILT WITH SAND (ML)**: Dark yellowish brown (10 YR 4/2), dry, 40% angular-to-subrounded well-graded gravel (diameter ≤ 2 in.) of volcanic lithologies with calcareous crusts, 40% silt, 20% subangular well-graded sand	
								45			45 - 70 ft. **SILT (ML)**: Dark yellowish brown (10 YR 4/3), dry, 80% slightly plastic, calcareous clayey silt with 20% coarse-grained sand to subangular-to-subrounded gravel (diameter ≤ 2 in.).	
								50				
								55			55-60 ft: clayey silt only, no sand or gravel.	
								60			60-70 ft: pale yellowish brown (10 YR 6/2), clayey silt with 0-30% interbedded fine-grained sand to gravel (diameter ≤ 2 in.).	
								65				

SS = SPLIT SPOON; ST = SHELBY TUBE
D= DENNISON P = PITCHER O = OTHER

SITE	Last Update:	HOLE NO.
North of Landfill	11-10-93	138

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	2 OF 3	138

(Template: BCHTLLS)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS 6"	% CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	1.5	27 41 45						75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145			70 - 75 ft. **SILTY GRAVEL (GM)**: Dark yellowish brown (10 YR 4/2), dry, 40% angular gravel (diameter ≤ 1 in.) of mostly volcanic lithologies, with calcareous crusts on larger gravels, 30% angular medium-to-coarse-grained angulnr sand, 30% silt, trace fine-grained sand.	
												75 - 128 ft. **GRAVELLY SILT TO SILT (ML)**: Pale yellowish brown (10 YR 6/2), mottled with dark yellowish brown (10 YR 4/2), dry, 80-100% slightly plastic, calcareous clayey silt with 0-20% medium-grained sand to subangular-to-subrounded gravel (diameter ≤ 2 in.).	
												75-80 ft: clayey silt with 20% gravel.	
												80-90 ft: clayey silt with up to 20% sand and gravel.	
												90-100 ft: clayey silt with trace sand and gravel.	
												100-118 ft: clayey silt with 10-20% sand and gravel.	
												118-120 ft: clayey silt with up to 40% sand and gravel.	
												120-128 ft: clayey silt with 20% gravel.	
												128 - 132 ft. **SILTY GRAVEL (GM)**: Dark yellowish brown (10 YR 4/2), dry, 40% angular-to-subrounded well-graded gravel (diameter ≤ 2 in.) of volcanic lithologies with slightly calcareous inclusions, 40% silt, 20% subangular fine-to-coarse-grained sand.	
												132 - 136 ft. **SILT (ML)**: Dry, 80% clayey silt with 20% subangular fine-to-medium-grained sand.	
												136 - 140 ft. **SILTY GRAVEL (GM) TO GRAVELLY SILT (ML)**: 50% subangular medium-grained sand to gravel (diameter ≤ 2 in.) with 50% clayey silt.	
												140 - 168 ft. **WEATHERED BEDROCK**: Highly-weathered, flow-banded, rhyolite ash-flow tuff, in places highly weathered and decomposed to sand and clay, with metamorphic sandstone in calcareous matrix, and some sand and gravel zones possibly associated with fractured and weathered	

@1

SS = SPLIT SPOON; ST = SHELBY TUBE
D= DENNISON P = PITCHER O = OTHER

SITE: North of Landfill

Last Update: 11-10-93

HOLE NO. 138

GEOLOGIC DRILL LOG

PROJECT	JOB NO.	SHEET NO.	HOLE NO.
EMF POCATELLO, ID	21372	3 OF 3	138

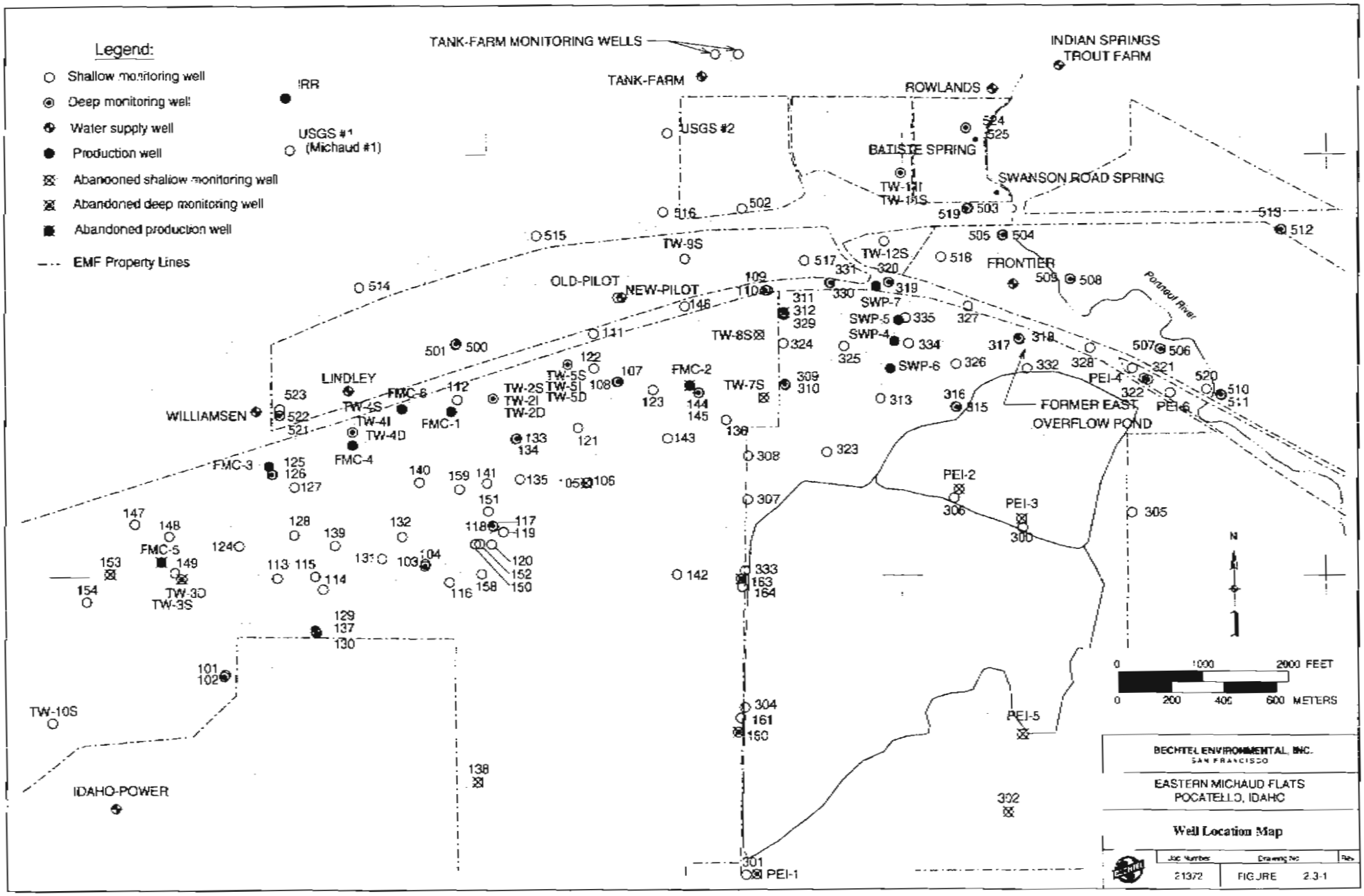
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS "N" % CORE RECOVERY	WATER PRESSURE TESTS: LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: BCHTLLS) DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								155 160 165			zones. Other zones include highly weathered coarse-grained sands. 140-150 ft: possible fine-grained, metamorphic sandstone with highly-weathered rhyolite tuff. Yellowish gray (5 Y 7/2). 150-160 ft: porphyritic rhyolite tuff with calcareous crusts, and laminated fine-grained metamorphic sandstone. 155-160 ft: Weathered and unweathered rhyolite. 160-165 ft: Dusky yellowish brown (5 Y 6/4), highly-weathered, fine-grained to medium-grained rhyolite tuff bedrock grading to clay and sand, but with visible original volcanic fragments. Some interbedded ash, sand, rhyolite gravel.	
											TOTAL DEPTH: 168 FT.	Drilling terminated at a depth of 168 ft. Drill casing retracted to a depth of 160 ft. Approx. 0.5 ft. of ground water accumulated by the following day and Pam French of FMC ordered that the boring be plugged. Boring plugged with cement-bentonite grout on 10-25-90.

SS = SPLIT SPOON; ST = SHELBY TUBE
D= DENNISON P = PITCHER O = OTHER

SITE: North of Landfill

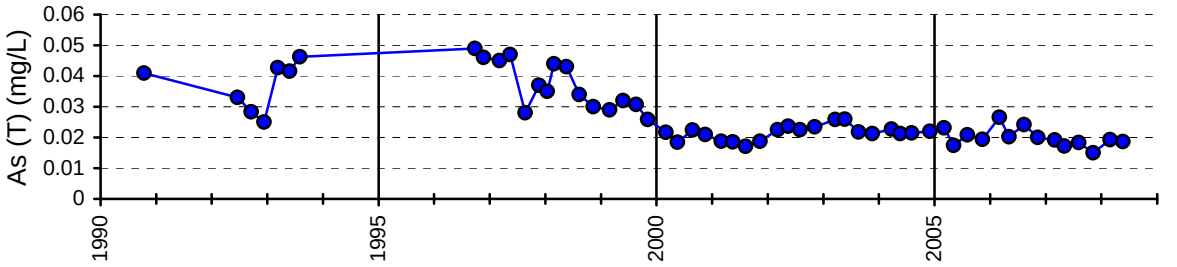
Last Update: 11-10-93

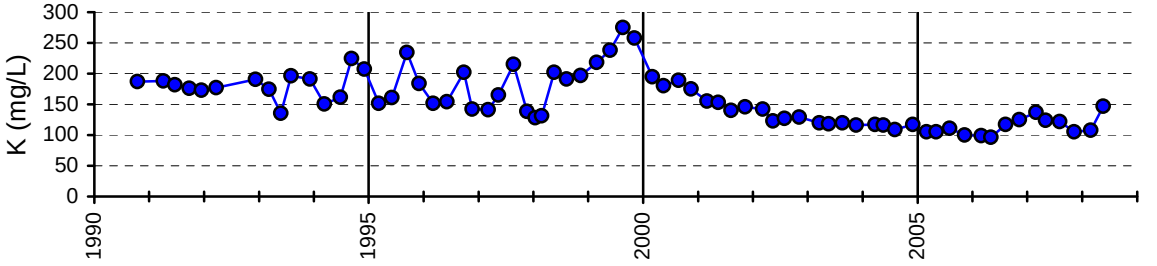
HOLE NO. 138

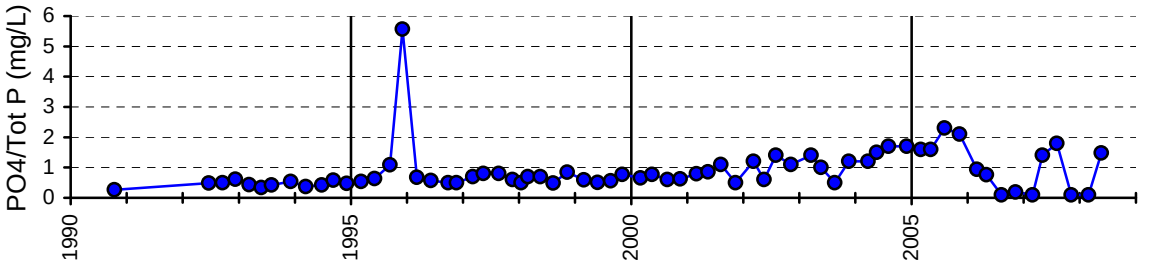

Legend:
Shallow monitoring well
Deep monitoring well
Water supply well
Production well
Abandoned shallow monitoring well
Abandoned deep monitoring well
Abandoned production well
EMF Property Lines
TANK-FARM MONITORING WELLS
TANK-FARM
INDIAN SPRINGS TROUT FARM
ROWLANDS
IRR
USGS #1 (Michaud #1)
USGS #2
BATISTE SPRING
SWANSON ROAD SPRING
TW-11I
TW-11S
TW-9S
TW-12S
FRONTIER
OLD-PILOT
NEW-PILOT
SWP-7
SWP-5
SWP-4
SWP-6
TW-8S
TW-7S
FMC-2
TW-5S
TW-5I
TW-5D
TW-2S
TW-2I
TW-2D
LINDLEY
FMC-6
TW-4S
TW-4I
TW-4D
FMC-1
FMC-4
FMC-3
WILLIAMSEN
FMC-5
TW-3D
TW-3S
TW-10S
IDAHO-POWER
PEI-1
PEI-2
PEI-3
PEI-4
PEI-5
PEI-6
FORMER EAST OVERFLOW POND
Portneuf River
N
0 1000 2000 FEET
0 200 400 600 METERS
BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO
EASTERN MICHAUD FLATS
POCATELLO, IDAHO
Well Location Map
Job Number 21372
Drawing No FIGURE 2.3-1
Rev

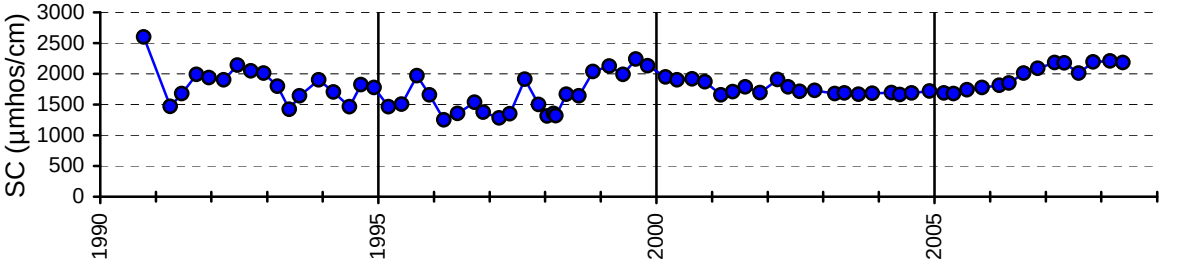
APPENDIX J

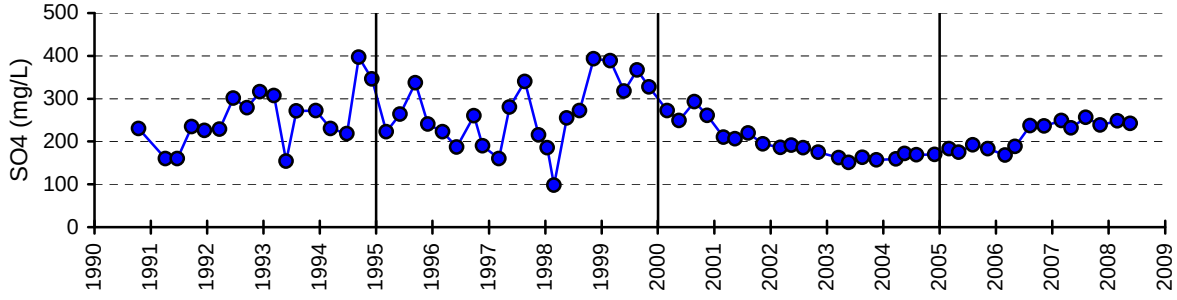
Well 108


As (T) (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
1990
1995
2000
2005

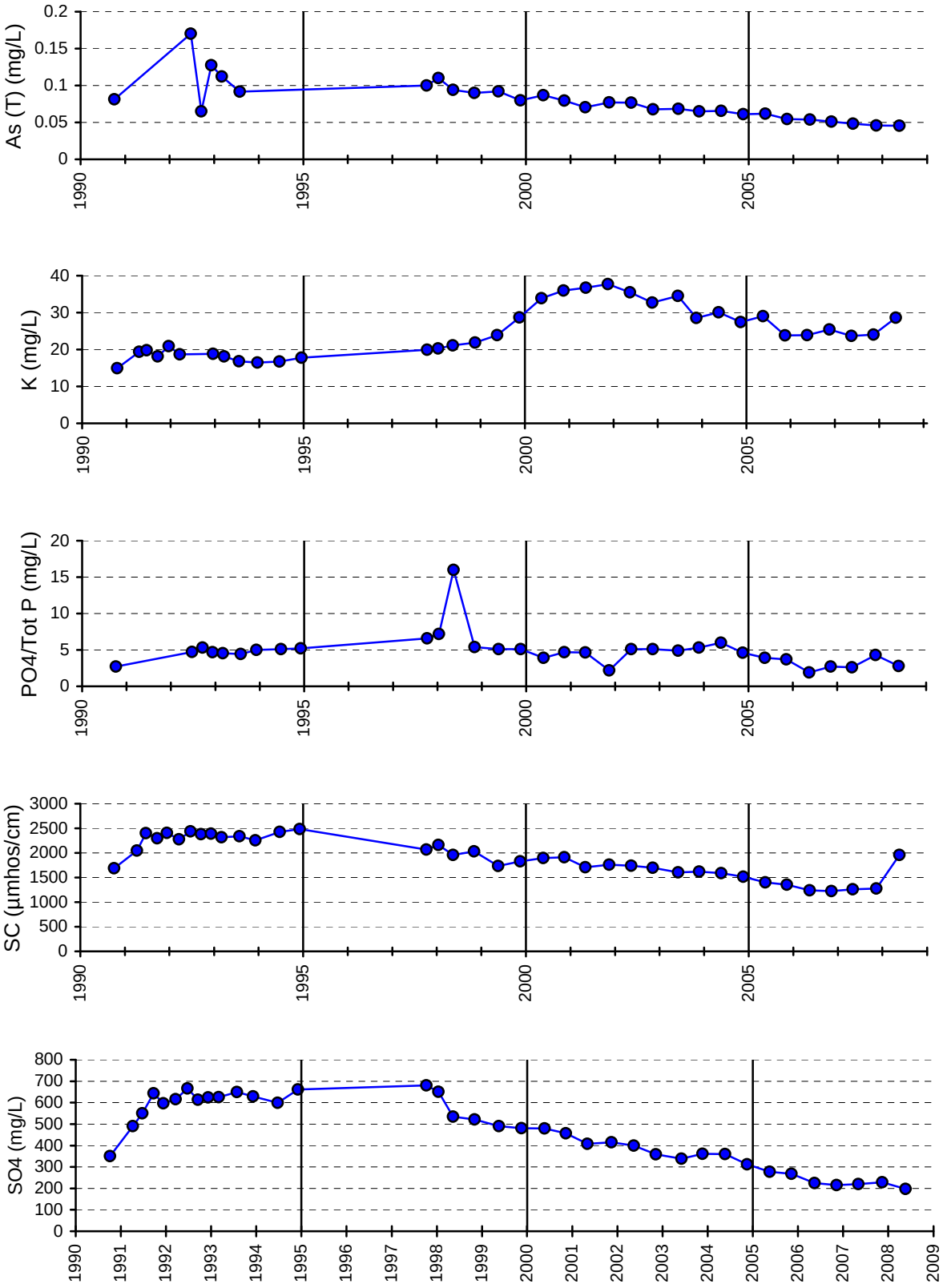

K (mg/L)
300
250
200
150
100
50
0
1990
1995
2000
2005


PO4/Tot P (mg/L)
6
5
4
3
2
1
0
1990
1995
2000
2005

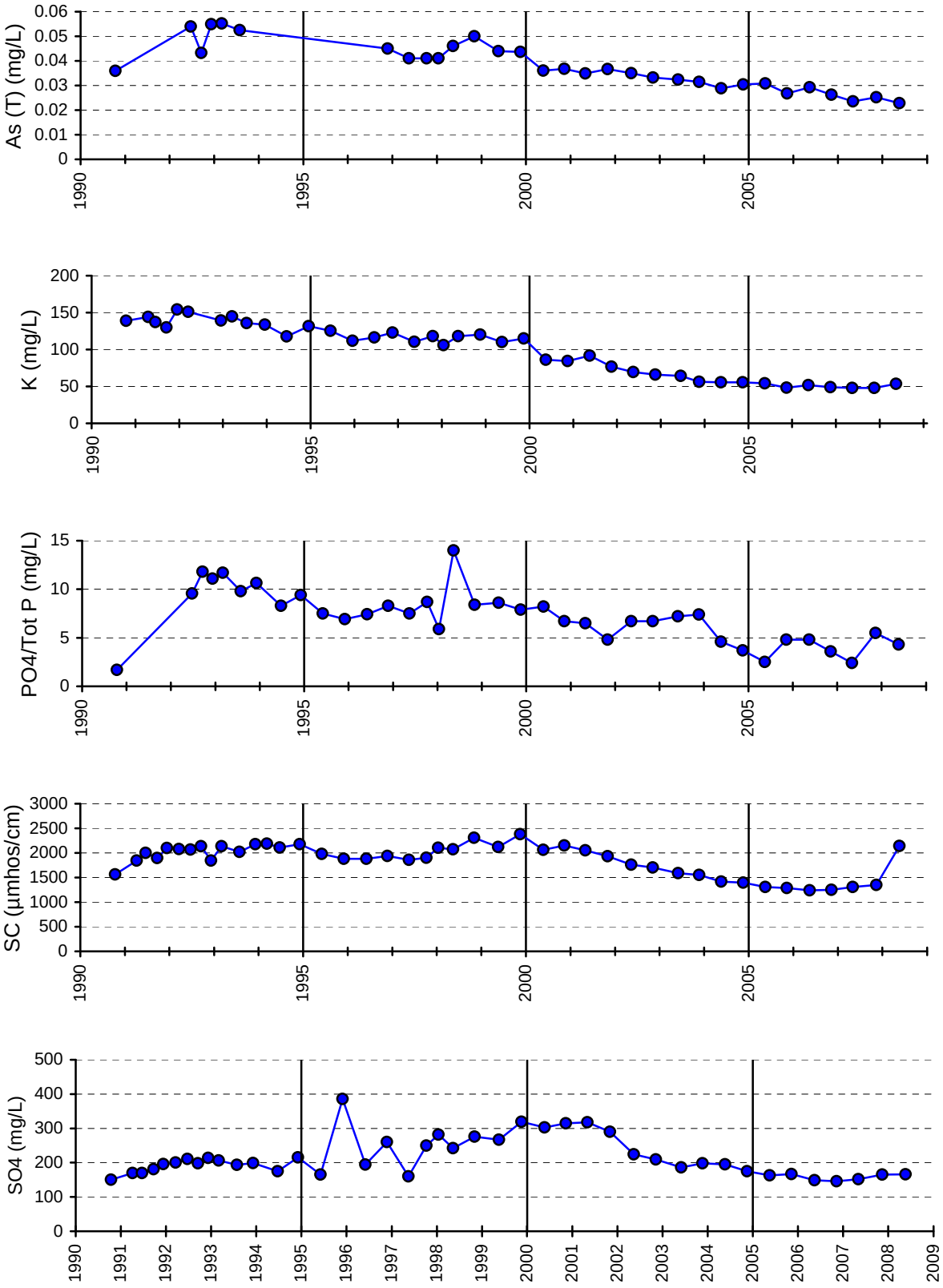

SC (µmhos/cm)
3000
2500
2000
1500
1000
500
0
1990
1995
2000
2005


SO4 (mg/L)
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

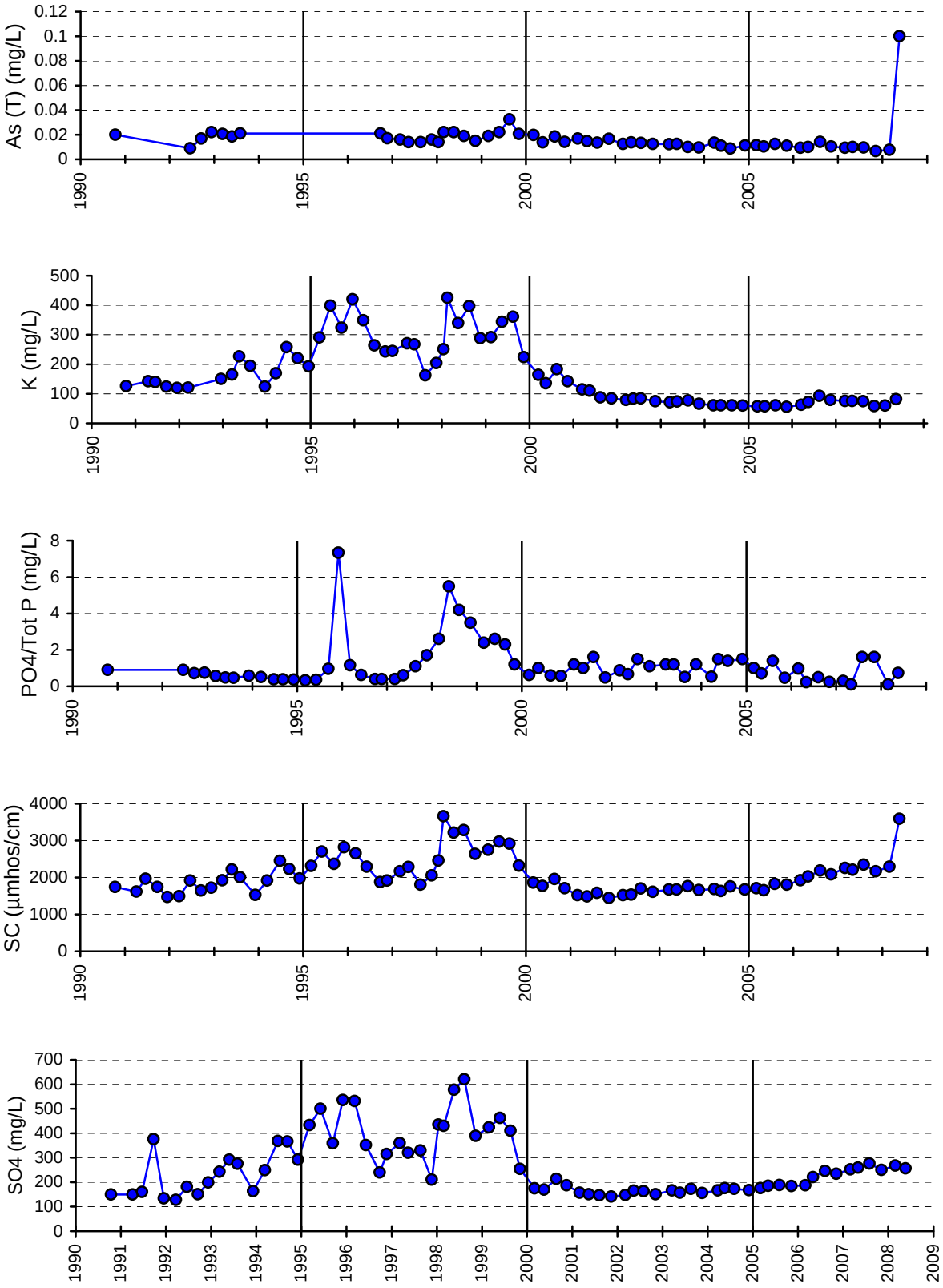
Well 110


As (T) (mg/L)
0.2
0.15
0.1
0.05
0
1990
1995
2000
2005
K (mg/L)
40
30
20
10
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
20
15
10
5
0
1990
1995
2000
2005
SC (µmhos/cm)
3000
2500
2000
1500
1000
500
0
1990
1995
2000
2005
SO4 (mg/L)
800
700
600
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

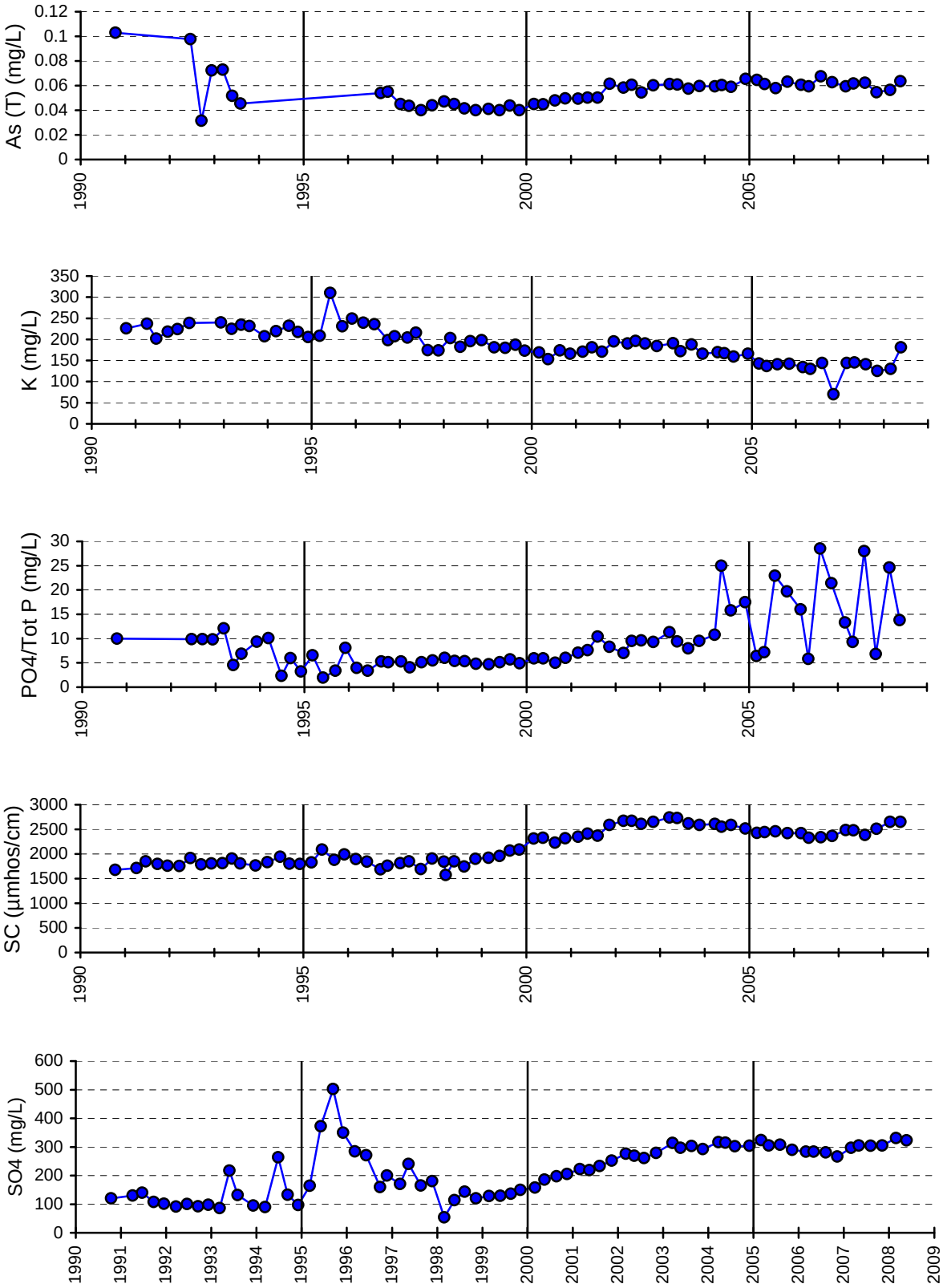
Well 111


As (T) (mg/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
1990
1995
2000
2005
K (mg/L)
200
150
100
50
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
15
10
5
0
1990
1995
2000
2005
SC (µmhos/cm)
3000
2500
2000
1500
1000
500
0
1990
1995
2000
2005
SO4 (mg/L)
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

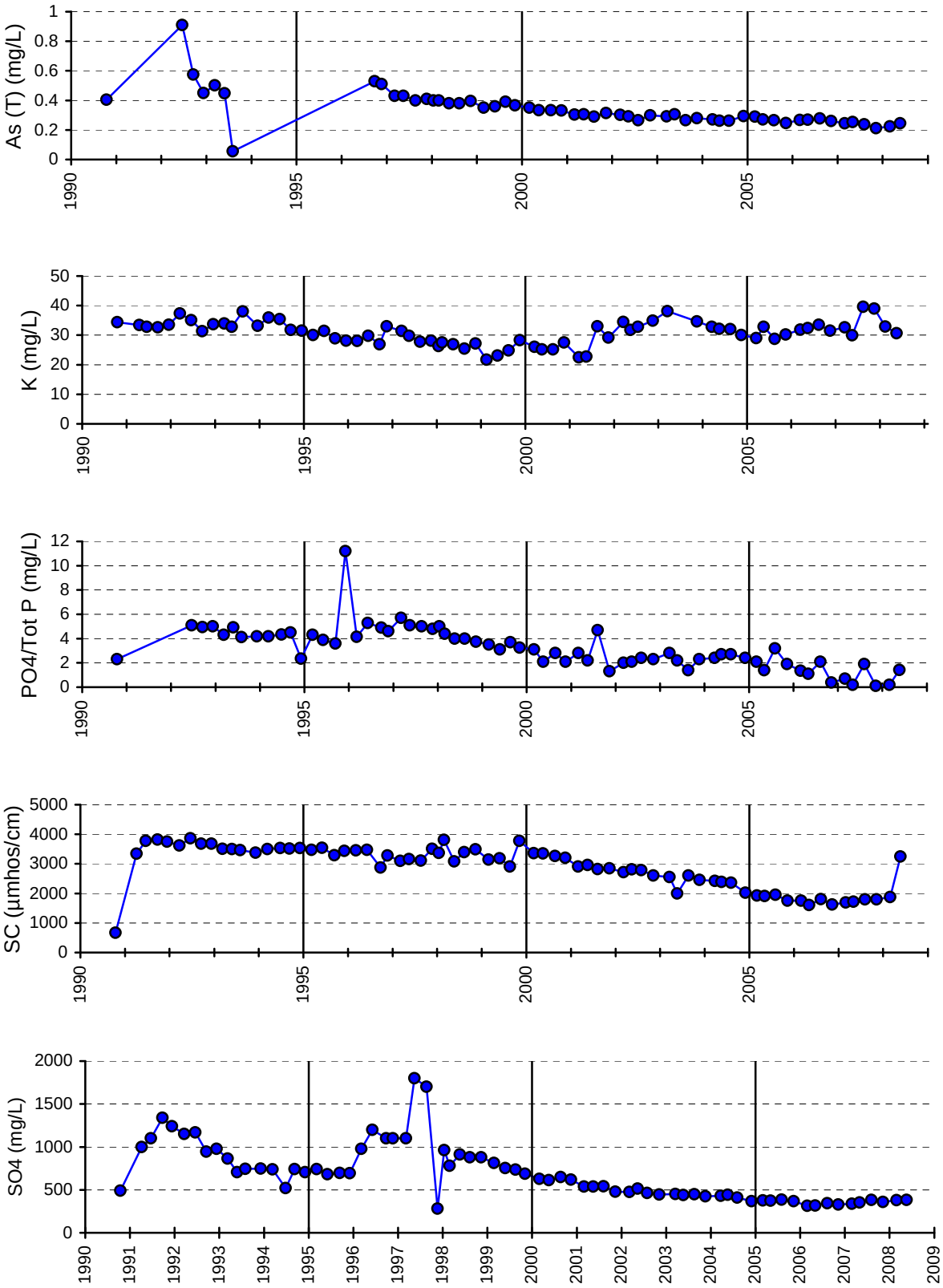
Well 121


As (T) (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
K (mg/L)
500
400
300
200
100
0
PO4/Tot P (mg/L)
8
6
4
2
0
SC (µmhos/cm)
4000
3000
2000
1000
0
SO4 (mg/L)
700
600
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

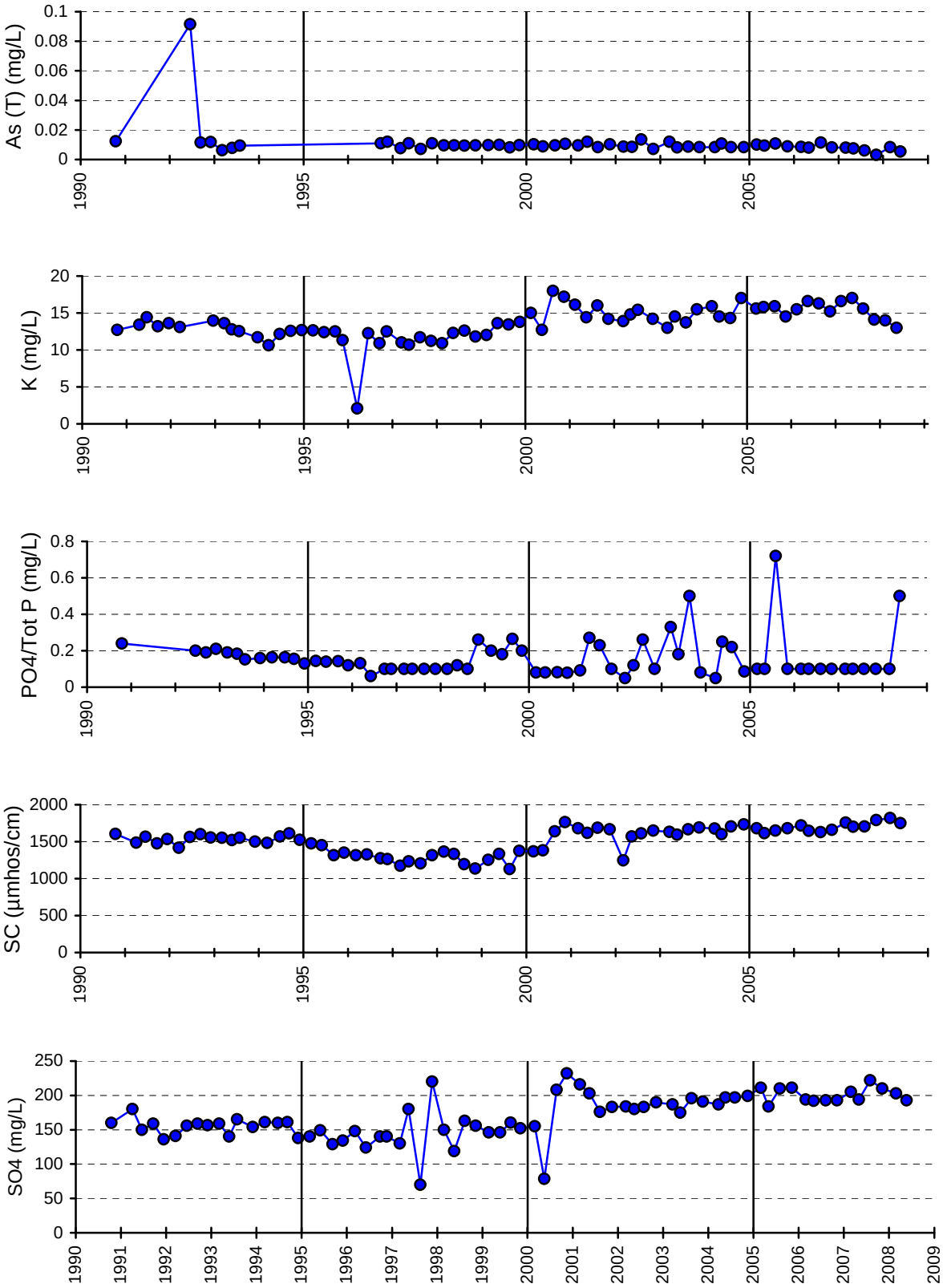
Well 122


As (T) (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
1990
1995
2000
2005
K (mg/L)
350
300
250
200
150
100
50
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
30
25
20
15
10
5
0
1990
1995
2000
2005
SC (µmhos/cm)
3000
2500
2000
1500
1000
500
0
1990
1995
2000
2005
SO4 (mg/L)
600
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

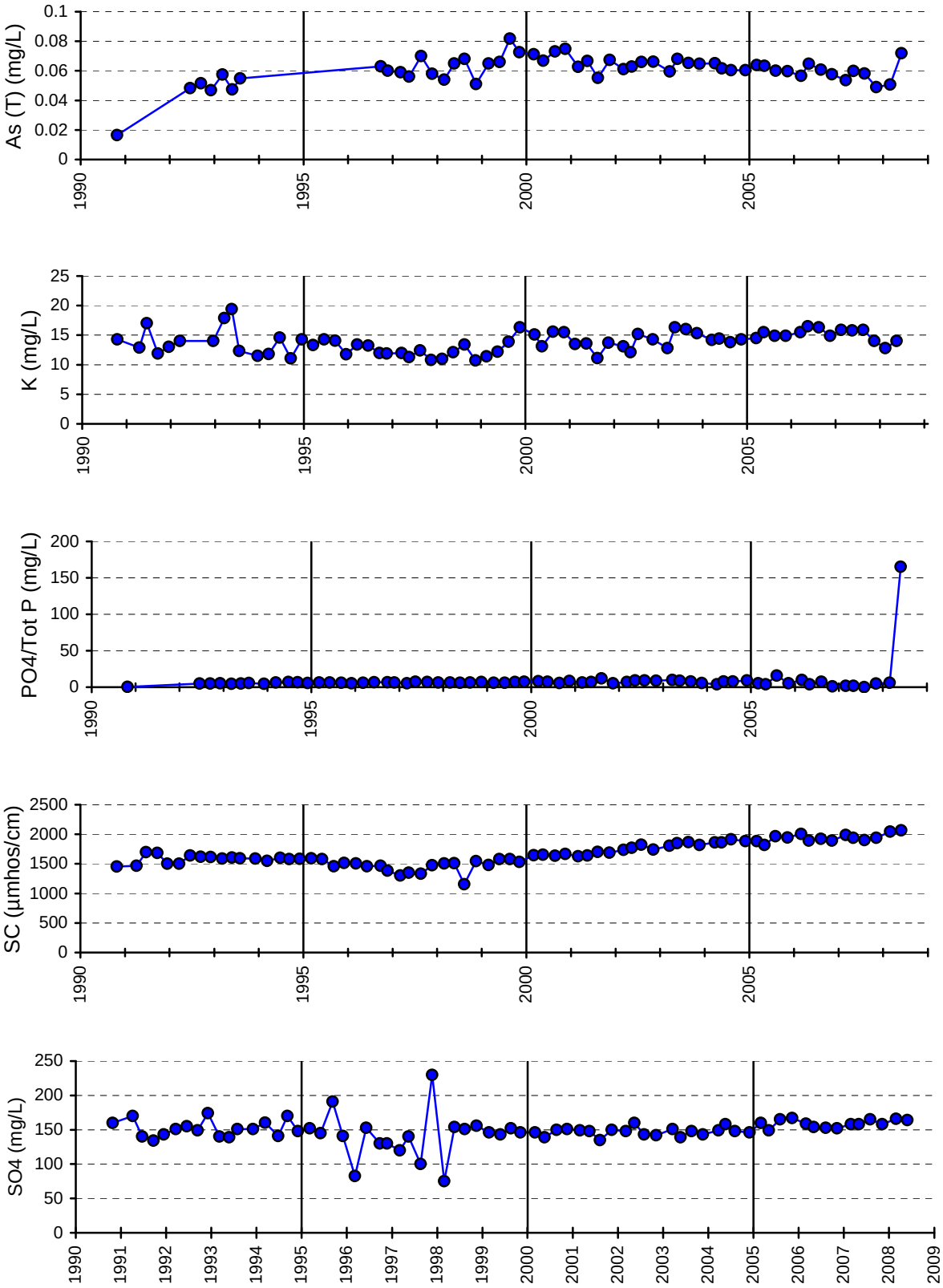
Well 123



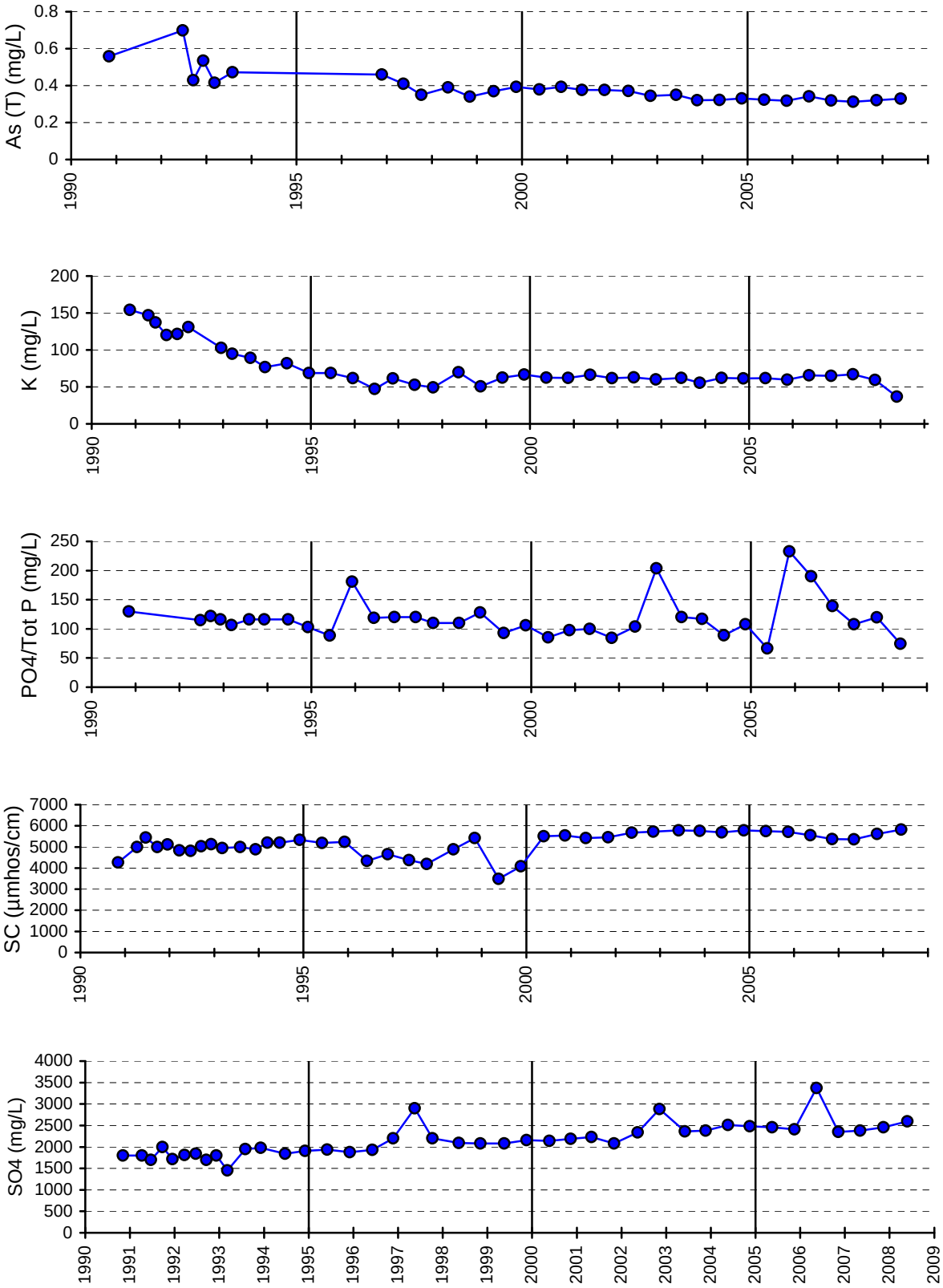
Well 127


As (T) (mg/L)
0.1
0.08
0.06
0.04
0.02
0
1990
1995
2000
2005
K (mg/L)
20
15
10
5
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
0.8
0.6
0.4
0.2
0
1990
1995
2000
2005
SC (µmhos/cm)
2000
1500
1000
500
0
1990
1995
2000
2005
SO4 (mg/L)
250
200
150
100
50
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

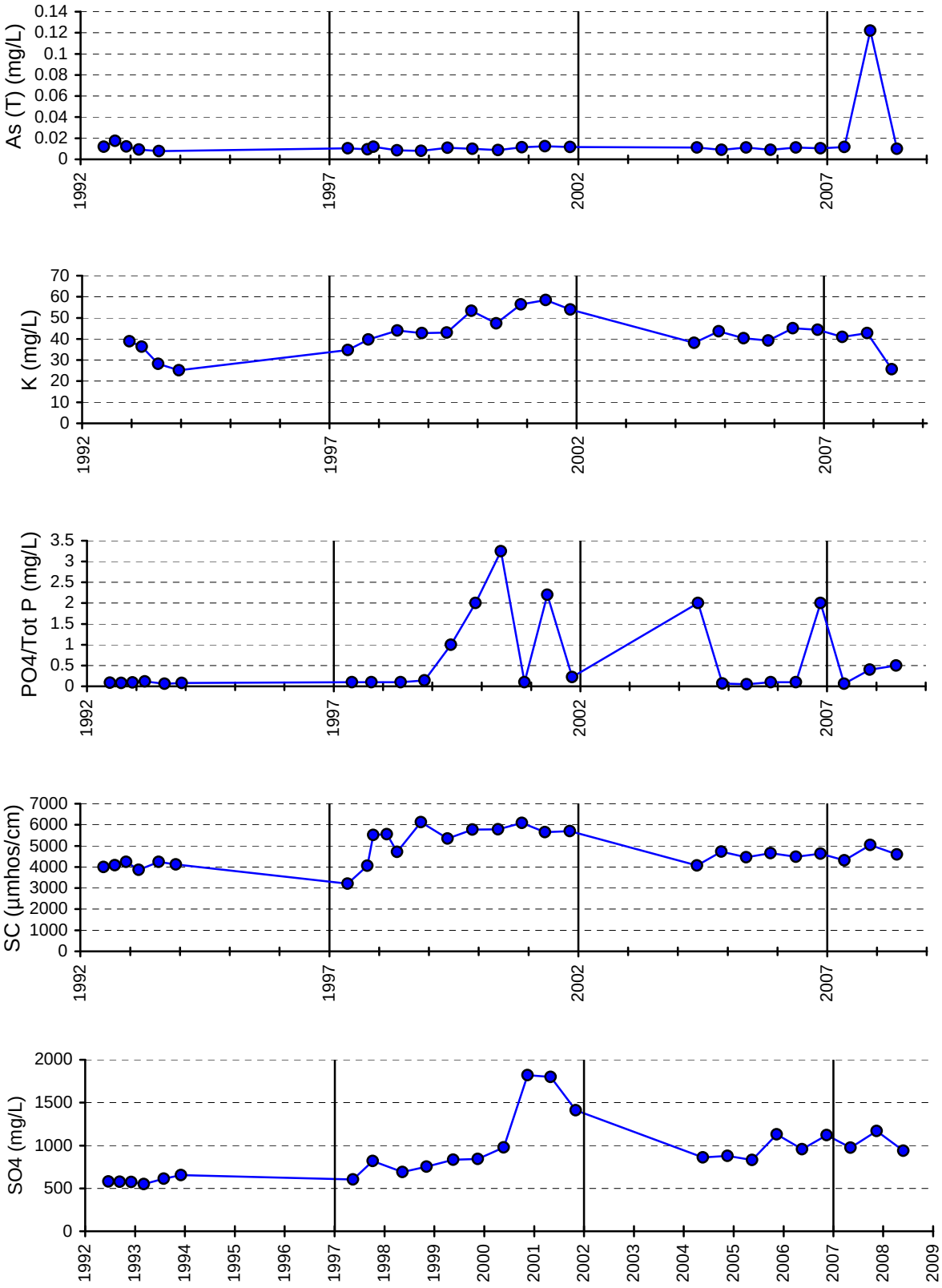
Well 131


As (T) (mg/L)
0.1
0.08
0.06
0.04
0.02
0
1990
1995
2000
2005
K (mg/L)
25
20
15
10
5
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
200
150
100
50
0
1990
1995
2000
2005
SC (µmhos/cm)
2500
2000
1500
1000
500
0
1990
1995
2000
2005
SO4 (mg/L)
250
200
150
100
50
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

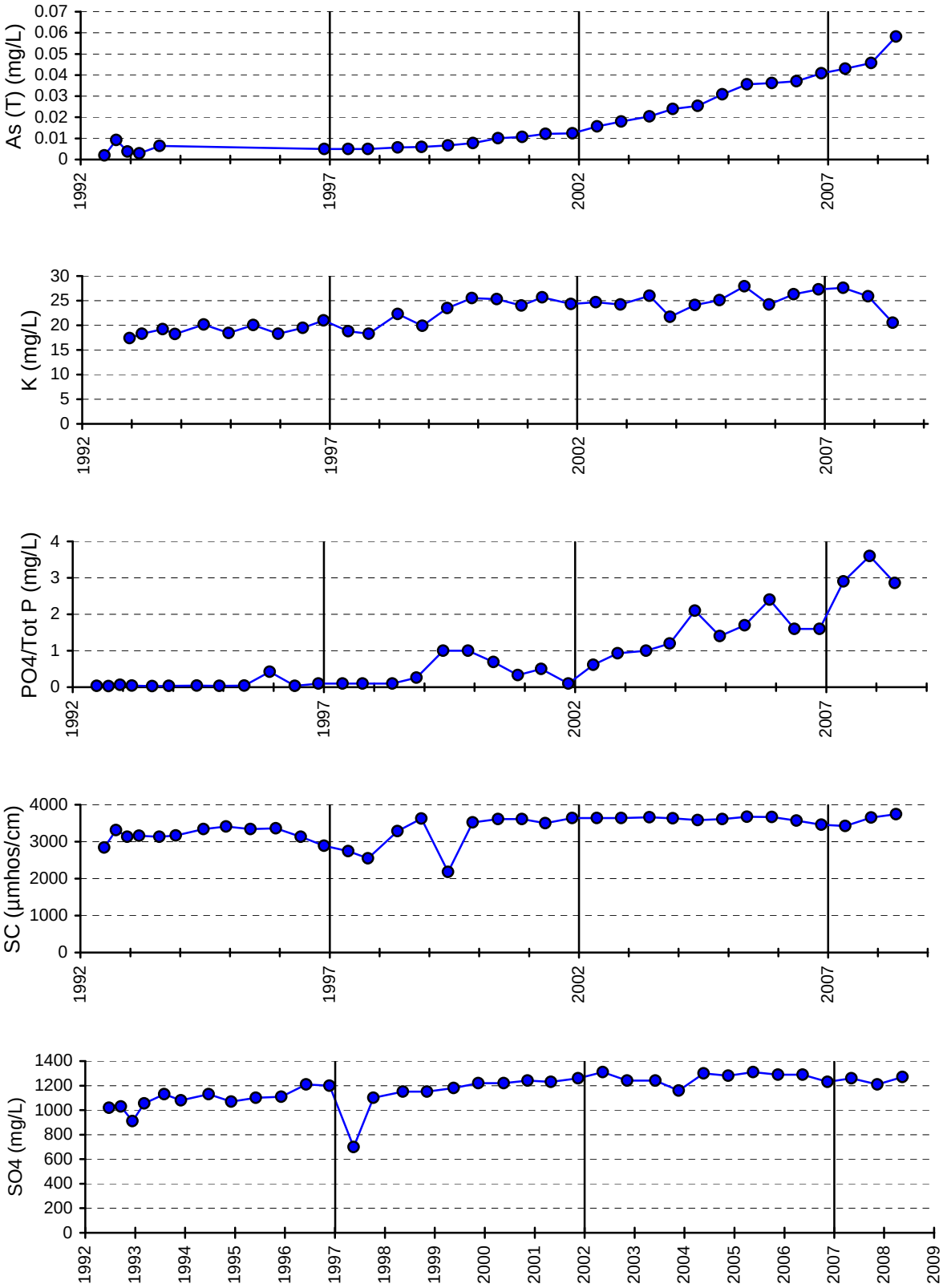
Well 136


As (T) (mg/L)
0.8
0.6
0.4
0.2
0
1990
1995
2000
2005
K (mg/L)
200
150
100
50
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
250
200
150
100
50
0
1990
1995
2000
2005
SC (µmhos/cm)
7000
6000
5000
4000
3000
2000
1000
0
1990
1995
2000
2005
SO4 (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

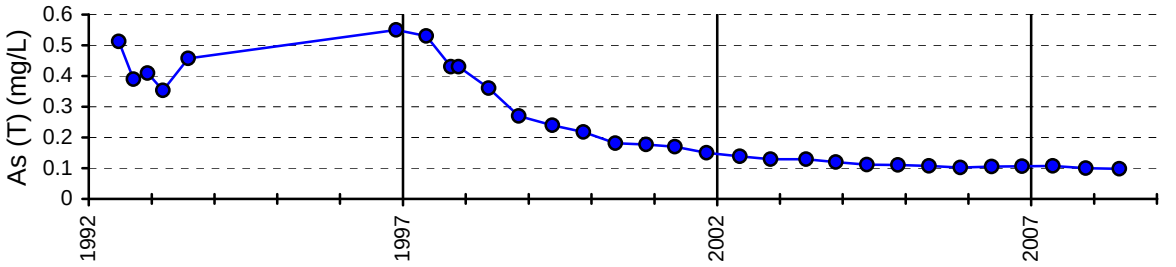
Well 139

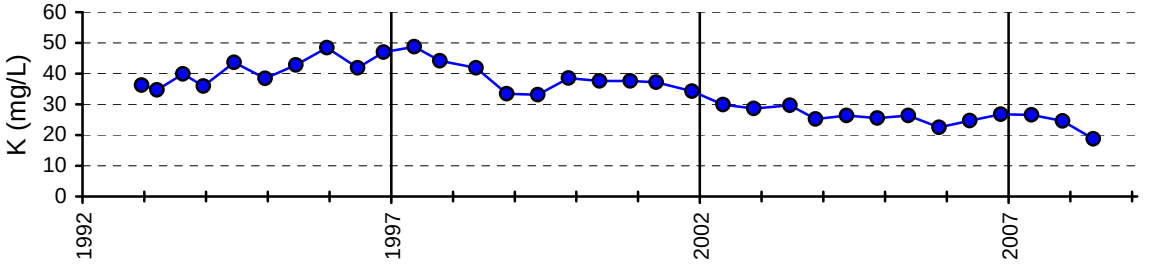

As (T) (mg/L)
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1992
1997
2002
2007
K (mg/L)
70
60
50
40
30
20
10
0
PO4/Tot P (mg/L)
3.5
3
2.5
2
1.5
1
0.5
SC (µmhos/cm)
7000
6000
5000
4000
3000
2000
1000
SO4 (mg/L)
2000
1500
1000
500
1993
1994
1995
1996
1998
1999
2000
2001
2003
2004
2005
2006
2008
2009

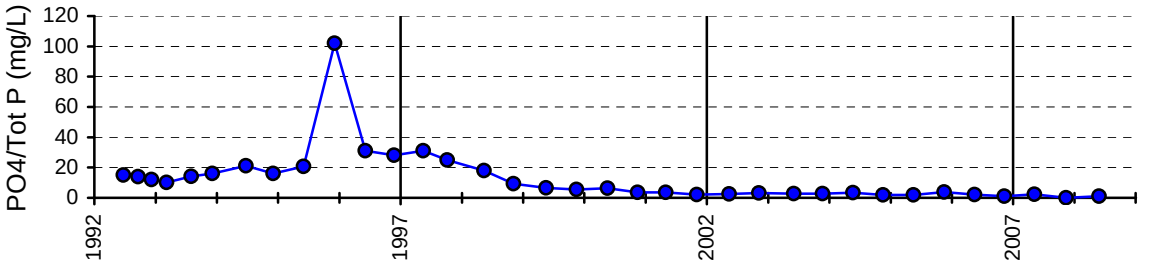
Well 142

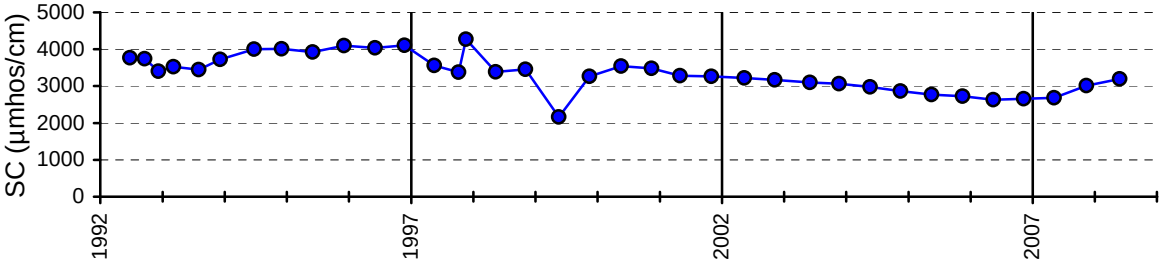

As (T) (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1992
1997
2002
2007
K (mg/L)
30
25
20
15
10
5
0
1992
1997
2002
2007
PO4/Tot P (mg/L)
4
3
2
1
0
1992
1997
2002
2007
SC (µmhos/cm)
4000
3000
2000
1000
0
1992
1997
2002
2007
SO4 (mg/L)
1400
1200
1000
800
600
400
200
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

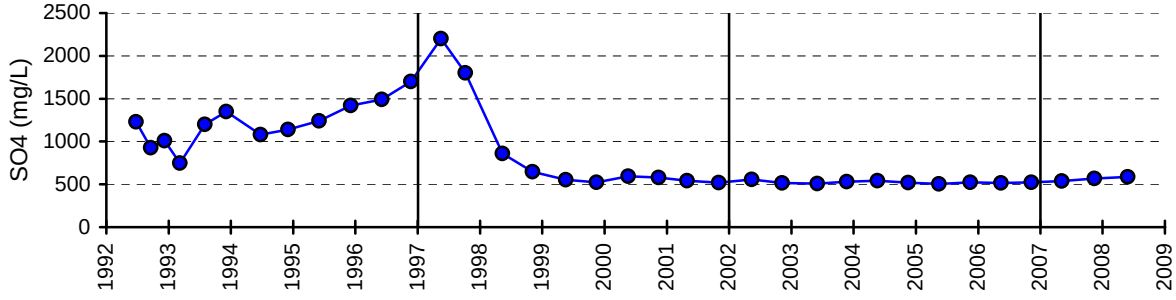
Well 143


As (T) (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
1992
1997
2002
2007

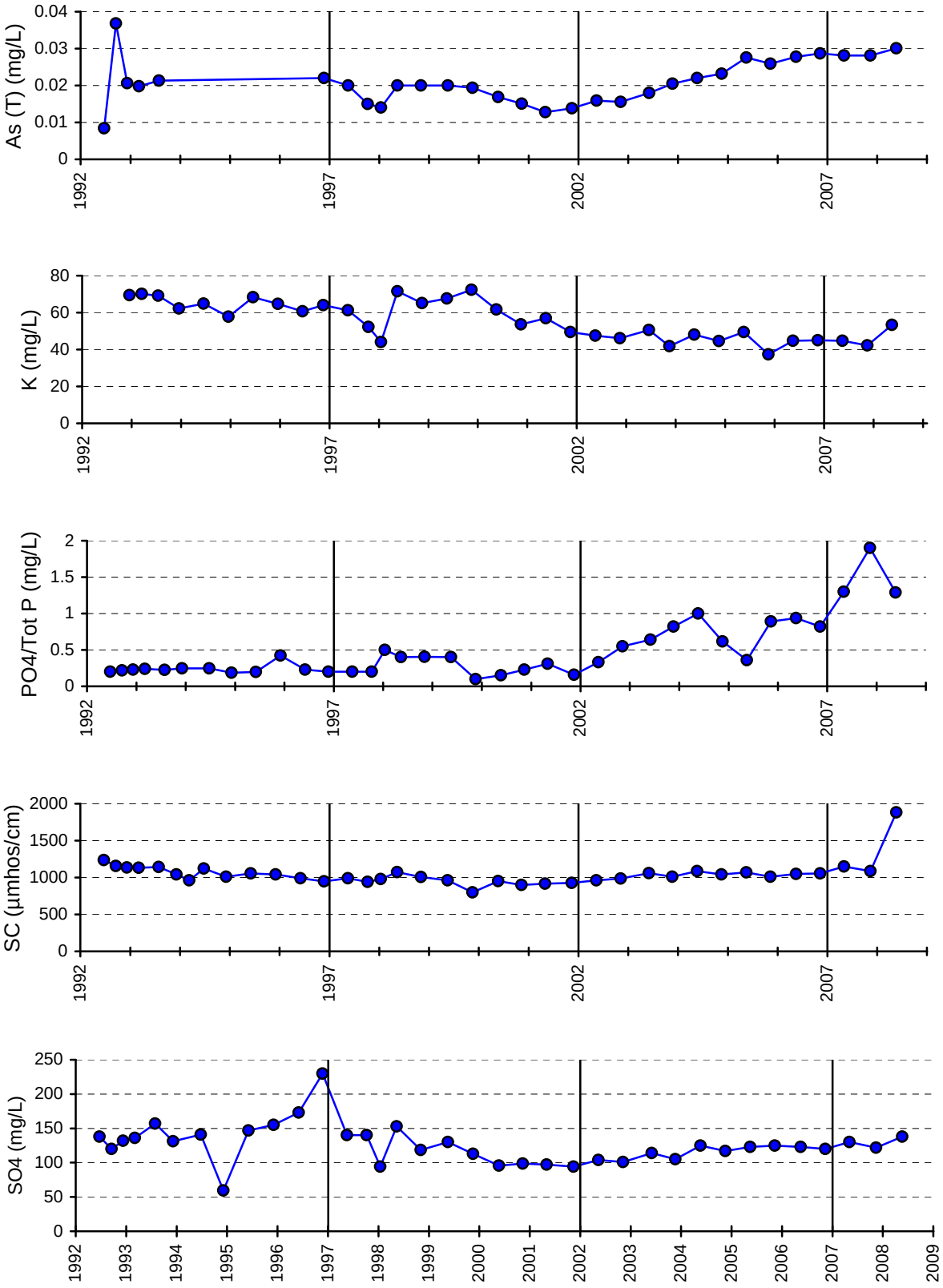

K (mg/L)
60
50
40
30
20
10
0
1992
1997
2002
2007


PO4/Tot P (mg/L)
120
100
80
60
40
20
0
1992
1997
2002
2007

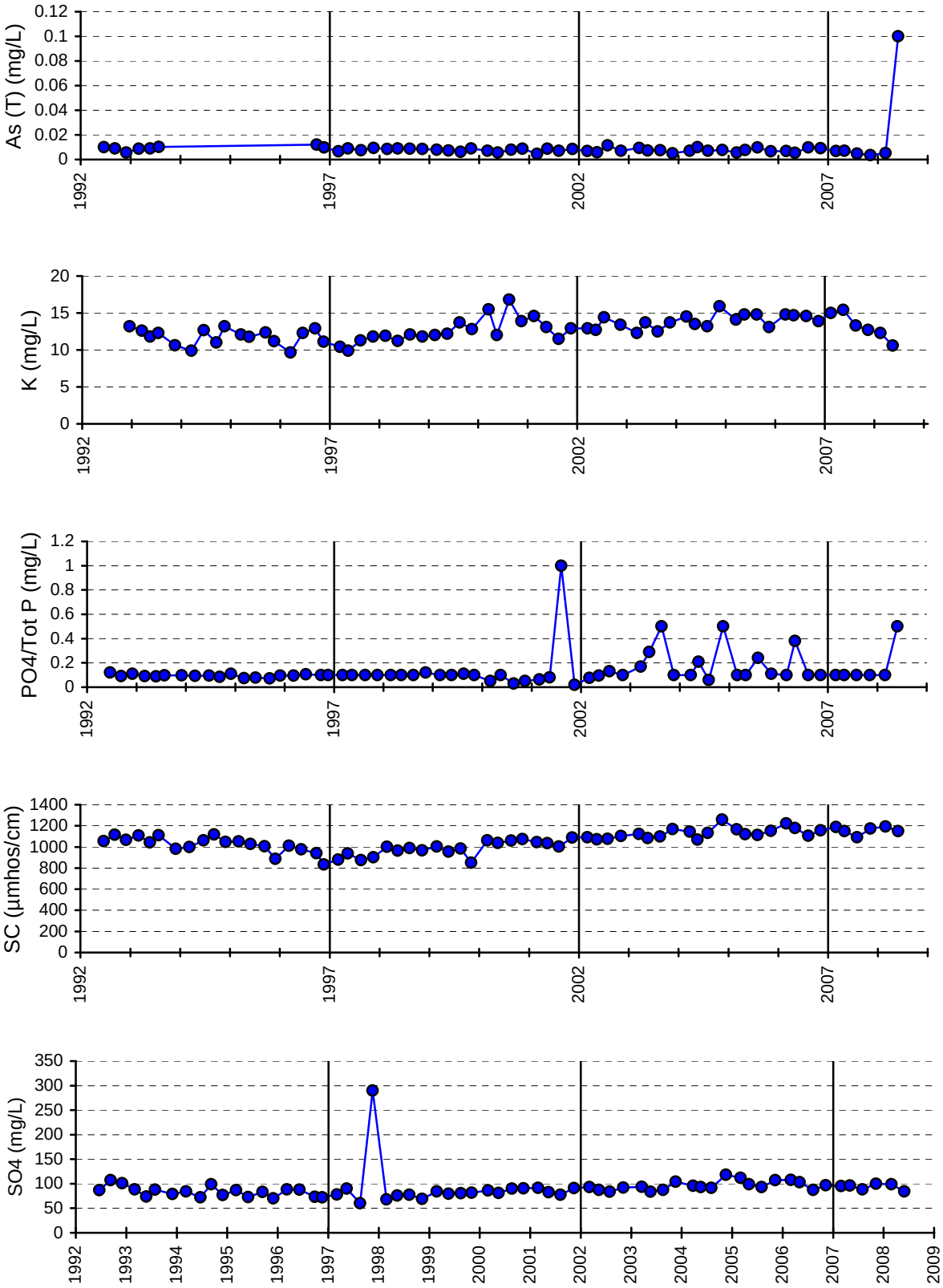

SC (µmhos/cm)
5000
4000
3000
2000
1000
0
1992
1997
2002
2007


SO4 (mg/L)
2500
2000
1500
1000
500
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

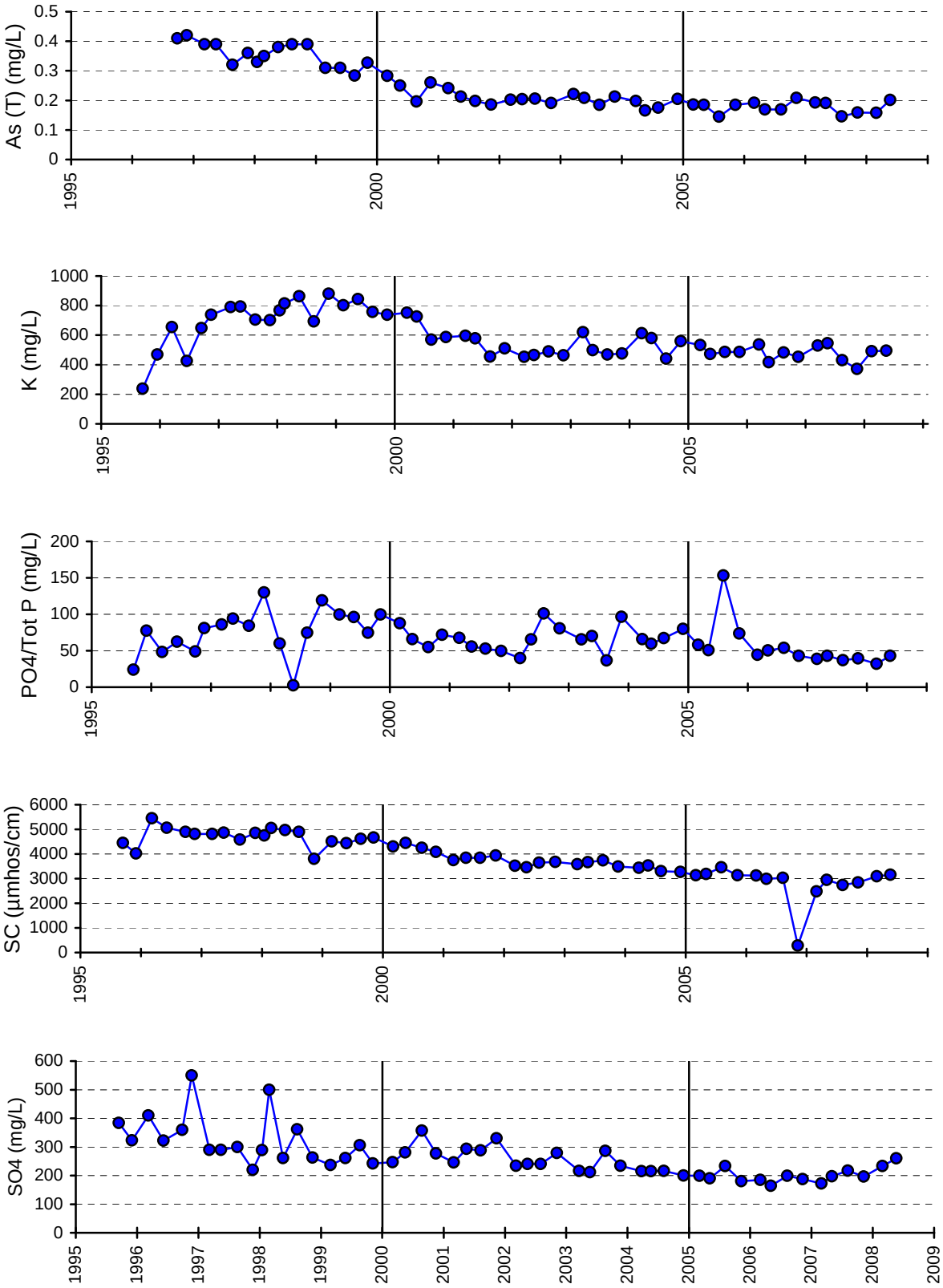
Well 146


As (T) (mg/L)
0.04
0.03
0.02
0.01
0
1992
1997
2002
2007
K (mg/L)
80
60
40
20
0
PO4/Tot P (mg/L)
2
1.5
1
0.5
SC (µmhos/cm)
2000
1500
1000
500
SO4 (mg/L)
250
200
150
100
50
1993
1994
1995
1996
1998
1999
2000
2001
2003
2004
2005
2006
2008
2009

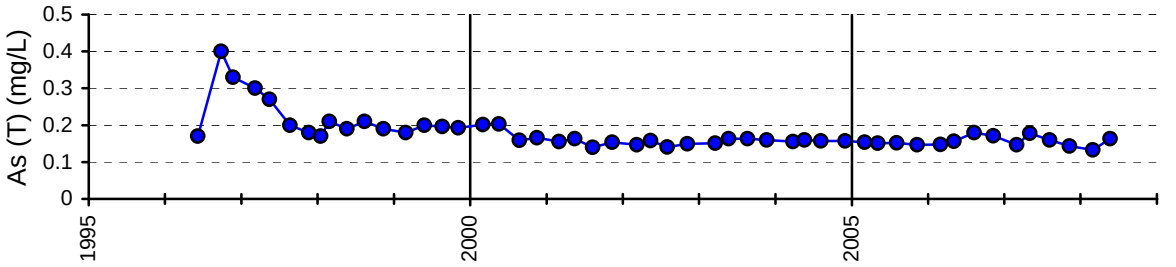
Well 148

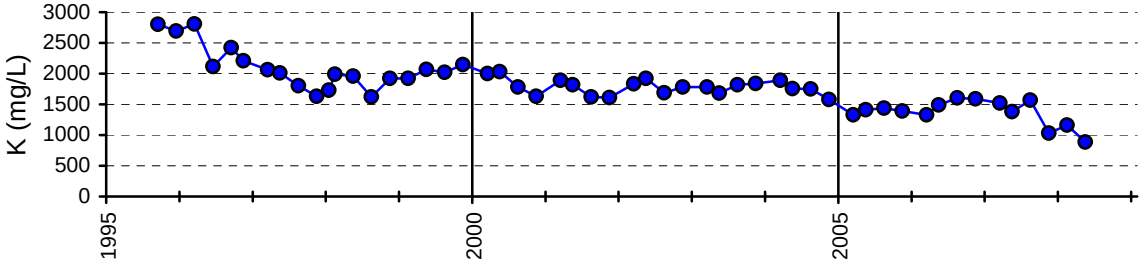

As (T) (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
1992
1997
2002
2007
K (mg/L)
20
15
10
5
0
1992
1997
2002
2007
PO4/Tot P (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
1992
1997
2002
2007
SC (µmhos/cm)
1400
1200
1000
800
600
400
200
0
1992
1997
2002
2007
SO4 (mg/L)
350
300
250
200
150
100
50
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

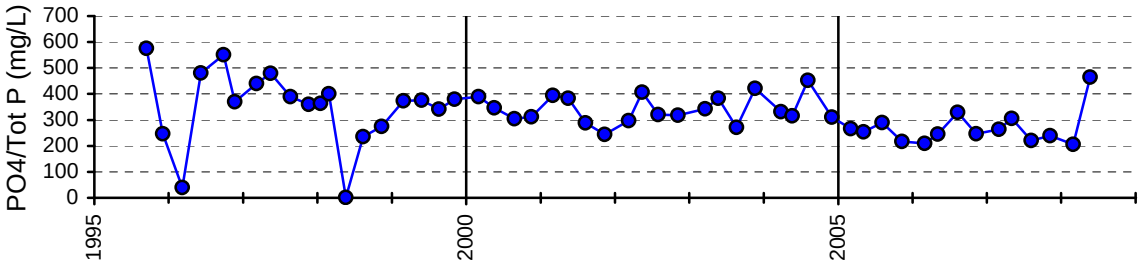
Well 155

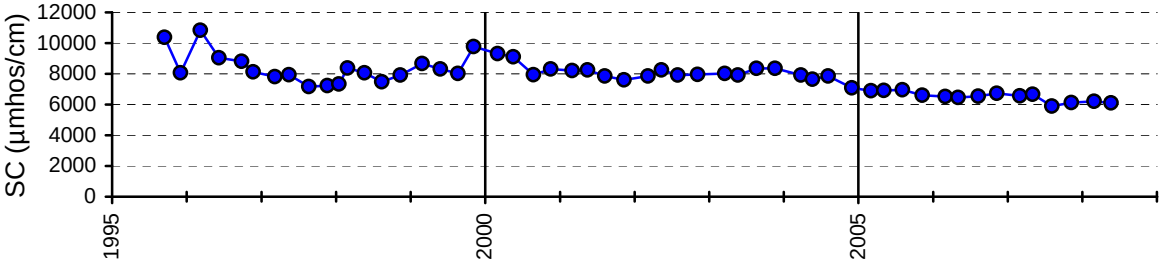

As (T) (mg/L)
0.5
0.4
0.3
0.2
0.1
0
1995
2000
2005
K (mg/L)
1000
800
600
400
200
0
1995
2000
2005
PO4/Tot P (mg/L)
200
150
100
50
0
1995
2000
2005
SC (µmhos/cm)
6000
5000
4000
3000
2000
1000
0
1995
2000
2005
SO4 (mg/L)
600
500
400
300
200
100
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

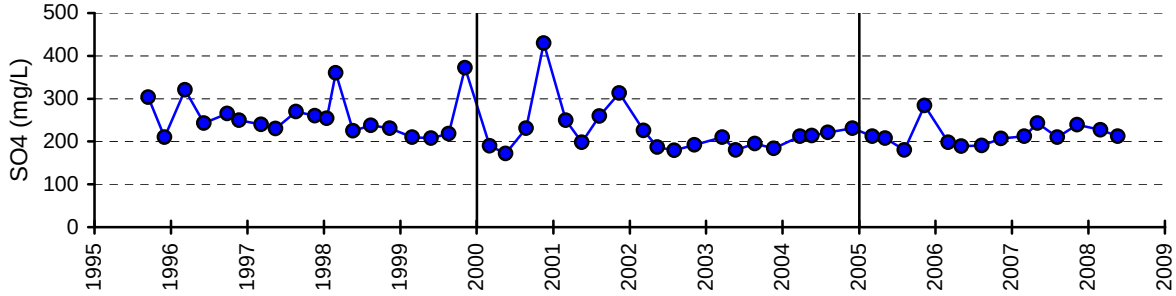
Well 156


As (T) (mg/L)
0.5
0.4
0.3
0.2
0.1
0
1995
2000
2005

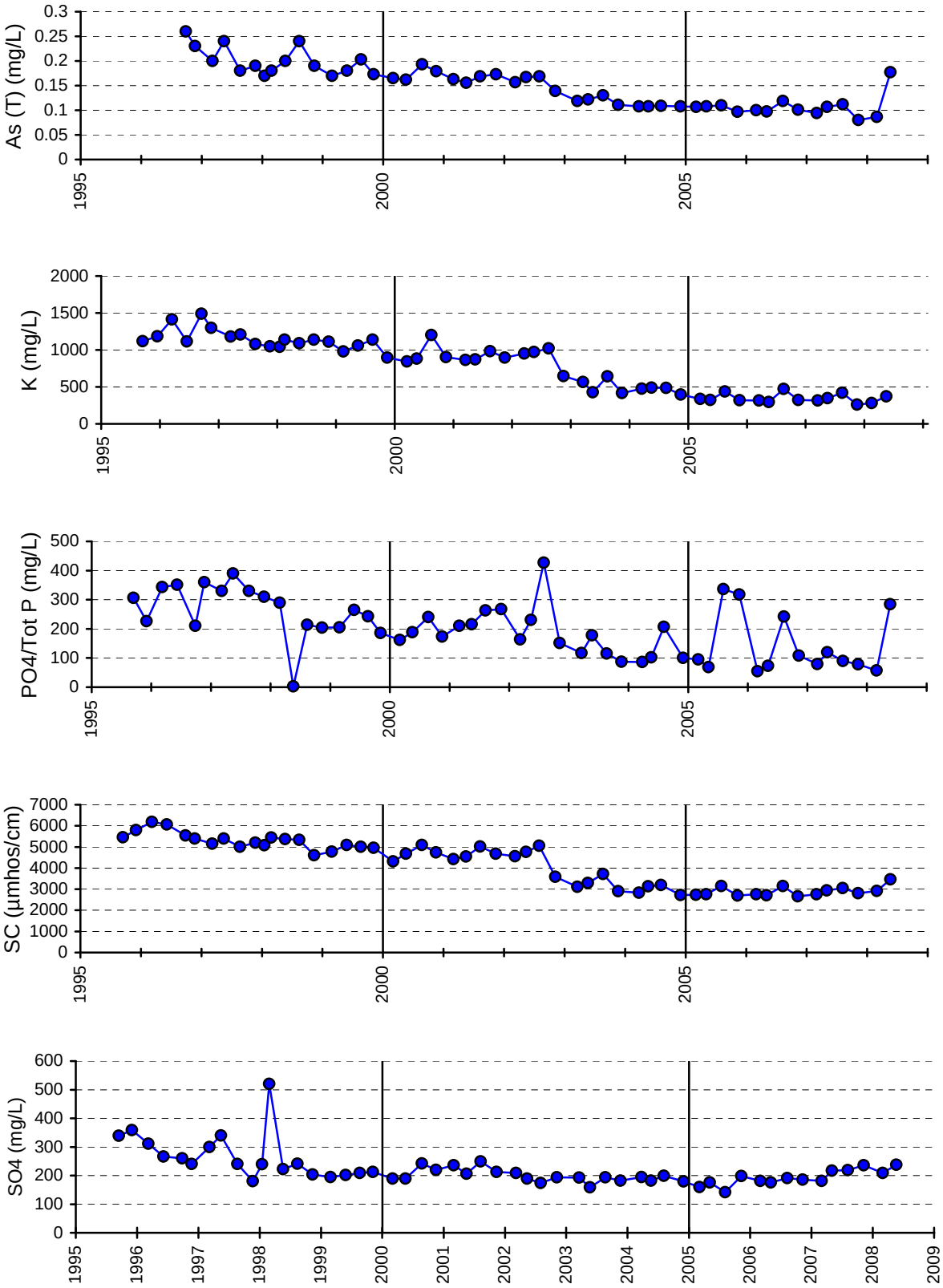

K (mg/L)
3000
2500
2000
1500
1000
500
0
1995
2000
2005


PO4/Tot P (mg/L)
700
600
500
400
300
200
100
0
1995
2000
2005

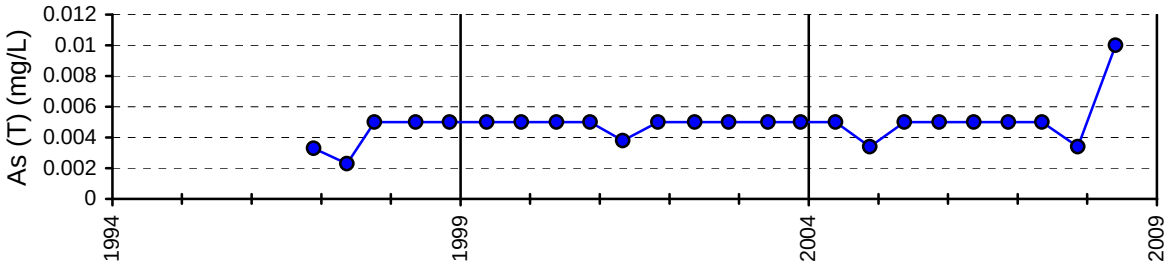

SC (µmhos/cm)
12000
10000
8000
6000
4000
2000
0
1995
2000
2005

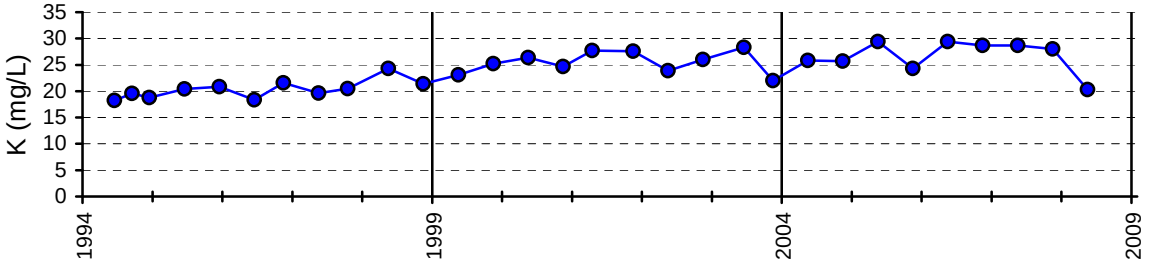

SO4 (mg/L)
500
400
300
200
100
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

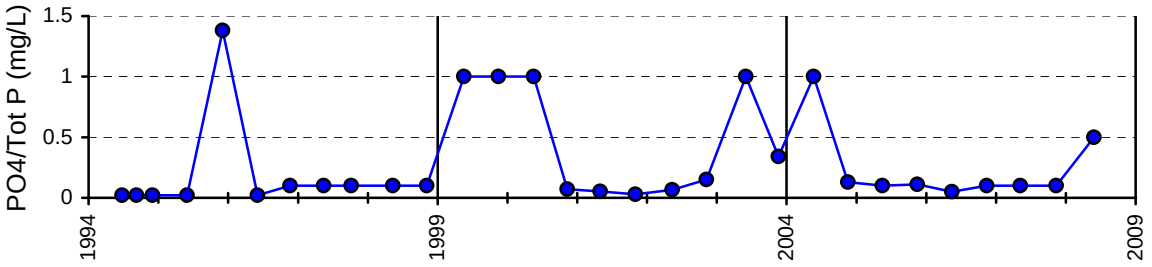
Well 157

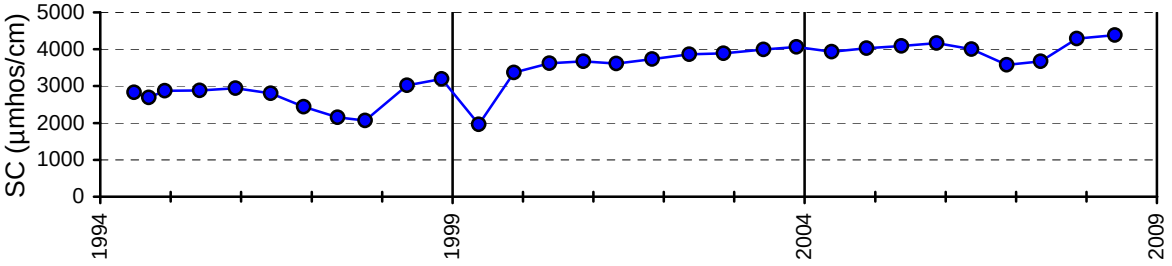

As (T) (mg/L)
0.3
0.25
0.2
0.15
0.1
0.05
0
1995
2000
2005
K (mg/L)
2000
1500
1000
500
0
1995
2000
2005
PO4/Tot P (mg/L)
500
400
300
200
100
0
1995
2000
2005
SC (µmhos/cm)
7000
6000
5000
4000
3000
2000
1000
0
1995
2000
2005
SO4 (mg/L)
600
500
400
300
200
100
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

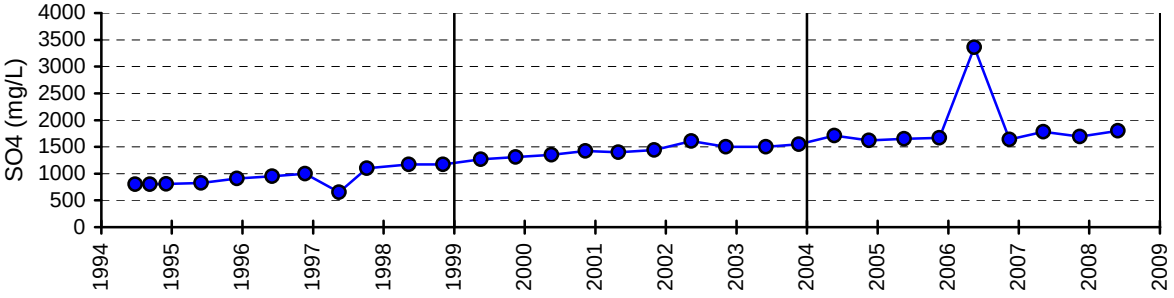
Well 161


As (T) (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
1994
1999
2004
2009

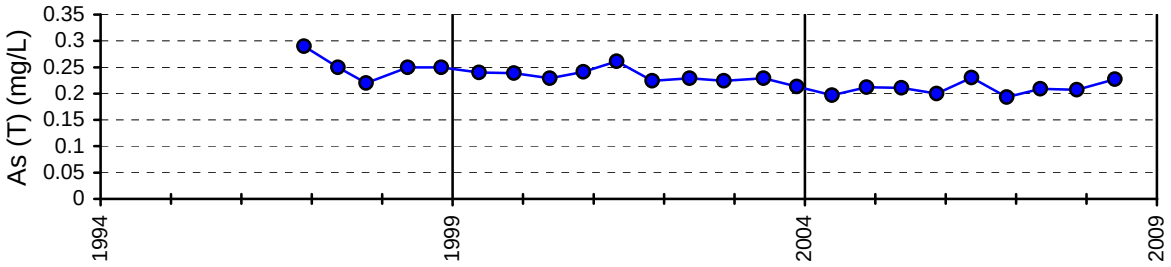

K (mg/L)
35
30
25
20
15
10
5
0
1994
1999
2004
2009

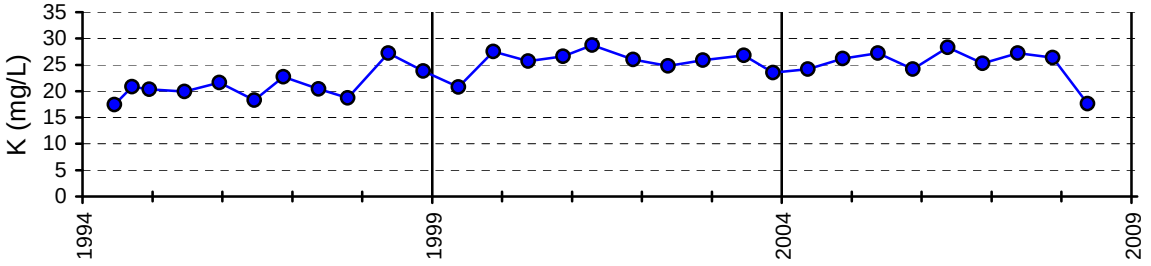

PO4/Tot P (mg/L)
1.5
1
0.5
0
1994
1999
2004
2009

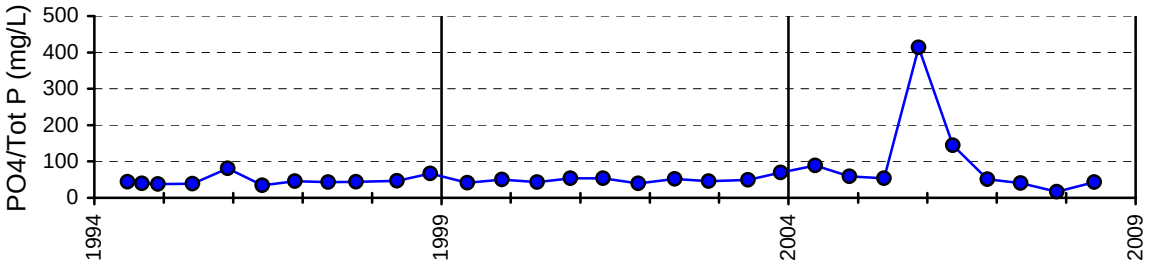

SC (µmhos/cm)
5000
4000
3000
2000
1000
0
1994
1999
2004
2009

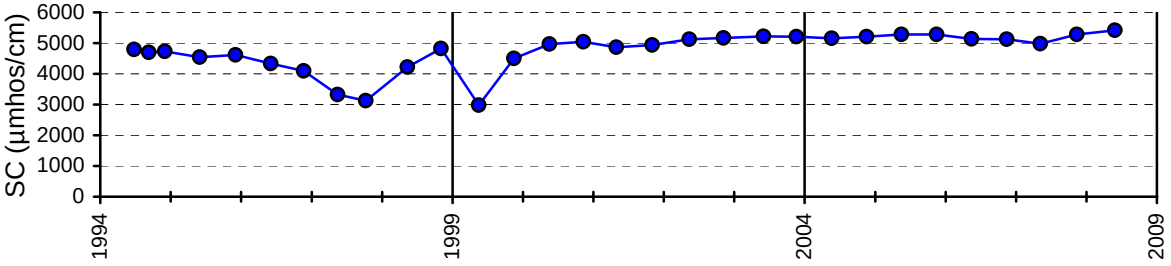

SO4 (mg/L)
4000
3500
3000
2500
2000
1500
1000
500
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

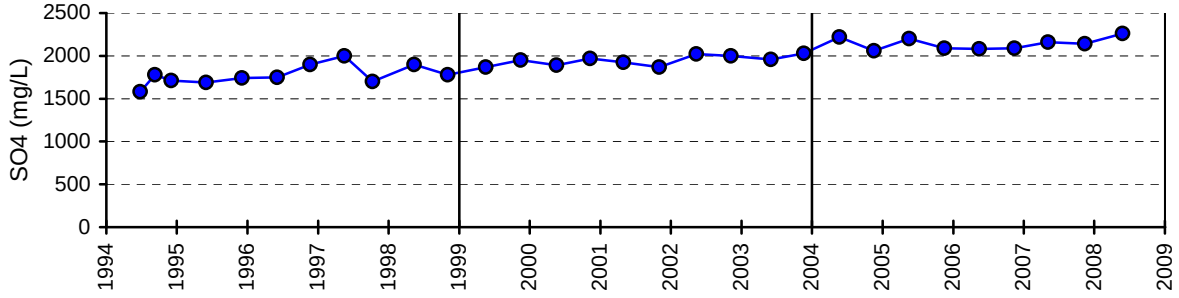
Well 164


As (T) (mg/L)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1994
1999
2004
2009

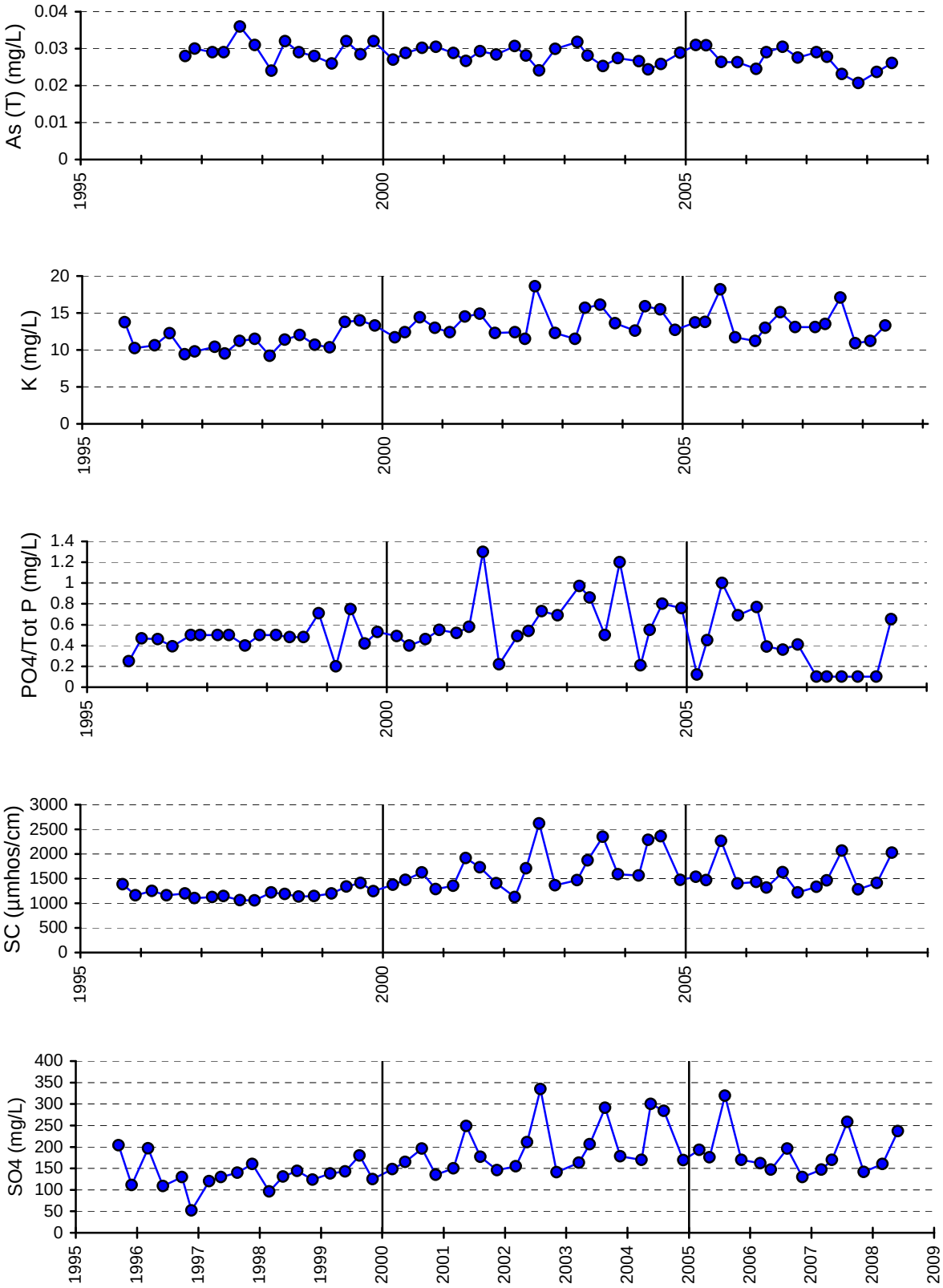

K (mg/L)
35
30
25
20
15
10
5
0
1994
1999
2004
2009


PO4/Tot P (mg/L)
500
400
300
200
100
0
1994
1999
2004
2009

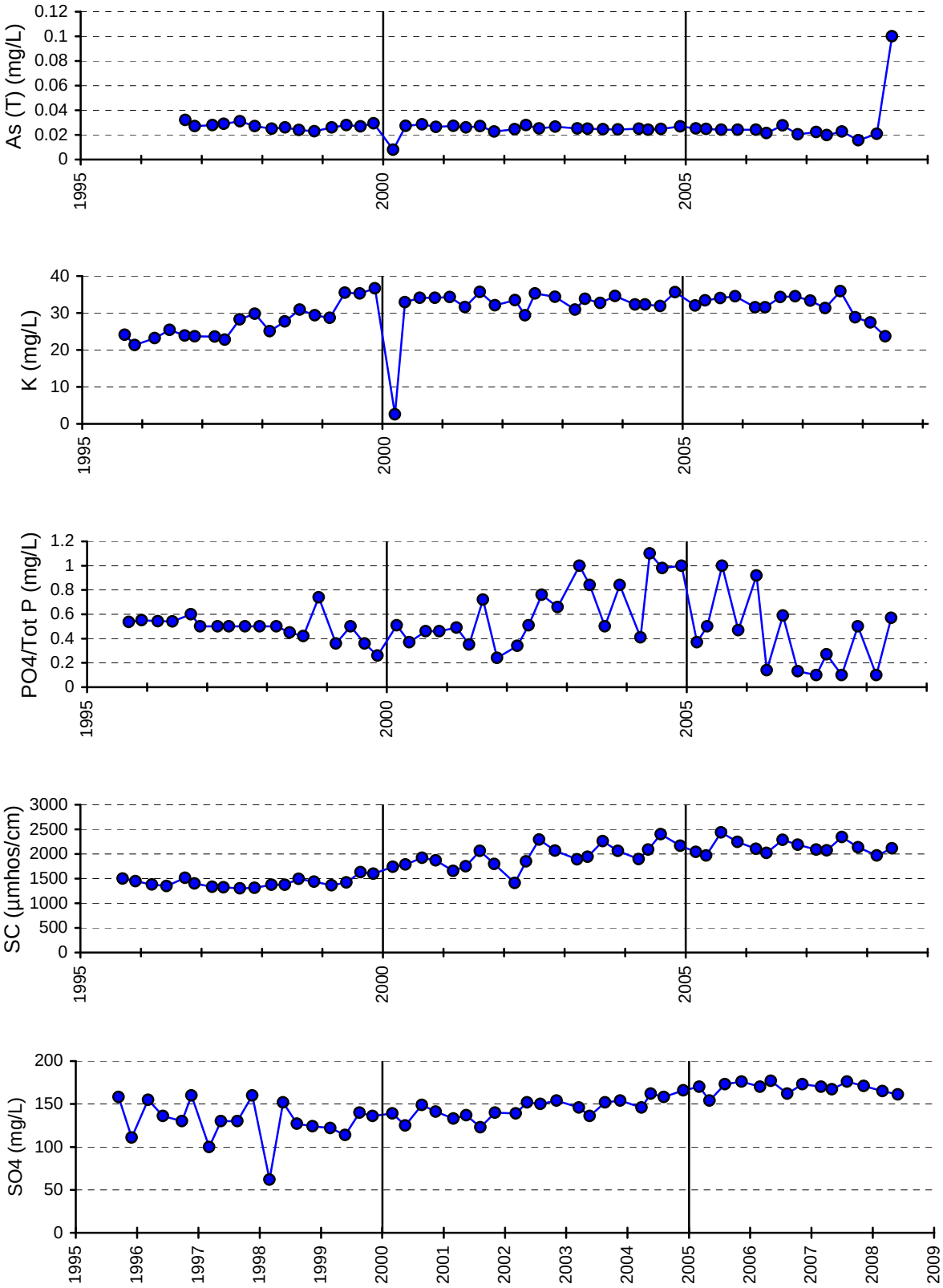

SC (µmhos/cm)
6000
5000
4000
3000
2000
1000
0
1994
1999
2004
2009


SO4 (mg/L)
2500
2000
1500
1000
500
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

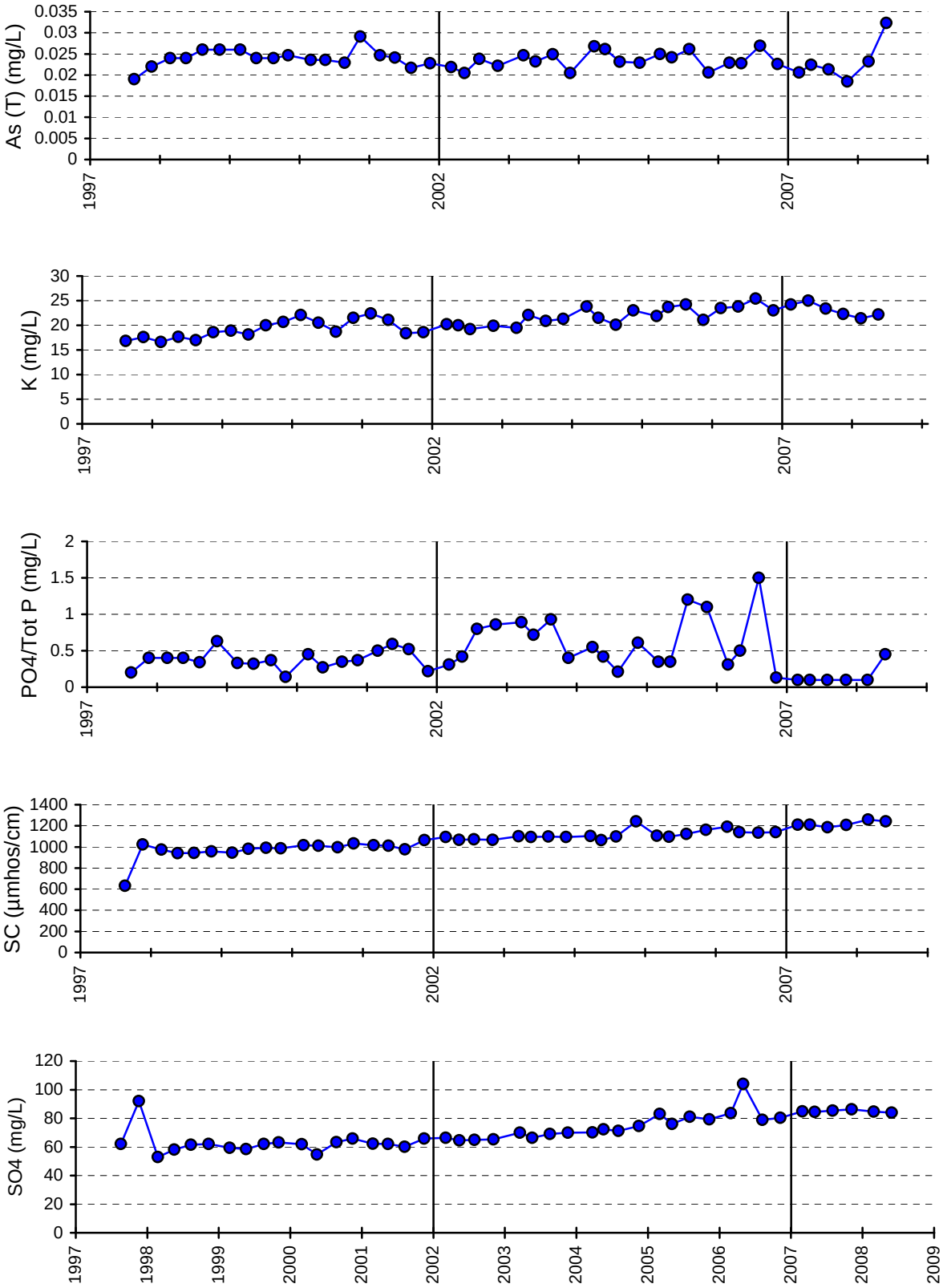
Well 165


As (T) (mg/L)
0.04
0.03
0.02
0.01
0
1995
2000
2005
K (mg/L)
20
15
10
5
0
1995
2000
2005
PO4/Tot P (mg/L)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1995
2000
2005
SC (µmhos/cm)
3000
2500
2000
1500
1000
500
0
1995
2000
2005
SO4 (mg/L)
400
350
300
250
200
150
100
50
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

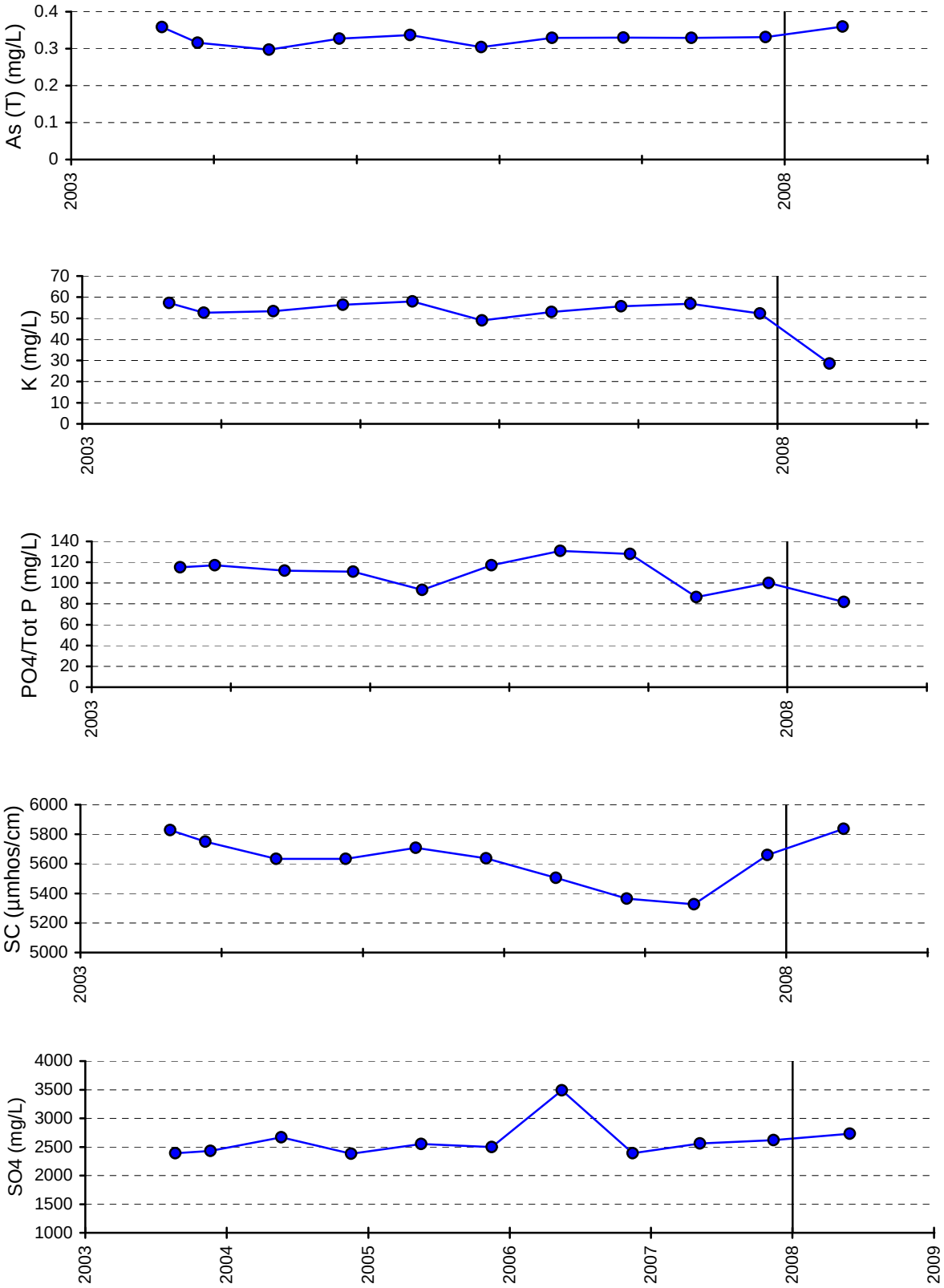
Well 166


As (T) (mg/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
1995
2000
2005
K (mg/L)
40
30
20
10
0
1995
2000
2005
PO4/Tot P (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
1995
2000
2005
SC (µmhos/cm)
3000
2500
2000
1500
1000
500
0
1995
2000
2005
SO4 (mg/L)
200
150
100
50
0
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

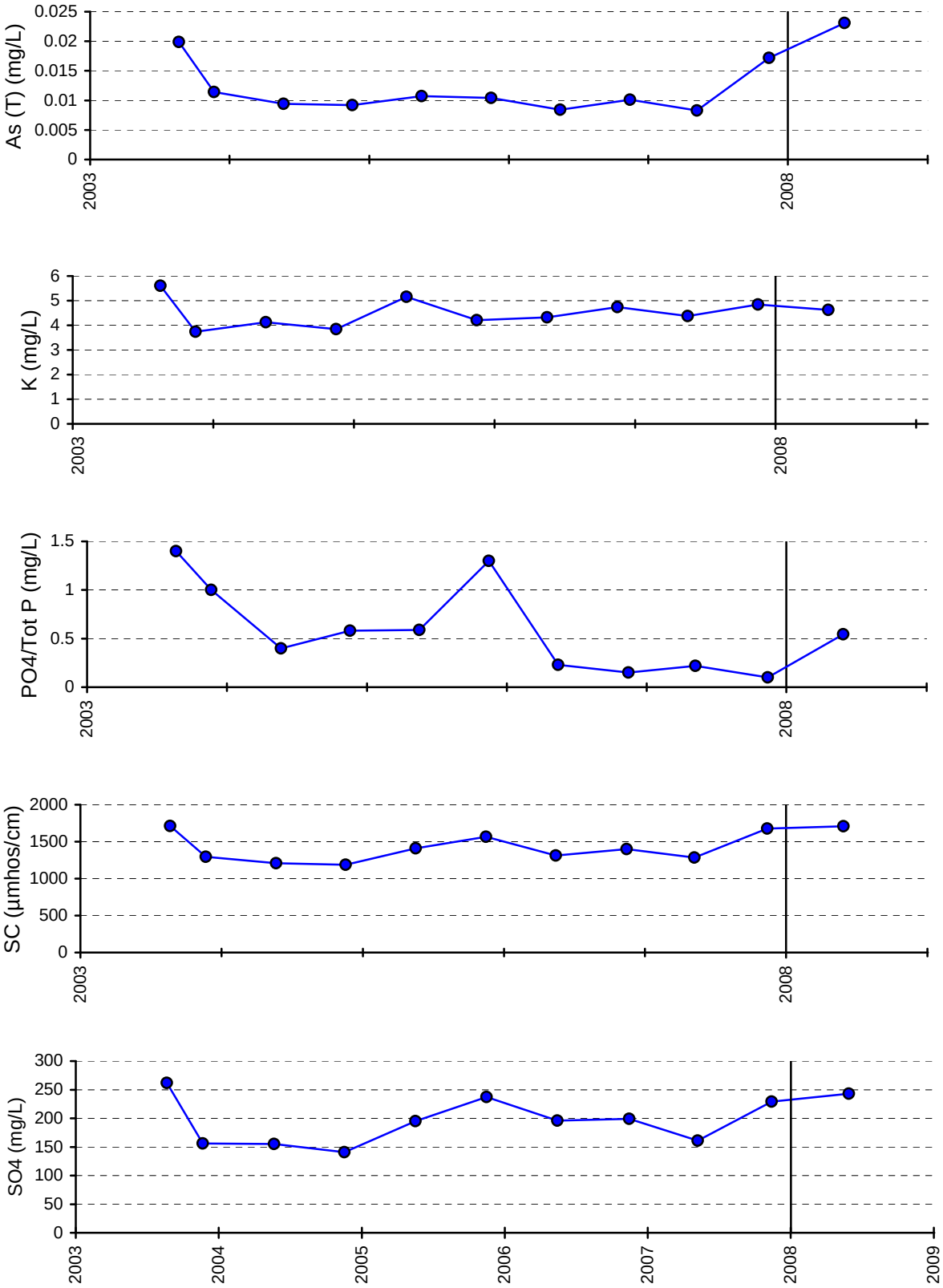
Well 172


As (T) (mg/L)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1997
2002
2007
K (mg/L)
30
25
20
15
10
5
0
1997
2002
2007
PO4/Tot P (mg/L)
2
1.5
1
0.5
0
1997
2002
2007
SC (µmhos/cm)
1400
1200
1000
800
600
400
200
0
1997
2002
2007
SO4 (mg/L)
120
100
80
60
40
20
0
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

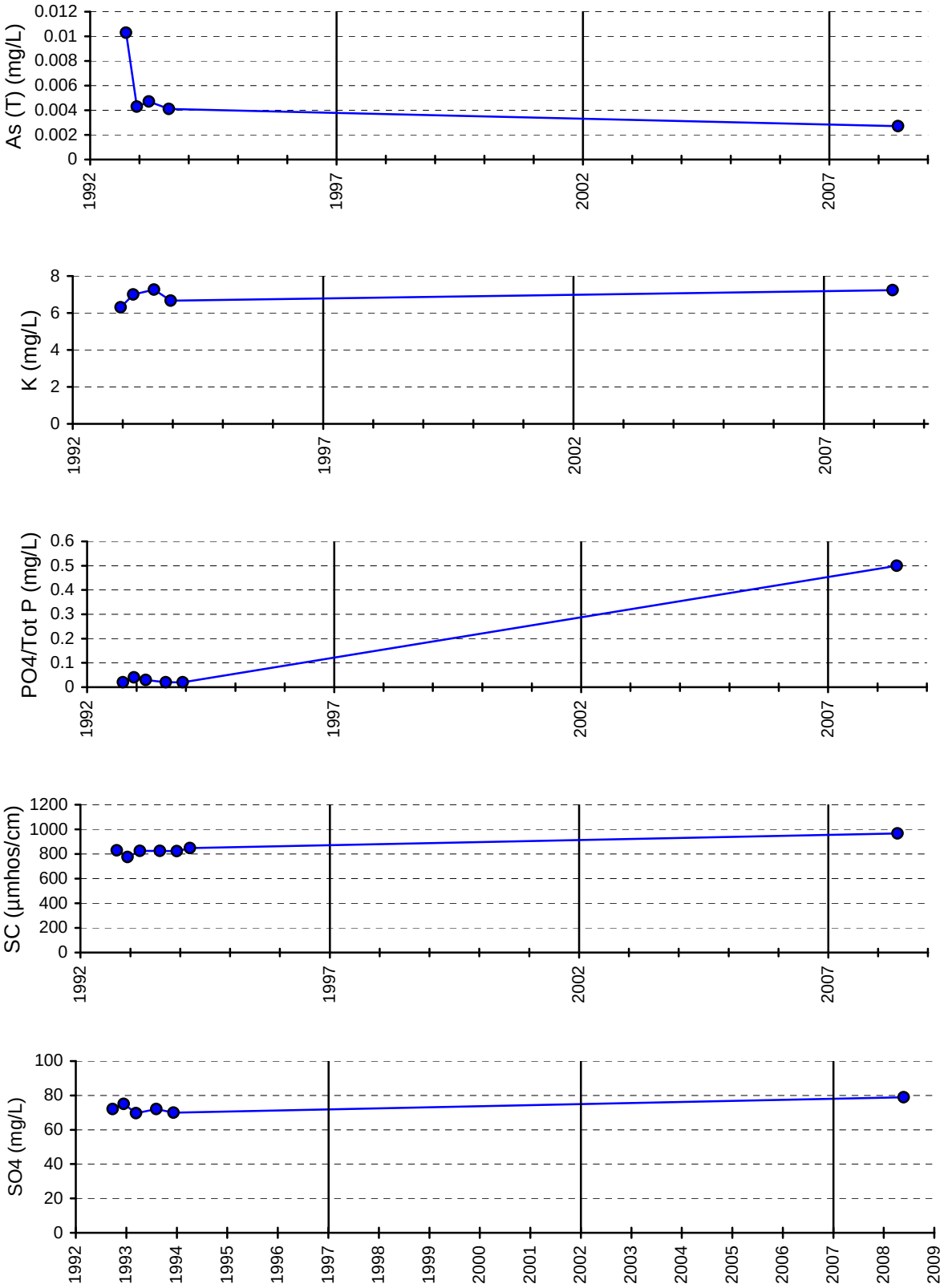
Well 189


As (T) (mg/L)
0.4
0.3
0.2
0.1
0
2003
2008
K (mg/L)
70
60
50
40
30
20
10
0
2003
2008
PO4/Tot P (mg/L)
140
120
100
80
60
40
20
0
2003
2008
SC (µmhos/cm)
6000
5800
5600
5400
5200
5000
2003
2008
SO4 (mg/L)
4000
3500
3000
2500
2000
1500
1000
2003
2004
2005
2006
2007
2008
2009

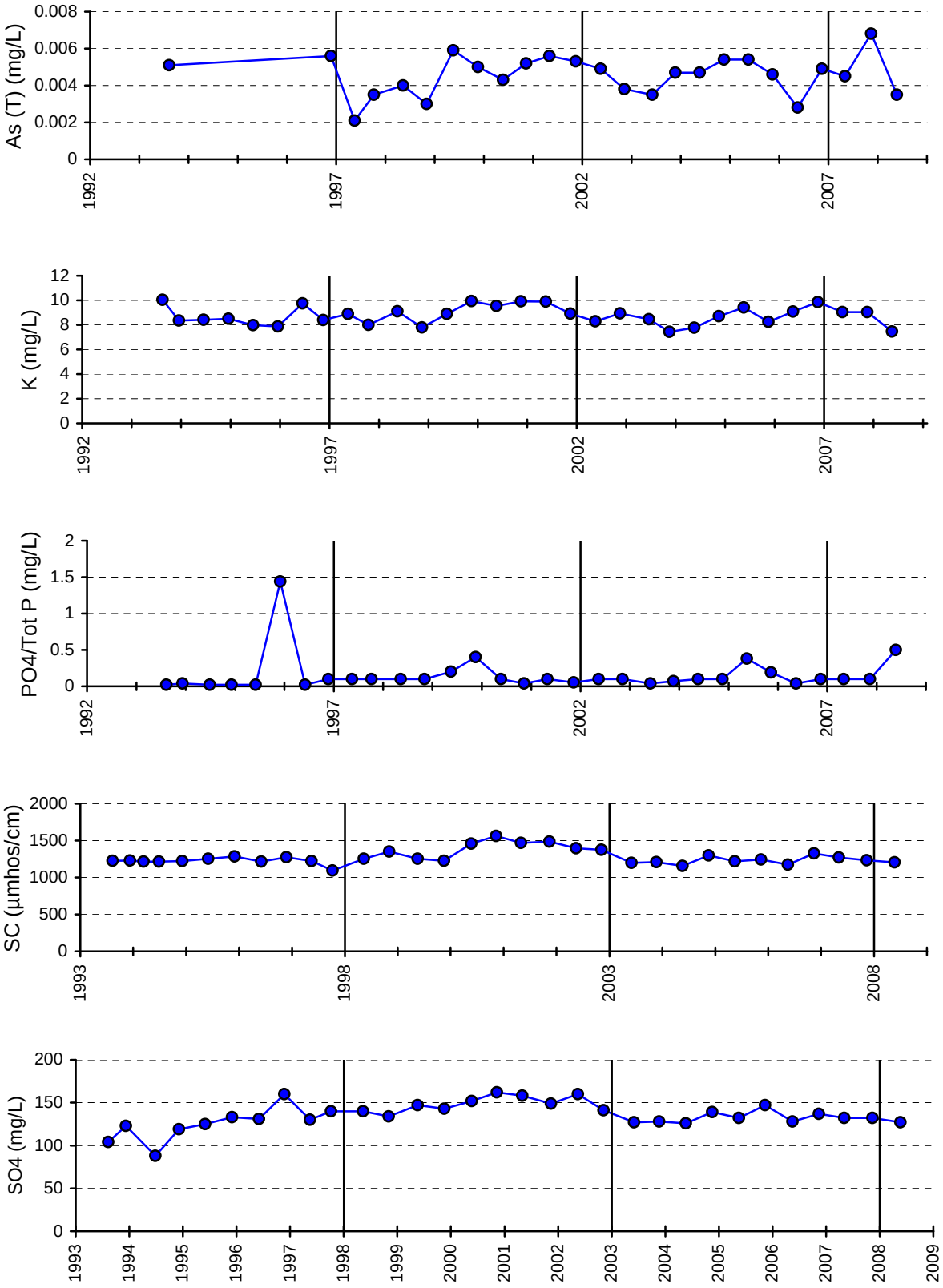
Well 190


As (T) (mg/L)
0.025
0.02
0.015
0.01
0.005
0
2003
2008
K (mg/L)
6
5
4
3
2
1
0
2003
2008
PO4/Tot P (mg/L)
1.5
1
0.5
0
2003
2008
SC (µmhos/cm)
2000
1500
1000
500
0
2003
2008
SO4 (mg/L)
300
250
200
150
100
50
0
2003
2004
2005
2006
2007
2008
2009

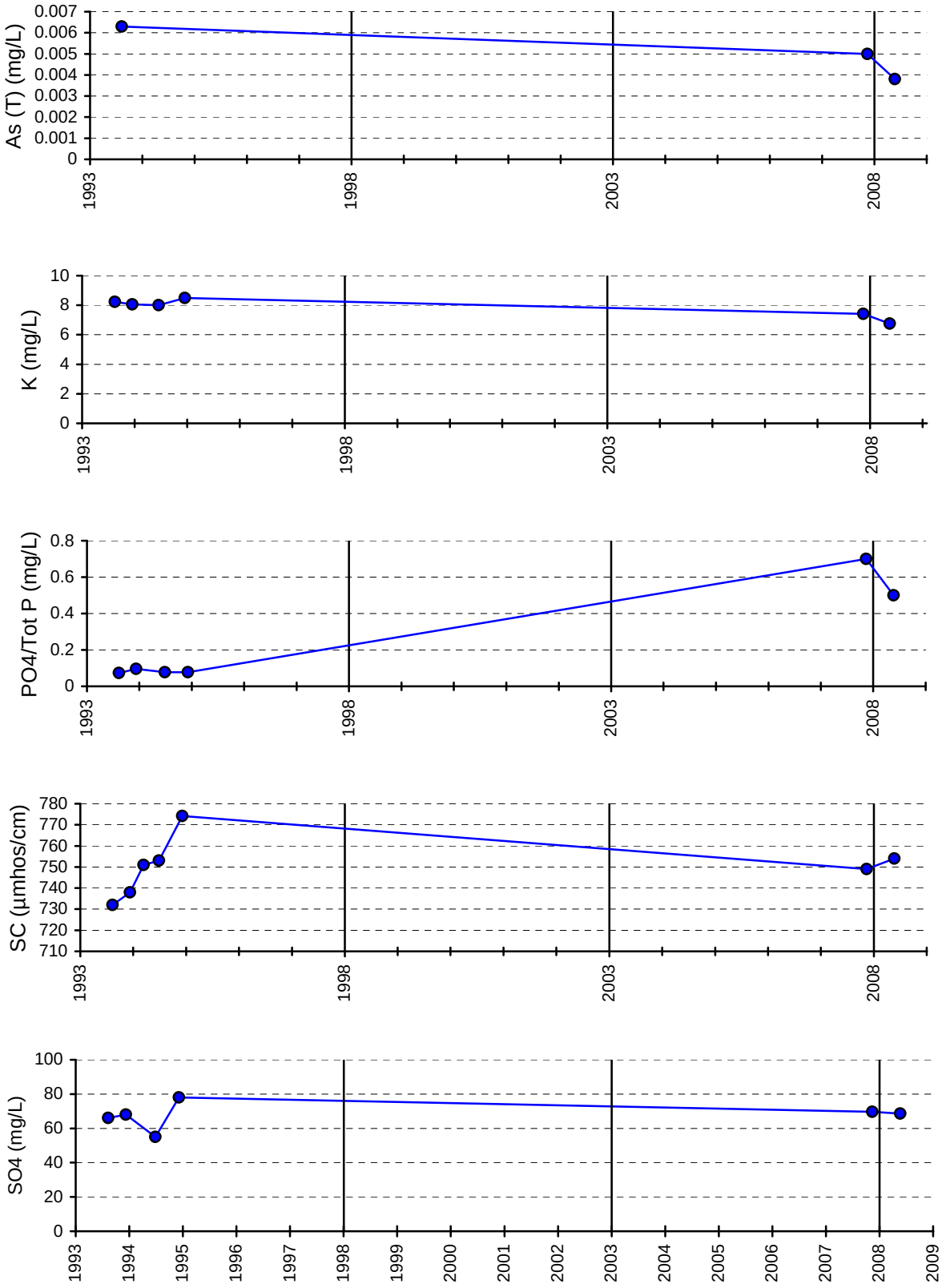
Well 501


As (T) (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
1992
1997
2002
2007
K (mg/L)
8
6
4
2
0
PO4/Tot P (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
SC (µmhos/cm)
1200
1000
800
600
400
200
SO4 (mg/L)
100
80
60
40
20
1993
1994
1995
1996
1998
1999
2000
2001
2003
2004
2005
2006
2008
2009

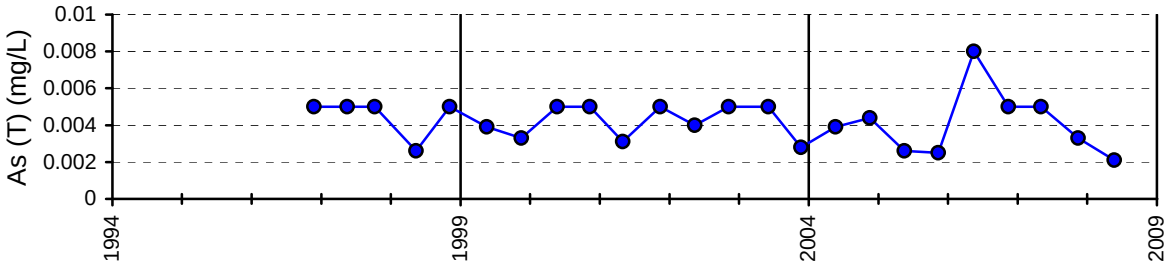
Well 515

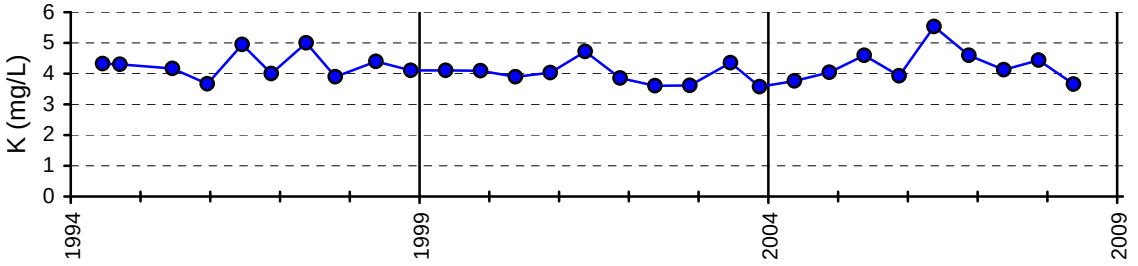

As (T) (mg/L)
0.008
0.006
0.004
0.002
0
1992
1997
2002
2007
K (mg/L)
12
10
8
6
4
2
0
1992
1997
2002
2007
PO4/Tot P (mg/L)
2
1.5
1
0.5
0
1992
1997
2002
2007
SC (µmhos/cm)
2000
1500
1000
500
0
1993
1998
2003
2008
SO4 (mg/L)
200
150
100
50
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

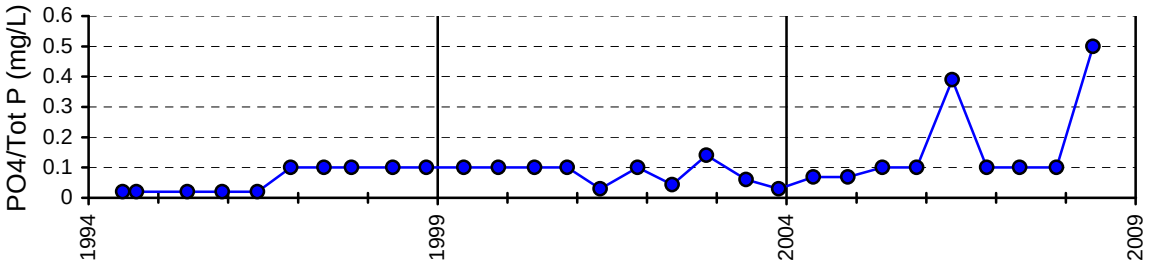
Well 516

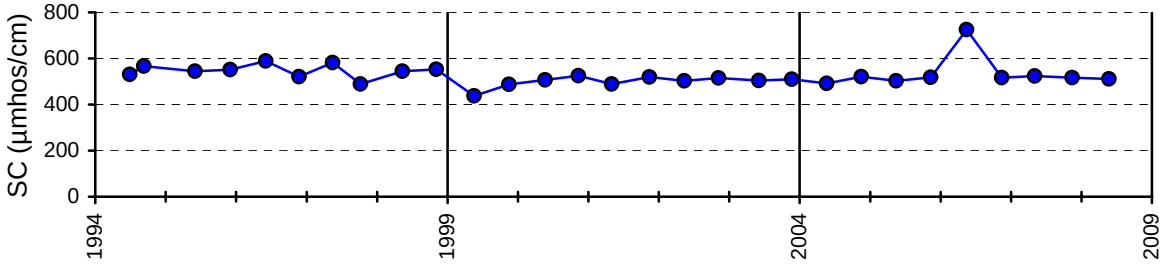

As (T) (mg/L)
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
1993
1998
2003
2008
K (mg/L)
10
8
6
4
2
0
1993
1998
2003
2008
PO4/Tot P (mg/L)
0.8
0.6
0.4
0.2
0
1993
1998
2003
2008
SC (µmhos/cm)
780
770
760
750
740
730
720
710
1993
1998
2003
2008
SO4 (mg/L)
100
80
60
40
20
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

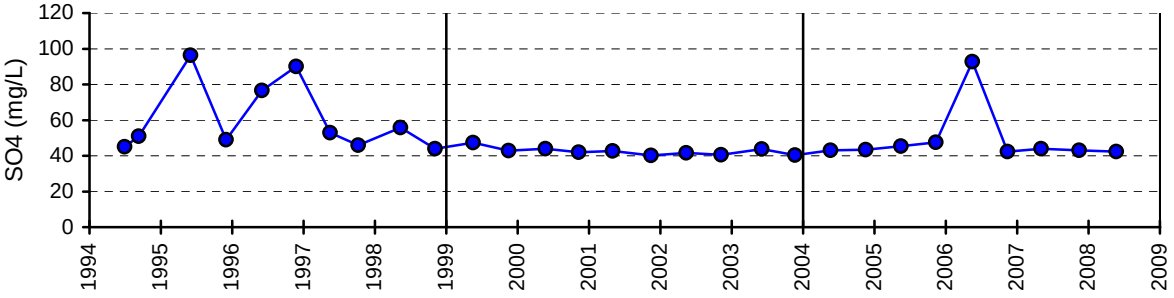
Well 524


As (T) (mg/L)
0.01
0.008
0.006
0.004
0.002
0
1994
1999
2004
2009

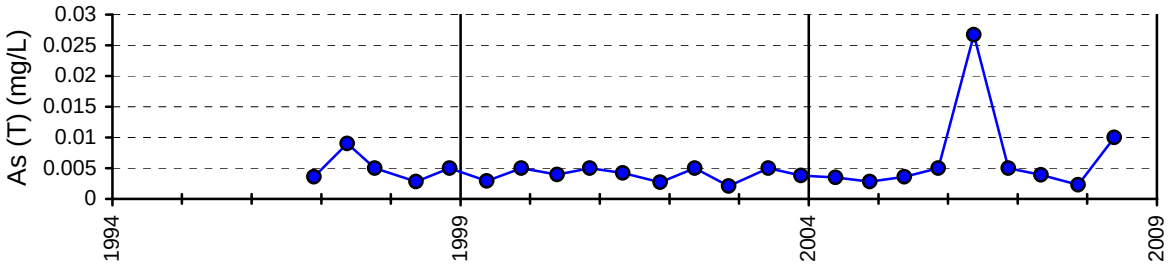

K (mg/L)
6
5
4
3
2
1
0
1994
1999
2004
2009

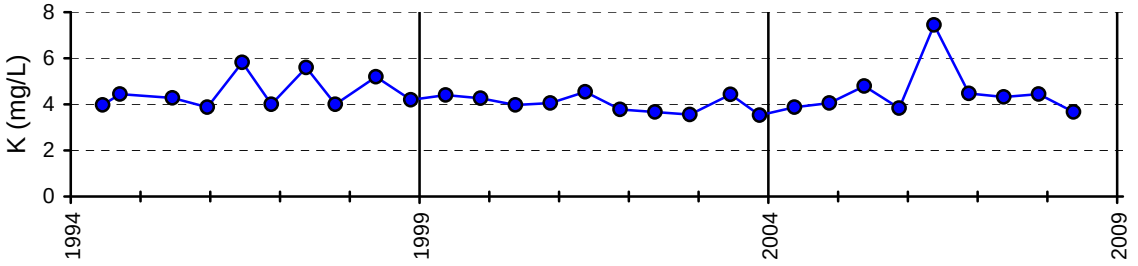

PO4/Tot P (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
1994
1999
2004
2009

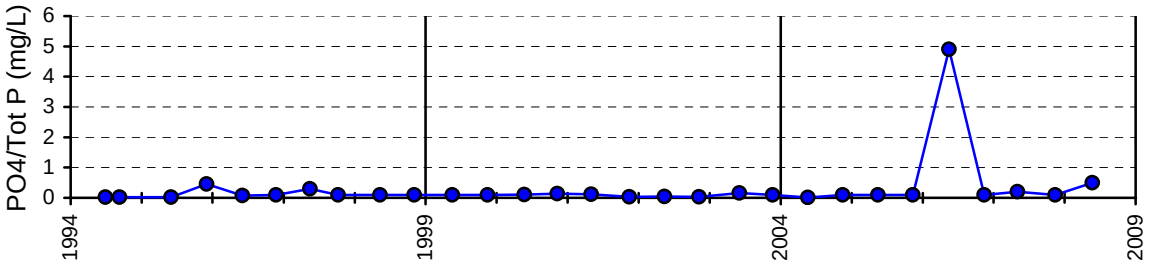

SC (µmhos/cm)
800
600
400
200
0
1994
1999
2004
2009

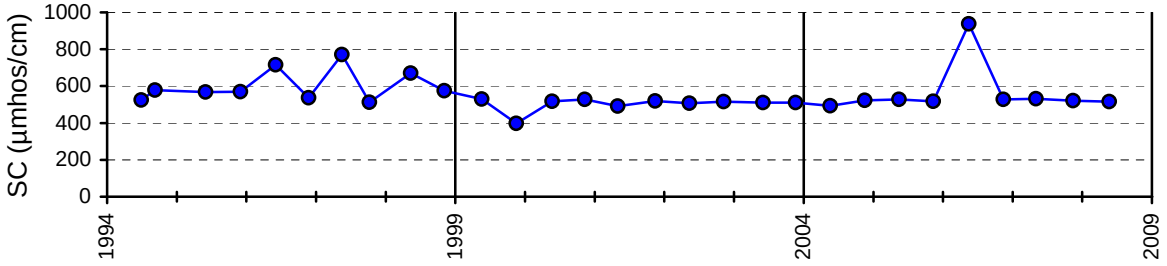

SO4 (mg/L)
120
100
80
60
40
20
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

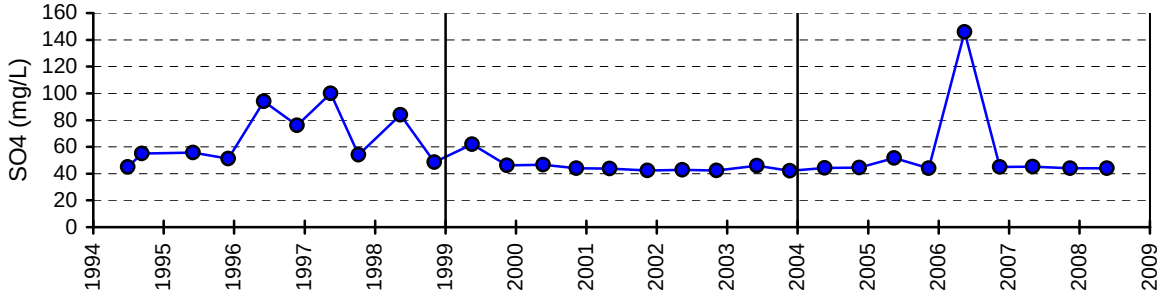
Well 525


As (T) (mg/L)
0.03
0.025
0.02
0.015
0.01
0.005
0
1994
1999
2004
2009

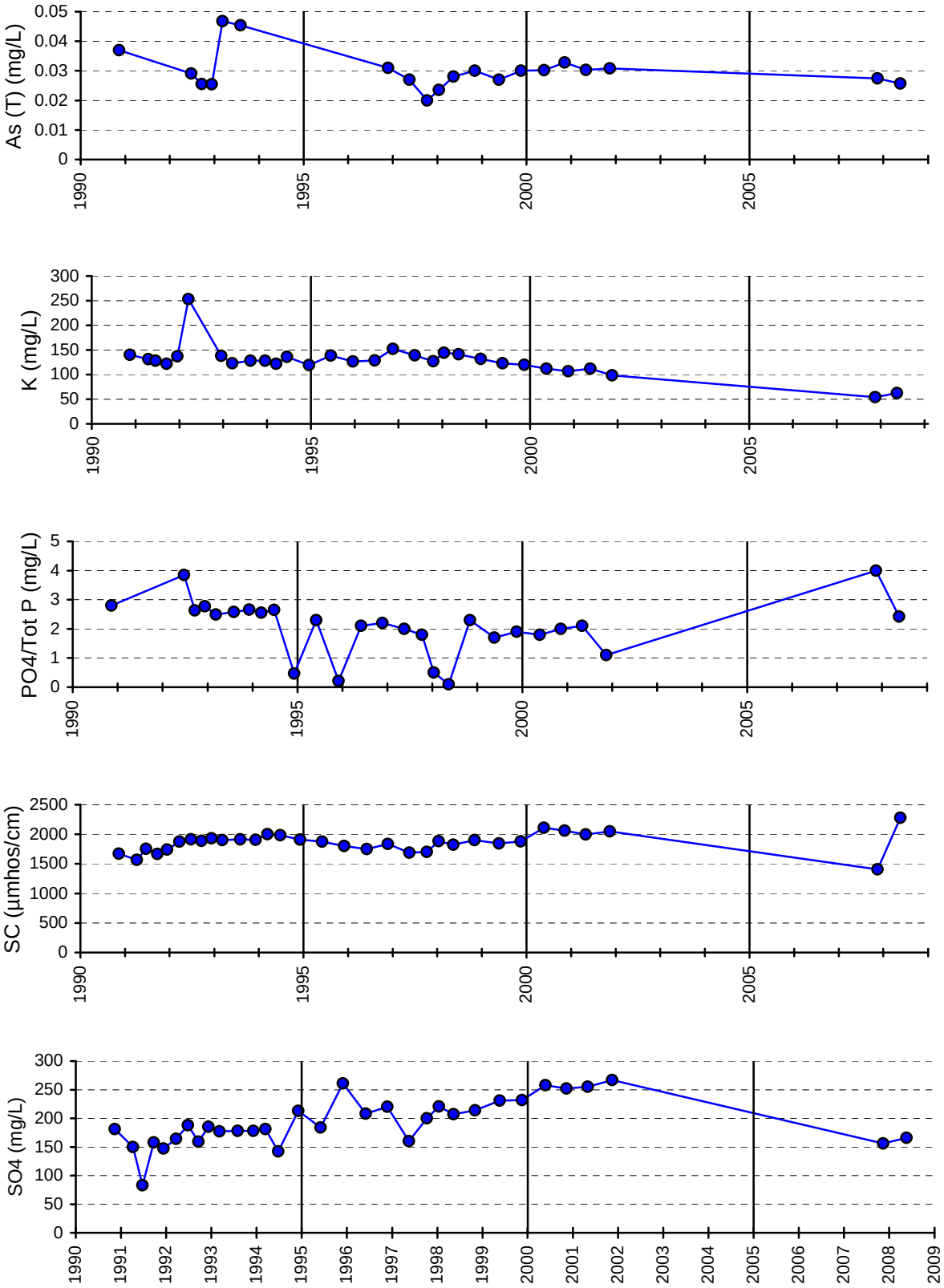

K (mg/L)
8
6
4
2
0
1994
1999
2004
2009


PO4/Tot P (mg/L)
6
5
4
3
2
1
0
1994
1999
2004
2009

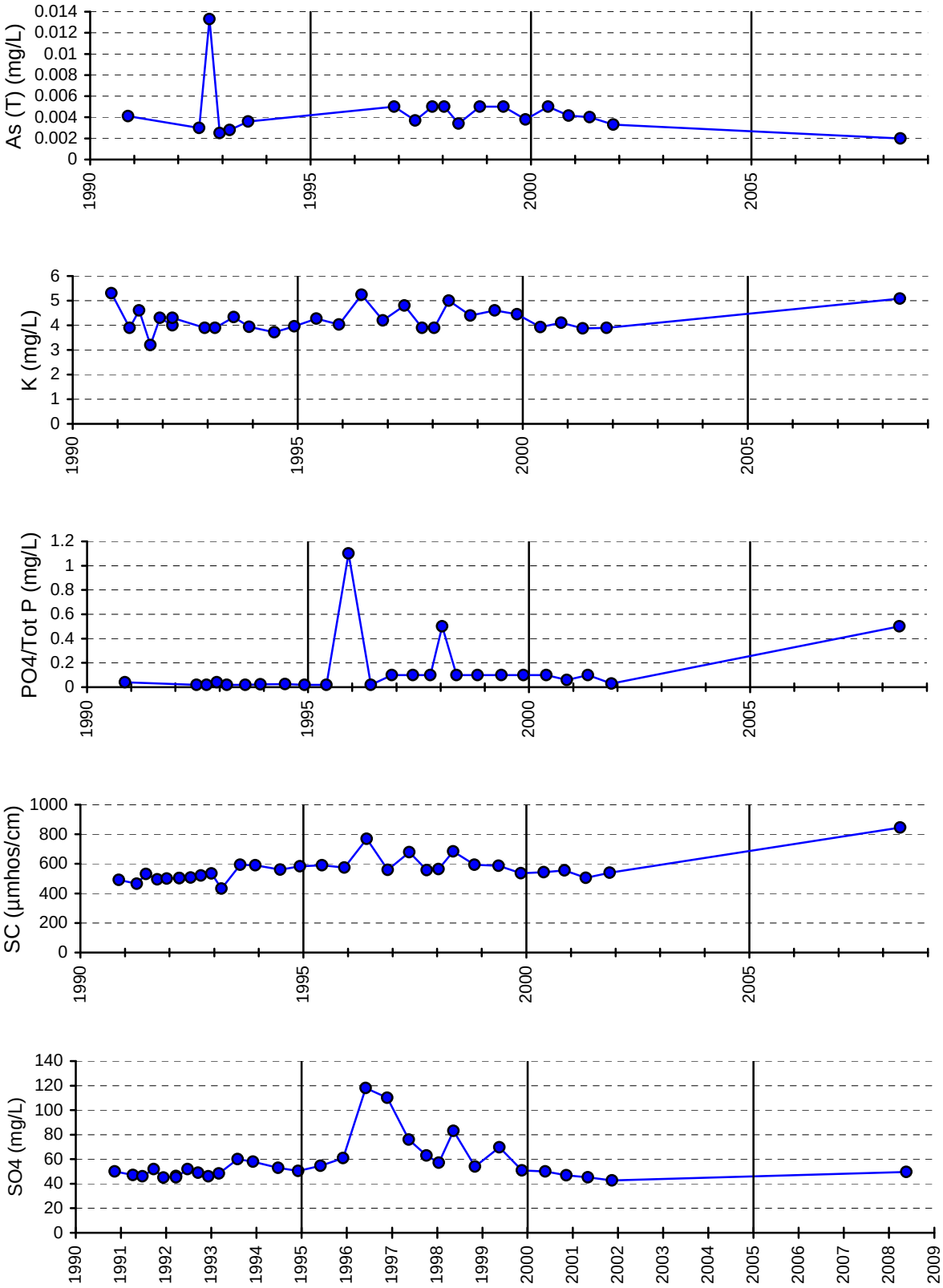

SC (µmhos/cm)
1000
800
600
400
200
0
1994
1999
2004
2009


SO4 (mg/L)
160
140
120
100
80
60
40
20
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

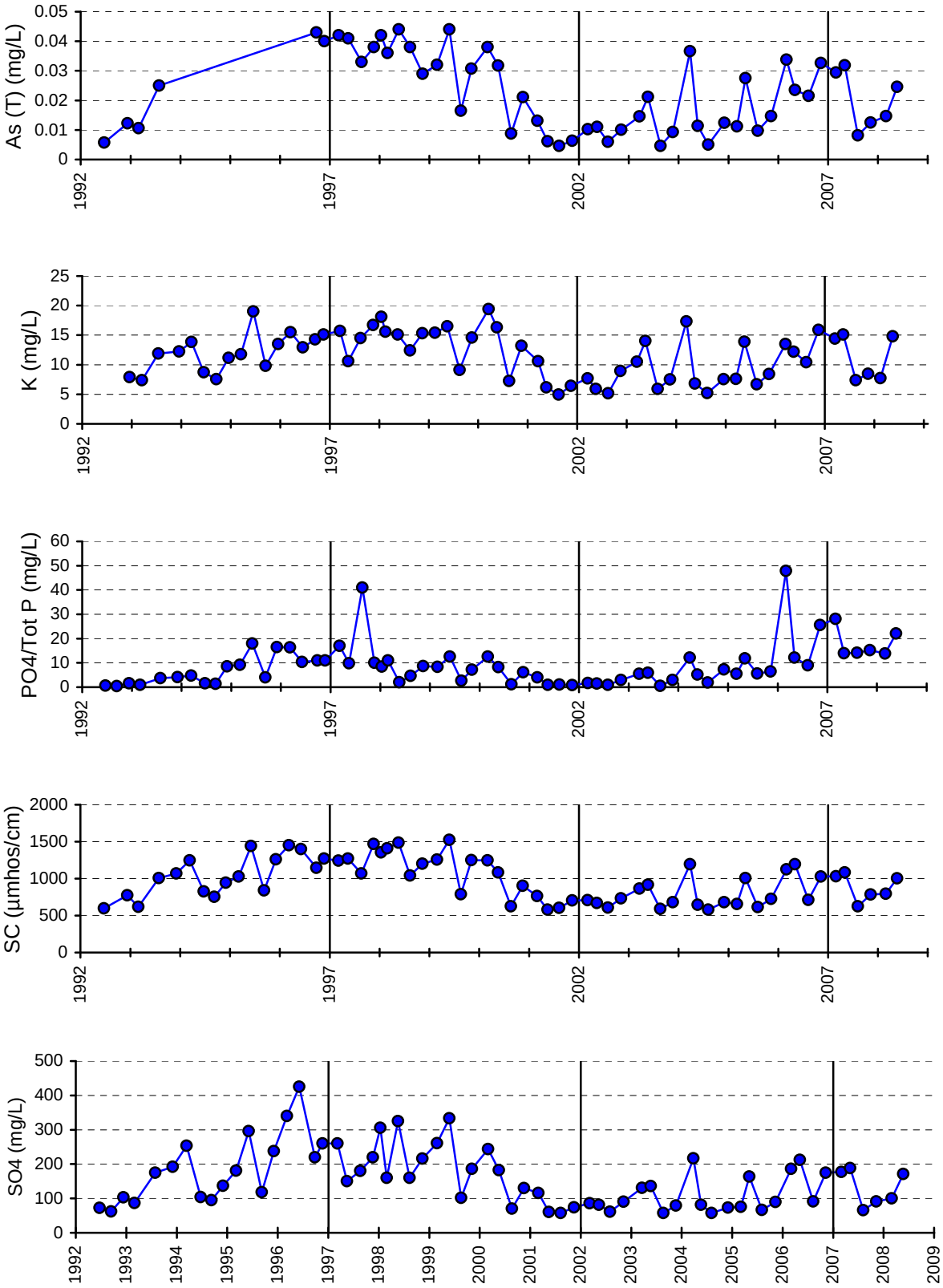
TW-9S


As (T) (mg/L)
0.05
0.04
0.03
0.02
0.01
0
1990
1995
2000
2005
K (mg/L)
300
250
200
150
100
50
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
5
4
3
2
1
0
1990
1995
2000
2005
SC (µmhos/cm)
2500
2000
1500
1000
500
0
1990
1995
2000
2005
SO4 (mg/L)
300
250
200
150
100
50
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

TW-11S

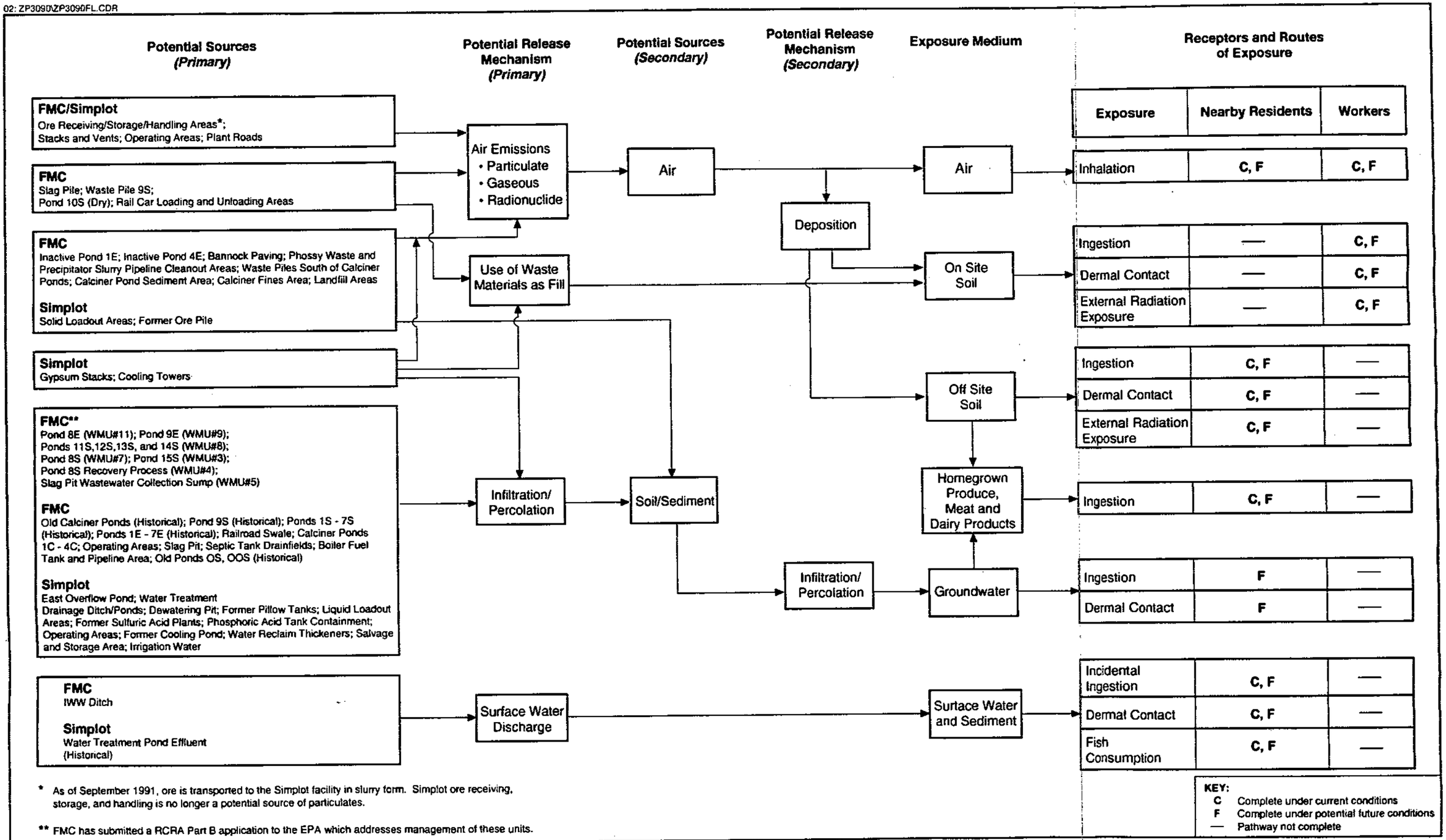

As (T) (mg/L)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
1990
1995
2000
2005
K (mg/L)
6
5
4
3
2
1
0
1990
1995
2000
2005
PO4/Tot P (mg/L)
1.2
1
0.8
0.6
0.4
0.2
0
1990
1995
2000
2005
SC (µmhos/cm)
1000
800
600
400
200
0
1990
1995
2000
2005
SO4 (mg/L)
140
120
100
80
60
40
20
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

Batiste Spring



APPENDIX K

02: ZP3090\ZP3090FL.CDR



* As of September 1991, ore is transported to the Simplot facility in slurry form. Simplot ore receiving, storage, and handling is no longer a potential source of particulates.

** FMC has submitted a RCRA Part B application to the EPA which addresses management of these units.

SOURCE: Adapted from Bechtel 1994

Figure 1-4 CONCEPTUAL SITE MODEL FOR POTENTIAL HUMAN EXPOSURE TO CONTAMINANTS FROM THE EASTERN MICHAUD FLATS SITE

Table 2-1

SUMMARY OF COPCs BY MEDIA

Chemical	Soil	Groundwater	Air[b]
Aluminum			X
Antimony	X		
Arsenic	X	X	X
Beryllium	X	X	
Boron	X	X	
Cadmium	X		X
Chromium			X
Crystalline Quartz			X
Fluoride	X	X	X
Gross alpha	X[a]	X[a]	
Gross beta	X[a]	X[a]	
Lead-210	X		X
Manganese	X	X	
Mercury	X	X	
Nickel	X	X	X
Nitrate		X	
Phosphorus			X
PM_{10}			X
Polonium-210	X	[a]	X
Potassium-40	X	[a]	
Radium-226	[a]	X	
Radon	[a,c]		
Selenium	X	X	X
Silver	X		X
Tetrachloroethene		X	
Thallium	X		
Thorium-230	[a]	[a]	X

Key at end of table.

Table 2-1

SUMMARY OF COPCs BY MEDIA

Chemical	Soil	Groundwater	Air[b]
Trichloroethene		X	
Uranium-234		[a]	
Uranium-238	X	[a]	X
Vanadium	X	X	
Zinc	X	X	

[a] Individual radionuclides potentially responsible for elevated gross alpha and gross beta levels are also COPCs.

[b] Chemicals that exceeded background concentrations and lacked inhalation toxicity criteria (reference concentrations and inhalation unit risks) were retained as COPCs.

[c] Retained as a COPC mainly for evaluation of potential radon infiltration into buildings under alternate future commercial or industrial uses of the site.

Key:

COPC = Contaminant of potential concern.

Table 3-17

FUTURE RESIDENTIAL EXPOSURE
PATHWAY R6 - INGESTION OF CONTAMINANTS IN GROUNDWATER
AGE-INTEGRATED RESIDENT

Equation for chemical contaminants:

$$Intake\ (mg/kg\text{-}day) = \frac{CW}{AT} \times \left[\frac{IRWc \times EDc \times EFc}{BWc} + \frac{IRWa \times EDa \times EFa}{BWa}\right]$$

Equation for radionuclide contaminants:

$$Intake\ (pCi) = CW \times [(IRWc \times EDc \times EFc) + (IRWa \times EDa \times EFa)]$$

Where:

CW = Contaminant Concentration in Water (mg/L) or (pCi/L)
IRWc = Groundwater Ingestion Rate, child ages 1-6 (L/day)
IRWa = Groundwater Ingestion Rate, adult (L/day)
EDc = Exposure Duration, child ages 1-6 (years)
EDa = Exposure Duration, adult (years)
EFc = Exposure Frequency, child (days/year)
EFa = Exposure Frequency, adult (days/year)
BWc = Body Weight, child (kg)
BWa = Body Weight, adult (kg)
AT = Averaging Time (period over which exposure is averaged - days)

Variable	Case	Value (Rationale/Source)
CW	RME/CT	UCL or maximum detected concentration in groundwater (single location)
IRWc	RME CT	1 liter/day (Region III EPA 1994d) 0.7 (Region VI EPA 1992d)
IRWa	RME CT	2 liter/day (90th percentile for drinking water ingestion; EPA 1991a) 1.4 liter/day (average for drinking water ingestion; EPA 1993b)
EDc	RME CT	6 years (entire duration of age group; EPA 1991a) 2 years (child portion of average time living at one residence; EPA 1993b)
EDa	RME CT	24 years (adult portion of 90th percentile time living at one residence; EPA 1991a) 7 years (adult portion of average time living at one residence; EPA 1993b)
EFc	RME CT	350 days/year (assumes two weeks away from home per year; EPA 1991a) 350 days/year (assumes two weeks away from home per year; EPA 1993b)
EFa	RME CT	350 days/year (assumes two weeks away from home per year; EPA 1991a) 234 days/year (accounts for average fraction of time spent at home [64%]).
BWc	RME CT	15 kg (average; EPA 1991a) 15 kg (average; EPA 1993b)

Key at end of table.

Table 3-17

FUTURE RESIDENTIAL EXPOSURE
PATHWAY R6 - INGESTION OF CONTAMINANTS IN GROUNDWATER
AGE-INTEGRATED RESIDENT

BWa	RME CT	70 kg (average; EPA 1991a) 70 kg (average; EPA 1993b)
AT	RME/CT	Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED x 365 days/year), and 70-year lifetime for carcinogenic effects (i.e., 70 years x 365 days/year)

Key:

UCL = 95% Upper confidence limit of the mean.

Table 3-27

FUTURE SITE WORKERS
PATHWAY W4 - INGESTION OF CONTAMINANTS IN GROUNDWATER
REASONABLE MAXIMUM EXPOSURE

Equation for chemical contaminants:

$$Intake\ (mg/kg\text{-}day) = \frac{CW \times IRW \times ED \times EF}{AT}$$

Equation for radionuclide contaminants:

$$Intake\ (pCi) = CW \times IRW \times ED \times EF$$

Where:
CW = Contaminant Concentration in Water (mg/L) or (pCi/L)
IRW = Groundwater Ingestion Rate (L/day)
ED = Exposure Duration (years)
EF = Exposure Frequency (days/year)
BW = Body Weight (kg)
AT = Averaging Time (period over which exposure is averaged - days)

Variable	Receptor	
	FMC	Simplot
	Future Site Workers	Future Site Workers
CW	UCL or maximum detected concentration in shallow groundwater at the FMC facility	UCL or maximum detected concentration in shallow groundwater at the Simplot facility
IRW	1 liter/day (assumes half of adult's daily water intake occurs at work; EPA 1991a)	1 liter/day (assumes half of adult's daily water intake occurs at work; EPA 1991a)
ED	25 years (95th percentile time spent working at one location; EPA 1991a)	25 years (95th percentile time spent working at one location; EPA 1991a)
EF	250 days/year (general worker default; EPA 1991a)	250 days/year (general worker default; EPA 1991a)
BW	70 kg (average adult body weight; EPA 1991a)	70 kg (average adult body weight; EPA 1991a)
AT	Pathway-specific period of exposure for noncarcinogenic effects (i.e., ED x 365 days/year), and 70-year lifetime for carcinogenic effects (i.e., 70 years x 365 days/year)	

Key:

UCL = 95% Upper confidence limit of the mean

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
103	Arsenic, total	7440-38-2	mg/l	7	3.36E-02	3.54E-02	UCL	Onsite	Deep
103	Boron, total	7440-42-8	mg/l	7	1.23E+00	1.48E+00	UCL	Onsite	Deep
103	Fluoride	16984-00-6	mg/l	8	1.32E-01	2.00E-01	MaxDet	Onsite	Deep
103	Manganese, total	7439-96-5	mg/l	7	1.30E+00	1.38E+00	UCL	Onsite	Deep
103	Nitrate (NO3 as N)	14797-55-8	mg/l	8	6.64E-01	9.97E-01	UCL	Onsite	Deep
103	Potassium	7440-09-7	mg/l	8	1.31E+01	1.41E+01	UCL	Onsite	Deep
103	Selenium, total	7782-49-2	mg/l	5	2.28E-03	6.05E-03	MaxDet	Onsite	Deep
103	Vanadium, total	7440-62-2	mg/l	4	4.99E-03	8.78E-03	MaxDet	Onsite	Deep
104	Arsenic, total	7440-38-2	mg/l	9	1.67E-01	1.90E-01	UCL	Onsite	Shallow
104	Boron, total	7440-42-8	mg/l	9	1.84E+00	2.14E+00	UCL	Onsite	Shallow
104	Fluoride	16984-00-6	mg/l	10	9.20E+00	1.10E+01	UCL	Onsite	Shallow
104	Manganese, total	7439-96-5	mg/l	9	3.96E+00	4.83E+00	UCL	Onsite	Shallow
104	Mercury, total	7439-97-6	mg/l	2	1.15E-04	1.80E-04	MaxDet	Onsite	Shallow
104	Nickel, total	7440-02-0	mg/l	8	1.32E-02	2.33E-02	UCL	Onsite	Shallow
104	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.24E+01	1.47E+01	UCL	Onsite	Shallow
104	Potassium	7440-09-7	mg/l	10	4.16E+02	4.50E+02	UCL	Onsite	Shallow
104	Selenium, total	7782-49-2	mg/l	5	2.08E-03	3.28E-03	UCL	Onsite	Shallow
104	Vanadium, total	7440-62-2	mg/l	6	1.76E-02	1.76E-02	UCL	Onsite	Shallow
107	Arsenic, total	7440-38-2	mg/l	5	6.07E-03	8.44E-03	UCL	Onsite	Deep
107	Boron, total	7440-42-8	mg/l	6	9.44E-02	1.24E-01	UCL	Onsite	Deep
107	Fluoride	16984-00-6	mg/l	9	5.33E-01	6.20E-01	UCL	Onsite	Deep
107	Manganese, total	7439-96-5	mg/l	4	7.33E-04	1.03E-03	MaxDet	Onsite	Deep
107	Mercury, total	7439-97-6	mg/l	3	8.67E-05	1.40E-04	MaxDet	Onsite	Deep
107	Nitrate (NO3 as N)	14797-55-8	mg/l	9	9.13E-01	1.05E+00	UCL	Onsite	Deep
107	Potassium	7440-09-7	mg/l	9	8.30E+00	8.68E+00	UCL	Onsite	Deep
107	Selenium, total	7782-49-2	mg/l	6	2.00E-03	7.00E-03	MaxDet	Onsite	Deep
107	Vanadium, total	7440-62-2	mg/l	4	2.78E-03	7.10E-03	MaxDet	Onsite	Deep
108	Arsenic, total	7440-38-2	mg/l	8	3.59E-02	4.12E-02	UCL	Onsite	Shallow
108	Boron, total	7440-42-8	mg/l	9	6.36E-01	7.40E-01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
108	Fluoride	16984-00-6	mg/l	10	2.39E+00	2.75E+00	UCL	Onsite	Shallow
108	Manganese, total	7439-96-5	mg/l	8	4.09E-01	6.15E-01	UCL	Onsite	Shallow
108	Mercury, total	7439-97-6	mg/l	4	8.75E-05	2.00E-04	MaxDet	Onsite	Shallow
108	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.16E+01	1.55E+01	UCL	Onsite	Shallow
108	Potassium	7440-09-7	mg/l	10	1.75E+02	1.88E+02	UCL	Onsite	Shallow
108	Selenium, total	7782-49-2	mg/l	6	5.26E-03	6.84E-03	UCL	Onsite	Shallow
108	Trichloroethene	79-01-6	mg/l	2	2.50E-03	3.00E-03	MaxDet	Onsite	Shallow
108	Vanadium, total	7440-62-2	mg/l	6	1.58E-02	1.97E-02	UCL	Onsite	Shallow
108	Zinc, total	7440-66-6	mg/l	5	2.55E-02	4.06E-02	UCL	Onsite	Shallow
109	Arsenic, total	7440-38-2	mg/l	4	2.93E-03	7.74E-03	MaxDet	Onsite	Deep
109	Boron, total	7440-42-8	mg/l	4	2.21E-01	5.31E-01	MaxDet	Onsite	Deep
109	Fluoride	16984-00-6	mg/l	8	8.91E-01	9.02E-01	UCL	Onsite	Deep
109	Mercury, total	7439-97-6	mg/l	2	1.20E-04	1.50E-04	MaxDet	Onsite	Deep
109	Nitrate (NO3 as N)	14797-55-8	mg/l	7	9.10E-01	9.10E-01	UCL	Onsite	Deep
109	Potassium	7440-09-7	mg/l	7	5.94E+00	5.94E+00	UCL	Onsite	Deep
110	Arsenic, total	7440-38-2	mg/l	7	1.12E-01	1.46E-01	UCL	Onsite	Shallow
110	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Shallow
110	Boron, total	7440-42-8	mg/l	6	7.36E-01	8.75E-01	UCL	Onsite	Shallow
110	Fluoride	16984-00-6	mg/l	8	2.86E-01	3.04E-01	UCL	Onsite	Shallow
110	Manganese, total	7439-96-5	mg/l	7	1.20E-01	1.43E-01	UCL	Onsite	Shallow
110	Mercury, total	7439-97-6	mg/l	2	1.13E-04	1.40E-04	MaxDet	Onsite	Shallow
110	Nitrate (NO3 as N)	14797-55-8	mg/l	8	3.69E+00	4.50E+00	UCL	Onsite	Shallow
110	Potassium	7440-09-7	mg/l	7	1.71E+01	1.83E+01	UCL	Onsite	Shallow
110	Selenium, total	7782-49-2	mg/l	6	5.26E-02	7.36E-02	UCL	Onsite	Shallow
110	Vanadium, total	7440-62-2	mg/l	4	1.66E-02	2.40E-02	MaxDet	Onsite	Shallow
111	Arsenic, total	7440-38-2	mg/l	8	4.77E-02	5.29E-02	UCL	Onsite	Shallow
111	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Shallow
111	Boron, total	7440-42-8	mg/l	6	9.47E-01	1.07E+00	UCL	Onsite	Shallow
111	Fluoride	16984-00-6	mg/l	9	1.07E-01	1.72E-01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
111	Manganese, total	7439-96-5	mg/l	7	1.10E+00	1.24E+00	UCL	Onsite	Shallow
111	Mercury, total	7439-97-6	mg/l	2	9.63E-05	1.40E-04	MaxDet	Onsite	Shallow
111	Nickel, total	7440-02-0	mg/l	6	1.28E-02	2.70E-02	MaxDet	Onsite	Shallow
111	Nitrate (NO3 as N)	14797-55-8	mg/l	8	1.72E+01	1.73E+01	UCL	Onsite	Shallow
111	Potassium	7440-09-7	mg/l	8	1.39E+02	1.46E+02	UCL	Onsite	Shallow
111	Selenium, total	7782-49-2	mg/l	6	3.45E-03	6.58E-03	MaxDet	Onsite	Shallow
111	Tetrachloroethene	127-18-4	mg/l	1	3.50E-02	3.50E-02	Single observation	Onsite	Shallow
111	Vanadium, total	7440-62-2	mg/l	3	6.98E-03	1.02E-02	MaxDet	Onsite	Shallow
112	Arsenic, total	7440-38-2	mg/l	6	5.31E-03	6.40E-03	UCL	Onsite	Shallow
112	Boron, total	7440-42-8	mg/l	5	1.37E-01	2.22E-01	UCL	Onsite	Shallow
112	Fluoride	16984-00-6	mg/l	9	5.43E-01	5.86E-01	UCL	Onsite	Shallow
112	Manganese, total	7439-96-5	mg/l	6	1.84E-03	5.80E-03	MaxDet	Onsite	Shallow
112	Nitrate (NO3 as N)	14797-55-8	mg/l	8	5.69E+00	8.10E+00	UCL	Onsite	Shallow
112	Potassium	7440-09-7	mg/l	7	9.34E+00	1.09E+01	UCL	Onsite	Shallow
112	Selenium, total	7782-49-2	mg/l	4	1.79E-03	4.68E-03	MaxDet	Onsite	Shallow
112	Vanadium, total	7440-62-2	mg/l	4	1.66E-03	3.45E-03	MaxDet	Onsite	Shallow
113	Arsenic, total	7440-38-2	mg/l	9	3.21E-02	3.50E-02	UCL	Onsite	Shallow
113	Beryllium, total	7440-41-7	mg/l	4	3.38E-04	1.00E-03	MaxDet	Onsite	Shallow
113	Boron, total	7440-42-8	mg/l	8	6.75E-01	8.39E-01	MaxDet	Onsite	Shallow
113	Fluoride	16984-00-6	mg/l	10	8.00E-01	8.00E-01	UCL	Onsite	Shallow
113	Manganese, total	7439-96-5	mg/l	3	6.03E-03	7.00E-03	MaxDet	Onsite	Shallow
113	Nitrate (NO3 as N)	14797-55-8	mg/l	10	6.47E+00	6.86E+00	UCL	Onsite	Shallow
113	Potassium	7440-09-7	mg/l	10	3.40E+01	3.72E+01	UCL	Onsite	Shallow
113	Selenium, total	7782-49-2	mg/l	4	3.97E-03	7.57E-03	MaxDet	Onsite	Shallow
113	Vanadium, total	7440-62-2	mg/l	4	8.82E-03	1.12E-02	MaxDet	Onsite	Shallow
114	Arsenic, total	7440-38-2	mg/l	9	1.70E-01	1.88E-01	UCL	Onsite	Shallow
114	Boron, total	7440-42-8	mg/l	9	1.89E+00	2.22E+00	UCL	Onsite	Shallow
114	Fluoride	16984-00-6	mg/l	10	7.33E-01	8.06E-01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
114	Manganese, total	7439-96-5	mg/l	9	1.88E+00	1.88E+00	UCL	Onsite	Shallow
114	Nickel, total	7440-02-0	mg/l	6	9.55E-03	1.89E-02	UCL	Onsite	Shallow
114	Nitrate (NO3 as N)	14797-55-8	mg/l	10	6.15E-02	1.17E-01	UCL	Onsite	Shallow
114	Potassium	7440-09-7	mg/l	10	1.27E+01	1.62E+01	UCL	Onsite	Shallow
114	Selenium, total	7782-49-2	mg/l	4	4.13E-03	7.38E-03	MaxDet	Onsite	Shallow
114	Vanadium, total	7440-62-2	mg/l	4	1.05E-02	1.29E-02	MaxDet	Onsite	Shallow
114	Zinc, total	7440-66-6	mg/l	3	5.94E-03	1.43E-02	MaxDet	Onsite	Shallow
115	Arsenic, total	7440-38-2	mg/l	9	1.89E-01	2.12E-01	UCL	Onsite	Shallow
115	Boron, total	7440-42-8	mg/l	9	2.18E+00	2.48E+00	UCL	Onsite	Shallow
115	Fluoride	16984-00-6	mg/l	10	1.34E-01	1.66E-01	UCL	Onsite	Shallow
115	Manganese, total	7439-96-5	mg/l	9	5.21E-01	5.36E-01	UCL	Onsite	Shallow
115	Mercury, total	7439-97-6	mg/l	2	7.50E-05	1.00E-04	MaxDet	Onsite	Shallow
115	Nitrate (NO3 as N)	14797-55-8	mg/l	9	5.78E-02	1.26E-01	UCL	Onsite	Shallow
115	Potassium	7440-09-7	mg/l	10	8.46E+00	9.28E+00	UCL	Onsite	Shallow
115	Selenium, total	7782-49-2	mg/l	4	3.27E-03	5.35E-03	UCL	Onsite	Shallow
115	Vanadium, total	7440-62-2	mg/l	6	1.47E-02	1.68E-02	UCL	Onsite	Shallow
116	Arsenic, total	7440-38-2	mg/l	9	6.93E-02	8.41E-02	UCL	Onsite	Shallow
116	Boron, total	7440-42-8	mg/l	8	1.52E+00	1.77E+00	UCL	Onsite	Shallow
116	Fluoride	16984-00-6	mg/l	10	9.50E-01	1.04E+00	UCL	Onsite	Shallow
116	Manganese, total	7439-96-5	mg/l	9	2.43E-01	2.72E-01	UCL	Onsite	Shallow
116	Mercury, total	7439-97-6	mg/l	2	1.10E-04	1.30E-04	MaxDet	Onsite	Shallow
116	Nitrate (NO3 as N)	14797-55-8	mg/l	10	4.80E+00	6.00E+00	UCL	Onsite	Shallow
116	Potassium	7440-09-7	mg/l	10	1.62E+02	1.62E+02	UCL	Onsite	Shallow
116	Selenium, total	7782-49-2	mg/l	8	1.18E-02	1.34E-02	UCL	Onsite	Shallow
116	Vanadium, total	7440-62-2	mg/l	7	3.61E-03	5.36E-03	UCL	Onsite	Shallow
117	Arsenic, total	7440-38-2	mg/l	6	1.59E-02	5.00E-02	UCL	Onsite	Deep
117	Boron, total	7440-42-8	mg/l	4	9.60E-02	1.20E-01	MaxDet	Onsite	Deep
117	Fluoride	16984-00-6	mg/l	9	3.27E-01	3.61E-01	UCL	Onsite	Deep
117	Manganese, total	7439-96-5	mg/l	4	8.50E-04	2.00E-03	MaxDet	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
117	Mercury, total	7439-97-6	mg/l	2	9.75E-05	1.40E-04	MaxDet	Onsite	Deep
117	Nitrate (NO3 as N)	14797-55-8	mg/l	9	7.04E-01	8.83E-01	UCL	Onsite	Deep
117	Potassium	7440-09-7	mg/l	9	1.56E+01	1.62E+01	UCL	Onsite	Deep
117	Selenium, total	7782-49-2	mg/l	5	2.19E-03	3.80E-03	UCL	Onsite	Deep
117	Vanadium, total	7440-62-2	mg/l	5	2.46E-03	5.51E-03	MaxDet	Onsite	Deep
118	Arsenic, total	7440-38-2	mg/l	7	2.91E-02	3.48E-02	UCL	Onsite	Shallow
118	Boron, total	7440-42-8	mg/l	9	6.61E-01	8.21E-01	UCL	Onsite	Shallow
118	Fluoride	16984-00-6	mg/l	10	1.40E-01	1.76E-01	UCL	Onsite	Shallow
118	Manganese, total	7439-96-5	mg/l	9	1.40E+00	1.59E+00	UCL	Onsite	Shallow
118	Mercury, total	7439-97-6	mg/l	2	8.50E-05	1.40E-04	MaxDet	Onsite	Shallow
118	Nickel, total	7440-02-0	mg/l	8	8.52E-03	1.25E-02	UCL	Onsite	Shallow
118	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.18E-01	3.19E-01	UCL	Onsite	Shallow
118	Potassium	7440-09-7	mg/l	10	2.91E+01	3.12E+01	UCL	Onsite	Shallow
118	Selenium, total	7782-49-2	mg/l	4	2.10E-03	4.46E-03	UCL	Onsite	Shallow
118	Vanadium, total	7440-62-2	mg/l	7	2.92E-03	6.01E-03	MaxDet	Onsite	Shallow
119	Arsenic, total	7440-38-2	mg/l	6	1.20E-02	1.39E-02	UCL	Onsite	Shallow
119	Boron, total	7440-42-8	mg/l	8	1.53E-01	1.88E-01	UCL	Onsite	Shallow
119	Fluoride	16984-00-6	mg/l	10	2.03E-01	2.33E-01	UCL	Onsite	Shallow
119	Mercury, total	7439-97-6	mg/l	3	8.00E-05	1.60E-04	MaxDet	Onsite	Shallow
119	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.45E+00	1.65E+00	UCL	Onsite	Shallow
119	Potassium	7440-09-7	mg/l	10	1.01E+01	1.07E+01	UCL	Onsite	Shallow
119	Selenium, total	7782-49-2	mg/l	6	3.32E-03	5.41E-03	MaxDet	Onsite	Shallow
119	Vanadium, total	7440-62-2	mg/l	7	3.69E-03	5.12E-03	UCL	Onsite	Shallow
120	Arsenic, total	7440-38-2	mg/l	6	1.61E-02	1.79E-02	UCL	Onsite	Shallow
120	Boron, total	7440-42-8	mg/l	9	2.18E-01	2.64E-01	UCL	Onsite	Shallow
120	Fluoride	16984-00-6	mg/l	10	1.80E-01	2.06E-01	UCL	Onsite	Shallow
120	Manganese, total	7439-96-5	mg/l	6	5.40E-02	2.66E-01	MaxDet	Onsite	Shallow
120	Nitrate (NO3 as N)	14797-55-8	mg/l	10	9.77E-01	1.22E+00	UCL	Onsite	Shallow
120	Potassium	7440-09-7	mg/l	10	8.37E+00	8.95E+00	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
120	Selenium, total	7782-49-2	mg/l	5	2.97E-03	5.60E-03	MaxDet	Onsite	Shallow
120	Vanadium, total	7440-62-2	mg/l	7	4.67E-03	7.02E-03	MaxDet	Onsite	Shallow
121	Arsenic, total	7440-38-2	mg/l	8	1.78E-02	2.06E-02	UCL	Onsite	Shallow
121	Boron, total	7440-42-8	mg/l	9	5.98E-01	9.13E-01	UCL	Onsite	Shallow
121	Fluoride	16984-00-6	mg/l	10	2.70E+00	4.55E+00	UCL	Onsite	Shallow
121	Manganese, total	7439-96-5	mg/l	7	5.19E-02	6.68E-02	UCL	Onsite	Shallow
121	Mercury, total	7439-97-6	mg/l	4	7.00E-05	1.30E-04	MaxDet	Onsite	Shallow
121	Nitrate (NO3 as N)	14797-55-8	mg/l	10	2.10E+01	2.56E+01	UCL	Onsite	Shallow
121	Potassium	7440-09-7	mg/l	10	1.67E+02	2.03E+02	UCL	Onsite	Shallow
121	Selenium, total	7782-49-2	mg/l	6	5.74E-02	3.12E-01	MaxDet	Onsite	Shallow
121	Trichloroethene	79-01-6	mg/l	4	9.44E-03	1.50E-02	MaxDet	Onsite	Shallow
121	Vanadium, total	7440-62-2	mg/l	5	7.40E-03	1.34E-02	MaxDet	Onsite	Shallow
121	Zinc, total	7440-66-6	mg/l	4	5.66E-03	1.81E-02	MaxDet	Onsite	Shallow
122	Arsenic, total	7440-38-2	mg/l	9	5.69E-02	7.16E-02	UCL	Onsite	Shallow
122	Beryllium, total	7440-41-7	mg/l	3	2.80E-04	5.90E-04	MaxDet	Onsite	Shallow
122	Boron, total	7440-42-8	mg/l	9	5.13E-01	6.26E-01	UCL	Onsite	Shallow
122	Fluoride	16984-00-6	mg/l	10	4.10E-01	2.17E+00	UCL	Onsite	Shallow
122	Manganese, total	7439-96-5	mg/l	9	6.71E-01	8.53E-01	UCL	Onsite	Shallow
122	Mercury, total	7439-97-6	mg/l	4	7.25E-05	1.40E-04	MaxDet	Onsite	Shallow
122	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.90E+01	2.40E+01	UCL	Onsite	Shallow
122	Potassium	7440-09-7	mg/l	10	2.29E+02	2.42E+02	UCL	Onsite	Shallow
122	Selenium, total	7782-49-2	mg/l	6	2.22E-03	3.10E-03	UCL	Onsite	Shallow
122	Vanadium, total	7440-62-2	mg/l	5	6.00E-03	1.02E-02	UCL	Onsite	Shallow
122	Zinc, total	7440-66-6	mg/l	5	9.80E-03	4.30E-02	MaxDet	Onsite	Shallow
123	Arsenic, total	7440-38-2	mg/l	9	4.33E-01	6.00E-01	UCL	Onsite	Shallow
123	Boron, total	7440-42-8	mg/l	9	9.40E-01	1.05E+00	UCL	Onsite	Shallow
123	Fluoride	16984-00-6	mg/l	10	7.50E-01	8.38E-01	UCL	Onsite	Shallow
123	Manganese, total	7439-96-5	mg/l	9	4.25E-01	4.56E-01	UCL	Onsite	Shallow
123	Mercury, total	7439-97-6	mg/l	8	5.75E-05	1.09E-04	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
123	Nickel, total	7440-02-0	mg/l	9	7.71E-03	9.54E-03	UCL	Onsite	Shallow
123	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.09E+01	1.32E+01	UCL	Onsite	Shallow
123	Potassium	7440-09-7	mg/l	10	3.16E+01	3.16E+01	UCL	Onsite	Shallow
123	Selenium, total	7782-49-2	mg/l	8	2.82E-01	3.79E-01	UCL	Onsite	Shallow
123	Vanadium, total	7440-62-2	mg/l	9	1.91E-01	2.10E-01	UCL	Onsite	Shallow
124	Arsenic, total	7440-38-2	mg/l	6	1.19E-02	1.58E-02	UCL	Onsite	Shallow
124	Boron, total	7440-42-8	mg/l	8	2.22E-01	2.48E-01	UCL	Onsite	Shallow
124	Fluoride	16984-00-6	mg/l	10	8.21E-01	8.22E-01	UCL	Onsite	Shallow
124	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.86E+00	2.08E+00	UCL	Onsite	Shallow
124	Potassium	7440-09-7	mg/l	10	1.11E+01	1.21E+01	UCL	Onsite	Shallow
124	Selenium, total	7782-49-2	mg/l	4	1.91E-03	3.20E-03	MaxDet	Onsite	Shallow
124	Vanadium, total	7440-62-2	mg/l	5	5.11E-03	7.79E-03	UCL	Onsite	Shallow
124	Zinc, total	7440-66-6	mg/l	4	3.10E-03	6.88E-03	MaxDet	Onsite	Shallow
125	Arsenic, total	7440-38-2	mg/l	4	5.44E-03	7.58E-03	MaxDet	Onsite	Deep
125	Boron, total	7440-42-8	mg/l	6	1.37E-01	2.71E-01	UCL	Onsite	Deep
125	Fluoride	16984-00-6	mg/l	9	1.13E+00	1.13E+00	UCL	Onsite	Deep
125	Manganese, total	7439-96-5	mg/l	4	1.05E-03	2.19E-03	MaxDet	Onsite	Deep
125	Nitrate (NO3 as N)	14797-55-8	mg/l	9	6.49E-01	7.05E-01	UCL	Onsite	Deep
125	Potassium	7440-09-7	mg/l	9	7.98E+00	8.54E+00	UCL	Onsite	Deep
125	Vanadium, total	7440-62-2	mg/l	4	3.31E-03	6.11E-03	MaxDet	Onsite	Deep
126	Arsenic, total	7440-38-2	mg/l	5	8.98E-03	1.31E-02	UCL	Onsite	Shallow
126	Boron, total	7440-42-8	mg/l	6	1.37E-01	1.58E-01	UCL	Onsite	Shallow
126	Fluoride	16984-00-6	mg/l	10	9.24E-01	9.25E-01	UCL	Onsite	Shallow
126	Mercury, total	7439-97-6	mg/l	2	9.50E-05	1.40E-04	MaxDet	Onsite	Shallow
126	Nitrate (NO3 as N)	14797-55-8	mg/l	9	1.43E+00	1.54E+00	UCL	Onsite	Shallow
126	Potassium	7440-09-7	mg/l	10	1.00E+01	1.05E+01	UCL	Onsite	Shallow
126	Selenium, total	7782-49-2	mg/l	3	1.99E-03	3.31E-03	MaxDet	Onsite	Shallow
126	Vanadium, total	7440-62-2	mg/l	5	3.88E-03	6.08E-03	UCL	Onsite	Shallow
127	Arsenic, total	7440-38-2	mg/l	7	2.07E-02	6.61E-02	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
127	Boron, total	7440-42-8	mg/l	8	2.98E-01	3.62E-01	UCL	Onsite	Shallow
127	Fluoride	16984-00-6	mg/l	10	3.41E-01	3.81E-01	UCL	Onsite	Shallow
127	Nickel, total	7440-02-0	mg/l	9	7.73E-03	1.19E-02	UCL	Onsite	Shallow
127	Nitrate (NO3 as N)	14797-55-8	mg/l	10	2.32E+00	2.71E+00	UCL	Onsite	Shallow
127	Potassium	7440-09-7	mg/l	10	1.42E+01	1.73E+01	UCL	Onsite	Shallow
127	Selenium, total	7782-49-2	mg/l	4	3.74E-03	7.28E-03	MaxDet	Onsite	Shallow
127	Vanadium, total	7440-62-2	mg/l	6	3.96E-03	5.89E-03	UCL	Onsite	Shallow
127	Zinc, total	7440-66-6	mg/l	3	7.21E-03	1.81E-02	MaxDet	Onsite	Shallow
128	Arsenic, total	7440-38-2	mg/l	9	2.22E-02	2.46E-02	UCL	Onsite	Shallow
128	Boron, total	7440-42-8	mg/l	8	4.86E-01	6.18E-01	UCL	Onsite	Shallow
128	Fluoride	16984-00-6	mg/l	10	3.02E-01	3.02E-01	UCL	Onsite	Shallow
128	Nitrate (NO3 as N)	14797-55-8	mg/l	10	3.99E+00	4.25E+00	UCL	Onsite	Shallow
128	Potassium	7440-09-7	mg/l	10	1.49E+01	1.60E+01	UCL	Onsite	Shallow
128	Selenium, total	7782-49-2	mg/l	3	1.81E-03	2.26E-03	MaxDet	Onsite	Shallow
128	Vanadium, total	7440-62-2	mg/l	4	7.33E-03	1.06E-02	MaxDet	Onsite	Shallow
129	Arsenic, total	7440-38-2	mg/l	6	2.23E-02	3.12E-02	UCL	Onsite	Deep
129	Boron, total	7440-42-8	mg/l	6	3.92E-01	4.60E-01	MaxDet	Onsite	Deep
129	Fluoride	16984-00-6	mg/l	7	2.83E-01	3.00E-01	MaxDet	Onsite	Deep
129	Manganese, total	7439-96-5	mg/l	3	9.23E-03	1.35E-02	MaxDet	Onsite	Deep
129	Nitrate (NO3 as N)	14797-55-8	mg/l	7	2.33E+00	2.60E+00	UCL	Onsite	Deep
129	Potassium	7440-09-7	mg/l	7	1.14E+01	1.44E+01	UCL	Onsite	Deep
129	Selenium, total	7782-49-2	mg/l	4	3.90E-03	5.61E-03	MaxDet	Onsite	Deep
129	Vanadium, total	7440-62-2	mg/l	3	3.65E-03	6.69E-03	MaxDet	Onsite	Deep
129	Zinc, total	7440-66-6	mg/l	1	5.15E-03	5.15E-03	Single observation	Onsite	Deep
130	Arsenic, total	7440-38-2	mg/l	9	3.02E-02	3.26E-02	UCL	Onsite	Deep
130	Boron, total	7440-42-8	mg/l	7	2.31E-01	2.79E-01	UCL	Onsite	Deep
130	Fluoride	16984-00-6	mg/l	10	2.87E-01	3.11E-01	UCL	Onsite	Deep
130	Manganese, total	7439-96-5	mg/l	5	1.20E-03	3.61E-03	MaxDet	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
130	Nitrate (NO3 as N)	14797-55-8	mg/l	10	4.82E+01	2.55E+02	UCL	Onsite	Deep
130	Potassium	7440-09-7	mg/l	10	9.68E+00	1.06E+01	UCL	Onsite	Deep
130	Selenium, total	7782-49-2	mg/l	5	3.47E-03	8.63E-03	MaxDet	Onsite	Deep
130	Vanadium, total	7440-62-2	mg/l	5	6.04E-03	8.88E-03	MaxDet	Onsite	Deep
130	Zinc, total	7440-66-6	mg/l	3	2.53E-03	4.10E-03	MaxDet	Onsite	Deep
131	Arsenic, total	7440-38-2	mg/l	9	5.12E-02	5.39E-02	UCL	Onsite	Shallow
131	Beryllium, total	7440-41-7	mg/l	5	1.07E-03	1.84E-03	UCL	Onsite	Shallow
131	Boron, total	7440-42-8	mg/l	9	2.04E+00	2.33E+00	UCL	Onsite	Shallow
131	Fluoride	16984-00-6	mg/l	10	3.74E-01	7.94E-01	UCL	Onsite	Shallow
131	Manganese, total	7439-96-5	mg/l	9	7.16E-01	8.96E-01	UCL	Onsite	Shallow
131	Mercury, total	7439-97-6	mg/l	3	1.67E-04	2.80E-04	MaxDet	Onsite	Shallow
131	Nickel, total	7440-02-0	mg/l	8	1.85E-02	4.28E-02	MaxDet	Onsite	Shallow
131	Nitrate (NO3 as N)	14797-55-8	mg/l	10	1.38E+00	2.52E+00	UCL	Onsite	Shallow
131	Potassium	7440-09-7	mg/l	10	1.39E+01	1.56E+01	UCL	Onsite	Shallow
131	Selenium, total	7782-49-2	mg/l	6	3.38E-03	5.27E-03	UCL	Onsite	Shallow
131	Vanadium, total	7440-62-2	mg/l	6	2.16E-02	4.24E-02	MaxDet	Onsite	Shallow
131	Zinc, total	7440-66-6	mg/l	5	5.61E-02	1.04E-01	UCL	Onsite	Shallow
132	Arsenic, total	7440-38-2	mg/l	8	1.71E-01	1.95E-01	UCL	Onsite	Shallow
132	Boron, total	7440-42-8	mg/l	9	2.11E+00	2.48E+00	UCL	Onsite	Shallow
132	Fluoride	16984-00-6	mg/l	10	1.02E+00	1.11E+00	UCL	Onsite	Shallow
132	Manganese, total	7439-96-5	mg/l	9	1.15E+00	1.30E+00	UCL	Onsite	Shallow
132	Mercury, total	7439-97-6	mg/l	3	8.67E-05	1.60E-04	MaxDet	Onsite	Shallow
132	Nickel, total	7440-02-0	mg/l	6	1.62E-02	2.16E-02	UCL	Onsite	Shallow
132	Nitrate (NO3 as N)	14797-55-8	mg/l	10	3.42E-01	1.39E+00	MaxDet	Onsite	Shallow
132	Potassium	7440-09-7	mg/l	10	2.72E+02	2.90E+02	UCL	Onsite	Shallow
132	Selenium, total	7782-49-2	mg/l	5	2.67E-03	9.33E-03	MaxDet	Onsite	Shallow
133	Arsenic, total	7440-38-2	mg/l	4	8.47E-03	1.05E-02	MaxDet	Onsite	Deep
133	Boron, total	7440-42-8	mg/l	4	9.88E-02	1.65E-01	MaxDet	Onsite	Deep
133	Fluoride	16984-00-6	mg/l	8	4.66E-01	5.06E-01	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
133	Nitrate (NO3 as N)	14797-55-8	mg/l	8	6.28E-01	7.33E-01	UCL	Onsite	Deep
133	Potassium	7440-09-7	mg/l	8	1.40E+01	1.47E+01	UCL	Onsite	Deep
133	Selenium, total	7782-49-2	mg/l	4	1.83E-03	5.93E-03	MaxDet	Onsite	Deep
133	Vanadium, total	7440-62-2	mg/l	4	2.43E-03	4.26E-03	MaxDet	Onsite	Deep
134	Arsenic, total	7440-38-2	mg/l	7	1.19E-01	1.41E-01	UCL	Onsite	Shallow
134	Boron, total	7440-42-8	mg/l	6	1.37E+00	1.66E+00	MaxDet	Onsite	Shallow
134	Fluoride	16984-00-6	mg/l	8	1.15E-01	1.66E-01	UCL	Onsite	Shallow
134	Manganese, total	7439-96-5	mg/l	7	3.51E+00	3.64E+00	UCL	Onsite	Shallow
134	Nickel, total	7440-02-0	mg/l	4	1.47E-02	3.06E-02	MaxDet	Onsite	Shallow
134	Nitrate (NO3 as N)	14797-55-8	mg/l	8	3.10E+00	9.79E+00	MaxDet	Onsite	Shallow
134	Potassium	7440-09-7	mg/l	8	1.90E+02	1.90E+02	UCL	Onsite	Shallow
134	Selenium, total	7782-49-2	mg/l	4	4.21E-03	5.60E-03	MaxDet	Onsite	Shallow
134	Vanadium, total	7440-62-2	mg/l	4	1.57E-02	2.00E-02	MaxDet	Onsite	Shallow
135	Arsenic, total	7440-38-2	mg/l	6	4.65E-02	5.62E-02	UCL	Onsite	Shallow
135	Boron, total	7440-42-8	mg/l	6	3.40E-01	3.87E-01	UCL	Onsite	Shallow
135	Fluoride	16984-00-6	mg/l	7	1.79E-01	5.00E-01	MaxDet	Onsite	Shallow
135	Manganese, total	7439-96-5	mg/l	4	3.13E-03	5.80E-03	UCL	Onsite	Shallow
135	Mercury, total	7439-97-6	mg/l	2	9.68E-04	1.87E-03	MaxDet	Onsite	Shallow
135	Nitrate (NO3 as N)	14797-55-8	mg/l	7	1.96E+01	2.61E+01	UCL	Onsite	Shallow
135	Potassium	7440-09-7	mg/l	6	1.44E+01	1.53E+01	UCL	Onsite	Shallow
135	Selenium, total	7782-49-2	mg/l	3	5.87E-03	1.03E-02	MaxDet	Onsite	Shallow
135	Vanadium, total	7440-62-2	mg/l	2	8.86E-03	9.53E-03	MaxDet	Onsite	Shallow
136	Arsenic, total	7440-38-2	mg/l	8	4.35E-01	5.58E-01	UCL	Onsite	Shallow
136	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Shallow
136	Boron, total	7440-42-8	mg/l	6	7.06E-01	8.23E-01	MaxDet	Onsite	Shallow
136	Fluoride	16984-00-6	mg/l	9	1.56E+00	1.56E+00	UCL	Onsite	Shallow
136	Manganese, total	7439-96-5	mg/l	7	2.11E+00	2.20E+00	UCL	Onsite	Shallow
136	Mercury, total	7439-97-6	mg/l	3	9.67E-05	1.70E-04	MaxDet	Onsite	Shallow
136	Nickel, total	7440-02-0	mg/l	5	3.28E-02	3.77E-02	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
136	Nitrate (NO3 as N)	14797-55-8	mg/l	8	2.32E+00	3.02E+00	UCL	Onsite	Shallow
136	Potassium	7440-09-7	mg/l	8	1.08E+02	1.40E+02	UCL	Onsite	Shallow
136	Selenium, total	7782-49-2	mg/l	7	5.61E-02	7.65E-02	UCL	Onsite	Shallow
136	Vanadium, total	7440-62-2	mg/l	5	2.08E-02	2.82E-02	UCL	Onsite	Shallow
136	Zinc, total	7440-66-6	mg/l	4	1.21E-02	4.40E-02	MaxDet	Onsite	Shallow
137	Arsenic, total	7440-38-2	mg/l	8	9.66E-02	1.06E-01	UCL	Onsite	Shallow
137	Boron, total	7440-42-8	mg/l	9	6.00E-01	7.38E-01	UCL	Onsite	Shallow
137	Fluoride	16984-00-6	mg/l	10	1.33E-01	1.67E-01	UCL	Onsite	Shallow
137	Manganese, total	7439-96-5	mg/l	9	1.03E-01	1.15E-01	UCL	Onsite	Shallow
137	Mercury, total	7439-97-6	mg/l	2	1.10E-04	1.70E-04	MaxDet	Onsite	Shallow
137	Nitrate (NO3 as N)	14797-55-8	mg/l	10	6.03E+00	6.74E+00	UCL	Onsite	Shallow
137	Potassium	7440-09-7	mg/l	10	8.20E+00	8.86E+00	UCL	Onsite	Shallow
137	Selenium, total	7782-49-2	mg/l	7	3.67E-03	4.94E-03	UCL	Onsite	Shallow
137	Vanadium, total	7440-62-2	mg/l	5	9.69E-03	1.22E-02	MaxDet	Onsite	Shallow
137	Zinc, total	7440-66-6	mg/l	5	3.90E-03	1.25E-02	MaxDet	Onsite	Shallow
139	Arsenic, total	7440-38-2	mg/l	5	1.11E-02	1.66E-02	UCL	Onsite	Shallow
139	Boron, total	7440-42-8	mg/l	5	7.72E-01	9.28E-01	UCL	Onsite	Shallow
139	Fluoride	16984-00-6	mg/l	6	1.13E+00	1.56E+00	UCL	Onsite	Shallow
139	Manganese, total	7439-96-5	mg/l	5	5.61E-03	2.34E-02	MaxDet	Onsite	Shallow
139	Mercury, total	7439-97-6	mg/l	1	5.20E-04	5.20E-04	Single observation	Onsite	Shallow
139	Nitrate (NO3 as N)	14797-55-8	mg/l	6	3.25E+01	4.10E+01	UCL	Onsite	Shallow
139	Potassium	7440-09-7	mg/l	5	3.19E+01	3.88E+01	UCL	Onsite	Shallow
139	Selenium, total	7782-49-2	mg/l	3	1.68E-02	2.37E-02	MaxDet	Onsite	Shallow
139	Vanadium, total	7440-62-2	mg/l	4	3.50E-03	6.09E-03	MaxDet	Onsite	Shallow
140	Arsenic, total	7440-38-2	mg/l	6	3.44E-02	5.80E-02	UCL	Onsite	Shallow
140	Beryllium, total	7440-41-7	mg/l	1	3.30E-04	3.30E-04	Single observation	Onsite	Shallow
140	Boron, total	7440-42-8	mg/l	6	1.11E+00	1.52E+00	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
140	Fluoride	16984-00-6	mg/l	7	3.06E+00	3.49E+00	UCL	Onsite	Shallow
140	Manganese, total	7439-96-5	mg/l	7	2.56E-01	3.29E-01	UCL	Onsite	Shallow
140	Nitrate (NO3 as N)	14797-55-8	mg/l	7	8.39E+00	9.48E+00	UCL	Onsite	Shallow
140	Potassium	7440-09-7	mg/l	6	3.93E+01	4.28E+01	UCL	Onsite	Shallow
140	Selenium, total	7782-49-2	mg/l	6	2.40E-02	2.85E-02	UCL	Onsite	Shallow
140	Vanadium, total	7440-62-2	mg/l	5	6.64E-03	2.20E-02	MaxDet	Onsite	Shallow
141	Arsenic, total	7440-38-2	mg/l	7	7.99E-02	9.45E-02	UCL	Onsite	Shallow
141	Boron, total	7440-42-8	mg/l	6	1.47E+00	1.73E+00	MaxDet	Onsite	Shallow
141	Fluoride	16984-00-6	mg/l	7	8.29E-02	1.00E-01	MaxDet	Onsite	Shallow
141	Manganese, total	7439-96-5	mg/l	7	2.05E+01	6.35E+01	UCL	Onsite	Shallow
141	Nickel, total	7440-02-0	mg/l	5	1.89E-02	2.77E-02	MaxDet	Onsite	Shallow
141	Nitrate (NO3 as N)	14797-55-8	mg/l	6	3.42E-02	5.26E-02	UCL	Onsite	Shallow
141	Potassium	7440-09-7	mg/l	6	2.62E+01	2.90E+01	UCL	Onsite	Shallow
141	Selenium, total	7782-49-2	mg/l	3	4.16E-03	1.15E-02	MaxDet	Onsite	Shallow
141	Vanadium, total	7440-62-2	mg/l	4	4.97E-03	9.49E-03	UCL	Onsite	Shallow
142	Arsenic, total	7440-38-2	mg/l	4	2.38E-03	3.24E-03	MaxDet	Onsite	Shallow
142	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Shallow
142	Boron, total	7440-42-8	mg/l	6	3.32E-01	3.71E-01	UCL	Onsite	Shallow
142	Fluoride	16984-00-6	mg/l	7	1.06E-01	1.30E-01	UCL	Onsite	Shallow
142	Manganese, total	7439-96-5	mg/l	5	2.27E-02	6.16E-02	MaxDet	Onsite	Shallow
142	Nitrate (NO3 as N)	14797-55-8	mg/l	7	1.85E+00	2.38E+00	UCL	Onsite	Shallow
142	Potassium	7440-09-7	mg/l	7	1.84E+01	1.95E+01	UCL	Onsite	Shallow
142	Selenium, total	7782-49-2	mg/l	4	6.82E-03	8.41E-03	MaxDet	Onsite	Shallow
142	Vanadium, total	7440-62-2	mg/l	5	5.74E-03	1.50E-02	MaxDet	Onsite	Shallow
142	Zinc, total	7440-66-6	mg/l	4	4.05E-03	1.03E-02	MaxDet	Onsite	Shallow
143	Arsenic, total	7440-38-2	mg/l	7	3.64E-01	4.73E-01	UCL	Onsite	Shallow
143	Beryllium, total	7440-41-7	mg/l	3	1.38E-03	2.00E-03	MaxDet	Onsite	Shallow
143	Boron, total	7440-42-8	mg/l	6	1.03E+00	1.03E+00	UCL	Onsite	Shallow
143	Fluoride	16984-00-6	mg/l	7	3.67E-01	4.36E-01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
143	Manganese, total	7439-96-5	mg/l	7	6.30E-01	6.90E-01	UCL	Onsite	Shallow
143	Mercury, total	7439-97-6	mg/l	1	1.70E-04	1.70E-04	Single observation	Onsite	Shallow
143	Nickel, total	7440-02-0	mg/l	6	5.78E-02	6.94E-02	UCL	Onsite	Shallow
143	Nitrate (NO3 as N)	14797-55-8	mg/l	7	7.36E+00	8.38E+00	UCL	Onsite	Shallow
143	Potassium	7440-09-7	mg/l	7	3.70E+01	4.02E+01	UCL	Onsite	Shallow
143	Selenium, total	7782-49-2	mg/l	7	1.98E-01	2.79E-01	UCL	Onsite	Shallow
143	Vanadium, total	7440-62-2	mg/l	5	1.12E-01	1.33E-01	UCL	Onsite	Shallow
143	Zinc, total	7440-66-6	mg/l	4	4.94E-03	1.30E-02	MaxDet	Onsite	Shallow
144	Arsenic, total	7440-38-2	mg/l	3	5.34E-03	7.70E-03	MaxDet	Onsite	Deep
144	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Deep
144	Boron, total	7440-42-8	mg/l	6	4.13E-01	4.30E-01	UCL	Onsite	Deep
144	Fluoride	16984-00-6	mg/l	6	4.59E-01	5.33E-01	UCL	Onsite	Deep
144	Manganese, total	7439-96-5	mg/l	6	1.29E-01	2.87E-01	MaxDet	Onsite	Deep
144	Mercury, total	7439-97-6	mg/l	4	2.25E-03	3.93E-03	MaxDet	Onsite	Deep
144	Nitrate (NO3 as N)	14797-55-8	mg/l	6	3.86E+00	4.33E+00	UCL	Onsite	Deep
144	Potassium	7440-09-7	mg/l	6	1.52E+01	1.62E+01	UCL	Onsite	Deep
144	Selenium, total	7782-49-2	mg/l	5	1.32E-02	1.90E-02	MaxDet	Onsite	Deep
144	Vanadium, total	7440-62-2	mg/l	3	2.11E-03	4.32E-03	MaxDet	Onsite	Deep
144	Zinc, total	7440-66-6	mg/l	2	1.37E-02	1.81E-02	MaxDet	Onsite	Deep
145	Arsenic, total	7440-38-2	mg/l	6	3.57E-01	4.92E-01	UCL	Onsite	Shallow
145	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Shallow
145	Boron, total	7440-42-8	mg/l	6	7.86E-01	8.85E-01	MaxDet	Onsite	Shallow
145	Fluoride	16984-00-6	mg/l	6	8.28E-01	9.54E-01	UCL	Onsite	Shallow
145	Manganese, total	7439-96-5	mg/l	6	1.07E+00	1.07E+00	UCL	Onsite	Shallow
145	Nickel, total	7440-02-0	mg/l	4	1.79E-02	2.60E-02	MaxDet	Onsite	Shallow
145	Nitrate (NO3 as N)	14797-55-8	mg/l	6	3.20E+00	4.08E+00	UCL	Onsite	Shallow
145	Potassium	7440-09-7	mg/l	6	8.21E+01	8.99E+01	MaxDet	Onsite	Shallow
145	Selenium, total	7782-49-2	mg/l	6	1.24E-01	1.82E-01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
145	Vanadium, total	7440-62-2	mg/l	4	1.24E-02	2.98E-02	UCL	Onsite	Shallow
146	Arsenic, total	7440-38-2	mg/l	8	2.14E-02	2.70E-02	UCL	Onsite	Shallow
146	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Shallow
146	Boron, total	7440-42-8	mg/l	6	3.92E-01	4.64E-01	UCL	Onsite	Shallow
146	Fluoride	16984-00-6	mg/l	8	7.60E-01	7.60E-01	UCL	Onsite	Shallow
146	Manganese, total	7439-96-5	mg/l	7	4.30E-01	5.43E-01	UCL	Onsite	Shallow
146	Mercury, total	7439-97-6	mg/l	2	1.00E-04	1.50E-04	MaxDet	Onsite	Shallow
146	Nickel, total	7440-02-0	mg/l	5	8.40E-03	1.46E-02	MaxDet	Onsite	Shallow
146	Nitrate (NO3 as N)	14797-55-8	mg/l	7	5.66E+00	6.63E+00	UCL	Onsite	Shallow
146	Potassium	7440-09-7	mg/l	7	6.82E+01	7.41E+01	UCL	Onsite	Shallow
146	Selenium, total	7782-49-2	mg/l	5	5.83E-03	7.77E-03	UCL	Onsite	Shallow
146	Trichloroethene	79-01-6	mg/l	2	2.50E-03	3.00E-03	MaxDet	Onsite	Shallow
146	Vanadium, total	7440-62-2	mg/l	3	9.60E-03	1.15E-02	MaxDet	Onsite	Shallow
148	Arsenic, total	7440-38-2	mg/l	6	8.53E-03	9.94E-03	UCL	Onsite	Shallow
148	Boron, total	7440-42-8	mg/l	7	2.74E-01	3.22E-01	UCL	Onsite	Shallow
148	Fluoride	16984-00-6	mg/l	9	7.92E-01	8.73E-01	UCL	Onsite	Shallow
148	Manganese, total	7439-96-5	mg/l	6	5.57E-03	2.78E-02	MaxDet	Onsite	Shallow
148	Mercury, total	7439-97-6	mg/l	4	5.75E-05	1.00E-04	MaxDet	Onsite	Shallow
148	Nitrate (NO3 as N)	14797-55-8	mg/l	9	2.57E+00	2.88E+00	UCL	Onsite	Shallow
148	Potassium	7440-09-7	mg/l	9	1.18E+01	1.27E+01	UCL	Onsite	Shallow
148	Selenium, total	7782-49-2	mg/l	5	4.86E-03	7.22E-03	UCL	Onsite	Shallow
148	Vanadium, total	7440-62-2	mg/l	6	3.18E-03	6.12E-03	MaxDet	Onsite	Shallow
148	Zinc, total	7440-66-6	mg/l	4	3.90E-03	1.09E-02	MaxDet	Onsite	Shallow
149	Arsenic, total	7440-38-2	mg/l	8	1.46E-02	1.70E-02	UCL	Onsite	Shallow
149	Boron, total	7440-42-8	mg/l	5	1.42E-01	1.51E-01	UCL	Onsite	Shallow
149	Fluoride	16984-00-6	mg/l	9	1.04E+00	1.10E+00	UCL	Onsite	Shallow
149	Nitrate (NO3 as N)	14797-55-8	mg/l	9	1.17E+00	1.27E+00	UCL	Onsite	Shallow
149	Potassium	7440-09-7	mg/l	8	9.86E+00	1.08E+01	UCL	Onsite	Shallow
149	Vanadium, total	7440-62-2	mg/l	5	3.82E-03	5.09E-03	MaxDet	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
149	Zinc, total	7440-66-6	mg/l	3	3.35E-03	4.58E-03	MaxDet	Onsite	Shallow
15	Boron, total	7440-42-8	mg/L	1	1.28E-01	1.28E-01	Single observation	Onsite	Deep
15	Fluoride	16984-00-6	mg/L	1	3.00E-01	3.00E-01	Single observation	Onsite	Deep
15	Nitrate (NO3 as N)	14797-55-8	mg/L	1	2.79E+00	2.79E+00	Single observation	Onsite	Deep
15	Potassium	7440-09-7	mg/L	1	6.56E+00	6.56E+00	Single observation	Onsite	Deep
150	Arsenic, total	7440-38-2	mg/l	10	4.33E-01	7.96E-01	UCL	Onsite	Shallow
150	Boron, total	7440-42-8	mg/l	9	1.24E+01	4.61E+01	UCL	Onsite	Shallow
150	Fluoride	16984-00-6	mg/l	9	1.03E+01	1.46E+01	UCL	Onsite	Shallow
150	Manganese, total	7439-96-5	mg/l	9	1.84E+00	1.99E+00	UCL	Onsite	Shallow
150	Mercury, total	7439-97-6	mg/l	5	5.50E-05	1.00E-04	MaxDet	Onsite	Shallow
150	Nickel, total	7440-02-0	mg/l	6	1.87E-02	2.70E-02	UCL	Onsite	Shallow
150	Nitrate (NO3 as N)	14797-55-8	mg/l	9	9.17E-02	2.16E-01	UCL	Onsite	Shallow
150	Potassium	7440-09-7	mg/l	9	1.34E+03	1.45E+03	UCL	Onsite	Shallow
150	Selenium, total	7782-49-2	mg/l	4	2.22E-03	6.30E-03	MaxDet	Onsite	Shallow
151	Arsenic, total	7440-38-2	mg/l	6	5.73E-02	7.45E-02	UCL	Onsite	Shallow
151	Boron, total	7440-42-8	mg/l	6	9.76E-01	1.18E+00	UCL	Onsite	Shallow
151	Fluoride	16984-00-6	mg/l	7	9.29E-02	1.18E-01	UCL	Onsite	Shallow
151	Manganese, total	7439-96-5	mg/l	7	5.08E+00	5.97E+00	UCL	Onsite	Shallow
151	Nickel, total	7440-02-0	mg/l	4	1.62E-02	2.73E-02	UCL	Onsite	Shallow
151	Potassium	7440-09-7	mg/l	6	1.99E+01	2.23E+01	UCL	Onsite	Shallow
151	Vanadium, total	7440-62-2	mg/l	4	7.69E-03	9.33E-03	MaxDet	Onsite	Shallow
152	Arsenic, total	7440-38-2	mg/l	9	1.53E-01	1.76E-01	UCL	Onsite	Deep
152	Boron, total	7440-42-8	mg/l	9	1.43E+01	3.30E+01	UCL	Onsite	Deep
152	Fluoride	16984-00-6	mg/l	9	9.27E+00	1.12E+01	UCL	Onsite	Deep
152	Manganese, total	7439-96-5	mg/l	9	1.52E+00	1.52E+00	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
152	Nickel, total	7440-02-0	mg/l	6	1.65E-02	2.27E-02	UCL	Onsite	Deep
152	Potassium	7440-09-7	mg/l	9	1.10E+03	1.19E+03	UCL	Onsite	Deep
153	Boron, total	7440-42-8	mg/l	2	1.04E-01	1.67E-01	MaxDet	Onsite	Deep
153	Fluoride	16984-00-6	mg/l	2	1.27E+00	1.37E+00	MaxDet	Onsite	Deep
153	Manganese, total	7439-96-5	mg/l	1	1.49E-01	1.49E-01	Single observation	Onsite	Deep
153	Nitrate (NO3 as N)	14797-55-8	mg/l	2	9.05E-01	9.60E-01	MaxDet	Onsite	Deep
153	Potassium	7440-09-7	mg/l	2	1.09E+01	1.42E+01	MaxDet	Onsite	Deep
153	Selenium, total	7782-49-2	mg/l	1	5.00E-03	5.00E-03	Single observation	Onsite	Deep
154	Arsenic, total	7440-38-2	mg/l	5	6.19E-03	7.91E-03	UCL	Onsite	Shallow
154	Boron, total	7440-42-8	mg/l	4	1.23E-01	1.60E-01	MaxDet	Onsite	Shallow
154	Fluoride	16984-00-6	mg/l	7	1.14E+00	1.24E+00	UCL	Onsite	Shallow
154	Manganese, total	7439-96-5	mg/l	5	1.24E-03	4.29E-03	MaxDet	Onsite	Shallow
154	Nitrate (NO3 as N)	14797-55-8	mg/l	7	1.07E+00	1.20E+00	UCL	Onsite	Shallow
154	Potassium	7440-09-7	mg/l	7	1.08E+01	1.14E+01	UCL	Onsite	Shallow
154	Selenium, total	7782-49-2	mg/l	3	1.08E-03	2.33E-03	MaxDet	Onsite	Shallow
154	Vanadium, total	7440-62-2	mg/l	6	3.51E-03	5.71E-03	UCL	Onsite	Shallow
159	Arsenic, total	7440-38-2	mg/l	3	7.45E-02	7.46E-02	UCL	Onsite	Shallow
159	Boron, total	7440-42-8	mg/l	2	2.28E+00	2.39E+00	MaxDet	Onsite	Shallow
159	Manganese, total	7439-96-5	mg/l	3	1.08E+01	1.08E+01	UCL	Onsite	Shallow
159	Potassium	7440-09-7	mg/l	3	2.80E+01	2.84E+01	MaxDet	Onsite	Shallow
159	Selenium, total	7782-49-2	mg/l	1	1.10E-03	1.10E-03	Single observation	Onsite	Shallow
161	Beryllium, total	7440-41-7	mg/l	1	2.10E-04	2.10E-04	Single observation	Onsite	Deep
161	Boron, total	7440-42-8	mg/l	1	4.82E-02	4.82E-02	Single observation	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
161	Fluoride	16984-00-6	mg/l	1	2.00E-01	2.00E-01	Single observation	Onsite	Deep
161	Manganese, total	7439-96-5	mg/l	1	6.07E-02	6.07E-02	Single observation	Onsite	Deep
161	Nitrate (NO3 as N)	14797-55-8	mg/l	1	5.21E+00	5.21E+00	Single observation	Onsite	Deep
161	Potassium	7440-09-7	mg/l	1	1.82E+01	1.82E+01	Single observation	Onsite	Deep
161	Vanadium, total	7440-62-2	mg/l	1	2.31E-03	2.31E-03	Single observation	Onsite	Deep
164	Arsenic, total	7440-38-2	mg/l	1	1.97E-01	1.97E-01	Single observation	Onsite	Deep
164	Boron, total	7440-42-8	mg/l	1	5.14E-01	5.14E-01	Single observation	Onsite	Deep
164	Manganese, total	7439-96-5	mg/l	1	2.90E-02	2.90E-02	Single observation	Onsite	Deep
164	Nitrate (NO3 as N)	14797-55-8	mg/l	1	6.38E+00	6.38E+00	Single observation	Onsite	Deep
164	Potassium	7440-09-7	mg/l	1	1.74E+01	1.74E+01	Single observation	Onsite	Deep
164	Vanadium, total	7440-62-2	mg/l	1	8.46E-03	8.46E-03	Single observation	Onsite	Deep
300	Arsenic, total	7440-38-2	mg/l	6	5.98E-01	7.26E-01	UCL	Onsite	Shallow
300	Beryllium, total	7440-41-7	mg/l	2	6.60E-04	1.17E-03	MaxDet	Onsite	Shallow
300	Boron, total	7440-42-8	mg/l	5	5.50E-01	5.50E-01	UCL	Onsite	Shallow
300	Fluoride	16984-00-6	mg/l	6	9.56E-02	1.72E-01	UCL	Onsite	Shallow
300	Manganese, total	7439-96-5	mg/l	4	4.18E-03	8.50E-03	MaxDet	Onsite	Shallow
300	Nitrate (NO3 as N)	14797-55-8	mg/l	6	1.86E+00	3.20E+00	UCL	Onsite	Shallow
300	Potassium	7440-09-7	mg/l	6	1.52E+01	1.65E+01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
300	Selenium, total	7782-49-2	mg/l	6	8.65E-03	1.22E-02	UCL	Onsite	Shallow
300	Vanadium, total	7440-62-2	mg/l	4	1.73E-03	3.72E-03	MaxDet	Onsite	Shallow
300	Zinc, total	7440-66-6	mg/l	2	2.23E-03	3.00E-03	MaxDet	Onsite	Shallow
304	Arsenic, total	7440-38-2	mg/l	3	3.60E-03	6.21E-03	MaxDet	Onsite	Shallow
304	Beryllium, total	7440-41-7	mg/l	2	6.15E-04	1.08E-03	MaxDet	Onsite	Shallow
304	Boron, total	7440-42-8	mg/l	3	1.05E-01	2.02E-01	MaxDet	Onsite	Shallow
304	Fluoride	16984-00-6	mg/l	5	1.34E-01	1.80E-01	UCL	Onsite	Shallow
304	Manganese, total	7439-96-5	mg/l	2	2.19E-03	3.97E-03	MaxDet	Onsite	Shallow
304	Nitrate (NO3 as N)	14797-55-8	mg/l	5	5.48E+00	7.16E+00	UCL	Onsite	Shallow
304	Potassium	7440-09-7	mg/l	5	1.69E+01	1.86E+01	UCL	Onsite	Shallow
304	Selenium, total	7782-49-2	mg/l	4	9.01E-03	9.90E-03	MaxDet	Onsite	Shallow
306	Arsenic, total	7440-38-2	mg/l	7	2.67E-01	2.94E-01	UCL	Onsite	Shallow
306	Beryllium, total	7440-41-7	mg/l	2	5.75E-04	1.00E-03	MaxDet	Onsite	Shallow
306	Boron, total	7440-42-8	mg/l	5	4.64E-01	5.56E-01	UCL	Onsite	Shallow
306	Fluoride	16984-00-6	mg/l	7	1.21E-01	1.99E-01	UCL	Onsite	Shallow
306	Manganese, total	7439-96-5	mg/l	3	5.26E-03	1.49E-02	MaxDet	Onsite	Shallow
306	Mercury, total	7439-97-6	mg/l	1	1.05E-03	1.05E-03	Single observation	Onsite	Shallow
306	Nitrate (NO3 as N)	14797-55-8	mg/l	5	1.95E+00	2.35E+00	UCL	Onsite	Shallow
306	Potassium	7440-09-7	mg/l	6	3.05E+01	3.24E+01	UCL	Onsite	Shallow
306	Selenium, total	7782-49-2	mg/l	4	6.59E-03	8.01E-03	MaxDet	Onsite	Shallow
306	Vanadium, total	7440-62-2	mg/l	4	2.81E-03	6.32E-03	MaxDet	Onsite	Shallow
307	Arsenic, total	7440-38-2	mg/l	6	5.44E-01	6.42E-01	UCL	Onsite	Shallow
307	Boron, total	7440-42-8	mg/l	5	7.50E-01	7.50E-01	UCL	Onsite	Shallow
307	Fluoride	16984-00-6	mg/l	5	9.64E-02	1.24E-01	UCL	Onsite	Shallow
307	Manganese, total	7439-96-5	mg/l	6	9.95E-02	9.96E-02	UCL	Onsite	Shallow
307	Nitrate (NO3 as N)	14797-55-8	mg/l	6	2.35E+00	2.97E+00	UCL	Onsite	Shallow
307	Potassium	7440-09-7	mg/l	6	3.24E+01	3.43E+01	MaxDet	Onsite	Shallow
307	Selenium, total	7782-49-2	mg/l	4	1.07E-02	1.40E-02	MaxDet	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
307	Trichloroethene	79-01-6	mg/l	1	2.80E-02	2.80E-02	Single observation	Onsite	Shallow
307	Vanadium, total	7440-62-2	mg/l	4	3.00E-02	3.42E-02	MaxDet	Onsite	Shallow
308	Arsenic, total	7440-38-2	mg/l	5	4.99E-01	6.35E-01	UCL	Onsite	Shallow
308	Beryllium, total	7440-41-7	mg/l	2	6.38E-04	1.13E-03	MaxDet	Onsite	Shallow
308	Boron, total	7440-42-8	mg/l	5	7.19E-01	7.72E-01	UCL	Onsite	Shallow
308	Fluoride	16984-00-6	mg/l	5	9.28E-01	2.65E+00	MaxDet	Onsite	Shallow
308	Manganese, total	7439-96-5	mg/l	5	4.84E-01	6.20E-01	UCL	Onsite	Shallow
308	Mercury, total	7439-97-6	mg/l	3	1.10E-04	2.00E-04	MaxDet	Onsite	Shallow
308	Nickel, total	7440-02-0	mg/l	4	3.40E-02	9.82E-02	MaxDet	Onsite	Shallow
308	Nitrate (NO3 as N)	14797-55-8	mg/l	4	1.70E+01	5.96E+01	MaxDet	Onsite	Shallow
308	Potassium	7440-09-7	mg/l	5	3.53E+01	3.80E+01	MaxDet	Onsite	Shallow
308	Selenium, total	7782-49-2	mg/l	5	2.10E-02	2.63E-02	UCL	Onsite	Shallow
308	Vanadium, total	7440-62-2	mg/l	4	2.53E-02	3.14E-02	MaxDet	Onsite	Shallow
308	Zinc, total	7440-66-6	mg/l	2	1.42E-02	2.70E-02	MaxDet	Onsite	Shallow
309	Arsenic, total	7440-38-2	mg/l	8	1.12E-01	1.46E-01	UCL	Onsite	Deep
309	Beryllium, total	7440-41-7	mg/l	3	7.90E-04	1.12E-03	MaxDet	Onsite	Deep
309	Boron, total	7440-42-8	mg/l	5	4.71E-01	5.36E-01	UCL	Onsite	Deep
309	Fluoride	16984-00-6	mg/l	8	5.56E-01	5.90E-01	UCL	Onsite	Deep
309	Manganese, total	7439-96-5	mg/l	3	1.93E-03	5.00E-03	MaxDet	Onsite	Deep
309	Nitrate (NO3 as N)	14797-55-8	mg/l	6	2.53E+00	2.73E+00	UCL	Onsite	Deep
309	Potassium	7440-09-7	mg/l	7	5.37E+01	6.03E+01	UCL	Onsite	Deep
309	Selenium, total	7782-49-2	mg/l	5	5.92E-03	8.39E-03	MaxDet	Onsite	Deep
309	Vanadium, total	7440-62-2	mg/l	4	5.00E-03	9.09E-03	MaxDet	Onsite	Deep
310	Arsenic, total	7440-38-2	mg/l	7	1.37E-01	1.72E-01	UCL	Onsite	Shallow
310	Boron, total	7440-42-8	mg/l	7	4.99E-01	5.73E-01	UCL	Onsite	Shallow
310	Fluoride	16984-00-6	mg/l	8	2.07E-01	2.44E-01	UCL	Onsite	Shallow
310	Manganese, total	7439-96-5	mg/l	6	1.41E-01	8.10E-01	MaxDet	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
310	Mercury, total	7439-97-6	mg/l	1	8.00E-04	8.00E-04	Single observation	Onsite	Shallow
310	Nickel, total	7440-02-0	mg/l	6	9.68E-03	1.78E-02	MaxDet	Onsite	Shallow
310	Nitrate (NO3 as N)	14797-55-8	mg/l	8	2.26E+00	2.48E+00	UCL	Onsite	Shallow
310	Potassium	7440-09-7	mg/l	8	2.29E+01	2.58E+01	UCL	Onsite	Shallow
310	Selenium, total	7782-49-2	mg/l	6	1.14E-02	2.26E-02	MaxDet	Onsite	Shallow
310	Vanadium, total	7440-62-2	mg/l	5	2.73E-02	5.60E-02	MaxDet	Onsite	Shallow
310	Zinc, total	7440-66-6	mg/l	3	8.08E-02	2.25E-01	MaxDet	Onsite	Shallow
311	Arsenic, total	7440-38-2	mg/l	3	4.16E-03	5.83E-03	MaxDet	Onsite	Deep
311	Beryllium, total	7440-41-7	mg/l	1	1.75E-03	1.75E-03	Single observation	Onsite	Deep
311	Boron, total	7440-42-8	mg/l	2	1.28E-01	1.57E-01	MaxDet	Onsite	Deep
311	Fluoride	16984-00-6	mg/l	5	5.90E-01	7.32E-01	UCL	Onsite	Deep
311	Manganese, total	7439-96-5	mg/l	2	4.75E-03	8.99E-03	MaxDet	Onsite	Deep
311	Nitrate (NO3 as N)	14797-55-8	mg/l	4	8.43E-01	9.80E-01	MaxDet	Onsite	Deep
311	Potassium	7440-09-7	mg/l	5	2.98E+01	6.76E+01	MaxDet	Onsite	Deep
311	Selenium, total	7782-49-2	mg/l	2	2.00E-03	3.50E-03	MaxDet	Onsite	Deep
311	Vanadium, total	7440-62-2	mg/l	2	2.31E-03	3.62E-03	MaxDet	Onsite	Deep
311	Zinc, total	7440-66-6	mg/l	1	8.99E-03	8.99E-03	Single observation	Onsite	Deep
312	Arsenic, total	7440-38-2	mg/l	5	2.38E-01	3.07E-01	MaxDet	Onsite	Shallow
312	Beryllium, total	7440-41-7	mg/l	4	9.08E-04	1.44E-03	MaxDet	Onsite	Shallow
312	Boron, total	7440-42-8	mg/l	5	7.99E-01	9.13E-01	UCL	Onsite	Shallow
312	Fluoride	16984-00-6	mg/l	5	2.20E-01	2.63E-01	UCL	Onsite	Shallow
312	Manganese, total	7439-96-5	mg/l	5	6.43E-01	8.33E-01	UCL	Onsite	Shallow
312	Nickel, total	7440-02-0	mg/l	5	2.65E-02	9.10E-02	MaxDet	Onsite	Shallow
312	Nitrate (NO3 as N)	14797-55-8	mg/l	5	4.62E+00	4.62E+00	UCL	Onsite	Shallow
312	Potassium	7440-09-7	mg/l	5	2.39E+01	2.66E+01	UCL	Onsite	Shallow
312	Selenium, total	7782-49-2	mg/l	5	1.54E-01	1.98E-01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
312	Vanadium, total	7440-62-2	mg/l	4	2.71E-02	3.65E-02	MaxDet	Onsite	Shallow
313	Arsenic, total	7440-38-2	mg/l	5	2.48E-01	2.94E-01	MaxDet	Onsite	Shallow
313	Beryllium, total	7440-41-7	mg/l	2	8.80E-04	1.61E-03	MaxDet	Onsite	Shallow
313	Boron, total	7440-42-8	mg/l	5	4.84E-01	5.38E-01	UCL	Onsite	Shallow
313	Fluoride	16984-00-6	mg/l	5	3.80E-01	1.00E+00	MaxDet	Onsite	Shallow
313	Manganese, total	7439-96-5	mg/l	4	5.65E-02	6.68E-02	MaxDet	Onsite	Shallow
313	Nitrate (NO3 as N)	14797-55-8	mg/l	5	6.20E+01	8.22E+01	MaxDet	Onsite	Shallow
313	Potassium	7440-09-7	mg/l	5	3.89E+01	3.90E+01	UCL	Onsite	Shallow
313	Selenium, total	7782-49-2	mg/l	5	2.35E-02	3.20E-02	UCL	Onsite	Shallow
313	Vanadium, total	7440-62-2	mg/l	4	5.40E-03	1.02E-02	MaxDet	Onsite	Shallow
315	Arsenic, total	7440-38-2	mg/l	5	2.31E-01	2.68E-01	UCL	Onsite	Deep
315	Beryllium, total	7440-41-7	mg/l	3	1.17E-03	2.00E-03	MaxDet	Onsite	Deep
315	Boron, total	7440-42-8	mg/l	5	5.02E-01	5.59E-01	UCL	Onsite	Deep
315	Fluoride	16984-00-6	mg/l	6	1.67E-01	2.00E-01	MaxDet	Onsite	Deep
315	Manganese, total	7439-96-5	mg/l	3	1.97E-03	3.19E-03	MaxDet	Onsite	Deep
315	Mercury, total	7439-97-6	mg/l	2	7.45E-04	1.40E-03	MaxDet	Onsite	Deep
315	Nickel, total	7440-02-0	mg/l	5	9.48E-03	2.00E-02	MaxDet	Onsite	Deep
315	Nitrate (NO3 as N)	14797-55-8	mg/l	5	6.42E+00	1.06E+01	MaxDet	Onsite	Deep
315	Potassium	7440-09-7	mg/l	6	2.79E+01	2.79E+01	UCL	Onsite	Deep
315	Selenium, total	7782-49-2	mg/l	3	3.22E-02	8.28E-02	MaxDet	Onsite	Deep
315	Vanadium, total	7440-62-2	mg/l	5	1.94E-02	7.00E-02	MaxDet	Onsite	Deep
315	Zinc, total	7440-66-6	mg/l	3	3.08E-02	9.00E-02	MaxDet	Onsite	Deep
316	Arsenic, total	7440-38-2	mg/l	5	4.02E-01	5.06E-01	UCL	Onsite	Shallow
316	Beryllium, total	7440-41-7	mg/l	2	7.50E-04	1.35E-03	MaxDet	Onsite	Shallow
316	Boron, total	7440-42-8	mg/l	6	6.19E-01	6.20E-01	UCL	Onsite	Shallow
316	Fluoride	16984-00-6	mg/l	6	9.17E-02	1.00E-01	MaxDet	Onsite	Shallow
316	Manganese, total	7439-96-5	mg/l	4	2.94E-01	1.13E+00	MaxDet	Onsite	Shallow
316	Nickel, total	7440-02-0	mg/l	5	1.15E-02	3.00E-02	MaxDet	Onsite	Shallow
316	Nitrate (NO3 as N)	14797-55-8	mg/l	6	1.26E+01	2.12E+01	UCL	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
316	Potassium	7440-09-7	mg/l	6	3.17E+01	3.38E+01	UCL	Onsite	Shallow
316	Selenium, total	7782-49-2	mg/l	5	3.54E-02	4.50E-02	UCL	Onsite	Shallow
316	Tetrachloroethene	127-18-4	mg/l	1	1.00E-03	1.00E-03	Single observation	Onsite	Shallow
316	Vanadium, total	7440-62-2	mg/l	5	1.47E-02	5.00E-02	MaxDet	Onsite	Shallow
316	Zinc, total	7440-66-6	mg/l	3	2.37E-01	7.10E-01	MaxDet	Onsite	Shallow
317	Arsenic, total	7440-38-2	mg/l	6	3.77E-01	4.45E-01	UCL	Onsite	Deep
317	Beryllium, total	7440-41-7	mg/l	1	5.60E-04	5.60E-04	Single observation	Onsite	Deep
317	Boron, total	7440-42-8	mg/l	5	5.96E-01	6.40E-01	UCL	Onsite	Deep
317	Fluoride	16984-00-6	mg/l	6	1.06E-01	1.70E-01	UCL	Onsite	Deep
317	Nitrate (NO3 as N)	14797-55-8	mg/l	5	9.66E-01	1.60E+00	MaxDet	Onsite	Deep
317	Potassium	7440-09-7	mg/l	6	1.98E+01	2.15E+01	UCL	Onsite	Deep
317	Selenium, total	7782-49-2	mg/l	5	4.61E-03	7.27E-03	MaxDet	Onsite	Deep
317	Vanadium, total	7440-62-2	mg/l	3	3.07E-02	3.63E-02	MaxDet	Onsite	Deep
318	Arsenic, total	7440-38-2	mg/l	6	2.84E-01	4.86E-01	UCL	Onsite	Shallow
318	Beryllium, total	7440-41-7	mg/l	5	4.56E-02	7.82E-02	UCL	Onsite	Shallow
318	Boron, total	7440-42-8	mg/l	5	2.81E+00	6.84E+00	MaxDet	Onsite	Shallow
318	Fluoride	16984-00-6	mg/l	6	9.03E+02	2.82E+03	MaxDet	Onsite	Shallow
318	Manganese, total	7439-96-5	mg/l	6	6.05E+00	9.50E+00	UCL	Onsite	Shallow
318	Mercury, total	7439-97-6	mg/l	1	7.00E-04	7.00E-04	Single observation	Onsite	Shallow
318	Nickel, total	7440-02-0	mg/l	5	2.41E+00	3.46E+00	MaxDet	Onsite	Shallow
318	Nitrate (NO3 as N)	14797-55-8	mg/l	3	4.10E+00	9.76E+00	MaxDet	Onsite	Shallow
318	Potassium	7440-09-7	mg/l	6	1.92E+02	2.99E+02	UCL	Onsite	Shallow
318	Selenium, total	7782-49-2	mg/l	6	2.25E-02	4.38E-02	MaxDet	Onsite	Shallow
318	Vanadium, total	7440-62-2	mg/l	5	1.52E+01	2.23E+01	MaxDet	Onsite	Shallow
318	Zinc, total	7440-66-6	mg/l	5	1.96E+01	2.89E+01	MaxDet	Onsite	Shallow
319	Arsenic, total	7440-38-2	mg/l	3	1.75E-02	2.77E-02	MaxDet	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
319	Boron, total	7440-42-8	mg/l	3	9.74E-02	1.26E-01	MaxDet	Onsite	Deep
319	Fluoride	16984-00-6	mg/l	7	1.19E+00	1.90E+00	UCL	Onsite	Deep
319	Nitrate (NO3 as N)	14797-55-8	mg/l	7	9.86E-01	1.06E+00	UCL	Onsite	Deep
319	Potassium	7440-09-7	mg/l	7	5.08E+00	5.55E+00	UCL	Onsite	Deep
319	Selenium, total	7782-49-2	mg/l	3	1.10E-03	2.40E-03	MaxDet	Onsite	Deep
319	Vanadium, total	7440-62-2	mg/l	4	3.09E-03	5.38E-03	MaxDet	Onsite	Deep
320	Arsenic, total	7440-38-2	mg/l	5	7.91E-02	8.95E-02	UCL	Onsite	Shallow
320	Beryllium, total	7440-41-7	mg/l	2	6.15E-04	1.08E-03	MaxDet	Onsite	Shallow
320	Boron, total	7440-42-8	mg/l	5	3.84E-01	4.50E-01	UCL	Onsite	Shallow
320	Fluoride	16984-00-6	mg/l	6	5.93E+00	8.07E+00	UCL	Onsite	Shallow
320	Manganese, total	7439-96-5	mg/l	6	4.62E-01	6.53E-01	UCL	Onsite	Shallow
320	Nickel, total	7440-02-0	mg/l	5	1.07E-01	1.63E-01	UCL	Onsite	Shallow
320	Nitrate (NO3 as N)	14797-55-8	mg/l	6	6.09E+01	7.68E+01	UCL	Onsite	Shallow
320	Potassium	7440-09-7	mg/l	6	2.94E+01	3.46E+01	UCL	Onsite	Shallow
320	Selenium, total	7782-49-2	mg/l	4	1.57E-02	2.49E-02	MaxDet	Onsite	Shallow
320	Vanadium, total	7440-62-2	mg/l	4	2.86E-02	5.00E-02	MaxDet	Onsite	Shallow
320	Zinc, total	7440-66-6	mg/l	4	5.17E-02	8.40E-02	MaxDet	Onsite	Shallow
321	Arsenic, total	7440-38-2	mg/l	3	3.17E-03	6.96E-03	MaxDet	Onsite	Deep
321	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Deep
321	Boron, total	7440-42-8	mg/l	3	9.50E-02	1.09E-01	MaxDet	Onsite	Deep
321	Fluoride	16984-00-6	mg/l	6	1.50E-01	1.95E-01	UCL	Onsite	Deep
321	Nitrate (NO3 as N)	14797-55-8	mg/l	6	2.73E+00	3.01E+00	UCL	Onsite	Deep
321	Potassium	7440-09-7	mg/l	6	6.43E+00	6.94E+00	UCL	Onsite	Deep
321	Selenium, total	7782-49-2	mg/l	3	2.42E-03	4.30E-03	MaxDet	Onsite	Deep
322	Arsenic, total	7440-38-2	mg/l	1	4.27E-03	4.27E-03	Single observation	Onsite	Deep
322	Fluoride	16984-00-6	mg/l	1	2.00E-01	2.00E-01	Single observation	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
322	Nitrate (NO3 as N)	14797-55-8	mg/l	1	7.78E+01	7.78E+01	Single observation	Onsite	Deep
322	Potassium	7440-09-7	mg/l	1	6.10E+00	6.10E+00	Single observation	Onsite	Deep
323	Arsenic, total	7440-38-2	mg/l	5	5.96E-01	6.69E-01	UCL	Onsite	Shallow
323	Boron, total	7440-42-8	mg/l	4	5.84E-01	5.84E-01	UCL	Onsite	Shallow
323	Fluoride	16984-00-6	mg/l	5	9.00E-02	1.00E-01	MaxDet	Onsite	Shallow
323	Manganese, total	7439-96-5	mg/l	5	2.48E-02	9.67E-02	MaxDet	Onsite	Shallow
323	Nitrate (NO3 as N)	14797-55-8	mg/l	5	2.30E+00	2.42E+00	UCL	Onsite	Shallow
323	Potassium	7440-09-7	mg/l	5	2.60E+01	2.60E+01	UCL	Onsite	Shallow
323	Selenium, total	7782-49-2	mg/l	3	4.07E-03	4.97E-03	MaxDet	Onsite	Shallow
323	Vanadium, total	7440-62-2	mg/l	4	3.49E-03	7.09E-03	UCL	Onsite	Shallow
324	Arsenic, total	7440-38-2	mg/l	2	1.28E-02	1.39E-02	MaxDet	Onsite	Shallow
324	Boron, total	7440-42-8	mg/l	3	1.45E-01	1.86E-01	MaxDet	Onsite	Shallow
324	Fluoride	16984-00-6	mg/l	4	7.25E-01	7.84E-01	UCL	Onsite	Shallow
324	Manganese, total	7439-96-5	mg/l	3	8.15E-03	2.01E-02	MaxDet	Onsite	Shallow
324	Nitrate (NO3 as N)	14797-55-8	mg/l	3	9.57E-01	1.27E+00	MaxDet	Onsite	Shallow
324	Potassium	7440-09-7	mg/l	4	6.73E+00	6.97E+00	MaxDet	Onsite	Shallow
324	Selenium, total	7782-49-2	mg/l	2	1.89E-03	2.41E-03	MaxDet	Onsite	Shallow
324	Vanadium, total	7440-62-2	mg/l	4	2.76E-03	4.80E-03	MaxDet	Onsite	Shallow
325	Arsenic, total	7440-38-2	mg/l	5	1.05E-01	1.35E-01	MaxDet	Onsite	Shallow
325	Beryllium, total	7440-41-7	mg/l	3	8.00E-04	1.20E-03	MaxDet	Onsite	Shallow
325	Boron, total	7440-42-8	mg/l	4	3.72E-01	3.89E-01	MaxDet	Onsite	Shallow
325	Fluoride	16984-00-6	mg/l	5	1.00E-01	1.00E-01	MaxDet	Onsite	Shallow
325	Manganese, total	7439-96-5	mg/l	5	5.11E-02	1.13E-01	MaxDet	Onsite	Shallow
325	Nitrate (NO3 as N)	14797-55-8	mg/l	5	2.77E+01	4.33E+01	UCL	Onsite	Shallow
325	Potassium	7440-09-7	mg/l	5	3.31E+01	3.31E+01	UCL	Onsite	Shallow
325	Selenium, total	7782-49-2	mg/l	5	5.46E-03	7.63E-03	MaxDet	Onsite	Shallow
325	Vanadium, total	7440-62-2	mg/l	4	7.53E-03	1.43E-02	MaxDet	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
326	Arsenic, total	7440-38-2	mg/l	4	4.62E-01	6.59E-01	MaxDet	Onsite	Shallow
326	Beryllium, total	7440-41-7	mg/l	3	9.53E-04	1.54E-03	MaxDet	Onsite	Shallow
326	Boron, total	7440-42-8	mg/l	4	6.27E-01	6.27E-01	UCL	Onsite	Shallow
326	Fluoride	16984-00-6	mg/l	4	8.75E-02	1.00E-01	MaxDet	Onsite	Shallow
326	Manganese, total	7439-96-5	mg/l	2	5.39E-03	8.50E-03	MaxDet	Onsite	Shallow
326	Nickel, total	7440-02-0	mg/l	4	8.75E-03	1.31E-02	MaxDet	Onsite	Shallow
326	Nitrate (NO3 as N)	14797-55-8	mg/l	4	1.56E+01	2.12E+01	MaxDet	Onsite	Shallow
326	Potassium	7440-09-7	mg/l	4	2.35E+01	2.35E+01	UCL	Onsite	Shallow
326	Selenium, total	7782-49-2	mg/l	4	2.08E-02	2.89E-02	MaxDet	Onsite	Shallow
326	Vanadium, total	7440-62-2	mg/l	4	1.12E-02	2.13E-02	MaxDet	Onsite	Shallow
327	Arsenic, total	7440-38-2	mg/l	5	2.68E-02	3.83E-02	MaxDet	Onsite	Shallow
327	Boron, total	7440-42-8	mg/l	3	1.70E-01	1.76E-01	MaxDet	Onsite	Shallow
327	Fluoride	16984-00-6	mg/l	5	1.26E+00	1.63E+00	UCL	Onsite	Shallow
327	Nickel, total	7440-02-0	mg/l	4	8.77E-03	1.32E-02	MaxDet	Onsite	Shallow
327	Nitrate (NO3 as N)	14797-55-8	mg/l	4	3.10E+00	3.97E+00	MaxDet	Onsite	Shallow
327	Potassium	7440-09-7	mg/l	5	1.21E+01	1.29E+01	UCL	Onsite	Shallow
327	Selenium, total	7782-49-2	mg/l	3	3.85E-03	6.60E-03	MaxDet	Onsite	Shallow
327	Vanadium, total	7440-62-2	mg/l	4	3.43E-03	6.84E-03	MaxDet	Onsite	Shallow
327	Zinc, total	7440-66-6	mg/l	2	1.99E-02	2.13E-02	MaxDet	Onsite	Shallow
328	Boron, total	7440-42-8	mg/l	3	1.27E-01	1.35E-01	MaxDet	Onsite	Shallow
328	Fluoride	16984-00-6	mg/l	5	2.40E-01	2.92E-01	UCL	Onsite	Shallow
328	Nitrate (NO3 as N)	14797-55-8	mg/l	4	2.84E+00	3.85E+00	MaxDet	Onsite	Shallow
328	Potassium	7440-09-7	mg/l	5	6.68E+00	6.69E+00	UCL	Onsite	Shallow
328	Selenium, total	7782-49-2	mg/l	2	1.18E-03	1.96E-03	MaxDet	Onsite	Shallow
329	Boron, total	7440-42-8	mg/l	2	1.08E-01	1.28E-01	MaxDet	Onsite	Deep
329	Fluoride	16984-00-6	mg/l	2	8.50E-01	9.00E-01	MaxDet	Onsite	Deep
329	Mercury, total	7439-97-6	mg/l	1	6.80E-04	6.80E-04	Single observation	Onsite	Deep
329	Nickel, total	7440-02-0	mg/l	2	9.25E-03	1.16E-02	MaxDet	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
329	Nitrate (NO3 as N)	14797-55-8	mg/l	2	3.44E+00	6.00E+00	MaxDet	Onsite	Deep
329	Potassium	7440-09-7	mg/l	2	6.36E+00	6.38E+00	MaxDet	Onsite	Deep
329	Selenium, total	7782-49-2	mg/l	1	1.36E-03	1.36E-03	Single observation	Onsite	Deep
329	Vanadium, total	7440-62-2	mg/l	2	3.13E-03	5.26E-03	MaxDet	Onsite	Deep
329	Zinc, total	7440-66-6	mg/l	2	7.25E-03	1.30E-02	MaxDet	Onsite	Deep
330	Boron, total	7440-42-8	mg/l	1	8.29E-02	8.29E-02	Single observation	Onsite	Deep
330	Fluoride	16984-00-6	mg/l	3	6.33E-01	9.00E-01	MaxDet	Onsite	Deep
330	Nitrate (NO3 as N)	14797-55-8	mg/l	3	8.47E-01	8.48E-01	UCL	Onsite	Deep
330	Potassium	7440-09-7	mg/l	3	5.09E+00	5.27E+00	MaxDet	Onsite	Deep
330	Zinc, total	7440-66-6	mg/l	1	3.51E-03	3.51E-03	Single observation	Onsite	Deep
331	Arsenic, total	7440-38-2	mg/l	3	2.17E-01	2.29E-01	MaxDet	Onsite	Shallow
331	Beryllium, total	7440-41-7	mg/l	2	4.60E-04	7.70E-04	MaxDet	Onsite	Shallow
331	Boron, total	7440-42-8	mg/l	2	5.21E-01	5.29E-01	MaxDet	Onsite	Shallow
331	Fluoride	16984-00-6	mg/l	3	2.00E-01	2.00E-01	MaxDet	Onsite	Shallow
331	Manganese, total	7439-96-5	mg/l	3	1.09E-01	1.25E-01	MaxDet	Onsite	Shallow
331	Nickel, total	7440-02-0	mg/l	2	9.74E-03	1.26E-02	MaxDet	Onsite	Shallow
331	Nitrate (NO3 as N)	14797-55-8	mg/l	3	2.47E+01	2.94E+01	MaxDet	Onsite	Shallow
331	Potassium	7440-09-7	mg/l	3	1.83E+01	1.89E+01	MaxDet	Onsite	Shallow
331	Selenium, total	7782-49-2	mg/l	3	5.95E-02	6.49E-02	MaxDet	Onsite	Shallow
331	Vanadium, total	7440-62-2	mg/l	2	1.31E-02	1.89E-02	MaxDet	Onsite	Shallow
332	Arsenic, total	7440-38-2	mg/l	2	2.43E-01	2.78E-01	MaxDet	Onsite	Shallow
332	Beryllium, total	7440-41-7	mg/l	2	6.70E-04	1.19E-03	MaxDet	Onsite	Shallow
332	Boron, total	7440-42-8	mg/l	2	5.54E-01	5.64E-01	MaxDet	Onsite	Shallow
332	Fluoride	16984-00-6	mg/l	2	3.00E-01	3.00E-01	MaxDet	Onsite	Shallow
332	Manganese, total	7439-96-5	mg/l	2	3.91E-02	4.11E-02	MaxDet	Onsite	Shallow
332	Nickel, total	7440-02-0	mg/l	2	3.18E-02	3.59E-02	MaxDet	Onsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
332	Nitrate (NO3 as N)	14797-55-8	mg/l	2	5.19E+00	5.34E+00	MaxDet	Onsite	Shallow
332	Potassium	7440-09-7	mg/l	2	3.59E+01	3.68E+01	MaxDet	Onsite	Shallow
332	Selenium, total	7782-49-2	mg/l	2	2.02E-02	2.40E-02	MaxDet	Onsite	Shallow
332	Vanadium, total	7440-62-2	mg/l	2	1.03E-02	1.96E-02	MaxDet	Onsite	Shallow
333	Arsenic, total	7440-38-2	mg/l	2	3.39E-01	3.43E-01	MaxDet	Onsite	Shallow
333	Beryllium, total	7440-41-7	mg/l	2	5.95E-04	1.04E-03	MaxDet	Onsite	Shallow
333	Boron, total	7440-42-8	mg/l	2	6.73E-01	6.94E-01	MaxDet	Onsite	Shallow
333	Fluoride	16984-00-6	mg/l	2	2.75E-01	4.50E-01	MaxDet	Onsite	Shallow
333	Manganese, total	7439-96-5	mg/l	2	1.79E-02	2.38E-02	MaxDet	Onsite	Shallow
333	Nitrate (NO3 as N)	14797-55-8	mg/l	2	3.18E+00	3.34E+00	MaxDet	Onsite	Shallow
333	Potassium	7440-09-7	mg/l	2	3.09E+01	3.11E+01	MaxDet	Onsite	Shallow
333	Selenium, total	7782-49-2	mg/l	2	1.19E-02	1.56E-02	MaxDet	Onsite	Shallow
333	Vanadium, total	7440-62-2	mg/l	2	1.75E-02	2.21E-02	MaxDet	Onsite	Shallow
500	Arsenic, total	7440-38-2	mg/l	3	4.25E-03	7.20E-03	MaxDet	Onsite	Deep
500	Boron, total	7440-42-8	mg/l	3	8.56E-02	1.00E-01	MaxDet	Onsite	Deep
500	Fluoride	16984-00-6	mg/l	6	7.67E-01	8.41E-01	UCL	Onsite	Deep
500	Manganese, total	7439-96-5	mg/l	5	1.48E-03	5.00E-03	MaxDet	Onsite	Deep
500	Nitrate (NO3 as N)	14797-55-8	mg/l	5	1.04E+00	1.15E+00	UCL	Onsite	Deep
500	Potassium	7440-09-7	mg/l	5	4.10E+00	4.10E+00	UCL	Onsite	Deep
500	Selenium, total	7782-49-2	mg/l	2	2.25E-03	4.10E-03	MaxDet	Onsite	Deep
500	Zinc, total	7440-66-6	mg/l	2	3.34E-03	5.22E-03	MaxDet	Onsite	Deep
501	Arsenic, total	7440-38-2	mg/l	3	5.88E-03	1.03E-02	MaxDet	Offsite	Shallow
501	Boron, total	7440-42-8	mg/l	3	9.73E-02	1.60E-01	MaxDet	Offsite	Shallow
501	Fluoride	16984-00-6	mg/l	6	5.00E-01	5.52E-01	UCL	Offsite	Shallow
501	Manganese, total	7439-96-5	mg/l	4	1.85E-03	6.00E-03	MaxDet	Offsite	Shallow
501	Nitrate (NO3 as N)	14797-55-8	mg/l	5	1.74E+00	1.99E+00	UCL	Offsite	Shallow
501	Potassium	7440-09-7	mg/l	5	6.79E+00	7.13E+00	UCL	Offsite	Shallow
501	Selenium, total	7782-49-2	mg/l	3	2.07E-03	5.30E-03	MaxDet	Offsite	Shallow
501	Zinc, total	7440-66-6	mg/l	2	3.21E-03	4.97E-03	MaxDet	Offsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
502	Arsenic, total	7440-38-2	mg/l	4	3.36E-03	8.20E-03	MaxDet	Offsite	Shallow
502	Beryllium, total	7440-41-7	mg/l	2	5.75E-04	1.00E-03	MaxDet	Offsite	Shallow
502	Boron, total	7440-42-8	mg/l	4	1.29E-01	1.80E-01	MaxDet	Offsite	Shallow
502	Fluoride	16984-00-6	mg/l	7	8.05E-01	8.93E-01	UCL	Offsite	Shallow
502	Manganese, total	7439-96-5	mg/l	5	1.28E-03	4.00E-03	MaxDet	Offsite	Shallow
502	Nitrate (NO3 as N)	14797-55-8	mg/l	6	3.03E+00	4.55E+00	UCL	Offsite	Shallow
502	Potassium	7440-09-7	mg/l	6	6.45E+00	6.45E+00	UCL	Offsite	Shallow
502	Selenium, total	7782-49-2	mg/l	3	1.77E-03	4.40E-03	MaxDet	Offsite	Shallow
502	Zinc, total	7440-66-6	mg/l	3	2.47E-03	4.95E-03	MaxDet	Offsite	Shallow
503	Arsenic, total	7440-38-2	mg/l	6	1.81E-02	1.97E-02	UCL	Offsite	Shallow
503	Boron, total	7440-42-8	mg/l	5	1.67E-01	1.97E-01	UCL	Offsite	Shallow
503	Fluoride	16984-00-6	mg/l	7	1.27E+00	1.50E+00	UCL	Offsite	Shallow
503	Manganese, total	7439-96-5	mg/l	7	4.62E-02	5.19E-02	UCL	Offsite	Shallow
503	Mercury, total	7439-97-6	mg/l	2	6.25E-05	9.50E-05	MaxDet	Offsite	Shallow
503	Nitrate (NO3 as N)	14797-55-8	mg/l	7	4.88E+00	5.50E+00	UCL	Offsite	Shallow
503	Potassium	7440-09-7	mg/l	7	8.72E+00	9.43E+00	UCL	Offsite	Shallow
503	Selenium, total	7782-49-2	mg/l	4	2.91E-03	5.20E-03	MaxDet	Offsite	Shallow
503	Trichloroethene	79-01-6	mg/l	1	3.25E-03	3.25E-03	Single observation	Offsite	Shallow
503	Vanadium, total	7440-62-2	mg/l	5	5.08E-03	7.97E-03	UCL	Offsite	Shallow
503	Zinc, total	7440-66-6	mg/l	4	9.66E-03	3.00E-02	MaxDet	Offsite	Shallow
504	Arsenic, total	7440-38-2	mg/l	3	4.62E-03	7.90E-03	MaxDet	Onsite	Deep
504	Boron, total	7440-42-8	mg/l	4	1.07E-01	1.70E-01	MaxDet	Onsite	Deep
504	Fluoride	16984-00-6	mg/l	7	8.68E-01	9.73E-01	UCL	Onsite	Deep
504	Mercury, total	7439-97-6	mg/l	4	1.08E-04	3.00E-04	MaxDet	Onsite	Deep
504	Nitrate (NO3 as N)	14797-55-8	mg/l	7	1.27E+00	1.64E+00	UCL	Onsite	Deep
504	Potassium	7440-09-7	mg/l	7	5.10E+00	5.10E+00	UCL	Onsite	Deep
504	Selenium, total	7782-49-2	mg/l	4	1.51E-03	4.10E-03	MaxDet	Onsite	Deep
504	Vanadium, total	7440-62-2	mg/l	5	1.41E-03	2.26E-03	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
504	Zinc, total	7440-66-6	mg/l	4	7.88E-03	2.60E-02	MaxDet	Onsite	Deep
505	Arsenic, total	7440-38-2	mg/l	3	3.73E-03	7.10E-03	MaxDet	Offsite	Shallow
505	Boron, total	7440-42-8	mg/l	5	1.56E-01	2.07E-01	UCL	Offsite	Shallow
505	Fluoride	16984-00-6	mg/l	7	2.84E-01	3.32E-01	UCL	Offsite	Shallow
505	Mercury, total	7439-97-6	mg/l	3	1.27E-04	3.00E-04	MaxDet	Offsite	Shallow
505	Nitrate (NO3 as N)	14797-55-8	mg/l	7	2.77E+00	3.26E+00	UCL	Offsite	Shallow
505	Potassium	7440-09-7	mg/l	7	6.77E+00	6.99E+00	UCL	Offsite	Shallow
505	Selenium, total	7782-49-2	mg/l	4	1.36E-03	3.10E-03	MaxDet	Offsite	Shallow
505	Tetrachloroethene	127-18-4	mg/l	1	1.00E-03	1.00E-03	Single observation	Offsite	Shallow
505	Zinc, total	7440-66-6	mg/l	3	4.76E-03	7.87E-03	MaxDet	Offsite	Shallow
506	Arsenic, total	7440-38-2	mg/l	3	5.64E-03	6.90E-03	MaxDet	Onsite	Deep
506	Boron, total	7440-42-8	mg/l	4	1.31E-01	1.75E-01	MaxDet	Onsite	Deep
506	Fluoride	16984-00-6	mg/l	5	2.00E-01	2.67E-01	UCL	Onsite	Deep
506	Mercury, total	7439-97-6	mg/l	3	3.97E-04	9.50E-04	MaxDet	Onsite	Deep
506	Nitrate (NO3 as N)	14797-55-8	mg/l	5	3.75E+00	4.37E+00	UCL	Onsite	Deep
506	Potassium	7440-09-7	mg/l	5	6.57E+00	6.87E+00	UCL	Onsite	Deep
506	Selenium, total	7782-49-2	mg/l	3	2.73E-03	4.00E-03	MaxDet	Onsite	Deep
506	Zinc, total	7440-66-6	mg/l	3	1.12E-02	3.00E-02	MaxDet	Onsite	Deep
507	Arsenic, total	7440-38-2	mg/l	3	3.56E-03	7.00E-03	MaxDet	Offsite	Shallow
507	Boron, total	7440-42-8	mg/l	3	1.60E-01	2.40E-01	MaxDet	Offsite	Shallow
507	Fluoride	16984-00-6	mg/l	5	2.20E-01	3.00E-01	UCL	Offsite	Shallow
507	Mercury, total	7439-97-6	mg/l	3	1.62E-04	3.00E-04	MaxDet	Offsite	Shallow
507	Nitrate (NO3 as N)	14797-55-8	mg/l	5	1.89E+00	2.18E+00	UCL	Offsite	Shallow
507	Potassium	7440-09-7	mg/l	5	6.52E+00	6.74E+00	UCL	Offsite	Shallow
507	Selenium, total	7782-49-2	mg/l	4	1.50E-03	4.60E-03	MaxDet	Offsite	Shallow
507	Tetrachloroethene	127-18-4	mg/l	3	2.33E-03	3.00E-03	MaxDet	Offsite	Shallow
507	Zinc, total	7440-66-6	mg/l	2	6.37E-03	1.13E-02	MaxDet	Offsite	Shallow
508	Arsenic, total	7440-38-2	mg/l	4	3.93E-03	6.82E-03	MaxDet	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
508	Boron, total	7440-42-8	mg/l	3	9.69E-02	1.30E-01	MaxDet	Onsite	Deep
508	Fluoride	16984-00-6	mg/l	6	8.46E-01	9.28E-01	UCL	Onsite	Deep
508	Mercury, total	7439-97-6	mg/l	3	6.50E-05	1.10E-04	MaxDet	Onsite	Deep
508	Nitrate (NO3 as N)	14797-55-8	mg/l	6	1.30E+00	1.41E+00	UCL	Onsite	Deep
508	Potassium	7440-09-7	mg/l	6	4.93E+00	5.21E+00	UCL	Onsite	Deep
508	Selenium, total	7782-49-2	mg/l	3	1.44E-03	3.43E-03	MaxDet	Onsite	Deep
508	Zinc, total	7440-66-6	mg/l	2	3.00E-03	4.55E-03	MaxDet	Onsite	Deep
509	Arsenic, total	7440-38-2	mg/l	4	3.68E-03	6.39E-03	MaxDet	Offsite	Shallow
509	Boron, total	7440-42-8	mg/l	3	1.44E-01	2.30E-01	MaxDet	Offsite	Shallow
509	Fluoride	16984-00-6	mg/l	6	2.76E-01	3.19E-01	UCL	Offsite	Shallow
509	Manganese, total	7439-96-5	mg/l	4	8.50E-04	2.00E-03	MaxDet	Offsite	Shallow
509	Nitrate (NO3 as N)	14797-55-8	mg/l	6	3.16E+00	3.48E+00	MaxDet	Offsite	Shallow
509	Potassium	7440-09-7	mg/l	6	6.40E+00	6.65E+00	UCL	Offsite	Shallow
509	Selenium, total	7782-49-2	mg/l	3	2.04E-03	5.23E-03	MaxDet	Offsite	Shallow
509	Tetrachloroethene	127-18-4	mg/l	3	2.67E-03	3.00E-03	MaxDet	Offsite	Shallow
509	Zinc, total	7440-66-6	mg/l	2	3.19E-03	4.94E-03	MaxDet	Offsite	Shallow
515	Arsenic, total	7440-38-2	mg/l	1	6.88E-03	6.88E-03	Single observation	Offsite	Shallow
515	Boron, total	7440-42-8	mg/l	2	1.19E-01	1.37E-01	MaxDet	Offsite	Shallow
515	Fluoride	16984-00-6	mg/l	4	7.28E-01	8.14E-01	MaxDet	Offsite	Shallow
515	Nitrate (NO3 as N)	14797-55-8	mg/l	3	1.94E+00	2.25E+00	MaxDet	Offsite	Shallow
515	Potassium	7440-09-7	mg/l	3	8.94E+00	1.01E+01	MaxDet	Offsite	Shallow
515	Selenium, total	7782-49-2	mg/l	1	1.93E-03	1.93E-03	Single observation	Offsite	Shallow
517	Arsenic, total	7440-38-2	mg/l	4	2.93E-02	3.29E-02	MaxDet	Offsite	Shallow
517	Boron, total	7440-42-8	mg/l	3	5.72E-01	6.24E-01	MaxDet	Offsite	Shallow
517	Fluoride	16984-00-6	mg/l	4	1.70E-01	2.71E-01	UCL	Offsite	Shallow
517	Manganese, total	7439-96-5	mg/l	3	2.02E-02	3.77E-02	MaxDet	Offsite	Shallow
517	Nitrate (NO3 as N)	14797-55-8	mg/l	4	8.68E+00	9.78E+00	MaxDet	Offsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
517	Potassium	7440-09-7	mg/l	4	8.48E+01	9.50E+01	MaxDet	Offsite	Shallow
517	Selenium, total	7782-49-2	mg/l	4	1.45E-02	2.07E-02	MaxDet	Offsite	Shallow
517	Vanadium, total	7440-62-2	mg/l	2	7.03E-03	9.92E-03	MaxDet	Offsite	Shallow
518	Arsenic, total	7440-38-2	mg/l	4	2.10E-02	2.43E-02	MaxDet	Offsite	Shallow
518	Boron, total	7440-42-8	mg/l	3	1.65E-01	1.86E-01	MaxDet	Offsite	Shallow
518	Fluoride	16984-00-6	mg/l	4	5.27E-01	6.56E-01	MaxDet	Offsite	Shallow
518	Mercury, total	7439-97-6	mg/L	1	1.40E-04	1.40E-04	Single observation	Offsite	Shallow
518	Nickel, total	7440-02-0	mg/l	3	8.47E-03	1.18E-02	MaxDet	Offsite	Shallow
518	Nitrate (NO3 as N)	14797-55-8	mg/l	4	2.35E+00	3.08E+00	MaxDet	Offsite	Shallow
518	Potassium	7440-09-7	mg/l	4	9.82E+00	9.82E+00	UCL	Offsite	Shallow
518	Selenium, total	7782-49-2	mg/l	2	2.50E-03	2.75E-03	MaxDet	Offsite	Shallow
518	Vanadium, total	7440-62-2	mg/l	2	2.44E-03	3.87E-03	MaxDet	Offsite	Shallow
519	Beryllium, total	7440-41-7	mg/l	2	4.50E-04	7.50E-04	MaxDet	Onsite	Deep
519	Boron, total	7440-42-8	mg/l	3	9.22E-02	1.22E-01	MaxDet	Onsite	Deep
519	Fluoride	16984-00-6	mg/l	4	3.40E-01	3.98E-01	UCL	Onsite	Deep
519	Mercury, total	7439-97-6	mg/l	2	1.90E-04	3.30E-04	MaxDet	Onsite	Deep
519	Nitrate (NO3 as N)	14797-55-8	mg/l	4	1.79E+00	2.14E+00	MaxDet	Onsite	Deep
519	Potassium	7440-09-7	mg/l	4	5.07E+00	5.07E+00	UCL	Onsite	Deep
519	Selenium, total	7782-49-2	mg/l	2	5.40E-04	6.80E-04	MaxDet	Onsite	Deep
519	Vanadium, total	7440-62-2	mg/l	3	2.96E-03	4.74E-03	MaxDet	Onsite	Deep
520	Boron, total	7440-42-8	mg/l	1	1.46E-01	1.46E-01	Single observation	Offsite	Shallow
520	Fluoride	16984-00-6	mg/l	1	2.00E-01	2.00E-01	Single observation	Offsite	Shallow
520	Nitrate (NO3 as N)	14797-55-8	mg/l	1	2.09E+00	2.09E+00	Single observation	Offsite	Shallow
520	Potassium	7440-09-7	mg/l	1	7.39E+00	7.39E+00	Single observation	Offsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
521	Arsenic, total	7440-38-2	mg/l	1	4.13E-03	4.13E-03	Single observation	Onsite	Deep
521	Fluoride	16984-00-6	mg/l	1	8.28E-01	8.28E-01	Single observation	Onsite	Deep
521	Manganese, total	7439-96-5	mg/l	1	2.40E-01	2.40E-01	Single observation	Onsite	Deep
521	Nitrate (NO3 as N)	14797-55-8	mg/l	1	7.90E-01	7.90E-01	Single observation	Onsite	Deep
521	Potassium	7440-09-7	mg/l	1	5.75E+00	5.75E+00	Single observation	Onsite	Deep
522	Arsenic, total	7440-38-2	mg/l	1	4.20E-03	4.20E-03	Single observation	Onsite	Deep
522	Fluoride	16984-00-6	mg/l	1	6.00E-01	6.00E-01	Single observation	Onsite	Deep
522	Nitrate (NO3 as N)	14797-55-8	mg/l	1	4.09E+00	4.09E+00	Single observation	Onsite	Deep
522	Potassium	7440-09-7	mg/l	1	9.32E+00	9.32E+00	Single observation	Onsite	Deep
523	Arsenic, total	7440-38-2	mg/l	1	5.38E-03	5.38E-03	Single observation	Onsite	Deep
523	Fluoride	16984-00-6	mg/l	1	5.66E-01	5.66E-01	Single observation	Onsite	Deep
523	Nitrate (NO3 as N)	14797-55-8	mg/l	1	3.08E+00	3.08E+00	Single observation	Onsite	Deep
523	Potassium	7440-09-7	mg/l	1	7.91E+00	7.91E+00	Single observation	Onsite	Deep
524	Fluoride	16984-00-6	mg/l	1	7.72E-01	7.72E-01	Single observation	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
524	Nitrate (NO3 as N)	14797-55-8	mg/l	1	1.78E+00	1.78E+00	Single observation	Onsite	Deep
524	Potassium	7440-09-7	mg/l	1	4.32E+00	4.32E+00	Single observation	Onsite	Deep
525	Fluoride	16984-00-6	mg/l	1	8.20E-01	8.20E-01	Single observation	Onsite	Deep
525	Nitrate (NO3 as N)	14797-55-8	mg/l	1	1.61E+00	1.61E+00	Single observation	Onsite	Deep
525	Potassium	7440-09-7	mg/l	1	3.97E+00	3.97E+00	Single observation	Onsite	Deep
BATISTE SPRI	Arsenic, total	7440-38-2	mg/l	6	1.73E-02	2.39E-02	UCL	Onsite	Shallow
BATISTE SPRI	Boron, total	7440-42-8	mg/l	5	1.55E-01	1.93E-01	UCL	Onsite	Shallow
BATISTE SPRI	Fluoride	16984-00-6	mg/l	8	5.03E-01	5.68E-01	UCL	Onsite	Shallow
BATISTE SPRI	Manganese, total	7439-96-5	mg/l	6	7.41E-03	2.50E-02	MaxDet	Onsite	Shallow
BATISTE SPRI	Nitrate (NO3 as N)	14797-55-8	mg/l	8	3.73E+00	6.68E+00	UCL	Onsite	Shallow
BATISTE SPRI	Potassium	7440-09-7	mg/l	7	9.81E+00	1.26E+01	UCL	Onsite	Shallow
BATISTE SPRI	Selenium, total	7782-49-2	mg/l	6	8.06E-03	1.02E-02	MaxDet	Onsite	Shallow
BATISTE SPRI	Vanadium, total	7440-62-2	mg/l	5	3.83E-03	6.46E-03	UCL	Onsite	Shallow
FMC-6	Arsenic, total	7440-38-2	mg/l	2	3.00E-03	3.40E-03	MaxDet	Onsite	Deep
FMC-6	Boron, total	7440-42-8	mg/l	3	4.20E-01	5.20E-01	MaxDet	Onsite	Deep
FMC-6	Fluoride	16984-00-6	mg/l	3	6.20E-01	7.00E-01	MaxDet	Onsite	Deep
FMC-6	Mercury, total	7439-97-6	mg/l	2	2.00E-04	2.00E-04	MaxDet	Onsite	Deep
FMC-6	Nickel, total	7440-02-0	mg/l	3	1.40E-02	2.90E-02	MaxDet	Onsite	Deep
FMC-6	Nitrate (NO3 as N)	14797-55-8	mg/l	3	9.17E-01	9.50E-01	MaxDet	Onsite	Deep
FMC-6	Potassium	7440-09-7	mg/l	3	6.47E+00	9.40E+00	MaxDet	Onsite	Deep
FMC-6	Vanadium, total	7440-62-2	mg/l	2	4.00E-02	6.00E-02	MaxDet	Onsite	Deep
FMC-6	Zinc, total	7440-66-6	mg/l	2	3.85E-02	4.40E-02	MaxDet	Onsite	Deep
FRONTIER	Arsenic, total	7440-38-2	mg/l	7	2.08E-02	2.54E-02	UCL	Onsite	Deep
FRONTIER	Boron, total	7440-42-8	mg/l	7	1.44E-01	1.74E-01	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
FRONTIER	Fluoride	16984-00-6	mg/l	7	4.84E-01	5.20E-01	UCL	Onsite	Deep
FRONTIER	Mercury, total	7439-97-6	mg/l	4	1.08E-04	3.00E-04	MaxDet	Onsite	Deep
FRONTIER	Nitrate (NO3 as N)	14797-55-8	mg/l	8	1.78E+00	2.02E+00	UCL	Onsite	Deep
FRONTIER	Potassium	7440-09-7	mg/l	8	7.21E+00	8.27E+00	UCL	Onsite	Deep
FRONTIER	Selenium, total	7782-49-2	mg/l	6	3.16E-03	3.82E-03	UCL	Onsite	Deep
FRONTIER	Vanadium, total	7440-62-2	mg/l	4	1.91E-03	4.14E-03	MaxDet	Onsite	Deep
FRONTIER	Zinc, total	7440-66-6	mg/l	3	1.28E-02	3.50E-02	MaxDet	Onsite	Deep
LINDLEY	Arsenic, total	7440-38-2	mg/l	4	5.08E-03	1.10E-02	UCL	Onsite	Deep
LINDLEY	Boron, total	7440-42-8	mg/l	3	3.47E-01	4.10E-01	MaxDet	Onsite	Deep
LINDLEY	Fluoride	16984-00-6	mg/l	5	4.99E-01	5.95E-01	UCL	Onsite	Deep
LINDLEY	Mercury, total	7439-97-6	mg/l	2	3.00E-04	3.00E-04	MaxDet	Onsite	Deep
LINDLEY	Nitrate (NO3 as N)	14797-55-8	mg/l	4	6.34E+00	7.73E+00	MaxDet	Onsite	Deep
LINDLEY	Potassium	7440-09-7	mg/l	4	1.25E+01	1.36E+01	MaxDet	Onsite	Deep
LINDLEY	Selenium, total	7782-49-2	mg/l	4	2.38E-03	4.21E-03	UCL	Onsite	Deep
LINDLEY	Vanadium, total	7440-62-2	mg/l	2	3.61E-03	6.21E-03	MaxDet	Onsite	Deep
LINDLEY	Zinc, total	7440-66-6	mg/l	3	1.00E-01	1.15E-01	MaxDet	Onsite	Deep
NEW PILOT	Arsenic, total	7440-38-2	mg/l	6	4.72E-03	1.20E-02	MaxDet	Onsite	Deep
NEW PILOT	Beryllium, total	7440-41-7	mg/l	3	7.50E-04	2.00E-03	MaxDet	Onsite	Deep
NEW PILOT	Boron, total	7440-42-8	mg/l	7	9.59E-02	1.31E-01	UCL	Onsite	Deep
NEW PILOT	Fluoride	16984-00-6	mg/l	8	8.66E-01	9.40E-01	UCL	Onsite	Deep
NEW PILOT	Manganese, total	7439-96-5	mg/l	3	2.07E-03	4.82E-03	MaxDet	Onsite	Deep
NEW PILOT	Mercury, total	7439-97-6	mg/l	2	4.60E-04	8.50E-04	MaxDet	Onsite	Deep
NEW PILOT	Nitrate (NO3 as N)	14797-55-8	mg/l	8	1.04E+00	1.13E+00	UCL	Onsite	Deep
NEW PILOT	Potassium	7440-09-7	mg/l	8	5.07E+00	5.51E+00	UCL	Onsite	Deep
NEW PILOT	Selenium, total	7782-49-2	mg/l	3	2.89E-03	5.53E-03	MaxDet	Onsite	Deep
NEW PILOT	Vanadium, total	7440-62-2	mg/l	4	2.08E-03	3.53E-03	MaxDet	Onsite	Deep
NEW PILOT	Zinc, total	7440-66-6	mg/l	2	1.61E-02	2.60E-02	MaxDet	Onsite	Deep
OLD PILOT	Arsenic, total	7440-38-2	mg/l	8	4.02E-02	4.50E-02	UCL	Offsite	Shallow
OLD PILOT	Beryllium, total	7440-41-7	mg/l	3	8.50E-04	2.00E-03	MaxDet	Offsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
OLD PILOT	Boron, total	7440-42-8	mg/l	7	7.28E-01	8.42E-01	UCL	Offsite	Shallow
OLD PILOT	Manganese, total	7439-96-5	mg/l	8	8.53E-01	9.23E-01	UCL	Offsite	Shallow
OLD PILOT	Mercury, total	7439-97-6	mg/l	3	1.18E-04	2.35E-04	MaxDet	Offsite	Shallow
OLD PILOT	Nickel, total	7440-02-0	mg/l	7	7.03E-03	1.05E-02	UCL	Offsite	Shallow
OLD PILOT	Nitrate (NO3 as N)	14797-55-8	mg/l	8	1.33E+01	1.54E+01	UCL	Offsite	Shallow
OLD PILOT	Potassium	7440-09-7	mg/l	8	1.05E+02	1.05E+02	UCL	Offsite	Shallow
OLD PILOT	Selenium, total	7782-49-2	mg/l	2	3.72E-03	5.03E-03	MaxDet	Offsite	Shallow
OLD PILOT	Trichloroethene	79-01-6	mg/l	1	1.75E-03	1.75E-03	Single observation	Offsite	Shallow
OLD PILOT	Vanadium, total	7440-62-2	mg/l	3	1.38E-02	2.00E-02	MaxDet	Offsite	Shallow
OLD PILOT	Zinc, total	7440-66-6	mg/l	3	1.26E-02	2.95E-02	MaxDet	Offsite	Shallow
PEI-3	Arsenic, total	7440-38-2	mg/l	2	3.02E-01	4.07E-01	MaxDet	Onsite	Deep
PEI-3	Boron, total	7440-42-8	mg/l	2	7.34E-01	9.60E-01	MaxDet	Onsite	Deep
PEI-3	Fluoride	16984-00-6	mg/l	2	1.13E-01	1.26E-01	MaxDet	Onsite	Deep
PEI-3	Manganese, total	7439-96-5	mg/l	2	4.20E-02	6.50E-02	MaxDet	Onsite	Deep
PEI-3	Nitrate (NO3 as N)	14797-55-8	mg/l	2	3.60E+00	3.65E+00	MaxDet	Onsite	Deep
PEI-3	Potassium	7440-09-7	mg/l	2	1.14E+01	1.24E+01	MaxDet	Onsite	Deep
PEI-3	Selenium, total	7782-49-2	mg/l	1	1.26E-02	1.26E-02	Single observation	Onsite	Deep
PEI-3	Vanadium, total	7440-62-2	mg/l	1	2.00E-02	2.00E-02	Single observation	Onsite	Deep
PEI-3	Zinc, total	7440-66-6	mg/l	2	1.04E-01	1.93E-01	MaxDet	Onsite	Deep
PEI-4	Arsenic, total	7440-38-2	mg/l	4	1.68E-03	2.18E-03	MaxDet	Onsite	Deep
PEI-4	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Deep
PEI-4	Boron, total	7440-42-8	mg/l	4	1.47E-01	1.70E-01	MaxDet	Onsite	Deep
PEI-4	Fluoride	16984-00-6	mg/l	6	2.33E-01	2.76E-01	UCL	Onsite	Deep
PEI-4	Manganese, total	7439-96-5	mg/l	4	2.11E-02	7.80E-02	MaxDet	Onsite	Deep
PEI-4	Mercury, total	7439-97-6	mg/l	2	1.68E-03	2.40E-03	MaxDet	Onsite	Deep
PEI-4	Nitrate (NO3 as N)	14797-55-8	mg/l	6	1.94E+00	2.47E+00	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
PEI-4	Potassium	7440-09-7	mg/l	6	6.33E+00	7.07E+00	UCL	Onsite	Deep
PEI-4	Selenium, total	7782-49-2	mg/l	3	1.07E-03	1.76E-03	MaxDet	Onsite	Deep
PEI-5	Arsenic, total	7440-38-2	mg/l	2	8.37E-02	1.23E-01	MaxDet	Onsite	Deep
PEI-5	Beryllium, total	7440-41-7	mg/l	1	2.10E-02	2.10E-02	Single observation	Onsite	Deep
PEI-5	Boron, total	7440-42-8	mg/l	2	2.18E-01	2.66E-01	MaxDet	Onsite	Deep
PEI-5	Fluoride	16984-00-6	mg/l	2	9.80E+00	9.80E+00	MaxDet	Onsite	Deep
PEI-5	Manganese, total	7439-96-5	mg/l	2	9.84E-01	1.82E+00	MaxDet	Onsite	Deep
PEI-5	Nickel, total	7440-02-0	mg/l	2	2.32E-01	4.43E-01	MaxDet	Onsite	Deep
PEI-5	Nitrate (NO3 as N)	14797-55-8	mg/l	2	1.83E+00	2.22E+00	MaxDet	Onsite	Deep
PEI-5	Potassium	7440-09-7	mg/l	2	5.83E+00	7.80E+00	MaxDet	Onsite	Deep
PEI-5	Selenium, total	7782-49-2	mg/l	1	6.80E-03	6.80E-03	Single observation	Onsite	Deep
PEI-5	Zinc, total	7440-66-6	mg/l	2	6.19E-02	7.88E-02	MaxDet	Onsite	Deep
ROWLANDS	Arsenic, total	7440-38-2	mg/l	5	4.73E-03	1.46E-02	MaxDet	Onsite	Deep
ROWLANDS	Boron, total	7440-42-8	mg/l	4	1.24E-01	1.60E-01	MaxDet	Onsite	Deep
ROWLANDS	Fluoride	16984-00-6	mg/l	6	2.64E-01	3.00E-01	MaxDet	Onsite	Deep
ROWLANDS	Mercury, total	7439-97-6	mg/l	3	2.50E-04	4.00E-04	MaxDet	Onsite	Deep
ROWLANDS	Nitrate (NO3 as N)	14797-55-8	mg/l	6	1.58E+00	1.83E+00	UCL	Onsite	Deep
ROWLANDS	Potassium	7440-09-7	mg/l	6	4.95E+00	5.56E+00	UCL	Onsite	Deep
ROWLANDS	Selenium, total	7782-49-2	mg/l	3	1.88E-03	4.20E-03	MaxDet	Onsite	Deep
ROWLANDS	Vanadium, total	7440-62-2	mg/l	3	2.47E-03	3.49E-03	MaxDet	Onsite	Deep
ROWLANDS	Zinc, total	7440-66-6	mg/l	3	1.11E-02	2.50E-02	MaxDet	Onsite	Deep
TANK FARM	Arsenic, total	7440-38-2	mg/l	5	4.13E-03	8.50E-03	MaxDet	Onsite	Deep
TANK FARM	Boron, total	7440-42-8	mg/l	4	1.09E-01	1.50E-01	MaxDet	Onsite	Deep
TANK FARM	Fluoride	16984-00-6	mg/l	6	7.45E-01	8.44E-01	UCL	Onsite	Deep
TANK FARM	Mercury, total	7439-97-6	mg/l	4	1.70E-04	3.00E-04	MaxDet	Onsite	Deep
TANK FARM	Nitrate (NO3 as N)	14797-55-8	mg/l	6	1.33E+00	1.58E+00	UCL	Onsite	Deep
TANK FARM	Potassium	7440-09-7	mg/l	6	3.44E+00	3.44E+00	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
TANK FARM	Selenium, total	7782-49-2	mg/l	3	2.03E-03	5.20E-03	MaxDet	Onsite	Deep
TANK FARM	Zinc, total	7440-66-6	mg/l	4	1.01E-01	1.26E-01	MaxDet	Onsite	Deep
TW-11I	Arsenic, total	7440-38-2	mg/l	5	2.60E-03	7.50E-03	MaxDet	Onsite	Deep
TW-11I	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Onsite	Deep
TW-11I	Boron, total	7440-42-8	mg/l	4	7.36E-02	1.12E-01	MaxDet	Onsite	Deep
TW-11I	Fluoride	16984-00-6	mg/l	8	8.58E-01	9.42E-01	UCL	Onsite	Deep
TW-11I	Manganese, total	7439-96-5	mg/l	6	3.27E-02	8.10E-02	MaxDet	Onsite	Deep
TW-11I	Nitrate (NO3 as N)	14797-55-8	mg/l	8	1.51E+00	1.78E+00	UCL	Onsite	Deep
TW-11I	Potassium	7440-09-7	mg/l	8	5.19E+00	5.42E+00	UCL	Onsite	Deep
TW-11I	Selenium, total	7782-49-2	mg/l	4	1.34E-03	2.46E-03	MaxDet	Onsite	Deep
TW-11I	Vanadium, total	7440-62-2	mg/l	5	6.28E-03	2.00E-02	MaxDet	Onsite	Deep
TW-11S	Arsenic, total	7440-38-2	mg/l	4	2.01E-03	3.00E-03	MaxDet	Offsite	Shallow
TW-11S	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Offsite	Shallow
TW-11S	Boron, total	7440-42-8	mg/l	4	7.28E-02	1.02E-01	MaxDet	Offsite	Shallow
TW-11S	Fluoride	16984-00-6	mg/l	8	7.77E-01	8.47E-01	UCL	Offsite	Shallow
TW-11S	Nitrate (NO3 as N)	14797-55-8	mg/l	8	1.81E+00	2.47E+00	UCL	Offsite	Shallow
TW-11S	Potassium	7440-09-7	mg/l	8	3.92E+00	4.09E+00	UCL	Offsite	Shallow
TW-11S	Vanadium, total	7440-62-2	mg/l	3	1.63E-03	2.90E-03	MaxDet	Offsite	Shallow
TW-12S	Arsenic, total	7440-38-2	mg/l	8	3.67E-02	4.38E-02	UCL	Offsite	Shallow
TW-12S	Beryllium, total	7440-41-7	mg/l	3	7.50E-04	2.00E-03	MaxDet	Offsite	Shallow
TW-12S	Boron, total	7440-42-8	mg/l	7	2.56E-01	3.01E-01	UCL	Offsite	Shallow
TW-12S	Fluoride	16984-00-6	mg/l	9	1.16E+00	1.30E+00	UCL	Offsite	Shallow
TW-12S	Manganese, total	7439-96-5	mg/l	8	2.10E-01	2.74E-01	UCL	Offsite	Shallow
TW-12S	Mercury, total	7439-97-6	mg/l	4	9.25E-05	2.40E-04	MaxDet	Offsite	Shallow
TW-12S	Nickel, total	7440-02-0	mg/l	7	6.19E-02	8.12E-02	UCL	Offsite	Shallow
TW-12S	Nitrate (NO3 as N)	14797-55-8	mg/l	9	1.49E+01	2.69E+01	UCL	Offsite	Shallow
TW-12S	Potassium	7440-09-7	mg/l	9	2.19E+01	3.00E+01	UCL	Offsite	Shallow
TW-12S	Selenium, total	7782-49-2	mg/l	6	1.25E-02	1.89E-02	UCL	Offsite	Shallow
TW-12S	Vanadium, total	7440-62-2	mg/l	4	6.99E-03	1.15E-02	MaxDet	Offsite	Shallow

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
TW-12S	Zinc, total	7440-66-6	mg/l	4	2.03E-02	2.36E-02	MaxDet	Offsite	Shallow
TW-3D	Arsenic, total	7440-38-2	mg/l	4	6.21E-03	7.35E-03	MaxDet	Onsite	Deep
TW-3D	Boron, total	7440-42-8	mg/l	3	7.37E-02	1.05E-01	MaxDet	Onsite	Deep
TW-3D	Fluoride	16984-00-6	mg/l	7	4.89E-01	5.54E-01	UCL	Onsite	Deep
TW-3D	Manganese, total	7439-96-5	mg/l	4	1.11E-02	1.38E-02	UCL	Onsite	Deep
TW-3D	Mercury, total	7439-97-6	mg/l	2	1.20E-04	2.10E-04	MaxDet	Onsite	Deep
TW-3D	Nitrate (NO3 as N)	14797-55-8	mg/l	7	7.27E-01	7.93E-01	UCL	Onsite	Deep
TW-3D	Potassium	7440-09-7	mg/l	6	8.45E+00	8.45E+00	UCL	Onsite	Deep
TW-3D	Selenium, total	7782-49-2	mg/l	2	1.50E-03	2.50E-03	MaxDet	Onsite	Deep
TW-3D	Vanadium, total	7440-62-2	mg/l	2	5.19E-03	5.72E-03	MaxDet	Onsite	Deep
TW-3S	Fluoride	16984-00-6	mg/l	1	5.65E-01	5.65E-01	Single observation	Onsite	Deep
TW-3S	Nitrate (NO3 as N)	14797-55-8	mg/l	1	1.07E+01	1.07E+01	Single observation	Onsite	Deep
TW-3S	Potassium	7440-09-7	mg/l	1	1.31E+01	1.31E+01	Single observation	Onsite	Deep
TW-5D	Arsenic, total	7440-38-2	mg/l	4	6.97E-03	8.99E-03	MaxDet	Onsite	Deep
TW-5D	Boron, total	7440-42-8	mg/l	5	1.07E-01	1.57E-01	UCL	Onsite	Deep
TW-5D	Fluoride	16984-00-6	mg/l	7	8.62E-01	8.62E-01	UCL	Onsite	Deep
TW-5D	Manganese, total	7439-96-5	mg/l	6	4.18E-02	8.10E-02	MaxDet	Onsite	Deep
TW-5D	Nitrate (NO3 as N)	14797-55-8	mg/l	7	8.80E-01	9.36E-01	UCL	Onsite	Deep
TW-5D	Potassium	7440-09-7	mg/l	6	1.01E+01	1.07E+01	UCL	Onsite	Deep
TW-5D	Selenium, total	7782-49-2	mg/l	2	1.55E-03	2.60E-03	MaxDet	Onsite	Deep
TW-5D	Vanadium, total	7440-62-2	mg/l	4	4.18E-03	6.34E-03	MaxDet	Onsite	Deep
TW-5D	Zinc, total	7440-66-6	mg/l	2	3.49E-03	5.53E-03	MaxDet	Onsite	Deep
TW-5I	Arsenic, total	7440-38-2	mg/l	5	2.87E-02	3.53E-02	UCL	Onsite	Deep
TW-5I	Boron, total	7440-42-8	mg/l	5	1.59E-01	2.31E-01	MaxDet	Onsite	Deep
TW-5I	Fluoride	16984-00-6	mg/l	7	1.07E-01	1.57E-01	UCL	Onsite	Deep
TW-5I	Manganese, total	7439-96-5	mg/l	6	1.40E+00	1.59E+00	UCL	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
TW-5I	Nitrate (NO3 as N)	14797-55-8	mg/l	7	6.41E-01	7.59E-01	UCL	Onsite	Deep
TW-5I	Potassium	7440-09-7	mg/l	6	6.94E+00	6.94E+00	UCL	Onsite	Deep
TW-5I	Selenium, total	7782-49-2	mg/l	2	1.60E-03	2.70E-03	MaxDet	Onsite	Deep
TW-5I	Vanadium, total	7440-62-2	mg/l	4	4.51E-03	7.44E-03	MaxDet	Onsite	Deep
TW-5S	Arsenic, total	7440-38-2	mg/l	6	5.59E-02	6.53E-02	UCL	Onsite	Shallow
TW-5S	Boron, total	7440-42-8	mg/l	6	5.48E-01	7.12E-01	MaxDet	Onsite	Shallow
TW-5S	Fluoride	16984-00-6	mg/l	7	9.29E-02	1.61E-01	UCL	Onsite	Shallow
TW-5S	Manganese, total	7439-96-5	mg/l	6	4.24E-01	4.59E-01	UCL	Onsite	Shallow
TW-5S	Mercury, total	7439-97-6	mg/l	2	1.66E-03	3.26E-03	MaxDet	Onsite	Shallow
TW-5S	Nitrate (NO3 as N)	14797-55-8	mg/l	7	2.49E+01	2.72E+01	UCL	Onsite	Shallow
TW-5S	Potassium	7440-09-7	mg/l	7	2.10E+02	2.30E+02	UCL	Onsite	Shallow
TW-5S	Vanadium, total	7440-62-2	mg/l	4	8.67E-03	1.21E-02	MaxDet	Onsite	Shallow
TW-9S	Arsenic, total	7440-38-2	mg/l	8	3.45E-02	4.16E-02	UCL	Offsite	Shallow
TW-9S	Beryllium, total	7440-41-7	mg/l	2	1.08E-03	2.00E-03	MaxDet	Offsite	Shallow
TW-9S	Boron, total	7440-42-8	mg/l	7	6.47E-01	7.06E-01	UCL	Offsite	Shallow
TW-9S	Fluoride	16984-00-6	mg/l	9	1.32E-01	2.59E-01	UCL	Offsite	Shallow
TW-9S	Manganese, total	7439-96-5	mg/l	8	1.09E+00	1.15E+00	UCL	Offsite	Shallow
TW-9S	Mercury, total	7439-97-6	mg/l	3	8.00E-05	1.40E-04	MaxDet	Offsite	Shallow
TW-9S	Nitrate (NO3 as N)	14797-55-8	mg/l	9	1.26E+01	1.42E+01	UCL	Offsite	Shallow
TW-9S	Potassium	7440-09-7	mg/l	9	1.41E+02	1.66E+02	UCL	Offsite	Shallow
TW-9S	Selenium, total	7782-49-2	mg/l	5	1.83E-03	3.62E-03	MaxDet	Offsite	Shallow
TW-9S	Trichloroethene	79-01-6	mg/l	2	1.00E-03	1.00E-03	MaxDet	Offsite	Shallow
TW-9S	Vanadium, total	7440-62-2	mg/l	4	3.89E-02	1.40E-01	MaxDet	Offsite	Shallow
TW-9S	Zinc, total	7440-66-6	mg/l	2	1.22E-02	2.30E-02	MaxDet	Offsite	Shallow
WILLIAMSEN	Arsenic, total	7440-38-2	mg/l	1	1.75E-02	1.75E-02	Single observation	Onsite	Deep
WILLIAMSEN	Boron, total	7440-42-8	mg/l	1	1.10E-01	1.10E-01	Single observation	Onsite	Deep

Table G-10Groundwater Exposure Point Concentrations for Chemical Contaminants

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
WILLIAMSEN	Fluoride	16984-00-6	mg/l	1	7.68E-01	7.68E-01	Single observation	Onsite	Deep
WILLIAMSEN	Nitrate (NO3 as N)	14797-55-8	mg/l	1	5.40E-01	5.40E-01	Single observation	Onsite	Deep
WILLIAMSEN	Potassium	7440-09-7	mg/l	1	2.90E+00	2.90E+00	Single observation	Onsite	Deep
WILLIAMSEN	Selenium, total	7782-49-2	mg/l	1	5.70E-03	5.70E-03	Single observation	Onsite	Deep

Key:

MaxDet = MaxDet = Maximum detected concentration.
n = Number of samples.
UCL = UCL = 95% Upper confidence limit of the mean.

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
103	Lead-210	014255-04-0	pCi/L	5	8.60E-01	1.30E+00	MaxDet	Onsite	Deep
103	Radium-226	13982-63-3	pCi/L	4	4.43E-01	7.20E-01	MaxDet	Onsite	Deep
103	Thorium-230	014269-63-7	pCi/L	5	8.60E-01	1.30E+00	MaxDet	Onsite	Deep
103	Uranium-234	013966-29-5	pCi/L	5	8.60E-01	1.30E+00	MaxDet	Onsite	Deep
103	Uranium-238	007440-61-1	pCi/L	5	8.60E-01	1.30E+00	MaxDet	Onsite	Deep
104	Lead-210	014255-04-0	pCi/L	5	7.72E-01	1.97E+00	MaxDet	Onsite	Shallow
104	Radium-226	13982-63-3	pCi/L	4	8.05E-01	1.25E+00	MaxDet	Onsite	Shallow
104	Thorium-230	014269-63-7	pCi/L	5	7.72E-01	1.97E+00	MaxDet	Onsite	Shallow
104	Uranium-234	013966-29-5	pCi/L	5	7.72E-01	1.97E+00	MaxDet	Onsite	Shallow
104	Uranium-238	007440-61-1	pCi/L	5	7.72E-01	1.97E+00	MaxDet	Onsite	Shallow
107	Lead-210	014255-04-0	pCi/L	6	6.05E-01	8.88E-01	UCL	Onsite	Deep
107	Radium-226	13982-63-3	pCi/L	5	1.28E+00	2.24E+00	MaxDet	Onsite	Deep
107	Thorium-230	014269-63-7	pCi/L	6	6.05E-01	8.88E-01	UCL	Onsite	Deep
107	Uranium-234	013966-29-5	pCi/L	6	6.05E-01	8.88E-01	UCL	Onsite	Deep
107	Uranium-238	007440-61-1	pCi/L	6	6.05E-01	8.88E-01	UCL	Onsite	Deep
108	Lead-210	014255-04-0	pCi/L	6	1.90E+00	3.50E+00	UCL	Onsite	Shallow
108	Radium-226	13982-63-3	pCi/L	5	2.50E-01	5.10E-01	MaxDet	Onsite	Shallow
108	Thorium-230	014269-63-7	pCi/L	6	1.90E+00	3.50E+00	UCL	Onsite	Shallow
108	Uranium-234	013966-29-5	pCi/L	6	1.90E+00	3.50E+00	UCL	Onsite	Shallow
108	Uranium-238	007440-61-1	pCi/L	6	1.90E+00	3.50E+00	UCL	Onsite	Shallow
109	Lead-210	014255-04-0	pCi/L	6	1.15E+00	2.01E+00	UCL	Onsite	Deep
109	Radium-226	13982-63-3	pCi/L	5	1.07E+00	3.83E+00	MaxDet	Onsite	Deep
109	Thorium-230	014269-63-7	pCi/L	6	1.15E+00	2.01E+00	UCL	Onsite	Deep
109	Uranium-234	013966-29-5	pCi/L	6	1.15E+00	2.01E+00	UCL	Onsite	Deep
109	Uranium-238	007440-61-1	pCi/L	6	1.15E+00	2.01E+00	UCL	Onsite	Deep
110	Lead-210	014255-04-0	pCi/L	6	4.39E+00	1.23E+01	MaxDet	Onsite	Shallow
110	Radium-226	13982-63-3	pCi/L	5	3.11E-01	7.90E-01	MaxDet	Onsite	Shallow
110	Thorium-230	014269-63-7	pCi/L	6	4.39E+00	1.23E+01	MaxDet	Onsite	Shallow
110	Uranium-234	013966-29-5	pCi/L	6	4.39E+00	1.23E+01	MaxDet	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
110	Uranium-238	007440-61-1	pCi/L	6	4.39E+00	1.23E+01	MaxDet	Onsite	Shallow
111	Lead-210	014255-04-0	pCi/L	6	1.12E+00	6.48E+00	MaxDet	Onsite	Shallow
111	Radium-226	13982-63-3	pCi/L	5	8.22E-01	2.50E+00	MaxDet	Onsite	Shallow
111	Thorium-230	014269-63-7	pCi/L	6	1.12E+00	6.48E+00	MaxDet	Onsite	Shallow
111	Uranium-234	013966-29-5	pCi/L	6	1.12E+00	6.48E+00	MaxDet	Onsite	Shallow
111	Uranium-238	007440-61-1	pCi/L	6	1.12E+00	6.48E+00	MaxDet	Onsite	Shallow
112	Lead-210	014255-04-0	pCi/L	6	2.53E-01	9.37E-01	MaxDet	Onsite	Shallow
112	Radium-226	13982-63-3	pCi/L	5	1.78E+00	3.08E+00	UCL	Onsite	Shallow
112	Thorium-230	014269-63-7	pCi/L	6	2.53E-01	9.37E-01	MaxDet	Onsite	Shallow
112	Uranium-234	013966-29-5	pCi/L	6	2.53E-01	9.37E-01	MaxDet	Onsite	Shallow
112	Uranium-238	007440-61-1	pCi/L	6	2.53E-01	9.37E-01	MaxDet	Onsite	Shallow
113	Lead-210	014255-04-0	pCi/L	6	2.79E-01	1.40E+00	MaxDet	Onsite	Shallow
113	Radium-226	13982-63-3	pCi/L	5	1.79E+00	3.02E+00	UCL	Onsite	Shallow
113	Thorium-230	014269-63-7	pCi/L	6	2.79E-01	1.40E+00	MaxDet	Onsite	Shallow
113	Uranium-234	013966-29-5	pCi/L	6	2.79E-01	1.40E+00	MaxDet	Onsite	Shallow
113	Uranium-238	007440-61-1	pCi/L	6	2.79E-01	1.40E+00	MaxDet	Onsite	Shallow
114	Lead-210	014255-04-0	pCi/L	6	2.08E-01	9.24E-01	MaxDet	Onsite	Shallow
114	Radium-226	13982-63-3	pCi/L	5	1.11E+00	3.06E+00	MaxDet	Onsite	Shallow
114	Thorium-230	014269-63-7	pCi/L	6	2.08E-01	9.24E-01	MaxDet	Onsite	Shallow
114	Uranium-234	013966-29-5	pCi/L	6	2.08E-01	9.24E-01	MaxDet	Onsite	Shallow
114	Uranium-238	007440-61-1	pCi/L	6	2.08E-01	9.24E-01	MaxDet	Onsite	Shallow
115	Lead-210	014255-04-0	pCi/L	6	5.76E-01	9.07E-01	UCL	Onsite	Shallow
115	Radium-226	13982-63-3	pCi/L	5	1.50E+00	3.99E+00	MaxDet	Onsite	Shallow
115	Thorium-230	014269-63-7	pCi/L	6	5.76E-01	9.07E-01	UCL	Onsite	Shallow
115	Uranium-234	013966-29-5	pCi/L	6	5.76E-01	9.07E-01	UCL	Onsite	Shallow
115	Uranium-238	007440-61-1	pCi/L	6	5.76E-01	9.07E-01	UCL	Onsite	Shallow
116	Lead-210	014255-04-0	pCi/L	5	2.18E-01	4.31E-01	UCL	Onsite	Shallow
116	Radium-226	13982-63-3	pCi/L	3	8.30E-01	1.35E+00	MaxDet	Onsite	Shallow
116	Thorium-230	014269-63-7	pCi/L	5	2.18E-01	4.31E-01	UCL	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
116	Uranium-234	013966-29-5	pCi/L	5	2.18E-01	4.31E-01	UCL	Onsite	Shallow
116	Uranium-238	007440-61-1	pCi/L	5	2.18E-01	4.31E-01	UCL	Onsite	Shallow
117	Lead-210	014255-04-0	pCi/L	5	1.98E+00	3.08E+00	UCL	Onsite	Deep
117	Radium-226	13982-63-3	pCi/L	4	4.65E-01	8.24E-01	UCL	Onsite	Deep
117	Thorium-230	014269-63-7	pCi/L	5	1.98E+00	3.08E+00	UCL	Onsite	Deep
117	Uranium-234	013966-29-5	pCi/L	5	1.98E+00	3.08E+00	UCL	Onsite	Deep
117	Uranium-238	007440-61-1	pCi/L	5	1.98E+00	3.08E+00	UCL	Onsite	Deep
118	Lead-210	014255-04-0	pCi/L	5	2.34E-02	9.24E-02	MaxDet	Onsite	Shallow
118	Radium-226	13982-63-3	pCi/L	4	1.03E+00	3.27E+00	MaxDet	Onsite	Shallow
118	Thorium-230	014269-63-7	pCi/L	5	2.34E-02	9.24E-02	MaxDet	Onsite	Shallow
118	Uranium-234	013966-29-5	pCi/L	5	2.34E-02	9.24E-02	MaxDet	Onsite	Shallow
118	Uranium-238	007440-61-1	pCi/L	5	2.34E-02	9.24E-02	MaxDet	Onsite	Shallow
119	Lead-210	014255-04-0	pCi/L	5	1.11E-01	2.48E-01	MaxDet	Onsite	Shallow
119	Radium-226	13982-63-3	pCi/L	5	4.08E-01	6.50E-01	MaxDet	Onsite	Shallow
119	Thorium-230	014269-63-7	pCi/L	5	1.11E-01	2.48E-01	MaxDet	Onsite	Shallow
119	Uranium-234	013966-29-5	pCi/L	5	1.11E-01	2.48E-01	MaxDet	Onsite	Shallow
119	Uranium-238	007440-61-1	pCi/L	5	1.11E-01	2.48E-01	MaxDet	Onsite	Shallow
120	Lead-210	014255-04-0	pCi/L	5	6.28E-03	6.60E-03	MaxDet	Onsite	Shallow
120	Radium-226	13982-63-3	pCi/L	5	6.36E-01	1.55E+00	MaxDet	Onsite	Shallow
120	Thorium-230	014269-63-7	pCi/L	5	6.28E-03	6.60E-03	MaxDet	Onsite	Shallow
120	Uranium-234	013966-29-5	pCi/L	5	6.28E-03	6.60E-03	MaxDet	Onsite	Shallow
120	Uranium-238	007440-61-1	pCi/L	5	6.28E-03	6.60E-03	MaxDet	Onsite	Shallow
121	Lead-210	014255-04-0	pCi/L	6	6.35E-01	2.45E+00	MaxDet	Onsite	Shallow
121	Radium-226	13982-63-3	pCi/L	5	7.46E-01	2.30E+00	MaxDet	Onsite	Shallow
121	Thorium-230	014269-63-7	pCi/L	6	6.35E-01	2.45E+00	MaxDet	Onsite	Shallow
121	Uranium-234	013966-29-5	pCi/L	6	6.35E-01	2.45E+00	MaxDet	Onsite	Shallow
121	Uranium-238	007440-61-1	pCi/L	6	6.35E-01	2.45E+00	MaxDet	Onsite	Shallow
122	Lead-210	014255-04-0	pCi/L	6	1.04E+00	3.90E+00	MaxDet	Onsite	Shallow
122	Radium-226	13982-63-3	pCi/L	5	7.68E-01	2.76E+00	MaxDet	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
122	Thorium-230	014269-63-7	pCi/L	6	1.04E+00	3.90E+00	MaxDet	Onsite	Shallow
122	Uranium-234	013966-29-5	pCi/L	6	1.04E+00	3.90E+00	MaxDet	Onsite	Shallow
122	Uranium-238	007440-61-1	pCi/L	6	1.04E+00	3.90E+00	MaxDet	Onsite	Shallow
123	Lead-210	014255-04-0	pCi/L	6	2.92E-01	1.21E+00	MaxDet	Onsite	Shallow
123	Radium-226	13982-63-3	pCi/L	5	5.63E-01	1.40E+00	MaxDet	Onsite	Shallow
123	Thorium-230	014269-63-7	pCi/L	6	2.92E-01	1.21E+00	MaxDet	Onsite	Shallow
123	Uranium-234	013966-29-5	pCi/L	6	2.92E-01	1.21E+00	MaxDet	Onsite	Shallow
123	Uranium-238	007440-61-1	pCi/L	6	2.92E-01	1.21E+00	MaxDet	Onsite	Shallow
124	Lead-210	014255-04-0	pCi/L	5	4.60E-01	8.25E-01	UCL	Onsite	Shallow
124	Radium-226	13982-63-3	pCi/L	4	1.50E-01	2.80E-01	MaxDet	Onsite	Shallow
124	Thorium-230	014269-63-7	pCi/L	5	4.60E-01	8.25E-01	UCL	Onsite	Shallow
124	Uranium-234	013966-29-5	pCi/L	5	4.60E-01	8.25E-01	UCL	Onsite	Shallow
124	Uranium-238	007440-61-1	pCi/L	5	4.60E-01	8.25E-01	UCL	Onsite	Shallow
125	Lead-210	014255-04-0	pCi/L	6	6.84E-01	9.76E-01	UCL	Onsite	Deep
125	Radium-226	13982-63-3	pCi/L	5	4.86E-01	1.50E+00	MaxDet	Onsite	Deep
125	Thorium-230	014269-63-7	pCi/L	6	6.84E-01	9.76E-01	UCL	Onsite	Deep
125	Uranium-234	013966-29-5	pCi/L	6	6.84E-01	9.76E-01	UCL	Onsite	Deep
125	Uranium-238	007440-61-1	pCi/L	6	6.84E-01	9.76E-01	UCL	Onsite	Deep
126	Lead-210	014255-04-0	pCi/L	6	4.53E-01	6.53E-01	UCL	Onsite	Shallow
126	Radium-226	13982-63-3	pCi/L	5	8.30E-01	2.28E+00	MaxDet	Onsite	Shallow
126	Thorium-230	014269-63-7	pCi/L	6	4.53E-01	6.53E-01	UCL	Onsite	Shallow
126	Uranium-234	013966-29-5	pCi/L	6	4.53E-01	6.53E-01	UCL	Onsite	Shallow
126	Uranium-238	007440-61-1	pCi/L	6	4.53E-01	6.53E-01	UCL	Onsite	Shallow
127	Lead-210	014255-04-0	pCi/L	5	4.36E-01	9.19E-01	MaxDet	Onsite	Shallow
127	Radium-226	13982-63-3	pCi/L	4	2.26E-01	5.80E-01	MaxDet	Onsite	Shallow
127	Thorium-230	014269-63-7	pCi/L	5	4.36E-01	9.19E-01	MaxDet	Onsite	Shallow
127	Uranium-234	013966-29-5	pCi/L	5	4.36E-01	9.19E-01	MaxDet	Onsite	Shallow
127	Uranium-238	007440-61-1	pCi/L	5	4.36E-01	9.19E-01	MaxDet	Onsite	Shallow
128	Lead-210	014255-04-0	pCi/L	5	5.48E-02	1.57E-01	UCL	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
128	Radium-226	13982-63-3	pCi/L	5	2.40E+00	7.09E+00	MaxDet	Onsite	Shallow
128	Thorium-230	014269-63-7	pCi/L	5	5.48E-02	1.57E-01	UCL	Onsite	Shallow
128	Uranium-234	013966-29-5	pCi/L	5	5.48E-02	1.57E-01	UCL	Onsite	Shallow
128	Uranium-238	007440-61-1	pCi/L	5	5.48E-02	1.57E-01	UCL	Onsite	Shallow
129	Lead-210	014255-04-0	pCi/L	5	2.08E-01	4.50E-01	UCL	Onsite	Deep
129	Radium-226	13982-63-3	pCi/L	4	8.10E-01	1.35E+00	MaxDet	Onsite	Deep
129	Thorium-230	014269-63-7	pCi/L	5	2.08E-01	4.50E-01	UCL	Onsite	Deep
129	Uranium-234	013966-29-5	pCi/L	5	2.08E-01	4.50E-01	UCL	Onsite	Deep
129	Uranium-238	007440-61-1	pCi/L	5	2.08E-01	4.50E-01	UCL	Onsite	Deep
130	Lead-210	014255-04-0	pCi/L	5	6.13E-01	1.14E+00	UCL	Onsite	Deep
130	Radium-226	13982-63-3	pCi/L	4	7.13E-01	1.20E+00	MaxDet	Onsite	Deep
130	Thorium-230	014269-63-7	pCi/L	5	6.13E-01	1.14E+00	UCL	Onsite	Deep
130	Uranium-234	013966-29-5	pCi/L	5	6.13E-01	1.14E+00	UCL	Onsite	Deep
130	Uranium-238	007440-61-1	pCi/L	5	6.13E-01	1.14E+00	UCL	Onsite	Deep
131	Lead-210	014255-04-0	pCi/L	5	1.01E+00	1.67E+00	UCL	Onsite	Shallow
131	Radium-226	13982-63-3	pCi/L	4	5.25E-01	1.04E+00	MaxDet	Onsite	Shallow
131	Thorium-230	014269-63-7	pCi/L	5	1.01E+00	1.67E+00	UCL	Onsite	Shallow
131	Uranium-234	013966-29-5	pCi/L	5	1.01E+00	1.67E+00	UCL	Onsite	Shallow
131	Uranium-238	007440-61-1	pCi/L	5	1.01E+00	1.67E+00	UCL	Onsite	Shallow
132	Lead-210	014255-04-0	pCi/L	5	8.72E-01	2.88E+00	MaxDet	Onsite	Shallow
132	Radium-226	13982-63-3	pCi/L	4	3.75E-01	7.40E-01	MaxDet	Onsite	Shallow
132	Thorium-230	014269-63-7	pCi/L	5	8.72E-01	2.88E+00	MaxDet	Onsite	Shallow
132	Uranium-234	013966-29-5	pCi/L	5	8.72E-01	2.88E+00	MaxDet	Onsite	Shallow
132	Uranium-238	007440-61-1	pCi/L	5	8.72E-01	2.88E+00	MaxDet	Onsite	Shallow
133	Lead-210	014255-04-0	pCi/L	6	1.25E+00	2.84E+00	MaxDet	Onsite	Deep
133	Radium-226	13982-63-3	pCi/L	5	4.64E-01	9.60E-01	MaxDet	Onsite	Deep
133	Thorium-230	014269-63-7	pCi/L	6	1.25E+00	2.84E+00	MaxDet	Onsite	Deep
133	Uranium-234	013966-29-5	pCi/L	6	1.25E+00	2.84E+00	MaxDet	Onsite	Deep
133	Uranium-238	007440-61-1	pCi/L	6	1.25E+00	2.84E+00	MaxDet	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
134	Lead-210	014255-04-0	pCi/L	6	6.11E-01	2.53E+00	MaxDet	Onsite	Shallow
134	Radium-226	13982-63-3	pCi/L	5	4.78E-01	9.80E-01	MaxDet	Onsite	Shallow
134	Thorium-230	014269-63-7	pCi/L	6	6.11E-01	2.53E+00	MaxDet	Onsite	Shallow
134	Uranium-234	013966-29-5	pCi/L	6	6.11E-01	2.53E+00	MaxDet	Onsite	Shallow
134	Uranium-238	007440-61-1	pCi/L	6	6.11E-01	2.53E+00	MaxDet	Onsite	Shallow
135	Lead-210	014255-04-0	pCi/L	6	8.47E-02	1.59E-01	UCL	Onsite	Shallow
135	Radium-226	13982-63-3	pCi/L	5	9.68E-01	3.77E+00	MaxDet	Onsite	Shallow
135	Thorium-230	014269-63-7	pCi/L	6	8.47E-02	1.59E-01	UCL	Onsite	Shallow
135	Uranium-234	013966-29-5	pCi/L	6	8.47E-02	1.59E-01	UCL	Onsite	Shallow
135	Uranium-238	007440-61-1	pCi/L	6	8.47E-02	1.59E-01	UCL	Onsite	Shallow
136	Lead-210	014255-04-0	pCi/L	5	5.51E-01	9.57E-01	UCL	Onsite	Shallow
136	Radium-226	13982-63-3	pCi/L	5	8.99E-01	1.75E+00	UCL	Onsite	Shallow
136	Thorium-230	014269-63-7	pCi/L	5	5.51E-01	9.57E-01	UCL	Onsite	Shallow
136	Uranium-234	013966-29-5	pCi/L	5	5.51E-01	9.57E-01	UCL	Onsite	Shallow
136	Uranium-238	007440-61-1	pCi/L	5	5.51E-01	9.57E-01	UCL	Onsite	Shallow
137	Lead-210	014255-04-0	pCi/L	5	9.01E-02	2.02E-01	UCL	Onsite	Shallow
137	Radium-226	13982-63-3	pCi/L	5	6.30E-01	1.53E+00	MaxDet	Onsite	Shallow
137	Thorium-230	014269-63-7	pCi/L	5	9.01E-02	2.02E-01	UCL	Onsite	Shallow
137	Uranium-234	013966-29-5	pCi/L	5	9.01E-02	2.02E-01	UCL	Onsite	Shallow
137	Uranium-238	007440-61-1	pCi/L	5	9.01E-02	2.02E-01	UCL	Onsite	Shallow
139	Lead-210	014255-04-0	pCi/L	5	5.52E-01	8.42E-01	MaxDet	Onsite	Shallow
139	Radium-226	13982-63-3	pCi/L	5	3.46E-01	9.30E-01	MaxDet	Onsite	Shallow
139	Thorium-230	014269-63-7	pCi/L	5	5.52E-01	8.42E-01	MaxDet	Onsite	Shallow
139	Uranium-234	013966-29-5	pCi/L	5	5.52E-01	8.42E-01	MaxDet	Onsite	Shallow
139	Uranium-238	007440-61-1	pCi/L	5	5.52E-01	8.42E-01	MaxDet	Onsite	Shallow
140	Lead-210	014255-04-0	pCi/L	5	1.59E+00	2.59E+00	UCL	Onsite	Shallow
140	Radium-226	13982-63-3	pCi/L	4	6.44E-01	1.02E+00	MaxDet	Onsite	Shallow
140	Thorium-230	014269-63-7	pCi/L	5	1.59E+00	2.59E+00	UCL	Onsite	Shallow
140	Uranium-234	013966-29-5	pCi/L	5	1.59E+00	2.59E+00	UCL	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
140	Uranium-238	007440-61-1	pCi/L	5	1.59E+00	2.59E+00	UCL	Onsite	Shallow
141	Lead-210	014255-04-0	pCi/L	5	3.00E-01	4.85E-01	UCL	Onsite	Shallow
141	Radium-226	13982-63-3	pCi/L	5	8.10E-01	1.65E+00	MaxDet	Onsite	Shallow
141	Thorium-230	014269-63-7	pCi/L	5	3.00E-01	4.85E-01	UCL	Onsite	Shallow
141	Uranium-234	013966-29-5	pCi/L	5	3.00E-01	4.85E-01	UCL	Onsite	Shallow
141	Uranium-238	007440-61-1	pCi/L	5	3.00E-01	4.85E-01	UCL	Onsite	Shallow
142	Lead-210	014255-04-0	pCi/L	6	9.36E+00	1.33E+01	UCL	Onsite	Shallow
142	Radium-226	13982-63-3	pCi/L	5	8.82E-01	2.75E+00	MaxDet	Onsite	Shallow
142	Thorium-230	014269-63-7	pCi/L	6	9.36E+00	1.33E+01	UCL	Onsite	Shallow
142	Uranium-234	013966-29-5	pCi/L	6	9.36E+00	1.33E+01	UCL	Onsite	Shallow
142	Uranium-238	007440-61-1	pCi/L	6	9.36E+00	1.33E+01	UCL	Onsite	Shallow
143	Lead-210	014255-04-0	pCi/L	6	8.24E-01	1.68E+00	UCL	Onsite	Shallow
143	Radium-226	13982-63-3	pCi/L	5	1.31E+00	2.49E+00	MaxDet	Onsite	Shallow
143	Thorium-230	014269-63-7	pCi/L	6	8.24E-01	1.68E+00	UCL	Onsite	Shallow
143	Uranium-234	013966-29-5	pCi/L	6	8.24E-01	1.68E+00	UCL	Onsite	Shallow
143	Uranium-238	007440-61-1	pCi/L	6	8.24E-01	1.68E+00	UCL	Onsite	Shallow
144	Lead-210	014255-04-0	pCi/L	6	4.39E+00	8.87E+00	MaxDet	Onsite	Deep
144	Radium-226	13982-63-3	pCi/L	5	4.23E-01	7.92E-01	UCL	Onsite	Deep
144	Thorium-230	014269-63-7	pCi/L	6	4.39E+00	8.87E+00	MaxDet	Onsite	Deep
144	Uranium-234	013966-29-5	pCi/L	6	4.39E+00	8.87E+00	MaxDet	Onsite	Deep
144	Uranium-238	007440-61-1	pCi/L	6	4.39E+00	8.87E+00	MaxDet	Onsite	Deep
145	Lead-210	014255-04-0	pCi/L	6	1.02E+00	1.56E+00	UCL	Onsite	Shallow
145	Radium-226	13982-63-3	pCi/L	5	4.02E-01	1.06E+00	MaxDet	Onsite	Shallow
145	Thorium-230	014269-63-7	pCi/L	6	1.02E+00	1.56E+00	UCL	Onsite	Shallow
145	Uranium-234	013966-29-5	pCi/L	6	1.02E+00	1.56E+00	UCL	Onsite	Shallow
145	Uranium-238	007440-61-1	pCi/L	6	1.02E+00	1.56E+00	UCL	Onsite	Shallow
146	Lead-210	014255-04-0	pCi/L	6	9.16E-01	4.40E+00	MaxDet	Onsite	Shallow
146	Radium-226	13982-63-3	pCi/L	5	7.87E-01	1.79E+00	MaxDet	Onsite	Shallow
146	Thorium-230	014269-63-7	pCi/L	6	9.16E-01	4.40E+00	MaxDet	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
146	Uranium-234	013966-29-5	pCi/L	6	9.16E-01	4.40E+00	MaxDet	Onsite	Shallow
146	Uranium-238	007440-61-1	pCi/L	6	9.16E-01	4.40E+00	MaxDet	Onsite	Shallow
148	Lead-210	014255-04-0	pCi/L	6	9.42E-01	2.05E+00	MaxDet	Onsite	Shallow
148	Radium-226	13982-63-3	pCi/L	5	1.84E+00	3.40E+00	UCL	Onsite	Shallow
148	Thorium-230	014269-63-7	pCi/L	6	9.42E-01	2.05E+00	MaxDet	Onsite	Shallow
148	Uranium-234	013966-29-5	pCi/L	6	9.42E-01	2.05E+00	MaxDet	Onsite	Shallow
148	Uranium-238	007440-61-1	pCi/L	6	9.42E-01	2.05E+00	MaxDet	Onsite	Shallow
149	Lead-210	014255-04-0	pCi/L	6	4.42E-01	6.98E-01	UCL	Onsite	Shallow
149	Radium-226	13982-63-3	pCi/L	5	4.58E-01	1.15E+00	MaxDet	Onsite	Shallow
149	Thorium-230	014269-63-7	pCi/L	6	4.42E-01	6.98E-01	UCL	Onsite	Shallow
149	Uranium-234	013966-29-5	pCi/L	6	4.42E-01	6.98E-01	UCL	Onsite	Shallow
149	Uranium-238	007440-61-1	pCi/L	6	4.42E-01	6.98E-01	UCL	Onsite	Shallow
150	Lead-210	014255-04-0	pCi/L	6	2.48E+00	5.17E+00	UCL	Onsite	Shallow
150	Radium-226	13982-63-3	pCi/L	5	9.24E-01	1.94E+00	MaxDet	Onsite	Shallow
150	Thorium-230	014269-63-7	pCi/L	6	2.48E+00	5.17E+00	UCL	Onsite	Shallow
150	Uranium-234	013966-29-5	pCi/L	6	2.48E+00	5.17E+00	UCL	Onsite	Shallow
150	Uranium-238	007440-61-1	pCi/L	6	2.48E+00	5.17E+00	UCL	Onsite	Shallow
151	Lead-210	014255-04-0	pCi/L	4	1.22E-01	4.69E-01	MaxDet	Onsite	Shallow
151	Radium-226	13982-63-3	pCi/L	4	5.75E-01	1.09E+00	MaxDet	Onsite	Shallow
151	Thorium-230	014269-63-7	pCi/L	4	1.22E-01	4.69E-01	MaxDet	Onsite	Shallow
151	Uranium-234	013966-29-5	pCi/L	4	1.22E-01	4.69E-01	MaxDet	Onsite	Shallow
151	Uranium-238	007440-61-1	pCi/L	4	1.22E-01	4.69E-01	MaxDet	Onsite	Shallow
152	Lead-210	014255-04-0	pCi/L	6	2.66E+00	1.36E+01	MaxDet	Onsite	Deep
152	Radium-226	13982-63-3	pCi/L	5	3.70E-01	6.02E-01	UCL	Onsite	Deep
152	Thorium-230	014269-63-7	pCi/L	6	2.66E+00	1.36E+01	MaxDet	Onsite	Deep
152	Uranium-234	013966-29-5	pCi/L	6	2.66E+00	1.36E+01	MaxDet	Onsite	Deep
152	Uranium-238	007440-61-1	pCi/L	6	2.66E+00	1.36E+01	MaxDet	Onsite	Deep
153	Lead-210	014255-04-0	pCi/L	2	1.15E+00	1.45E+00	MaxDet	Onsite	Deep
153	Thorium-230	014269-63-7	pCi/L	2	1.15E+00	1.45E+00	MaxDet	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
153	Uranium-234	013966-29-5	pCi/L	2	1.15E+00	1.45E+00	MaxDet	Onsite	Deep
153	Uranium-238	007440-61-1	pCi/L	2	1.15E+00	1.45E+00	MaxDet	Onsite	Deep
154	Lead-210	014255-04-0	pCi/L	4	8.93E-01	1.33E+00	MaxDet	Onsite	Shallow
154	Radium-226	13982-63-3	pCi/L	4	8.63E-01	1.76E+00	UCL	Onsite	Shallow
154	Thorium-230	014269-63-7	pCi/L	4	8.93E-01	1.33E+00	MaxDet	Onsite	Shallow
154	Uranium-234	013966-29-5	pCi/L	4	8.93E-01	1.33E+00	MaxDet	Onsite	Shallow
154	Uranium-238	007440-61-1	pCi/L	4	8.93E-01	1.33E+00	MaxDet	Onsite	Shallow
159	Lead-210	014255-04-0	pCi/L	2	4.32E-01	8.58E-01	MaxDet	Onsite	Shallow
159	Radium-226	13982-63-3	pCi/L	2	6.43E-01	6.50E-01	MaxDet	Onsite	Shallow
159	Thorium-230	014269-63-7	pCi/L	2	4.32E-01	8.58E-01	MaxDet	Onsite	Shallow
159	Uranium-234	013966-29-5	pCi/L	2	4.32E-01	8.58E-01	MaxDet	Onsite	Shallow
159	Uranium-238	007440-61-1	pCi/L	2	4.32E-01	8.58E-01	MaxDet	Onsite	Shallow
300	Lead-210	014255-04-0	pCi/L	1	6.60E-03	6.60E-03	Single observation	Onsite	Shallow
300	Radium-226	13982-63-3	pCi/L	4	3.15E-01	5.57E-01	UCL	Onsite	Shallow
300	Thorium-230	014269-63-7	pCi/L	1	6.60E-03	6.60E-03	Single observation	Onsite	Shallow
300	Uranium-234	013966-29-5	pCi/L	1	6.60E-03	6.60E-03	Single observation	Onsite	Shallow
300	Uranium-238	007440-61-1	pCi/L	1	6.60E-03	6.60E-03	Single observation	Onsite	Shallow
304	Lead-210	014255-04-0	pCi/L	4	6.32E+01	8.25E+01	MaxDet	Onsite	Shallow
304	Radium-226	13982-63-3	pCi/L	4	5.55E-01	1.67E+00	MaxDet	Onsite	Shallow
304	Thorium-230	014269-63-7	pCi/L	4	6.32E+01	8.25E+01	MaxDet	Onsite	Shallow
304	Uranium-234	013966-29-5	pCi/L	4	6.32E+01	8.25E+01	MaxDet	Onsite	Shallow
304	Uranium-238	007440-61-1	pCi/L	4	6.32E+01	8.25E+01	MaxDet	Onsite	Shallow
306	Lead-210	014255-04-0	pCi/L	4	1.39E+01	1.74E+01	MaxDet	Onsite	Shallow
306	Radium-226	13982-63-3	pCi/L	4	2.25E-01	4.90E-01	MaxDet	Onsite	Shallow
306	Thorium-230	014269-63-7	pCi/L	4	1.39E+01	1.74E+01	MaxDet	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
306	Uranium-234	013966-29-5	pCi/L	4	1.39E+01	1.74E+01	MaxDet	Onsite	Shallow
306	Uranium-238	007440-61-1	pCi/L	4	1.39E+01	1.74E+01	MaxDet	Onsite	Shallow
307	Lead-210	014255-04-0	pCi/L	4	1.29E+00	3.57E+00	MaxDet	Onsite	Shallow
307	Radium-226	13982-63-3	pCi/L	4	5.44E-01	1.15E+00	MaxDet	Onsite	Shallow
307	Thorium-230	014269-63-7	pCi/L	4	1.29E+00	3.57E+00	MaxDet	Onsite	Shallow
307	Uranium-234	013966-29-5	pCi/L	4	1.29E+00	3.57E+00	MaxDet	Onsite	Shallow
307	Uranium-238	007440-61-1	pCi/L	4	1.29E+00	3.57E+00	MaxDet	Onsite	Shallow
308	Radium-226	13982-63-3	pCi/L	4	3.76E-01	5.00E-01	MaxDet	Onsite	Shallow
309	Lead-210	014255-04-0	pCi/L	5	6.07E+00	7.71E+00	MaxDet	Onsite	Deep
309	Radium-226	13982-63-3	pCi/L	4	2.83E-01	5.80E-01	MaxDet	Onsite	Deep
309	Thorium-230	014269-63-7	pCi/L	5	6.07E+00	7.71E+00	MaxDet	Onsite	Deep
309	Uranium-234	013966-29-5	pCi/L	5	6.07E+00	7.71E+00	MaxDet	Onsite	Deep
309	Uranium-238	007440-61-1	pCi/L	5	6.07E+00	7.71E+00	MaxDet	Onsite	Deep
310	Lead-210	014255-04-0	pCi/L	6	2.24E+00	3.88E+00	UCL	Onsite	Shallow
310	Radium-226	13982-63-3	pCi/L	4	5.08E-01	9.60E-01	MaxDet	Onsite	Shallow
310	Thorium-230	014269-63-7	pCi/L	6	2.24E+00	3.88E+00	UCL	Onsite	Shallow
310	Uranium-234	013966-29-5	pCi/L	6	2.24E+00	3.88E+00	UCL	Onsite	Shallow
310	Uranium-238	007440-61-1	pCi/L	6	2.24E+00	3.88E+00	UCL	Onsite	Shallow
311	Lead-210	014255-04-0	pCi/L	5	1.48E-01	2.92E-01	UCL	Onsite	Deep
311	Radium-226	13982-63-3	pCi/L	4	3.50E-01	5.90E-01	MaxDet	Onsite	Deep
311	Thorium-230	014269-63-7	pCi/L	5	1.48E-01	2.92E-01	UCL	Onsite	Deep
311	Uranium-234	013966-29-5	pCi/L	5	1.48E-01	2.92E-01	UCL	Onsite	Deep
311	Uranium-238	007440-61-1	pCi/L	5	1.48E-01	2.92E-01	UCL	Onsite	Deep
312	Lead-210	014255-04-0	pCi/L	4	1.71E+00	2.53E+00	MaxDet	Onsite	Shallow
312	Radium-226	13982-63-3	pCi/L	4	6.80E-01	9.60E-01	MaxDet	Onsite	Shallow
312	Thorium-230	014269-63-7	pCi/L	4	1.71E+00	2.53E+00	MaxDet	Onsite	Shallow
312	Uranium-234	013966-29-5	pCi/L	4	1.71E+00	2.53E+00	MaxDet	Onsite	Shallow
312	Uranium-238	007440-61-1	pCi/L	4	1.71E+00	2.53E+00	MaxDet	Onsite	Shallow
313	Lead-210	014255-04-0	pCi/L	4	5.31E+00	8.40E+00	MaxDet	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
313	Radium-226	13982-63-3	pCi/L	4	3.03E-01	6.70E-01	MaxDet	Onsite	Shallow
313	Thorium-230	014269-63-7	pCi/L	4	5.31E+00	8.40E+00	MaxDet	Onsite	Shallow
313	Uranium-234	013966-29-5	pCi/L	4	5.31E+00	8.40E+00	MaxDet	Onsite	Shallow
313	Uranium-238	007440-61-1	pCi/L	4	5.31E+00	8.40E+00	MaxDet	Onsite	Shallow
315	Lead-210	014255-04-0	pCi/L	5	5.79E+00	9.51E+00	UCL	Onsite	Deep
315	Radium-226	13982-63-3	pCi/L	4	3.38E-01	7.30E-01	MaxDet	Onsite	Deep
315	Thorium-230	014269-63-7	pCi/L	5	5.79E+00	9.51E+00	UCL	Onsite	Deep
315	Uranium-234	013966-29-5	pCi/L	5	5.79E+00	9.51E+00	UCL	Onsite	Deep
315	Uranium-238	007440-61-1	pCi/L	5	5.79E+00	9.51E+00	UCL	Onsite	Deep
316	Lead-210	014255-04-0	pCi/L	5	2.23E+00	4.40E+00	UCL	Onsite	Shallow
316	Radium-226	13982-63-3	pCi/L	4	2.60E-01	3.60E-01	MaxDet	Onsite	Shallow
316	Thorium-230	014269-63-7	pCi/L	5	2.23E+00	4.40E+00	UCL	Onsite	Shallow
316	Uranium-234	013966-29-5	pCi/L	5	2.23E+00	4.40E+00	UCL	Onsite	Shallow
316	Uranium-238	007440-61-1	pCi/L	5	2.23E+00	4.40E+00	UCL	Onsite	Shallow
317	Lead-210	014255-04-0	pCi/L	2	4.75E-01	9.44E-01	MaxDet	Onsite	Deep
317	Radium-226	13982-63-3	pCi/L	3	3.40E-01	8.50E-01	MaxDet	Onsite	Deep
317	Thorium-230	014269-63-7	pCi/L	2	4.75E-01	9.44E-01	MaxDet	Onsite	Deep
317	Uranium-234	013966-29-5	pCi/L	2	4.75E-01	9.44E-01	MaxDet	Onsite	Deep
317	Uranium-238	007440-61-1	pCi/L	2	4.75E-01	9.44E-01	MaxDet	Onsite	Deep
318	Lead-210	014255-04-0	pCi/L	4	3.28E+02	5.58E+02	MaxDet	Onsite	Shallow
318	Radium-226	13982-63-3	pCi/L	4	2.36E-01	3.40E-01	MaxDet	Onsite	Shallow
318	Thorium-230	014269-63-7	pCi/L	4	3.28E+02	5.58E+02	MaxDet	Onsite	Shallow
318	Uranium-234	013966-29-5	pCi/L	4	3.28E+02	5.58E+02	MaxDet	Onsite	Shallow
318	Uranium-238	007440-61-1	pCi/L	4	3.28E+02	5.58E+02	MaxDet	Onsite	Shallow
319	Lead-210	014255-04-0	pCi/L	5	5.78E-01	8.90E-01	UCL	Onsite	Deep
319	Radium-226	13982-63-3	pCi/L	4	2.30E-01	3.70E-01	MaxDet	Onsite	Deep
319	Thorium-230	014269-63-7	pCi/L	5	5.78E-01	8.90E-01	UCL	Onsite	Deep
319	Uranium-234	013966-29-5	pCi/L	5	5.78E-01	8.90E-01	UCL	Onsite	Deep
319	Uranium-238	007440-61-1	pCi/L	5	5.78E-01	8.90E-01	UCL	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
320	Lead-210	014255-04-0	pCi/L	5	8.41E-01	2.69E+00	MaxDet	Onsite	Shallow
320	Radium-226	13982-63-3	pCi/L	4	2.13E-01	2.60E-01	MaxDet	Onsite	Shallow
320	Thorium-230	014269-63-7	pCi/L	5	8.41E-01	2.69E+00	MaxDet	Onsite	Shallow
320	Uranium-234	013966-29-5	pCi/L	5	8.41E-01	2.69E+00	MaxDet	Onsite	Shallow
320	Uranium-238	007440-61-1	pCi/L	5	8.41E-01	2.69E+00	MaxDet	Onsite	Shallow
321	Lead-210	014255-04-0	pCi/L	4	5.35E-01	9.64E-01	MaxDet	Onsite	Deep
321	Radium-226	13982-63-3	pCi/L	4	2.93E-01	6.40E-01	MaxDet	Onsite	Deep
321	Thorium-230	014269-63-7	pCi/L	4	5.35E-01	9.64E-01	MaxDet	Onsite	Deep
321	Uranium-234	013966-29-5	pCi/L	4	5.35E-01	9.64E-01	MaxDet	Onsite	Deep
321	Uranium-238	007440-61-1	pCi/L	4	5.35E-01	9.64E-01	MaxDet	Onsite	Deep
322	Lead-210	014255-04-0	pCi/L	1	7.16E-01	7.16E-01	Single observation	Onsite	Deep
322	Radium-226	13982-63-3	pCi/L	1	1.00E-01	1.00E-01	Single observation	Onsite	Deep
322	Thorium-230	014269-63-7	pCi/L	1	7.16E-01	7.16E-01	Single observation	Onsite	Deep
322	Uranium-234	013966-29-5	pCi/L	1	7.16E-01	7.16E-01	Single observation	Onsite	Deep
322	Uranium-238	007440-61-1	pCi/L	1	7.16E-01	7.16E-01	Single observation	Onsite	Deep
323	Radium-226	13982-63-3	pCi/L	3	1.43E+00	3.63E+00	MaxDet	Onsite	Shallow
324	Lead-210	014255-04-0	pCi/L	3	3.43E-01	6.83E-01	MaxDet	Onsite	Shallow
324	Radium-226	13982-63-3	pCi/L	3	4.53E-01	9.00E-01	MaxDet	Onsite	Shallow
324	Thorium-230	014269-63-7	pCi/L	3	3.43E-01	6.83E-01	MaxDet	Onsite	Shallow
324	Uranium-234	013966-29-5	pCi/L	3	3.43E-01	6.83E-01	MaxDet	Onsite	Shallow
324	Uranium-238	007440-61-1	pCi/L	3	3.43E-01	6.83E-01	MaxDet	Onsite	Shallow
325	Lead-210	014255-04-0	pCi/L	3	3.11E+00	5.36E+00	MaxDet	Onsite	Shallow
325	Radium-226	13982-63-3	pCi/L	3	5.90E-01	1.53E+00	MaxDet	Onsite	Shallow
325	Thorium-230	014269-63-7	pCi/L	3	3.11E+00	5.36E+00	MaxDet	Onsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
325	Uranium-234	013966-29-5	pCi/L	3	3.11E+00	5.36E+00	MaxDet	Onsite	Shallow
325	Uranium-238	007440-61-1	pCi/L	3	3.11E+00	5.36E+00	MaxDet	Onsite	Shallow
326	Lead-210	014255-04-0	pCi/L	3	1.46E+00	2.66E+00	MaxDet	Onsite	Shallow
326	Radium-226	13982-63-3	pCi/L	3	2.47E-01	4.50E-01	MaxDet	Onsite	Shallow
326	Thorium-230	014269-63-7	pCi/L	3	1.46E+00	2.66E+00	MaxDet	Onsite	Shallow
326	Uranium-234	013966-29-5	pCi/L	3	1.46E+00	2.66E+00	MaxDet	Onsite	Shallow
326	Uranium-238	007440-61-1	pCi/L	3	1.46E+00	2.66E+00	MaxDet	Onsite	Shallow
327	Lead-210	014255-04-0	pCi/L	3	5.87E-01	7.82E-01	MaxDet	Onsite	Shallow
327	Radium-226	13982-63-3	pCi/L	3	3.23E-01	4.70E-01	MaxDet	Onsite	Shallow
327	Thorium-230	014269-63-7	pCi/L	3	5.87E-01	7.82E-01	MaxDet	Onsite	Shallow
327	Uranium-234	013966-29-5	pCi/L	3	5.87E-01	7.82E-01	MaxDet	Onsite	Shallow
327	Uranium-238	007440-61-1	pCi/L	3	5.87E-01	7.82E-01	MaxDet	Onsite	Shallow
328	Lead-210	014255-04-0	pCi/L	3	4.97E-01	1.05E+00	MaxDet	Onsite	Shallow
328	Radium-226	13982-63-3	pCi/L	3	3.70E-01	6.20E-01	MaxDet	Onsite	Shallow
328	Thorium-230	014269-63-7	pCi/L	3	4.97E-01	1.05E+00	MaxDet	Onsite	Shallow
328	Uranium-234	013966-29-5	pCi/L	3	4.97E-01	1.05E+00	MaxDet	Onsite	Shallow
328	Uranium-238	007440-61-1	pCi/L	3	4.97E-01	1.05E+00	MaxDet	Onsite	Shallow
329	Lead-210	014255-04-0	pCi/L	1	2.48E-01	2.48E-01	Single observation	Onsite	Deep
329	Radium-226	13982-63-3	pCi/L	1	1.26E+00	1.26E+00	Single observation	Onsite	Deep
329	Thorium-230	014269-63-7	pCi/L	1	2.48E-01	2.48E-01	Single observation	Onsite	Deep
329	Uranium-234	013966-29-5	pCi/L	1	2.48E-01	2.48E-01	Single observation	Onsite	Deep
329	Uranium-238	007440-61-1	pCi/L	1	2.48E-01	2.48E-01	Single observation	Onsite	Deep
330	Lead-210	014255-04-0	pCi/L	1	1.78E-01	1.78E-01	Single observation	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
330	Radium-226	13982-63-3	pCi/L	1	6.00E-01	6.00E-01	Single observation	Onsite	Deep
330	Thorium-230	014269-63-7	pCi/L	1	1.78E-01	1.78E-01	Single observation	Onsite	Deep
330	Uranium-234	013966-29-5	pCi/L	1	1.78E-01	1.78E-01	Single observation	Onsite	Deep
330	Uranium-238	007440-61-1	pCi/L	1	1.78E-01	1.78E-01	Single observation	Onsite	Deep
331	Lead-210	014255-04-0	pCi/L	1	1.08E+00	1.08E+00	Single observation	Onsite	Shallow
331	Radium-226	13982-63-3	pCi/L	1	2.55E-01	2.55E-01	Single observation	Onsite	Shallow
331	Thorium-230	014269-63-7	pCi/L	1	1.08E+00	1.08E+00	Single observation	Onsite	Shallow
331	Uranium-234	013966-29-5	pCi/L	1	1.08E+00	1.08E+00	Single observation	Onsite	Shallow
331	Uranium-238	007440-61-1	pCi/L	1	1.08E+00	1.08E+00	Single observation	Onsite	Shallow
332	Radium-226	13982-63-3	pCi/L	1	3.50E-01	3.50E-01	Single observation	Onsite	Shallow
333	Radium-226	13982-63-3	pCi/L	1	4.60E-01	4.60E-01	Single observation	Onsite	Shallow
500	Lead-210	014255-04-0	pCi/L	5	7.50E-01	1.14E+00	UCL	Onsite	Deep
500	Radium-226	13982-63-3	pCi/L	5	2.08E-01	6.50E-01	MaxDet	Onsite	Deep
500	Thorium-230	014269-63-7	pCi/L	5	7.50E-01	1.14E+00	UCL	Onsite	Deep
500	Uranium-234	013966-29-5	pCi/L	5	7.50E-01	1.14E+00	UCL	Onsite	Deep
500	Uranium-238	007440-61-1	pCi/L	5	7.50E-01	1.14E+00	UCL	Onsite	Deep
501	Lead-210	014255-04-0	pCi/L	5	7.21E-01	9.10E-01	UCL	Offsite	Shallow
501	Radium-226	13982-63-3	pCi/L	5	2.92E-01	9.10E-01	MaxDet	Offsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
501	Thorium-230	014269-63-7	pCi/L	5	7.21E-01	9.10E-01	UCL	Offsite	Shallow
501	Uranium-234	013966-29-5	pCi/L	5	7.21E-01	9.10E-01	UCL	Offsite	Shallow
501	Uranium-238	007440-61-1	pCi/L	5	7.21E-01	9.10E-01	UCL	Offsite	Shallow
502	Lead-210	014255-04-0	pCi/L	5	1.20E+00	1.20E+00	UCL	Offsite	Shallow
502	Radium-226	13982-63-3	pCi/L	5	2.42E-01	4.90E-01	MaxDet	Offsite	Shallow
502	Thorium-230	014269-63-7	pCi/L	5	1.20E+00	1.20E+00	UCL	Offsite	Shallow
502	Uranium-234	013966-29-5	pCi/L	5	1.20E+00	1.20E+00	UCL	Offsite	Shallow
502	Uranium-238	007440-61-1	pCi/L	5	1.20E+00	1.20E+00	UCL	Offsite	Shallow
503	Lead-210	014255-04-0	pCi/L	4	8.02E-01	9.78E-01	MaxDet	Offsite	Shallow
503	Radium-226	13982-63-3	pCi/L	4	2.98E-01	5.85E-01	MaxDet	Offsite	Shallow
503	Thorium-230	014269-63-7	pCi/L	4	8.02E-01	9.78E-01	MaxDet	Offsite	Shallow
503	Uranium-234	013966-29-5	pCi/L	4	8.02E-01	9.78E-01	MaxDet	Offsite	Shallow
503	Uranium-238	007440-61-1	pCi/L	4	8.02E-01	9.78E-01	MaxDet	Offsite	Shallow
504	Lead-210	014255-04-0	pCi/L	4	8.20E-01	1.36E+00	MaxDet	Onsite	Deep
504	Radium-226	13982-63-3	pCi/L	4	2.80E-01	5.20E-01	MaxDet	Onsite	Deep
504	Thorium-230	014269-63-7	pCi/L	4	8.20E-01	1.36E+00	MaxDet	Onsite	Deep
504	Uranium-234	013966-29-5	pCi/L	4	8.20E-01	1.36E+00	MaxDet	Onsite	Deep
504	Uranium-238	007440-61-1	pCi/L	4	8.20E-01	1.36E+00	MaxDet	Onsite	Deep
505	Lead-210	014255-04-0	pCi/L	4	4.32E-01	7.56E-01	MaxDet	Offsite	Shallow
505	Radium-226	13982-63-3	pCi/L	4	1.48E-01	2.80E-01	MaxDet	Offsite	Shallow
505	Thorium-230	014269-63-7	pCi/L	4	4.32E-01	7.56E-01	MaxDet	Offsite	Shallow
505	Uranium-234	013966-29-5	pCi/L	4	4.32E-01	7.56E-01	MaxDet	Offsite	Shallow
505	Uranium-238	007440-61-1	pCi/L	4	4.32E-01	7.56E-01	MaxDet	Offsite	Shallow
506	Lead-210	014255-04-0	pCi/L	5	4.01E-01	7.29E-01	UCL	Onsite	Deep
506	Radium-226	13982-63-3	pCi/L	5	8.53E-01	2.63E+00	MaxDet	Onsite	Deep
506	Thorium-230	014269-63-7	pCi/L	5	4.01E-01	7.29E-01	UCL	Onsite	Deep
506	Uranium-234	013966-29-5	pCi/L	5	4.01E-01	7.29E-01	UCL	Onsite	Deep
506	Uranium-238	007440-61-1	pCi/L	5	4.01E-01	7.29E-01	UCL	Onsite	Deep
507	Lead-210	014255-04-0	pCi/L	5	5.82E-01	9.34E-01	UCL	Offsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
507	Radium-226	13982-63-3	pCi/L	5	3.84E-01	5.55E-01	UCL	Offsite	Shallow
507	Thorium-230	014269-63-7	pCi/L	5	5.82E-01	9.34E-01	UCL	Offsite	Shallow
507	Uranium-234	013966-29-5	pCi/L	5	5.82E-01	9.34E-01	UCL	Offsite	Shallow
507	Uranium-238	007440-61-1	pCi/L	5	5.82E-01	9.34E-01	UCL	Offsite	Shallow
508	Lead-210	014255-04-0	pCi/L	5	3.92E-01	7.63E-01	UCL	Onsite	Deep
508	Radium-226	13982-63-3	pCi/L	5	1.35E+00	5.39E+00	MaxDet	Onsite	Deep
508	Thorium-230	014269-63-7	pCi/L	5	3.92E-01	7.63E-01	UCL	Onsite	Deep
508	Uranium-234	013966-29-5	pCi/L	5	3.92E-01	7.63E-01	UCL	Onsite	Deep
508	Uranium-238	007440-61-1	pCi/L	5	3.92E-01	7.63E-01	UCL	Onsite	Deep
509	Lead-210	014255-04-0	pCi/L	5	5.65E-01	7.10E-01	UCL	Offsite	Shallow
509	Radium-226	13982-63-3	pCi/L	5	3.47E-01	7.35E-01	MaxDet	Offsite	Shallow
509	Thorium-230	014269-63-7	pCi/L	5	5.65E-01	7.10E-01	UCL	Offsite	Shallow
509	Uranium-234	013966-29-5	pCi/L	5	5.65E-01	7.10E-01	UCL	Offsite	Shallow
509	Uranium-238	007440-61-1	pCi/L	5	5.65E-01	7.10E-01	UCL	Offsite	Shallow
515	Lead-210	014255-04-0	pCi/L	1	1.56E+00	1.56E+00	Single observation	Offsite	Shallow
515	Radium-226	13982-63-3	pCi/L	1	5.20E-01	5.20E-01	Single observation	Offsite	Shallow
515	Thorium-230	014269-63-7	pCi/L	1	1.56E+00	1.56E+00	Single observation	Offsite	Shallow
515	Uranium-234	013966-29-5	pCi/L	1	1.56E+00	1.56E+00	Single observation	Offsite	Shallow
515	Uranium-238	007440-61-1	pCi/L	1	1.56E+00	1.56E+00	Single observation	Offsite	Shallow
517	Radium-226	13982-63-3	pCi/L	2	5.35E-01	6.60E-01	MaxDet	Offsite	Shallow
518	Lead-210	014255-04-0	pCi/L	2	1.04E-01	1.48E-01	MaxDet	Offsite	Shallow
518	Radium-226	13982-63-3	pCi/L	2	6.53E-01	7.00E-01	MaxDet	Offsite	Shallow
518	Thorium-230	014269-63-7	pCi/L	2	1.04E-01	1.48E-01	MaxDet	Offsite	Shallow
518	Uranium-234	013966-29-5	pCi/L	2	1.04E-01	1.48E-01	MaxDet	Offsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
518	Uranium-238	007440-61-1	pCi/L	2	1.04E-01	1.48E-01	MaxDet	Offsite	Shallow
519	Lead-210	014255-04-0	pCi/L	1	6.50E-01	6.50E-01	Single observation	Onsite	Deep
519	Radium-226	13982-63-3	pCi/L	1	1.65E-01	1.65E-01	Single observation	Onsite	Deep
519	Thorium-230	014269-63-7	pCi/L	1	6.50E-01	6.50E-01	Single observation	Onsite	Deep
519	Uranium-234	013966-29-5	pCi/L	1	6.50E-01	6.50E-01	Single observation	Onsite	Deep
519	Uranium-238	007440-61-1	pCi/L	1	6.50E-01	6.50E-01	Single observation	Onsite	Deep
520	Radium-226	13982-63-3	pCi/L	1	3.20E-01	3.20E-01	Single observation	Offsite	Shallow
BATISTE SPRI	Lead-210	014255-04-0	pCi/L	6	1.54E-01	2.51E-01	UCL	Onsite	Shallow
BATISTE SPRI	Radium-226	13982-63-3	pCi/L	5	6.30E-01	1.28E+00	MaxDet	Onsite	Shallow
BATISTE SPRI	Thorium-230	014269-63-7	pCi/L	6	1.54E-01	2.51E-01	UCL	Onsite	Shallow
BATISTE SPRI	Uranium-234	013966-29-5	pCi/L	6	1.54E-01	2.51E-01	UCL	Onsite	Shallow
BATISTE SPRI	Uranium-238	007440-61-1	pCi/L	6	1.54E-01	2.51E-01	UCL	Onsite	Shallow
DI BLANK	Radium-226	13982-63-3	pCi/L	3	1.93E-01	2.70E-01	MaxDet	Onsite	Deep
FMC-6	Lead-210	014255-04-0	pCi/L	3	1.01E+01	2.90E+01	MaxDet	Onsite	Deep
FMC-6	Radium-226	13982-63-3	pCi/L	2	4.60E-01	4.80E-01	MaxDet	Onsite	Deep
FMC-6	Thorium-230	014269-63-7	pCi/L	3	1.01E+01	2.90E+01	MaxDet	Onsite	Deep
FMC-6	Uranium-234	013966-29-5	pCi/L	3	1.01E+01	2.90E+01	MaxDet	Onsite	Deep
FMC-6	Uranium-238	007440-61-1	pCi/L	3	1.01E+01	2.90E+01	MaxDet	Onsite	Deep
FRONTIER	Lead-210	014255-04-0	pCi/L	6	5.76E-01	8.70E-01	UCL	Onsite	Deep
FRONTIER	Radium-226	13982-63-3	pCi/L	5	2.66E-01	3.30E-01	UCL	Onsite	Deep
FRONTIER	Thorium-230	014269-63-7	pCi/L	6	5.76E-01	8.70E-01	UCL	Onsite	Deep
FRONTIER	Uranium-234	013966-29-5	pCi/L	6	5.76E-01	8.70E-01	UCL	Onsite	Deep
FRONTIER	Uranium-238	007440-61-1	pCi/L	6	5.76E-01	8.70E-01	UCL	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
LINDLEY	Lead-210	014255-04-0	pCi/L	4	3.23E+00	4.66E+00	MaxDet	Onsite	Deep
LINDLEY	Radium-226	13982-63-3	pCi/L	3	2.40E-01	4.20E-01	MaxDet	Onsite	Deep
LINDLEY	Thorium-230	014269-63-7	pCi/L	4	3.23E+00	4.66E+00	MaxDet	Onsite	Deep
LINDLEY	Uranium-234	013966-29-5	pCi/L	4	3.23E+00	4.66E+00	MaxDet	Onsite	Deep
LINDLEY	Uranium-238	007440-61-1	pCi/L	4	3.23E+00	4.66E+00	MaxDet	Onsite	Deep
NEW PILOT	Lead-210	014255-04-0	pCi/L	6	3.81E-01	6.74E-01	UCL	Onsite	Deep
NEW PILOT	Radium-226	13982-63-3	pCi/L	5	9.29E-01	2.20E+00	MaxDet	Onsite	Deep
NEW PILOT	Thorium-230	014269-63-7	pCi/L	6	3.81E-01	6.74E-01	UCL	Onsite	Deep
NEW PILOT	Uranium-234	013966-29-5	pCi/L	6	3.81E-01	6.74E-01	UCL	Onsite	Deep
NEW PILOT	Uranium-238	007440-61-1	pCi/L	6	3.81E-01	6.74E-01	UCL	Onsite	Deep
OLD PILOT	Lead-210	014255-04-0	pCi/L	6	9.95E-01	5.18E+00	MaxDet	Offsite	Shallow
OLD PILOT	Radium-226	13982-63-3	pCi/L	5	6.64E-01	1.08E+00	UCL	Offsite	Shallow
OLD PILOT	Thorium-230	014269-63-7	pCi/L	6	9.95E-01	5.18E+00	MaxDet	Offsite	Shallow
OLD PILOT	Uranium-234	013966-29-5	pCi/L	6	9.95E-01	5.18E+00	MaxDet	Offsite	Shallow
OLD PILOT	Uranium-238	007440-61-1	pCi/L	6	9.95E-01	5.18E+00	MaxDet	Offsite	Shallow
PEI-3	Radium-226	13982-63-3	pCi/L	1	9.00E-02	9.00E-02	Single observation	Onsite	Deep
PEI-4	Lead-210	014255-04-0	pCi/L	4	4.50E-01	7.59E-01	MaxDet	Onsite	Deep
PEI-4	Radium-226	13982-63-3	pCi/L	3	4.17E-01	9.50E-01	MaxDet	Onsite	Deep
PEI-4	Thorium-230	014269-63-7	pCi/L	4	4.50E-01	7.59E-01	MaxDet	Onsite	Deep
PEI-4	Uranium-234	013966-29-5	pCi/L	4	4.50E-01	7.59E-01	MaxDet	Onsite	Deep
PEI-4	Uranium-238	007440-61-1	pCi/L	4	4.50E-01	7.59E-01	MaxDet	Onsite	Deep
PEI-5	Lead-210	014255-04-0	pCi/L	2	1.78E+00	2.58E+00	MaxDet	Onsite	Deep
PEI-5	Radium-226	13982-63-3	pCi/L	1	1.50E-01	1.50E-01	Single observation	Onsite	Deep
PEI-5	Thorium-230	014269-63-7	pCi/L	2	1.78E+00	2.58E+00	MaxDet	Onsite	Deep
PEI-5	Uranium-234	013966-29-5	pCi/L	2	1.78E+00	2.58E+00	MaxDet	Onsite	Deep
PEI-5	Uranium-238	007440-61-1	pCi/L	2	1.78E+00	2.58E+00	MaxDet	Onsite	Deep
ROWLANDS	Lead-210	014255-04-0	pCi/L	6	6.06E-01	8.44E-01	UCL	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
ROWLANDS	Radium-226	13982-63-3	pCi/L	5	2.92E-01	6.70E-01	MaxDet	Onsite	Deep
ROWLANDS	Thorium-230	014269-63-7	pCi/L	6	6.06E-01	8.44E-01	UCL	Onsite	Deep
ROWLANDS	Uranium-234	013966-29-5	pCi/L	6	6.06E-01	8.44E-01	UCL	Onsite	Deep
ROWLANDS	Uranium-238	007440-61-1	pCi/L	6	6.06E-01	8.44E-01	UCL	Onsite	Deep
TANK FARM	Lead-210	014255-04-0	pCi/L	5	5.08E-01	6.81E-01	UCL	Onsite	Deep
TANK FARM	Radium-226	13982-63-3	pCi/L	5	2.86E-01	3.86E-01	UCL	Onsite	Deep
TANK FARM	Thorium-230	014269-63-7	pCi/L	5	5.08E-01	6.81E-01	UCL	Onsite	Deep
TANK FARM	Uranium-234	013966-29-5	pCi/L	5	5.08E-01	6.81E-01	UCL	Onsite	Deep
TANK FARM	Uranium-238	007440-61-1	pCi/L	5	5.08E-01	6.81E-01	UCL	Onsite	Deep
TW-11I	Lead-210	014255-04-0	pCi/L	6	6.95E-01	2.50E+00	MaxDet	Onsite	Deep
TW-11I	Radium-226	13982-63-3	pCi/L	5	7.00E-01	1.09E+00	UCL	Onsite	Deep
TW-11I	Thorium-230	014269-63-7	pCi/L	6	6.95E-01	2.50E+00	MaxDet	Onsite	Deep
TW-11I	Uranium-234	013966-29-5	pCi/L	6	6.95E-01	2.50E+00	MaxDet	Onsite	Deep
TW-11I	Uranium-238	007440-61-1	pCi/L	6	6.95E-01	2.50E+00	MaxDet	Onsite	Deep
TW-11S	Lead-210	014255-04-0	pCi/L	6	8.23E-01	1.59E+00	UCL	Offsite	Shallow
TW-11S	Radium-226	13982-63-3	pCi/L	5	3.52E-01	5.90E-01	MaxDet	Offsite	Shallow
TW-11S	Thorium-230	014269-63-7	pCi/L	6	8.23E-01	1.59E+00	UCL	Offsite	Shallow
TW-11S	Uranium-234	013966-29-5	pCi/L	6	8.23E-01	1.59E+00	UCL	Offsite	Shallow
TW-11S	Uranium-238	007440-61-1	pCi/L	6	8.23E-01	1.59E+00	UCL	Offsite	Shallow
TW-12S	Lead-210	014255-04-0	pCi/L	5	1.43E+00	4.72E+00	MaxDet	Offsite	Shallow
TW-12S	Radium-226	13982-63-3	pCi/L	5	6.59E-01	9.17E-01	UCL	Offsite	Shallow
TW-12S	Thorium-230	014269-63-7	pCi/L	5	1.43E+00	4.72E+00	MaxDet	Offsite	Shallow
TW-12S	Uranium-234	013966-29-5	pCi/L	5	1.43E+00	4.72E+00	MaxDet	Offsite	Shallow
TW-12S	Uranium-238	007440-61-1	pCi/L	5	1.43E+00	4.72E+00	MaxDet	Offsite	Shallow
TW-2D	Lead-210	014255-04-0	pCi/L	1	1.00E+00	1.00E+00	Single observation	Onsite	Deep
TW-2D	Thorium-230	014269-63-7	pCi/L	1	1.00E+00	1.00E+00	Single observation	Onsite	Deep

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth
TW-2D	Uranium-234	013966-29-5	pCi/L	1	1.00E+00	1.00E+00	Single observation	Onsite	Deep
TW-2D	Uranium-238	007440-61-1	pCi/L	1	1.00E+00	1.00E+00	Single observation	Onsite	Deep
TW-3D	Lead-210	014255-04-0	pCi/L	6	1.05E+00	1.67E+00	UCL	Onsite	Deep
TW-3D	Radium-226	13982-63-3	pCi/L	5	9.22E-01	1.66E+00	UCL	Onsite	Deep
TW-3D	Thorium-230	014269-63-7	pCi/L	6	1.05E+00	1.67E+00	UCL	Onsite	Deep
TW-3D	Uranium-234	013966-29-5	pCi/L	6	1.05E+00	1.67E+00	UCL	Onsite	Deep
TW-3D	Uranium-238	007440-61-1	pCi/L	6	1.05E+00	1.67E+00	UCL	Onsite	Deep
TW-5D	Lead-210	014255-04-0	pCi/L	6	4.64E-01	7.99E-01	UCL	Onsite	Deep
TW-5D	Radium-226	13982-63-3	pCi/L	5	1.12E+00	1.92E+00	UCL	Onsite	Deep
TW-5D	Thorium-230	014269-63-7	pCi/L	6	4.64E-01	7.99E-01	UCL	Onsite	Deep
TW-5D	Uranium-234	013966-29-5	pCi/L	6	4.64E-01	7.99E-01	UCL	Onsite	Deep
TW-5D	Uranium-238	007440-61-1	pCi/L	6	4.64E-01	7.99E-01	UCL	Onsite	Deep
TW-5I	Lead-210	014255-04-0	pCi/L	6	3.60E-02	1.85E-01	MaxDet	Onsite	Deep
TW-5I	Radium-226	13982-63-3	pCi/L	5	4.88E-01	7.08E-01	UCL	Onsite	Deep
TW-5I	Thorium-230	014269-63-7	pCi/L	6	3.60E-02	1.85E-01	MaxDet	Onsite	Deep
TW-5I	Uranium-234	013966-29-5	pCi/L	6	3.60E-02	1.85E-01	MaxDet	Onsite	Deep
TW-5I	Uranium-238	007440-61-1	pCi/L	6	3.60E-02	1.85E-01	MaxDet	Onsite	Deep
TW-5S	Lead-210	014255-04-0	pCi/L	6	9.87E-02	5.61E-01	MaxDet	Onsite	Shallow
TW-5S	Radium-226	13982-63-3	pCi/L	5	5.82E-01	1.29E+00	MaxDet	Onsite	Shallow
TW-5S	Thorium-230	014269-63-7	pCi/L	6	9.87E-02	5.61E-01	MaxDet	Onsite	Shallow
TW-5S	Uranium-234	013966-29-5	pCi/L	6	9.87E-02	5.61E-01	MaxDet	Onsite	Shallow
TW-5S	Uranium-238	007440-61-1	pCi/L	6	9.87E-02	5.61E-01	MaxDet	Onsite	Shallow
TW-9S	Lead-210	014255-04-0	pCi/L	6	7.60E-01	4.47E+00	MaxDet	Offsite	Shallow
TW-9S	Radium-226	13982-63-3	pCi/L	5	4.40E-01	7.86E-01	UCL	Offsite	Shallow
TW-9S	Thorium-230	014269-63-7	pCi/L	6	7.60E-01	4.47E+00	MaxDet	Offsite	Shallow
TW-9S	Uranium-234	013966-29-5	pCi/L	6	7.60E-01	4.47E+00	MaxDet	Offsite	Shallow
TW-9S	Uranium-238	007440-61-1	pCi/L	6	7.60E-01	4.47E+00	MaxDet	Offsite	Shallow

Table G-11Groundwater Exposure Point Concentrations for Radionuclides

Station	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?	On- or Off-site Well	Qualitative Well Depth

Key:

MaxDet = Maximum detected concentration.
n = Number of samples.
UCL = 95% Upper confidence limit of the mean.

Table G-12

Background Groundwater Exposure Point Concentrations

Station ID	Chemical	CAS Number	Units	n	Average Concentration	Exposure Point Concentration Used	UCL or Maximum Detected Concentration?
GW Bkgd	Arsenic, total	7440-38-2	mg/l	64	8.01E-03	1.19E-02	UCL
GW Bkgd	Beryllium, total	7440-41-7	mg/l	81	5.31E-04	6.34E-04	UCL
GW Bkgd	Boron, total	7440-42-8	mg/l	61	1.21E-01	1.39E-01	UCL
GW Bkgd	Fluoride	16984-00-6	mg/l	102	4.26E-01	4.27E-01	UCL
GW Bkgd	Lead-210	014255-04-0	pCi/l	76	8.58E-01	9.51E-01	UCL
GW Bkgd	Manganese, total	7439-96-5w	mg/l	67	6.46E-03	3.90E-03	UCL
GW Bkgd	Mercury, total	7439-97-6	mg/l	40	1.63E-04	2.10E-04	UCL
GW Bkgd	Nickel, total	7440-02-0	mg/l	75	6.73E-03	7.10E-03	UCL
GW Bkgd	Nitrate (NO3 as N)	14797-55-8	mg/l	98	2.13E+00	2.51E+00	UCL
GW Bkgd	Potassium	7440-09-7	mg/l	99	8.02E+00	8.40E+00	UCL
GW Bkgd	Radium-226	13982-63-3	pCi/l	61	4.61E-01	5.62E-01	UCL
GW Bkgd	Selenium, total	7782-49-2	mg/l	66	2.06E-03	2.63E-03	UCL
GW Bkgd	Tetrachloroethene	127-18-4	mg/l	25	2.48E-03	2.60E-03	UCL
GW Bkgd	Thorium-230	014269-63-7	pCi/l	76	8.58E-01	9.51E-01	UCL
GW Bkgd	Trichloroethene	79-01-6	mg/l	25	2.60E-03	2.77E-03	UCL
GW Bkgd	Uranium-234	013966-29-5	pCi/l	76	8.58E-01	9.51E-01	UCL
GW Bkgd	Uranium-238	007440-61-1	pCi/l	76	8.58E-01	9.51E-01	UCL
GW Bkgd	Vanadium, total	7440-62-2	mg/l	61	2.83E-03	3.45E-03	UCL
GW Bkgd	Zinc, total	7440-66-6	mg/l	49	3.96E-02	2.84E-02	UCL

Key:

Bkgd = Background.
n = Number of samples.
UCL = 95% Upper confidence limit of the mean.

Note: Data from the following wells were used to derive exposure point concentrations: 101, 102, 106, 147, 158, 301, 305, 510, 511, 512, 513, 514, 516, Idaho Power, PEI-1, PEI-6, and TW-10S.

APPENDIX L

FMC Corporation

Phosphorus Chemicals Division
PO Box 4111
Pocatello, Idaho 83205
(208) 236-8200

FMC

May 24, 1999

Ms. Linda Meyer
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Revised Interim Stormwater Management at Western Ponds Area, FMC Corporation; EPA ID No. IDD 07092 9518

Dear Ms. Meyer:

Attached please find two (2) copies of Figure 7-16, Interim Grading and Drainage Area Plan that has been revised per our meeting on May 3, 1999. The interim stormwater management plan for the western ponds area has been revised to incorporate the following features to divert or detain runoff from RCRA capped areas and minimize potential flow onto old phossy pond:

1. Raise the roadway between pond 8S and pond 8E. The existing roadway will be raised to divert flow from the pond 8S cap and surrounding area to the north between ponds 8S and 8E, away from old pond 1E. The north end of the raised roadway will impinge on the 8E temporary cover, but will be constructed carefully to prevent any damage to the temporary FML. As we discussed, the culvert specified in the Pond 8S closure plan will be installed under the roadway per the plans and specifications, but the upstream end will be plugged during the interim period by an HDPE boot cap with strap and seal, as well as placing fill to protect the end cap.

2. Construct berm on the south side of pond 8E. An earthen berm approximately 1 to 2 feet high will be created along the south side of the roadway to the southeast/south of pond 8E to detain stormwater flow from the southern third of the pond 8E temporary cover. Although the berm will not be designed to detain peak stormwater flows, the berm will minimize the potential for nominal or average runoff from 8E temporary cover into the area of old pond 4E.

3. Construct berm on the southwest perimeter of pond 14S. An earthen berm approximately 1 to 2 feet high will be created along the southwestern side of the roadway to the southwest of pond 14S to detain stormwater flow from the southern half of the pond 14S temporary FML. Although the berm will not be

designed to detain peak stormwater flows, the berm will minimize the potential for nominal or average runoff from 14S temporary cover into the area of old pond 6E.

4. Construct lined drainage swale on top of the pond 15S south dike to divert flows to the west. The temporary FML for pond 15S will be extended to cover essentially the entire top portion of the south dike. The FML will conform to the finished swale, which will slope from the edges of the dike to form a valley drain in the middle. The valley drain will slope form the east at approximately 0.1% toward daylight at the west end of the pond area (well beyond the area of old pond 6E). The swale portion of the FML will be covered with a minimum of 6 inches of soil for liner anchorage. This swale will effectively intercept peak runoff from the 15S temporary cover during storms as frequent as 2-year events.

These interim stormwater management features will be constructed during the 1999 pond closure construction, probably near the end of the construction season (September/October).

Please contact me at (208) 236-8658 should you have questions regarding this information.

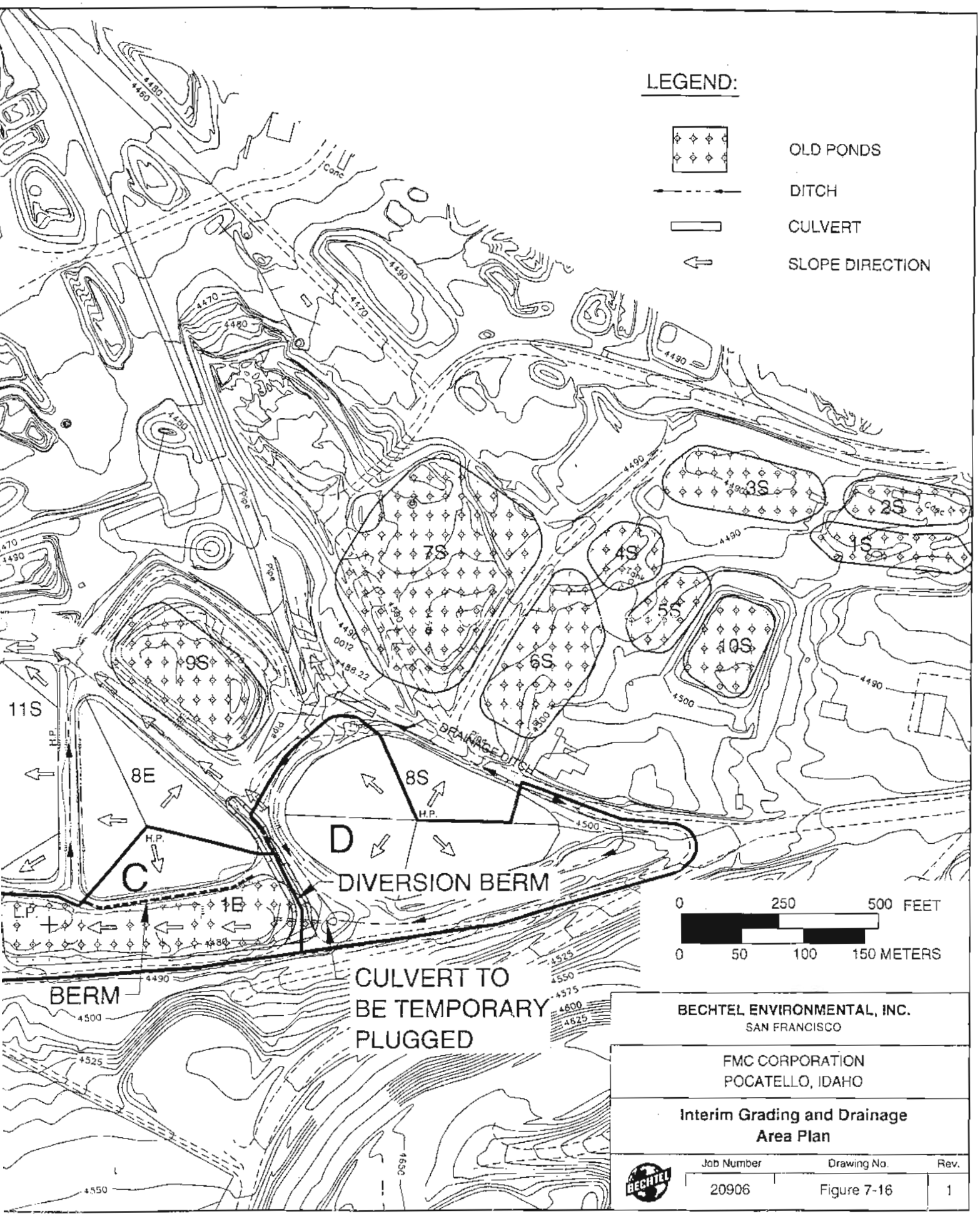
Very truly yours,

Rob J. Hartman

Rob J. Hartman
FMC Corporation

Attachments

cc: Loren McPhillips, EPA w/ attachment
Ken Valder, TTEMI w/ attachments

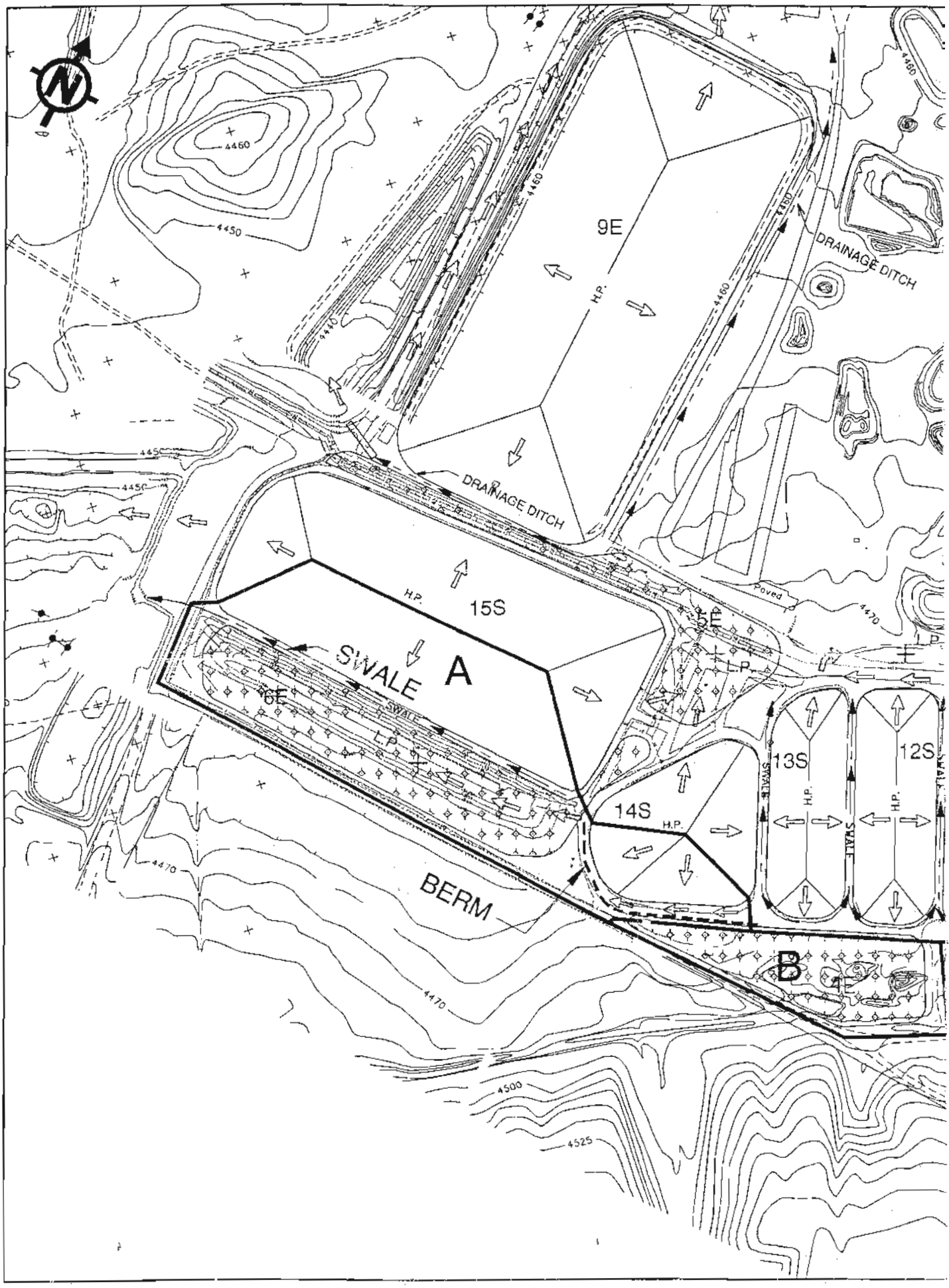


BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

FMC CORPORATION
POCATELLO, IDAHO

Interim Grading and Drainage Area Plan

Job Number	Drawing No.	Rev.
20906	Figure 7-16	1



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FMC Corporation

Phosphorus Chemicals Division
PO Box 4111
Pocatello, Idaho 83205
(208) 236-8200

FMC

May 24, 1999

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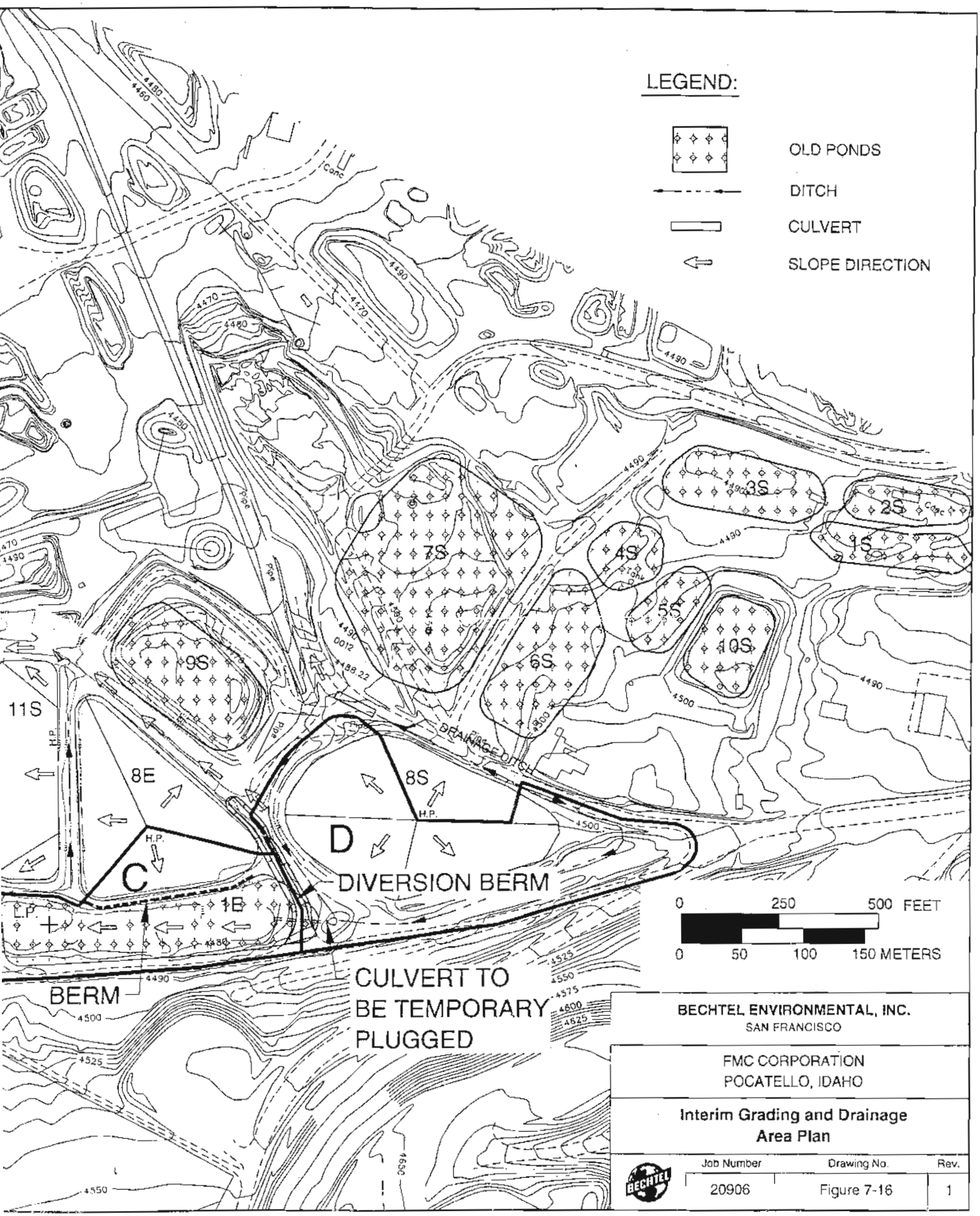

BECHTEL ENVIRONMENTAL, INC.
SAN FRANCISCO

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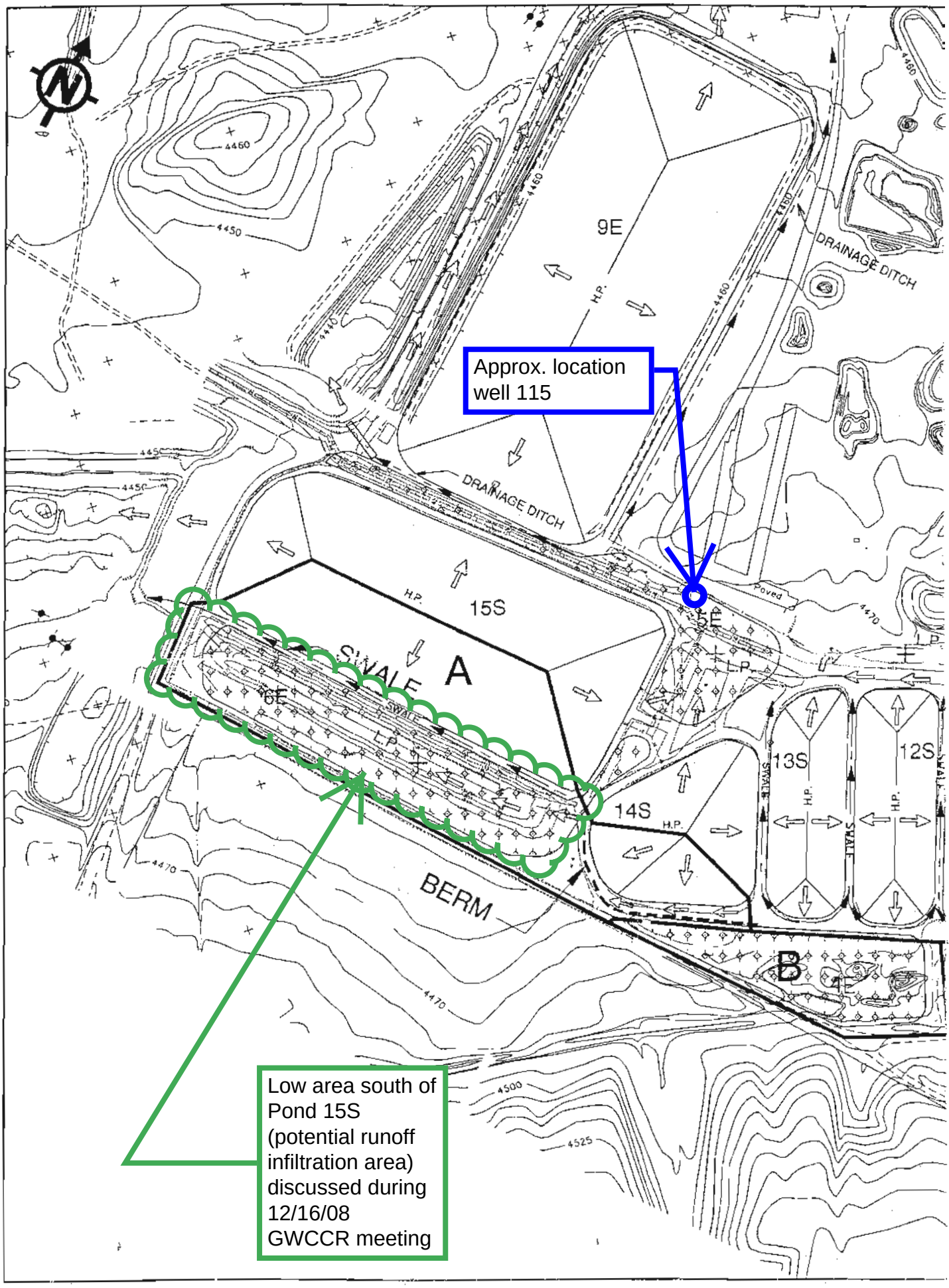
Interim Grading and Drainage Area Plan

Job Number	Drawing No.	Rev.
20906	Figure 7-16	1


Approx. location well 115
Low area south of Pond 15S (potential runoff infiltration area) discussed during 12/16/08 GWCCR meeting
9E
DRAINAGE DITCH
DRAINAGE DITCH
15S
A
SWALE
6E
5E
14S
13S
12S
BERM
B
H.P.
L.P.
Paved
4460
4450
4470
4500
4525