

**FIVE-YEAR REVIEW REPORT FOR
SACO TANNERY WASTE PITS SUPERFUND SITE
YORK COUNTY, MAINE**



Prepared by

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Region 1
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09/23/14
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**2014 FIVE-YEAR REVIEW
SACO TANNERY WASTE PITS SUPERFUND SITE**

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LIST OF ACRONYMS

ACL	Alternate Concentration Limit
ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
BDL	Below Detection Limit
COC	Contaminant of Concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
ET	Ecotox Threshold benchmark value
FAME	Finance Authority of Maine
FSSB	Freshwater Sediment Screening Benchmarks
FYR	Five-Year Review
MCL	Maximum Contaminant Level
MEDEP	Maine Department of Environmental Protection
MEGs	Maximum Exposure Guidelines
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operations and Maintenance
ppb	parts per billion
ppm	parts per million
RAG	Remedial Action Guideline
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SEL	Severe Effect Level
SSC	Superfund State Contract
SVOC	Semi-volatile organic compound
TBC	To be Considered
TCL	Target Compound List
VOC	volatile organic compound
µg/l	micrograms per liter

EXECUTIVE SUMMARY

This is the fourth Five-Year Review (FYR) for the Saco Tannery Waste Pits Superfund (Site) located in Saco, York County, Maine. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on December 30, 2008.

In 1956, a tanning company purchased the Site for disposal of its process wastes. The process wastes characteristically had high concentrations of chromium, volatile organic compounds, semi-volatile organic compounds, acids, leather hides and scraps. For nearly two decades, wastes were disposed in two lagoons (approximately two acres each in size) and 57 smaller disposal pits. By the early 1980s the tanning company went bankrupt and the title transferred to a state agency, the Finance Authority of Maine (FAME).

Investigations in the early 1980s and a removal action in 1983 were followed by completion of a Remedial Investigation/Feasibility Study in October 1987. A Record of Decision (ROD) was signed on September 27, 1989. The ROD set forth a remedy that combined a source control cover system with institutional controls to restrict access and use of the Site and a monitoring program. The primary contaminants of concern affecting on-site soil, groundwater, surface water, and sediment were determined to be arsenic, chromium, lead, manganese, chlorobenzene, and bis(2-ethylhexyl)phthalate. Safe Drinking Water Act Maximum Contaminants Levels (MCLs) were set as the action levels for all groundwater contaminants, except arsenic at four locations where alternate concentration limits were established.

On May 22, 1989, the Maine state legislature passed a Legislative Resolve that permanently converted the Site to a wildlife preserve. The Legislative Resolve prohibits development for residential or commercial use, excavation that penetrates the soil cover systems, and utilization of the groundwater as a drinking water source. In addition to the Legislative Resolve, in 1991 a Conservation Easement was implemented on the property as a further assurance of the restrictions on future land use.

An Explanation of Significant Differences (ESD) was signed on January 16, 1993. The ESD changed the compensatory wetland requirement of the ROD to allow for the purchase of an off-site wetland area, the Saco Heath, because insufficient acreage was available on the Site to mitigate the wetlands lost as a result of the construction of the soil covers. The ESD also allowed water collected from dewatering the pits and lagoons to be treated onsite and used for dust suppression during construction of the soil cover systems rather than transported offsite for disposal.

Source control preparation activities were completed in the fall 1992. Construction of the soil cover systems took place from March through October 1993. Between April 1990 and March 1995, EPA conducted the monitoring program that included quarterly sampling of on-site monitoring wells, semi-annual surface water and sediment sampling, and annual sampling of residential wells on Flag Pond, Jenkins and Hearn Roads. In April 1995, responsibility for the monitoring program was transferred to Maine Department of Environmental Protection (MEDEP).

MEDEP and FAME continue operation and maintenance under a division of responsibility defined in a 1991 Memorandum of Agreement and 2001 Amended Memorandum of Agreement. The operation and maintenance activities have been modified since the last five-year review. MEDEP has reduced the groundwater and sediment sampling frequency to every two years, has reduced the number of monitoring wells sampled, and has proposed further modifications to the monitoring program. EPA concurred with the changes in frequency and number of wells and is reviewing the latest proposal.

Based on the data reviewed, observations from the site inspection, and interviews, the remedy is functioning as intended by the ROD. The source control portion of the remedy is complete and inspections have confirmed that the remedy is functioning as designed and remains protective of human health and the environment. Groundwater and sediment monitoring continue, as does maintenance, although ongoing vandalism remains a concern. The effective implementation of institutional controls prohibiting development and use of Site groundwater have prevented exposure to Site soils and groundwater. Although vandalism has created openings in the interior fencing, the cover systems remain intact.

The primary ARARs for groundwater on the Site are the MCLs and 1992 Maine Maximum Exposure Guidelines. While the MCL for arsenic has been reduced to 10 µg/l, and a number of the monitoring wells exceed this value, the restriction on groundwater use prevents any exposure.

Land use at the Site and adjacent properties has not changed appreciably since the previous five-year review and is not expected to change, and there are no additional routes of exposure.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Saco Tannery Waste Pits Superfund Site		
EPA ID: MED980520241		
Region: 1	State: Maine	City/County: Saco/York County
SITE STATUS		
NPL Status: Deleted		
Multiple OUs? No	Has the site achieved construction completion? Yes	
REVIEW STATUS		
Lead agency: State <i>[If "Other Federal Agency", enter Agency name]:</i> Click here to enter text.		
Author name (Federal or State Project Manager): Terrence Connelly		
Author affiliation: EPA		
Review period: 6/26/2013 – 9/30/2014		
Date of site inspection: December 10, 2013, and April 9, 2014		
Type of review: Statutory		
Review number: 4		
Triggering action date: 12/30/2008		
Due date (five years after triggering action date): 12/30/2013		

Issues/Recommendations				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Sitewide	Issue Category: Site Access/Security			
	Issue: Ongoing vandalism			
	Recommendation: Partner with local groups to create solution			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	MEDEP/FAME	MEDEP	7/30/2015

Issues and Recommendations Identified in the Five-Year Review:

OU(s): Sitewide	Issue Category: Remedy Performance			
	Issue: Potential Sediment Toxicity			
	Recommendation: Evaluate sediment toxicity to aquatic organisms			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	MEDEP	MEDEP	7/30/2018

Protectiveness Statement(s)

Site-wide Protectiveness Statement	
<i>Protectiveness Determination:</i> Short-term Protective	<i>Addendum Due Date (if applicable):</i>
<i>Protectiveness Statement:</i> The site-wide remedy currently protects human health and the environment because the remedy is functioning as designed. Institutional controls restrict future use of the Site and its groundwater. However, in order for the remedy to be protective in the long-term, a solution is needed to prevent ongoing vandalism of the interior fencing and gates, and an evaluation of potential sediment toxicity to aquatic organisms should be performed.	

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.

EPA has conducted three FYRs on the remedy implemented at the Saco Tannery Waste Pits Superfund Site (Site) in Saco, York County, Maine. EPA was the lead agency for developing and implementing the remedy for the Site. Maine Department of Environmental Protection (MEDEP), as the support agency representing the State of Maine during the implementation of the remedy, has been the lead agency since 1995. MEDEP reviewed all supporting documentation and provided input to EPA for each FYR.

This is the fourth FYR for the Site. The triggering action for this statutory review is December 30, 2008, the completion date of the third FYR. This FYR is required since hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. The Site consists of one Operable Unit.

II. PROGRESS SINCE THE LAST REVIEW

The third Five-Year Review Report was signed on December 30, 2008. The 2008 review found that the site-wide remedy was protective because the remedial activities have been implemented and are complete. Institutional controls have been enacted (a 1989 State of Maine Legislative

Resolve and a 1991 Conservation Easement) that prohibits use of groundwater and restricts future use of the Site. Tables 1 and 2 below present the protectiveness determination and follow-up actions from the 2008 FYR. The 2008 FYR did not identify any issues or any recommendations but did note two follow-up actions.

Table 1: Protectiveness Determinations/Statements from the 2008 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	Because the remedial actions implemented for the Site are protective, the Site is protective of human health and the environment. The soil cover systems constructed under the source control remedy are functioning as designed and remain in good condition, thus preventing contact with soils and sludge in the pits and lagoons. Institutional controls, including the resolution creating a wildlife preserve at the Site, the conservation easement restricting future use of the Site and its groundwater, and fencing restrict access to the soil cover systems and prevent exposure to soils and groundwater ensuring the Site remains protective of human health and the environment. Groundwater and sediment monitoring have shown reductions in concentrations of contaminants of concern, below many of the target levels established in the ROD. The monitoring results demonstrate that there is no off-site migration and on-site contamination is identifiable and localized. The monitoring program will continue to ensure that concentrations remain within acceptable ranges.

Table 2: Status of Follow-up Actions from the 2008 FYR

OU #	Issue	Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
1	No issues identified	Continue O&M activities and periodically review to assure that they remain current with site conditions	State	EPA	None	Ongoing	
1	No issues identified	Monitor chromium concentrations in downstream locations as they appear to have increased	State	EPA	None	Ongoing	

Follow-up Action 1

- *O&M activities continue through a contract that the Finance Authority of Maine (FAME) has with the City of Saco and contractors with oversight provided by MEDEP.*

Follow-up Action 2

- *Sediment samples have been collected three times (2009, 2011, and 2013) since the last five-year review and are discussed in Section III below.*

Remedy Implementation Activities

No remedial implementation activities were performed since the previous FYR.

System Operation/Operation and Maintenance Activities

The first Operation and Maintenance (O&M) plan for the Site was prepared as part of the September 1992 Remedial Design Report, and it was included in the 1993 Superfund State Contract. MEDEP has periodically updated the O&M Plan with the last update made February 2, 2009. The O&M activities include periodic inspections and maintenance, annual mowing of and around the soil covers, and performing all necessary repairs due to erosion, burrowing animals, off-road vehicles and other forms of cover damage with adequate materials. Inspection observations and details of any maintenance and repairs are required to be documented in an Inspection and Maintenance Report that is to be submitted after each Site inspection is conducted.

During this five-year period, the Site was inspected on August 31, 2010; July 8, 2011; October 16, 2012; and August 21, 2013, by a contractor for FAME. Damage to the fences and gates, either damaged by trees falling or vandalism, have been noted in the inspection reports and have been repaired but documentation of these repairs were not submitted to MEDEP. The inspection reports do not indicate any problems with the soil cover systems, roads, or drainage culverts.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

MEDEP was notified of the initiation of the five-year review on June 26, 2013. The FYR was led by Terrence Connelly, EPA's Remedial Project Manager for the Site. Danielle Obery of MEDEP assisted in the review as the State Project Manager.

The review consisted of the following components:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection; and
- Five-Year Review Report Development and Review.

Community Notification and Involvement

Activities to involve the community in the five-year review process were initiated by the Remedial Project Manager in June 2013 with a summary of the Site sent to the regional team. Per Region 1 policy, a region-wide press release announcing all upcoming five-year reviews in New England was sent to all regional newspapers including the Portland Press Herald. The press release was sent on May 9, 2013 and is attached in Appendix B. The results of the review and

the report will be made available at the Site information repository located at:

Saco City Hall¹
300 Main Street
Saco, Maine 04072

and at

Superfund Records Center
US Environmental Protection Agency
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Document Review

This five-year review consisted of a review of relevant documents including O&M records and monitoring data provided by FAME/MEDEP. Groundwater and surface water cleanup standards and sediment target clean-up levels, as listed in the September 1989 Record of Decision (ROD), were also reviewed.

Data Review - Groundwater

The 1989 ROD set MCLs as the groundwater performance standards for the six groundwater Contaminants of Concern: arsenic, chromium, lead, manganese, chlorobenzene, and bis(2-ethylhexyl)phthalate (plus four individual Alternate Concentration Limits (ACLs) for arsenic). During this review period, 2008-2013, groundwater samples were collected from nine monitoring wells on a biennial schedule. (See Figure 1 for sampling locations. Figure 2 also shows the sampling locations relative to the five waste management areas that are enclosed by fencing. In Appendix B, Figure 2 identifies the individual waste pits and the two lagoons.) Analysis of the groundwater data since the 2008 FYR follows below and the data from this review period are presented in Table 3. Historical data from 1992 (pre-remedy through 2013 are presented on Figures 3-11.

Arsenic

The 1989 ROD established ACLs for four overburden monitoring wells: MW-101, MW-103, MW-111B, and MW-114. For the remainder of the monitoring wells, the arsenic performance standard was the MCL. At the time of the ROD, the arsenic MCL was 50 ug/L. The MCL was revised to 10 µg/l in 2001 and became effective in February 2002. During this review period, arsenic concentrations exceeded the ACL of 123 ppb in MW-103 which is consistent with previous review periods in both the location (concentrations were below the respective ACLs at the other three wells) and the concentrations detected. Also during this review period, there have been eight exceedances of the revised MCL in the other five wells in the long-term monitoring program, with concentrations ranging from 12 to 24 µg/l. For these wells the concentrations appear stable with little fluctuation since the last FYR in 2008.

¹ Dyer Public Library served as the original local repository for the Site but after years of no requests for the Site's Administrative Record, the library transferred the Record to City Hall on December 9, 2004.

Chromium

The MCL for chromium is 50 µg/l. Since the completion of the remedial actions in 1993, concentrations of chromium (the metal foremost associated with tanning operations) have been below the detection limit at all locations except at MW-114B, where concentrations have ranged from below the detection limit up to 160 µg/l. During this review period, chromium concentrations at MW-114B fluctuated between 13 and 73 µg/l.

Lead

The action level for lead is 15 µg/l. Since the completion of the remedial actions in 1993, concentrations of lead have been below the detection limit of between 5-10 ug/l in 27 of the 29 sampling events. (Seven of nine wells exceeded the action level in April 2002 and lead was reported at all nine wells in November 2006 with one exceedance. Given the entire data history, these two separate events appear to be outliers, possibly caused by cross-contamination either in the field or in the laboratory.)

Manganese

Manganese concentrations exceeded the Maine 2000 MEG (a TBC) of 500 ug/L in six of the nine monitoring wells in 2003 through 2005. In the 2005 hydraulic assessment, MEDEP noted that manganese concentrations had remained stable since monitoring began with no marked decline in concentrations following the completion of the remedial actions in 1993. Consequently, with these stable results and recognition that manganese is not associated with the tanning industry, MEDEP recommended discontinuation of monitoring for manganese. EPA concurred with this recommendation and manganese was dropped from the long-term monitoring program in 2005. For historical purposes, charts of manganese concentrations from 1992-2005 are included in this report

Chlorobenzene (also identified as monochlorobenzene)

Following the 2005 hydraulic assessment, MEDEP discontinued monitoring for monochlorobenzene except at MW-114A. This was done because for the other eight wells in the long-term monitoring program, six never exceeded the MCL (100 µg/l) and the other two wells only exceeded the MCL once each. The MCL was exceeded slightly at MW-114A seven times (100-130 µg/l) from 2000 - 2005 but has not been exceeded in the five sampling events since 2005.

Bis(2-ethylhexyl)phthalate

Sampling has not been performed for bis(2-ethylhexyl)phthalate after MEDEP assumed O&M responsibilities in 1995. It was listed as a COC in the 1989 ROD after it was detected in four of thirty-two groundwater samples (reported concentrations of 10, 16, 24, and 1,500 µg/l. The well with the reported 1,500 µg/l had no other COCs, nor did the four other wells in the vicinity). The current Maine MEG is 30 µg/l. At the time of the Remedial Action in 1993, the MEG was 4 µg/l. The MCL is 6 µg/l. In the twenty quarterly monitoring rounds performed by EPA from April 1990 through March 1995, 256 samples from monitoring wells and 50 samples from residential wells were analyzed for bis(2-ethylhexyl)phthalate. It was detected twice in

monitoring wells above the laboratory detection limit (ranging from 0.7 to 10 µg/l), at 25 and 46 µg/l, and once in a residential sample at 40 µg/l.

Table 3: Groundwater Sampling Results Since the 2008 FYR

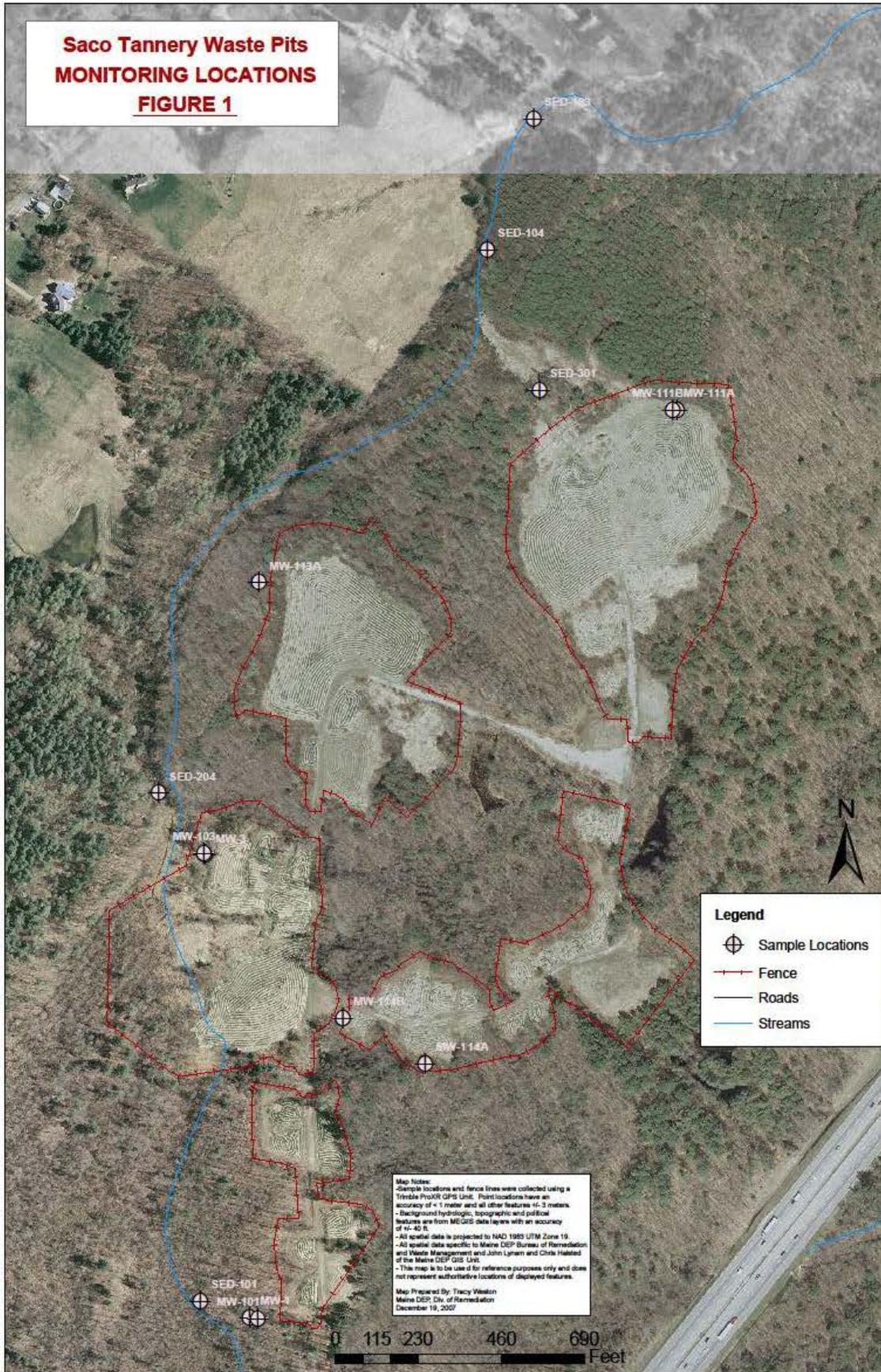
Sampling Location	Arsenic MCL 10 µg/l * ACL- well specific			Chromium MCL 50 µg/l			Lead Action Level 15 µg/l		
	2009	2011	2013	2009	2011	2013	2009	2011	2013
MW-1	14	16	15	<10	15U	10U	<10	5U	5U
MW-101 ACL 70 µg/l	40	29	59	<10	15U	10U	<10	5U	5U
MW-114A	15	16	24	<10	15U	10U	<10	5U	5U
MW-114B ACL 77 µg/l	12	8U	8U	13	56	73	<10	5U	5U
MW-111A	<10	12	8U	<10	15U	10U	<10	5U	5U
MW-111B ACL 64 µg/l	22	8U	8U	<10	15U	10U	<10	5U	5U
MW-113A	<10	8U	15	<10	15U	10U	<10	5U	5U
MW-3	<10	8U	8U	<10	15U	10U	<10	5U	5U
MW-103 ACL 123 µg/l	19	199	127	<10	15U	10U	<10	5U	5U
	Monochlorobenzene MCL 100								
MW-114A	69	72	1U						

* The arsenic MCL was 50 µg/l at the time of the ROD; in 2001, it was revised to 10 µg/l

Bold: exceeds performance standard

U: Undetected at this concentration

**Saco Tannery Waste Pits
MONITORING LOCATIONS
FIGURE 1**



**Figure 2: Operation and Maintenance Plan Sample Locations
Saco Tannery Waste Pits**

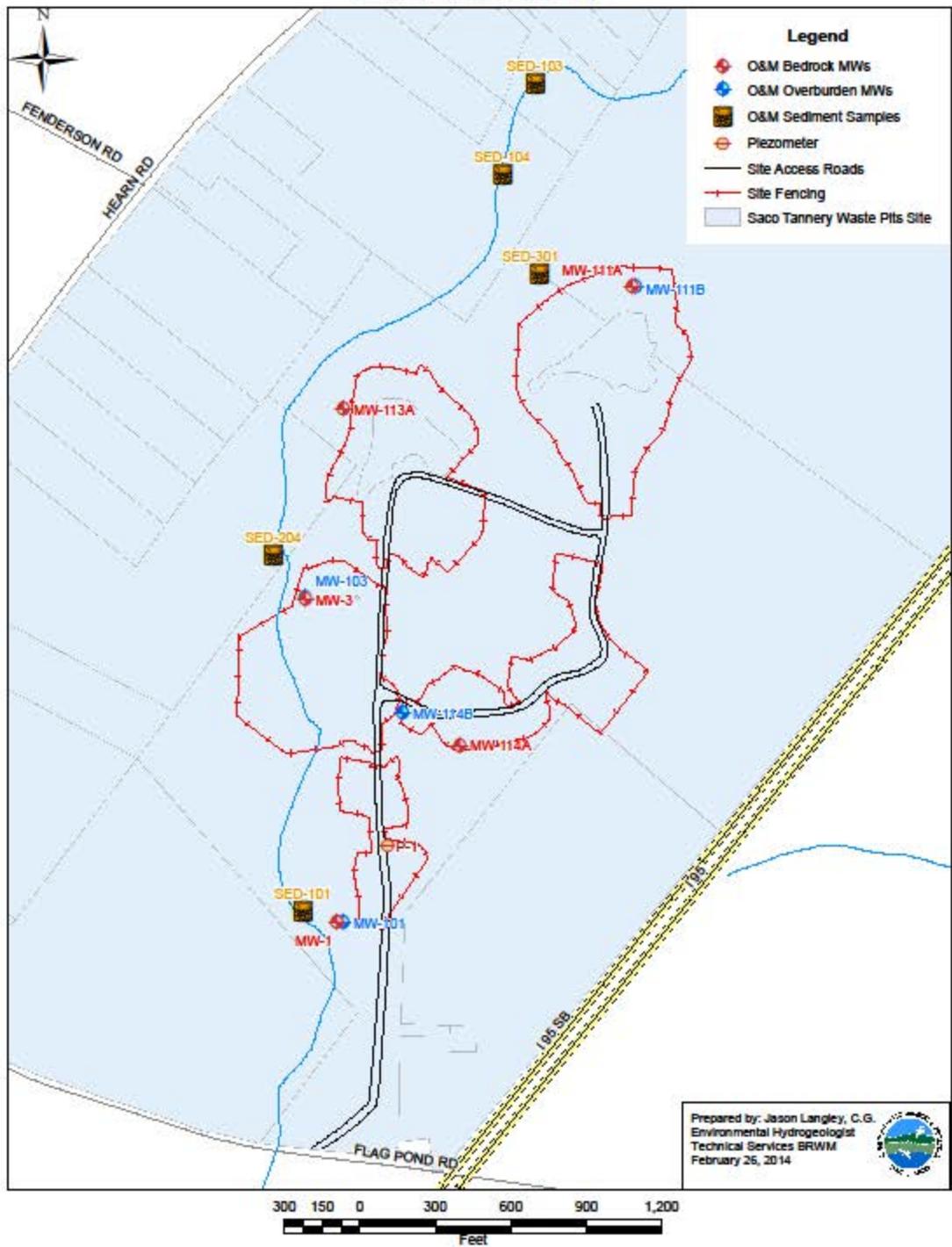


Figure 3: Arsenic Concentrations in Overburden Wells, 1992-2013

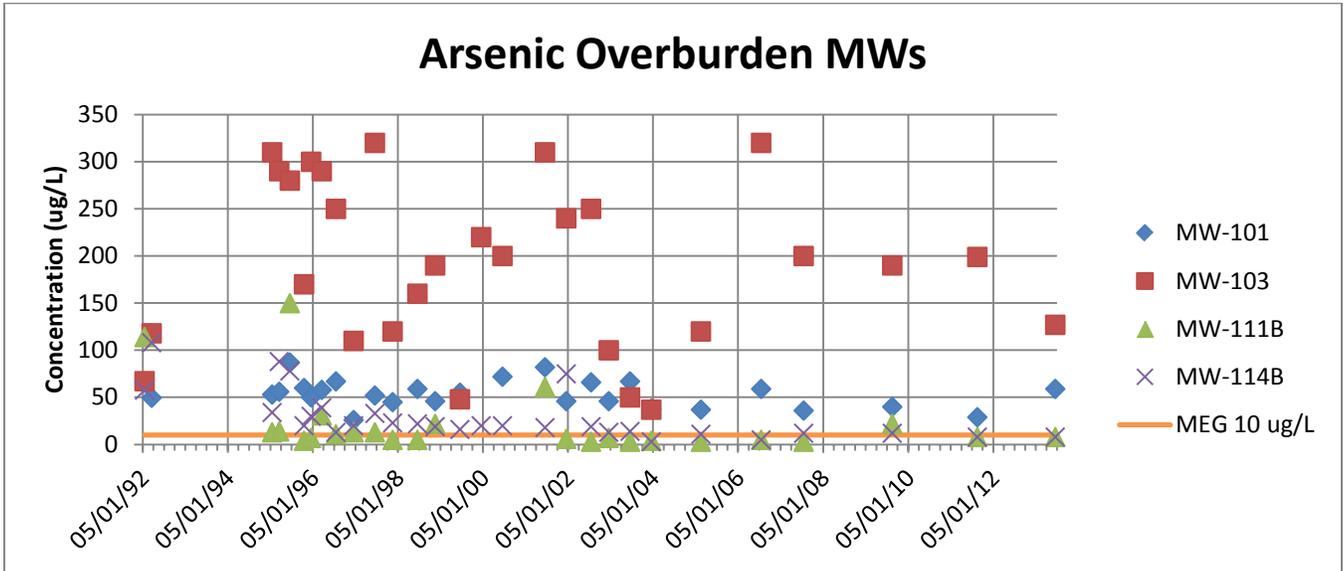


Figure 4: Chromium Concentrations in Overburden Wells 1992-2013

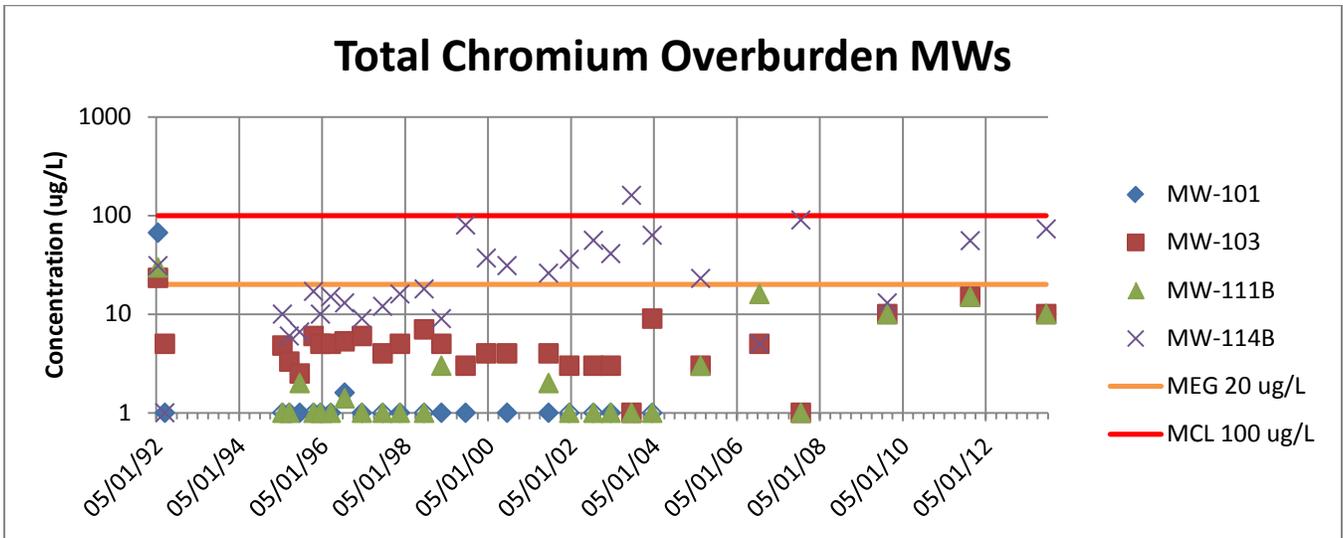


Figure 5: Lead Concentrations in Overburden Wells, 1992-2013

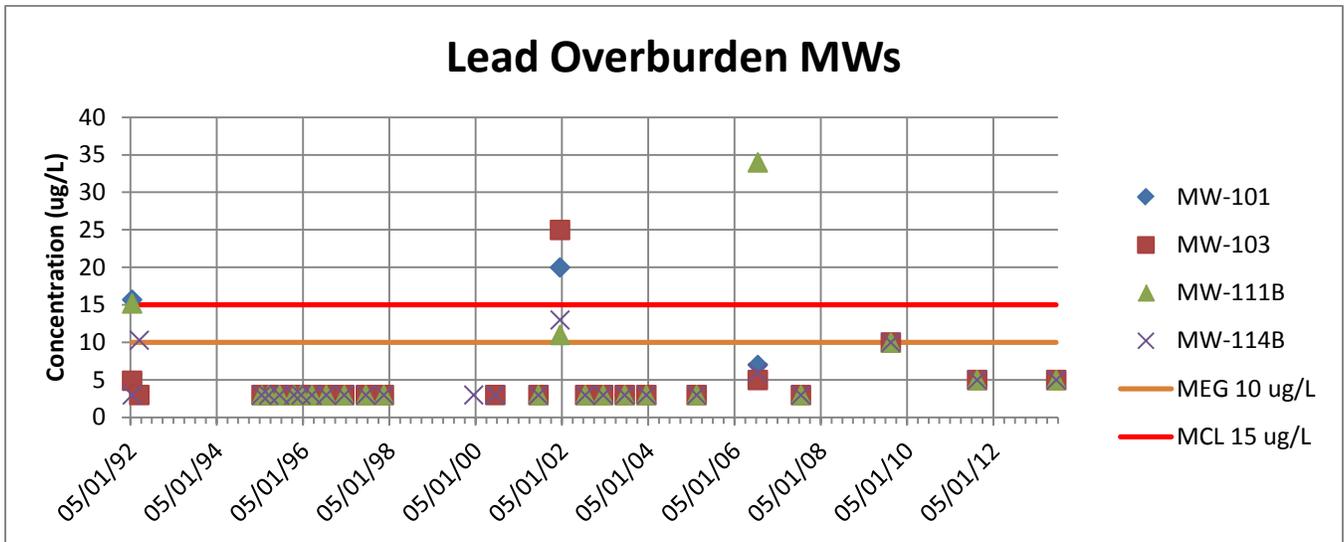


Figure 6: Manganese Concentrations in Overburden Wells, 1992 -2005

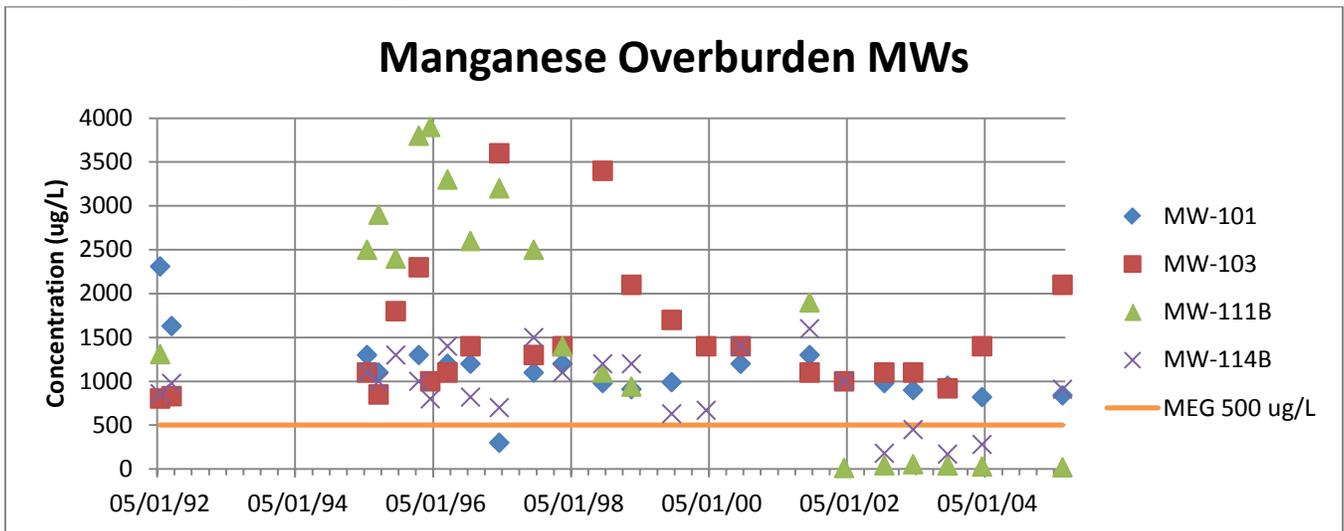


Figure 9: Chromium Concentrations in Bedrock Wells, 1992-2013

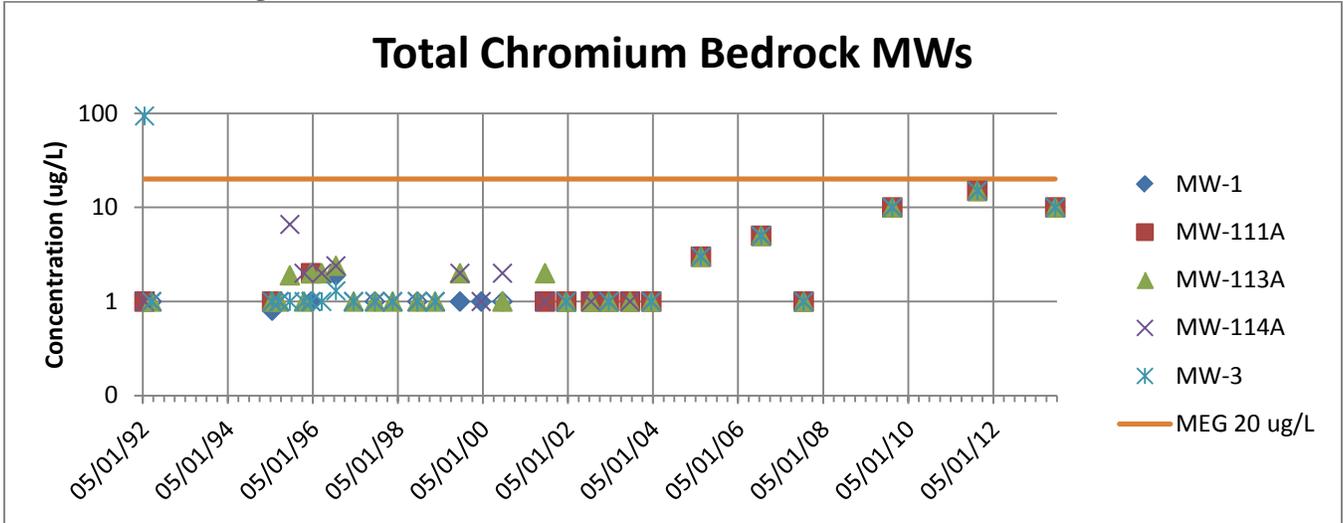


Figure 10: Lead Concentrations in Bedrock Wells, 1992-2013

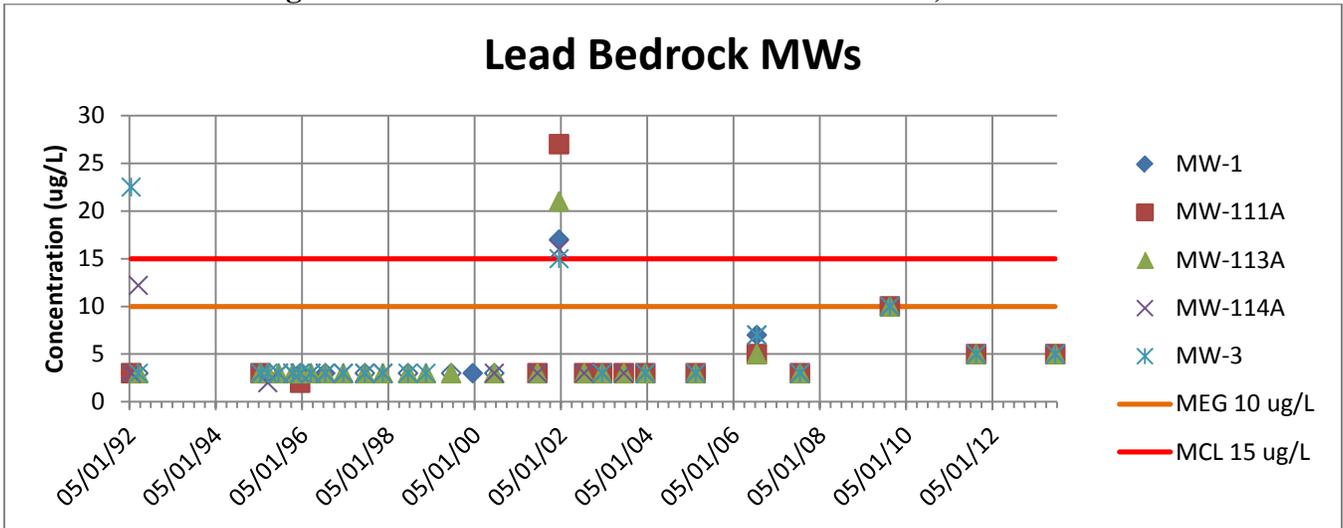
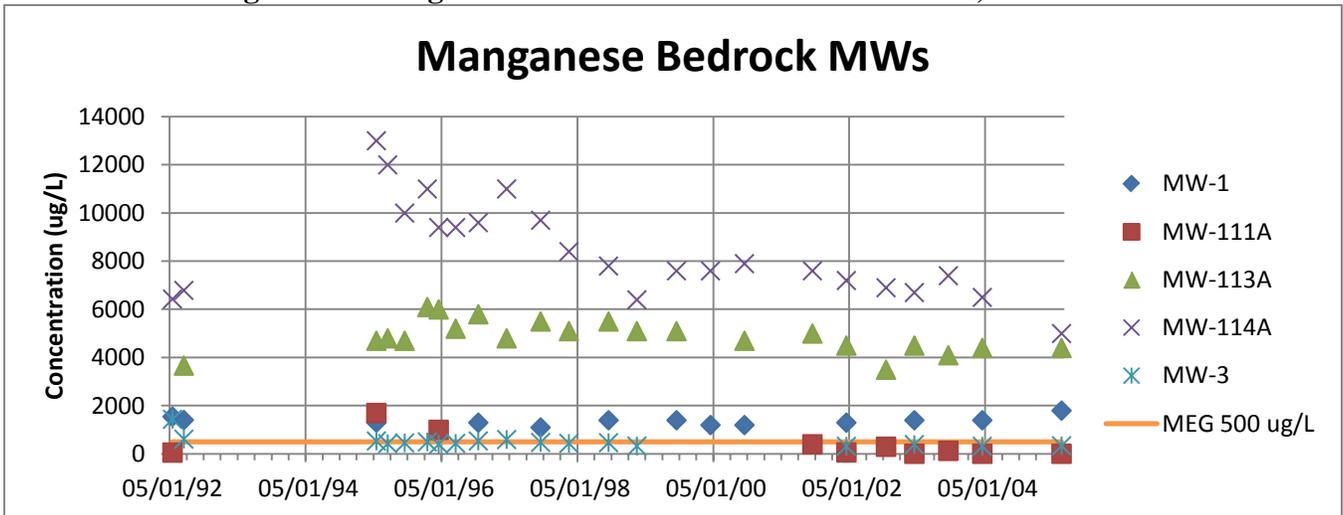


Figure 11: Manganese Concentrations in Bedrock Wells, 1992-2005



Data Review – Surface Water and Sediment

The 1989 ROD set Ambient Water Quality Criteria as the surface water cleanup target for the same six Contaminants of Concern as in groundwater: arsenic, chromium, lead, manganese, chlorobenzene, and bis(2-ethylhexyl)phthalate. MEDEP discontinued surface water sampling in 1999 because all prior sampling results showed no detections of any Contaminants of Concern.

The 1989 ROD set cleanup target levels for four sediment Contaminants of Concern: arsenic, total chromium, lead, and antimony. These levels were set for two areas of the Site, beyond Waste Pit #9 where the berm was incomplete allowing for overland flow and a seep was identified from Chromium Lagoon #2 (Waste Pit #9 is located in Area 2 [Figure 2 in Appendix B] and SED-301 is located downstream of the lagoon seep [Figure 2 above]). These target levels were expanded to include the entire Site in 1993 for the long-term monitoring program. During this review period, 2008-2013, sediment samples were collected from five locations (See Figure 1 and 2 above for sampling locations) on a biennial schedule.

The total chromium ROD cleanup target level was a "To Be Considered" (TBC) for sediments based on a risk calculation from a 1980 stream water quality study associated with a Maine tannery. After this risk-based action level was established in 1989, EPA began using Ecotoxicity Threshold benchmark values (ETs) for sediment and stream quality screening, comparing maximum measured contaminant concentrations to an ecotoxicological-based benchmark. As noted in the 1998 FYR, these values are intended for screening; they are not regulatory criteria, site-specific cleanup standards, or remediation goals. These screening values in turn have been supplanted by the Freshwater Sediment Screening Benchmarks (FSSB) developed in 2004 by EPA Region 3.

Similarly, MEDEP had been using the Ontario Ministry of Environment Severe Effect Level (SEL) as a screening level. SELs are listed in Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario, March 1993. A SEL is defined as the level at which pronounced disturbance of the sediment-dwelling community can be expected. Now however, MEDEP also uses the FSSB.

MEDEP has modified the sediment sampling program three times after they took over responsibility for long-term monitoring of the Site in 1995: the number of locations was decreased in 1998; the frequency was reduced from semi-annual to annual sampling in 2002; and following the hydraulic assessment in December 2005, the frequency was further reduced to every two years. EPA concurred with these modifications.

Since the last five year review in 2008, EPA Region 1 has recommended the use of Threshold Effect Concentrations (TEC) and Probable Effect Concentrations (PEC) from Macdonald et al (2000). These consensus-based sediment quality guidelines are based on the geometric average of five freshwater sediment guidelines. These consensus-based guidelines are viewed as reliably predicting presence or absence of sediment toxicity.

Sediment data collected since the 2008 FYR are compared against sediment guidelines in Table 4 and are discussed below. Sediment data collected from 1992 to 2013 are presented in Figures 13 -17 and provide an overall picture of Site.

Arsenic

Since the 2008 FYR, arsenic concentrations have been within the ROD action level of 60 mg/kg in four of the five sampling locations. Only SED-301, which is the location closest to the historical Chromium Lagoon #2 seep, has had arsenic concentrations above the ROD action level. Both sampling locations downstream of SED-301 (i.e., at locations SED-103 and SED-104) continue to be below the ROD action level and fluctuate below or slightly above the ET-ERL and FSSB. Arsenic was higher than the PEC in SED-301 in 2011 and 2013.

Chromium

Chromium continues to be detected in the sediment in the Stuart Brook drainage (SED-204, SED-301, SED-104, and SED-103) and in the Cascade Brook drainage (SED-101) but all concentrations are well below the ROD action level of 2,000 mg/kg and four of the five locations also are below the ET-ERL and FSSB. Only SED-204, which is the location closest to the surface water divide between the two drainages, had consistently elevated concentrations higher than the PEC in 2009, 2011, and 2013. Chromium also occurred above the PEC in SED-103 in 2011, but not later. Chromium has not been detected in monitoring wells MW-103 and MW-3, which are located between the waste pits and the wetlands where SED-204 is located, and the chromium concentrations at the two downstream sediment locations from SED-204 are about an order of magnitude lower than at SED-204. This suggests the spillage from Waste Pit #9 has attenuated within a short distance from Waste Pit #9.

Lead

Lead concentrations have been within its ROD action level of 125 mg/kg since the 2003 FYR. The lead concentrations at four of the five locations have also been below the ET-ERL, FSSB, and TEC since the 2008 FYR. As with chromium, the only location with elevated lead concentrations was SED-204. Lead exceeded the FSSB and TEC in SED-204 in 2013, but did not exceed the PEC during this five-year review period. This further suggests a limited extent of spillage from Waste Pit #9.

Antimony

The 1989 ROD set 30 ppm for the target cleanup level for antimony. No ET-ERL or SEL value has been established for antimony. The 2008 FYR (page 29) provided a detailed review of antimony data. Antimony was selected as a Contaminant of Concern as result of one detection in six samples during the 1988 Phase II RI. In the ten semi-annual sampling events following the ROD, April 1990 through January 1995, forty-three sediment samples were collected and all but one October 1993 sample were below the ROD target cleanup level for antimony and almost all were non-detect (generally less than 10 ppm). Consequently EPA and MEDEP agreed that antimony did not need to be added to the sediment sampling program.

Table 4: Sediment Sampling Results Since the 2008 FYR

(all concentrations in mg/kg)

	Arsenic			Chromium			Lead		
1989 ROD Perf Std	60			2,000			125		
ET-ERL	8.2			81			47		
1993 Ontario MOE SEL	33			110			250		
2004 FSSB	9.8			43.4			35.8		
TEC	9.79			43.4			35.8		
PEC	33			111			128		
	2009	2011	2013	2009	2011	2013	2009	2011	2013
Stuart Brook Drainage									
SED-103	6.8	21	18.6	22	134	28.3	6.9	16	12.7
SED-104	3	9.3	5.6	22	64.5	39.4	5.1	17.1	12.6
SED-301	38	151	72.6	29	69.4	30.9	14	26.4	27.9
SED-204	<3	5.8	10	900	236	1420	39	17.1	70.5
Cascade Brook Drainage									
SED-101	<3	0.89		3.9	1.5		18	5.7	

ET-ERL: Ecotoxicity Threshold - Effects Range, Low

SEL: Ontario Ministry of Environment - Severe Effect Levels

FSSB: EPA Freshwater Sediment Screening Benchmarks

TEC: Threshold Effect Concentration

PEC: Probable Effect Concentration

Bold: exceeds 1989 ROD performance standard

Shaded: exceeds PEC

Site Inspection

The Site was initially inspected for this FYR on December 10, 2013. In attendance were Terry Connelly, EPA Remedial Project Manager, Ronald Gonzalez, EPA Site attorney, and Danielle Obery, MEDEP State Project Manager. Because the Site was covered in snow when the initial inspection was conducted, a follow-up inspection was conducted on April 9, 2014. In attendance were Terry Connelly, Danielle Obery, and Jason Langley, MEDEP Hydrogeologist. The purpose of the FYR inspections was to assess the protectiveness of the remedy.

The Site received about two inches of snow the day before the scheduled December inspection so it was not possible to observe the conditions of the lagoon and waste pits soil covers. The inspection did note the absence of any vegetation such as saplings or shrubs or woody stem plants (roses, raspberries, blackberries, bittersweet) on the soil covers. By the height of the vegetation on the lagoon and waste pit covers, it appeared that they had been mowed in late fall. While the front gate was securely locked, several of the interior gates had been removed from the fence posts.

The Site was inspected again on April 9, 2014, with only small amounts of snow remaining on the Site roads. The soil cover systems appeared to be well vegetated with no apparent bare spots nor were any signs of erosion observed. The roads and drainage culverts also were in good condition. There were no significant blow-downs of trees on the interior fences though the five-

foot wide strip that had been cleared on either side of the interior fences prior to the 2008 FYR has become overgrown again with woody stem brush and saplings. Of much greater concern, more damage to the gates had occurred between the two inspections. In more than one location, it appeared that the gate locks had been burned, apparently to remove them, and several gates (these are at least ten-foot wide vehicular gates) had been torn from their posts, snapping the hinges. A section of the fence on the east side of Chromium Lagoon #2 had been disconnected from the horizontal bars, one vertical steel fence post pulled out of the ground (with its two-foot concrete footing), and the adjacent pedestrian gate broken from its hinges.

Interviews

During the FYR process interviews were conducted with parties impacted by the Site, including MEDEP, FAME, and City of Saco, all who are involved in Site activities or aware of the Site. The purpose of the interviews was to document any perceived problems or successes with the remedy that has been implemented to date. Interviews were conducted during the five-year review process and are summarized below.

Per the 1993 Superfund State Contract (SSC) with EPA, the State of Maine is responsible for the overall operation and maintenance of the Site. In Paragraph 28.B of the SSC, MEDEP and FAME are identified as the organizational units that are responsible for the operation and maintenance (O&M) of the Site. MEDEP has been the lead agency for the Site since 1995. MEDEP is aware of the CERCLA requirement for five-year reviews when waste is left in place that prevents unrestricted use yet also notes the SSC says “that the State will assure all future operation and maintenance of response actions at the Site, for thirty years from the start date of Operations and Maintenance.” With the 1995 start date, it is now nearly twenty years since the State of Maine assumed O&M responsibility for the Site and believes it is time to start planning for the completion of its responsibilities. MEDEP seeks to allocate the appropriate resources to assure the continued protectiveness of the remedy and fulfill its obligations. Within that context and with the remedy functioning as intended, MEDEP is receptive to finding a local or another State entity that will be able to manage the Site in a more suitable manner.

FAME acquired the Site in the early 1980s when the prior owner, NKL Tanning Inc., who used the Site as collateral for a FAME-backed loan, went bankrupt. Per a Memorandum of Agreement with MEDEP, FAME is responsible for the O&M of the Site. FAME has contracted with the City of Saco Public Works Department and local contractors to perform the annual inspections and O&M activities and is pleased that these activities have kept on top of Site conditions. FAME officials are aware of the recent increase in vandalism. For the short-term FAME is reaching out to law enforcement agencies for assistance. For the long-term, FAME is also receptive to working with local and State entities to find a more lasting solution to the vandalism and management of the Site. FAME acknowledged the CERCLA requirement for five-year reviews while hopeful that someday that requirement would end and also seeks clarification of the thirty-year assurance in the SSC.

Discussions were held with City of Saco officials in the Economic and Development and Planning Departments. City Hall serves as the repository for the Administrative Record; because it has been years since anyone asked to review the Administrative Record, it has been moved into storage space within City Hall.

Both departments expressed interest in returning the Site to some use, understanding the restraints placed on the Site by the Legislative Resolve and Conservation Easement.

The City of Saco's March 2011 Comprehensive Plan, zoning ordinances, and tax maps were reviewed. The Comprehensive Plan "serves as a guide for the decisions the City must make about growth, development, redevelopment, and change over the coming decade. The Plan continues the City's established long range planning process, and creates a framework for managing future development." For the Site and surrounding area, the Comprehensive Plan seeks to maintain its rural character, directing development elsewhere where city services are available.

The Site and surrounding area is zoned C-1 Conservation District. The C-1 District zoning is designed to promote and preserve agriculture and open space, while permitting low density residential uses that do not conflict with this overall purpose (City of Saco Zoning Ordinance, amended through July 2013). This zoning designation and definition have not changed since at least the 2003 FYR (the 1998 FYR did not state what the zoning was).

A comparison of 2008 and 2013 tax maps indicated a net increase of two properties in five years (four properties have been sub-divided while four other properties shown on the 2008 maps have since been merged into two properties). This is another indication of the land use stability in the surrounding area.

IV. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Yes.

Remedial action performance. The 1998 FYR noted that the remedy had achieved all four Remedial Action Objectives and that exposures through direct contact or ingestion of soils and groundwater had been eliminated by the cover systems and restrictions formalized in the Legislative Resolve and Conservation Easement. This generally continues to be the case for this FYR (except for the ongoing vandalism allowing access to the fenced areas). The cover systems remain in good condition, and future land and groundwater use is restricted. The groundwater is meeting the lead standard at all nine locations and the chromium standard at eight locations. Arsenic exceeded either the individual ACL or the new MCL in ten of the twenty-seven samples collected during this FYR period, but there was no trend of increasing concentrations. With the possible exception of chromium and lead, concentrations in sediment remain stable. The ROD target cleanup levels are being met, but with some exceedances of the FSSB, TEC, and PEC values.

Operations and Maintenance. The required "operational and functional" periods for each component of the Site remedy have been successfully completed. EPA was responsible for monitoring from 1990 to 1995, when O&M responsibilities were transferred to MEDEP. MEDEP and FAME have continued the O&M activities at the Site under a division of responsibility defined in a 1991 MOA (and as amended in 2001). The O&M activities have been modified since MEDEP prepared the 1995 O&M Plan. The Plan allows for reevaluation and

changes to inspection frequency, monitoring frequency, and analyses. Site inspections have been performed regularly since the 2008 FYR and have been appropriately documented although documentation of repairs have not been submitted. Annual mowing of the cover systems has not always occurred, but there has not been any emergence of woody-stem vegetation on the soil covers. Fencing and gates that have been repaired have been targets of subsequent vandalism and the vandalism remains an issue.

Opportunities for Optimization. Based on the extensive post-construction monitoring history, MEDEP has proposed further reductions in both monitoring frequency, monitoring locations, and analyses. With conditions stable, institutional controls in place that prevent the use of groundwater and land use in the surrounding area having changed little (three homes built in the twenty years since remedy construction), it may be appropriate to reduce the monitoring to once in the year preceding the five-year reviews. It is recommended that, if these modifications are made, they are conditioned on development of a stronger arrangement for site inspections and more frequent sediment and surface water sampling as part of an evaluation of potential sediment toxicity due to the exceedances of PECs at SED-204 and SED-301.

Indicators of Remedy Problems. The continuing vandalism of the interior fences and gates raises concern over potential damage to the soil cover systems and thereby increasing O&M costs.

Implementation of Institutional Controls and Other Measures. There has been no change in the institutional controls since the 2003 FYR which described the 1989 State of Maine Legislative Resolve and the 1991 Conservation Easement placed on the property. Both documents were appended to the 2008 FYR. As noted above, although the fencing and gates have been vandalized, to date, the soil cover systems have remained intact and there is no indication of exposure to the waste.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes.

Changes in Standards and TBCs. There have not been any changes to ARARs since the 2008 FYR. The Maine Maximum Exposure Guidelines for Drinking Water (MEGs) were last updated in 2012 and are TBCs. EPA and MEDEP now use EPA's FSSB rather than ET-ERL or SEL as the TBC for sediment. Although EPA Region 1 prefers the use of TECs, the TECs for arsenic, chromium, and lead are the same as the FSSBs for these chemicals.

There are no current chemical-specific ARARs that apply to soil contaminants at the Site. Guidance that was written following the 1989 ROD includes the 1997 Maine Remedial Action Guidelines (RAGs) developed for three exposure scenarios, e.g. residential, trespasser, and adult worker. With the Legislative Resolve and Conservation Easement in place on the Site, the only potentially applicable scenario is a trespasser. The trespasser RAG for lead in soil is 700 mg/kg, significantly above the 125 mg/kg target level established in the ROD. The trespasser RAG for arsenic in soil is 30 mg/kg, or half the 60 mg/kg target level. Although the interior fences are not secure because of vandalism, there were no signs that the soil cover systems had been negatively affected and therefore this potential route of exposure is highly unlikely to be occurring at the Site.

The chemical-specific ARARs that apply to groundwater contaminants are MCLs and 1992 MEGs (the 1992 MEGs were promulgated by reference and are ARARs whereas subsequent values have not been promulgated and are TBCs). The MEGs have been updated several times since the 1989 ROD, most recently in 2012. The MCL for arsenic was lowered to 10 µg/l effective February 2002. The MCL for chromium was increased from 50 µg/l to 100 µg/l in 1994. The MCL for monochlorobenzene (100 µg/l) was established after the ROD was signed. A comparison of the MCLs in effect at the time the ROD was signed (1989), the current MCLs, and the 1992 MEGs and 2012 MEGs is shown in the table below.

Table 5: Groundwater Standards and TBCs since the 1989 ROD

Contaminant	MCL at ROD (µg/l)	Current MCL (µg/l)	1992 MEG (µg/l)	2012 MEG (TBC) (µg/l)
Arsenic	50	10	NS ¹	10
Chromium	50	100	100	20
Lead	15 ²	15	20	10
Manganese	NS	NS ³	200	500
Monochlorobenzene	NS	100	47	100
Bis (2-ethylhexyl) phthalate	NS	6	25	30

¹NS- No Standard

²Action Level; no MCL established

³EPA Health Advisory, a TBC, for manganese is 300 ug/L

The 1989 ROD set chemical-specific target cleanup levels for sediments. The total chromium target level was risk-based. After the ROD, EPA began using Ecotox Threshold - Low Range Level benchmark values (ET-ERL) for sediment screening. EPA and MEDEP now use the FSSB for screening purposes for stream and sediment quality. In addition, since the last FYR, EPA Region 1 recommends the use of TEC values. The FSSB and TEC values for arsenic, chromium, and lead are 9.8 mg/kg, 43.4 mg/kg, and 35.8 mg/kg, respectively. During this review period, these screening levels have been exceeded in 5 of 14 samples for arsenic, in 6 of 14 samples for chromium, and in 2 of 14 samples for lead. The target clean-up level established in the ROD for arsenic was exceeded twice; chromium and lead target levels were met in the three sampling events that occurred within this review period. It is unknown whether the exceedances of PEC values in SED-204 indicates that toxicity to aquatic organisms may be occurring so an evaluation is recommended prior to the next FYR. The remedy is protective to the environment in the short term because only one of the sediment locations (SED-204) exceeds the PEC, and it is uncertain whether exceedances of the PEC have a site-specific adverse impact on aquatic organisms in sediment.

Changes in Exposure Pathways. No new exposure pathways were been identified as part of this FYR. The 1989 ROD identified unacceptable risk from future dermal contact with soils/sludge and sediment and ingestion of groundwater. With the implementation of the soil cover systems and the institutional controls, these exposure pathways have been prevented. In 2002, EPA issued draft guidance on vapor intrusion to address the potential pathway of vapors moving from

the subsurface into indoor air of a structure. However, because the Contaminants of Concern are primarily metals (not volatile in the subsurface) and monochlorobenzene is limited to one area of the Site (MW-114A), and institutional controls that prevent any development on the Site are in place, this potential exposure pathway is not a concern. Since the 2002 draft guidance EPA has issued guidance on inhalation risk assessment (EPA, 2005), default exposure factors (2011 and 2014), calculating groundwater exposure point concentrations (EPA, 2014), and vapor intrusion screening levels. All related exposure pathways have been prevented by the soil cover and institutional controls. Land use around at the Site has not changed and is not expected to change.

Changes in Toxicity and Other Contaminant Characteristics. A review of EPA's Integrated Risk Information System did not indicate any changes in toxicity values since the 2008 FYR for the Contaminants of Concern identified in the 1989 ROD. Arsenic toxicity was last updated in 1995; chromium (both III and VI) in 1998, lead in 2004, manganese in 1995, monochlorobenzene in 1990, and bis (2-ethylhexyl) phthalate in 1988. The 2008 FYR concluded the remedy was protective therefore the protectiveness of the remedy remains unchanged relative to toxicity and other contaminant characteristics.

Changes in Risk Assessment Methods. Although there have been some changes in risk assessment methods (EPA, 2005, 2009, 2011, 2013, 2014a, 2014b) they do not affect the protectiveness of the remedy because exposure has been prevented by implementation of the soil cover and institutional controls.

Expected Progress Towards Meeting RAOs. The four RAOs set by the 1989 ROD have been met. Sitewide monitoring and O&M continue to assure that conditions remain unchanged.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

Technical Assessment Summary

Based on the data reviewed, observations from the site inspection, and interviews, the remedy continues to function as intended by the ROD and remains protective of human health and the environment in the short term. Uncertainty about the significance of exceedances of the PEC by arsenic in SED-301 and by chromium in SED-204 suggests that the remedy for sediment may not be protective in the long term. The source control portion of the remedy is complete and the integrity of the soil cover systems remains intact. Groundwater monitoring data for this review period do not indicate any significant changes in contaminant concentrations as nearly all sampling locations are meeting the standards set in the ROD. The implemented institutional controls prohibit development on the Site and use of the groundwater. Inspections have identified a maintenance issue with the recurring vandalism of the interior fences and gates.

The primary ARARs for groundwater on the Site are the MCLs and the 1992 MEGs. While the MCL for arsenic has been reduced to 10 µg/l, and a number of the monitoring wells have values slightly above this value, the restriction on use of site groundwater prevents any exposures.

During this review period, arsenic concentrations appear to be increasing at SED-301 and chromium concentrations at SED-204. During the 2003-2008 FYR period, chromium concentrations increased at SED-103 and SED-104 whereas during this review period they remained relatively stable (they are also located downstream of SED-301 and SED-204 so if there was a leaching of contaminated sediment from the covered pits and lagoons, the increases would have been expected to be seen first in SED-301 and SED-204). Following similar results in 1998 when elevated chromium concentrations were detected in SED-104 and SED-204, in 1999 EPA performed extensive sediment sampling and concluded that the increases were natural fluctuations associated with sediment sampling. Subsequent sampling will be done to confirm this interpretation, and an evaluation of the potential sediment toxicity to aquatic organisms will be conducted.

Land use at the Site and surrounding properties have not changed and is not expected to change, and there are no additional routes of exposure.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 6: Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
Site-wide	Ongoing vandalism	Partner with local groups to create solution	MEDEP/ FAME	MEDEP	7/30/2016	No	Yes
Site-wide	Potential sediment toxicity	Evaluate sediment toxicity to aquatic organisms	MEDEP	MEDEP	7/30/2018	No	Yes

In addition, the following are follow-up actions that could improve management of O&M (and possibly reduce costs) but do not affect current protectiveness as identified during this Five-Year Review:

- Increase frequency of Site inspections including updates on land use in surrounding properties
- Track vandalism-related repair costs by O&M contractor
- The repairs made as a result of Site inspections should be documented as required by the O&M Plan
- Reduce groundwater monitoring frequency to once every five years such that the sampling events occur the year prior to the five-year reviews
- Add co-located surface water samples at existing sediment sampling locations once every five years such that the sampling events occur the year prior to the five-year reviews

VI. PROTECTIVENESS STATEMENT

Site-wide Protectiveness Statement	
<i>Protectiveness Determination:</i> Short-term Protective	<i>Addendum Due Date (if applicable):</i>
<i>Protectiveness Statement:</i> The site-wide remedy currently protects human health and the environment because the remedy is functioning as designed. Institutional controls restrict future use of the Site and its groundwater. However, in order for the remedy to be protective in the long-term, a solution is needed to prevent ongoing vandalism of the interior fencing and gates, and an evaluation of potential sediment toxicity to aquatic organisms.	

VII. NEXT REVIEW

The next five-year review report for the Saco Tannery Waste Pits Superfund Site is required five years from the signature date of this review.

APPENDIX A – EXISTING SITE INFORMATION

A. SITE CHRONOLOGY

EVENT	DATE
A tanning company purchased the property (previously a homestead/farmland) and utilized it for disposal of process wastes	1956
Waste disposal on-site ceased	Late 1970s
Tannery went bankrupt and title passed to Finance Authority of Maine (FAME)	1981
MEDEP, in conjunction with EPA, began site investigations	Early 1980s
Removal response action was conducted	July – October 1983
Site placed on National Priorities List (NPL)	September 1983
MEDEP began initial Remedial Investigation (Phase I RI)	1985
EPA initiated a Phase II RI and a Feasibility Study	October 1987
Maine legislature passed the resolution converting the Site to a permanent wildlife preserve	May 22, 1989
EPA issued a Wetlands and Floodplains Assessment and an FS addendum	June 1989
ROD signed	September 27, 1989
EPA began a monitoring program of on-site groundwater, surface water and sediment and residential wells adjacent to the Site	April 1990
Memorandum of Agreement between MEDEP and FAME signed	September 23, 1991
Conservation Easement created by FAME recorded in the York County Registry of Deeds	June 23, 1992
Explanation of Significant Differences signed	January 16, 1993
Site Preparation Remedial Action performed	October 6, 1992 – December 15, 1992
Soil Cover/Compensatory Wetlands Remedial Action performed	March 1, 1993 – October 20, 1993
Construction inspection	September 1993
Superfund State Contract for road repairs with MEDEP and City of Saco	April 1994
Operational and Functional Period for Soil Covers	October 20, 1993 – October 1, 1994
Operational and Functional Period for Compensatory Wetlands	October 20, 1993 – October 1, 1997
O&M for soil covers by MEDEP	October 1, 1994 – ongoing
Final inspection of soil covers; transfer of O&M responsibilities from EPA to MEDEP	March 24, 1995
Final inspection for restored on-site wetlands component of the remedial action	July 1996
First Five-Year Review signed	December 31, 1998
EPA conducted sediment sampling in response to a possible re-emergence of seeps from Chromium Lagoon 2 and Wet Area 1.	Spring 1999
Site deleted from the NPL	September 1999
Amended Memorandum of Agreement between MEDEP and FAME signed	July 10, 2001
Second Five-Year Review signed	December 19, 2003

MEDEP updated O&M Plan	2004 and 2007
O&M activities, including annual inspections, mowing, and repairs as needed, continued to be performed for FAME	2004 – 2008
Long-term monitoring of groundwater and sediments continued to be performed by MEDEP	2004-2007
MEDEP abandoned monitoring wells that were no longer part of the long-term monitoring program	2005
MEDEP performed hydrological assessment	2005
Third Five-Year Review	December 30, 2008

B. BACKGROUND

Physical Characteristics

The Site is located off Flag Pond Road in a rural, residential area of Saco, Maine (Figure 1). The approximately 212-acre parcel is relatively flat. It is bounded on the east by the Maine Turnpike, on the west by residential properties, on the south by Flag Pond Road, and on the north by the woods and fields. The majority of the Site is forested, both uplands and wetlands. Non-forested land consists of scrub-shrub wetlands, bedrock outcrops, and the covered pits and lagoons. Grasses are well established on the soil covers.

The Site is within two miles and in the same watershed as the Saco Heath, the southern-most coalesced domed bog in Maine. Saco Heath and the surrounding forest cover over 1000 acres and include a mosaic of habitat types including forested bog, wooded shrub heath and shrub heath. Several rare natural communities, rare plants, and rare animal species have been documented in the heath, including species only known in a few locations in Maine and other species at the northern edge of their range. Over 250 acres of the Heath was purchased by MEDEP as part of the wetlands mitigation required by the 1989 ROD.

Hydrology

There are two surface water drainage-ways onsite, located in the northern and southwestern portions of the property. Both originate in a swampy region in the western part of the property near Waste Pits 7, 8, and 9 (Figure 2). One drainage-way flows in a southerly direction via poorly defined channels towards Flag Pond Road and eventually to Cascade Brook. The other drainage-way flows in a northeast direction to form the well-defined Stuart Brook. Stuart Brook then flows in a southeastern direction where it exits the site beneath the Maine Turnpike. Approximately one and a half mile farther downstream Stuart Brook joins Cascade Brook, which then flows another mile before discharging into Scarborough Marsh (thus, the entire site is located within the same watershed). A 100-year flood plain is located within the property boundaries, but the waste pits or lagoons are not located within the flood plain.

The site geology consists of unconsolidated glacial sediments and till that overlie the bedrock. The thickness of the glacial deposits ranges from 0 to 55 feet below ground surface with the maximum overburden located north of Stuart Brook along the northern edge of the Site. Topographically the Site slopes gently toward the north, west and east in a radial pattern.

Land and Resource Use

Surrounding land uses to the west and south are primarily residential and agricultural. Interstate I-95 borders the Site to the east and this highway was expanded from two to three lanes in each direction between the 2003 and 2008 FYRs. A large wooded parcel bordered the Site to the north at the time of the 2003 FYR but portions of this parcel were clear cut prior to the 2008 FYR. A large-scale rotating irrigation system was in place on this property at the time of the 2008 FYR but is no longer present.

A review of the current City of Saco zoning map indicated that the area around the Site remains a Conservation District, or Zone C-1. This zoning classification, C-1, is “designed to promote and preserve agriculture and open space, while permitting low density residential uses that do not conflict with this overall purpose.” Examples of permitted uses include, but are not limited to, cemeteries, single- and two-family dwellings, cluster residential projects, public parks, and agriculture.

Historical records indicate that from the 1800s until the 1950s farming and residential uses were the primary land uses of the Site and surrounding properties. Although the Site was converted into a commercial disposal area in 1956, the surrounding properties have continued to be residential areas and farms. There were approximately 60 single-family homes located within a half-mile radius of the Site at the time the ROD was signed in 1989; the number has gradually increased as farmland is converted into residential properties. Residential development is concentrated along Hearn Road and Flag Pond Road. All of the homes in the area have private wells and rely on groundwater for their water supply. A comparison of City of Saco tax records and aerial photography indicates that there have been only two additional homes constructed on the site-sides of Flag Pond and Hearn Roads since the previous five-year review. Figure 3 is an aerial photograph taken on August 5, 2007, and illustrates the land use that has remained relatively unchanged over the past twenty-five years.

The groundwater aquifer in the area of the Site is classified under federal standards as IIB, suitable for use as a public water supply. Site groundwater flows radially outward from the highest point (located near monitoring wells MW-114) toward and discharging into the streams that originate on the Site. Groundwater also flows from the residential properties towards the Site. Therefore the potential for site contamination to migrate offsite into the private water supply wells is unlikely.

History of Contamination

In 1956, a tanning company purchased the Site for disposal of its process wastes. Prior to that time the property was used as a homestead and farm. For nearly two decades, until the late 1970s, tanning process wastes were transported for disposal on the Site from the tannery facility located on the Saco River approximately three miles away. The process wastes characteristically had high concentrations of chromium, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs), and included acids, and leather hides and scraps. Wastes were disposed of onsite in two large lagoons (approximately two acres each in size) and 57 smaller disposal pits (during the initial investigations 53 pits were discovered; four additional pits were uncovered in 1993 during the initial source control activities). The lagoons are located in the northwestern and northeastern portions of the property and are identified as “Chromium Lagoon 1” and “Chromium Lagoon 2” (see Figure 2 for pit and lagoon locations). The smaller 57

disposal pits are located throughout the property along both sides of the road system. By the early 1980s the tanning company went bankrupt, and title transferred FAME.

Initial Response

In the early 1980's MEDEP and EPA conducted the first recorded site investigation. During a 1982 EPA investigation, three acid pits, known as Waste Pits 1, 27 and 30, were identified as areas that posed immediate and significant human health risks. Between July and October 1983, EPA remediated the three acid pits by removing the liquids, neutralizing the sludge in place with lime, and capping the pits. A fence was also erected along Flag Pond Road. EPA estimated that the total surface area of contamination was approximately 13 acres. The Site was placed on NPL in September 1983.

Basis for Taking Action

From 1985 through 1987, under a Cooperative Agreement with EPA, MEDEP conducted a Phase I Remedial Investigation (RI) and Baseline Risk Assessment to determine the nature and extent of contamination and associated health risks at the Site. EPA initiated a Phase II RI and Feasibility Study (FS) in October 1987.

The RI found that the contaminated soil and standing water in the two lagoons and waste pits included high concentrations of chromium and lead, along with low VOC and SVOC concentrations. With the exception of two discrete areas on the Site, the western berm of Waste Pit 9 and the northern berm of Chromium Lagoon 2, contaminants levels were found to decrease significantly immediately below the visibly contaminated waste sludge. The FS evaluated potential cleanup alternatives for the Site and provided information used to select a remedy.

Groundwater contaminants included arsenic and monochlorobenzene at concentrations that exceeded the MCLs. (The MCL for monochlorobenzene was established after the ROD was signed.) No definitive source of arsenic was identified in the RI; arsenic is not a characteristic of tannery wastes. The RI identified the sludge in the waste pits and lagoons as the VOC source. Water quality data from residential wells in the immediate vicinity of the Site did not indicate any exceedances of MCLs. The investigations found no evidence of a hydraulic connection between the residential wells and the Site.

In June 1989, EPA issued a Wetlands and Floodplains Assessment report and a revised Proposed Plan that was accepted by MEDEP. Based on the results of these investigations, ARARs and other guidance, target cleanup goals were established to protect human health and the environment from the identified risks. On September 27, 1989, the ROD was signed. The ROD set forth a remedy for the Site that combined a source control cover system with institutional controls to restrict access to and use of the Site. The primary contaminants of concern affecting on-site soil, groundwater, surface water and/or sediment were determined to be arsenic, chromium, lead, and a few SVOCs and VOCs.

C. REMEDIAL ACTIONS

Remedy Selection

The ROD specified a multi-component remedy to address contaminated soils and groundwater. The following remedial action objectives (RAOs) were identified for the Site:

- Minimize exposure to contaminants or reduce contaminants to levels that are protective of human health and the environment;
- Reduce the threat of future leaching of chromium and/or reduce the levels of chromium in the sludge that could leach into the groundwater in the future;
- Prevent ingestion of contaminated groundwater; and
- Minimize exposure of wildlife to contaminated soil, sediments, and standing water.

The remedy selected in the ROD specified:

- Construction of soil cover systems over the waste pits and lagoons to minimize direct contact with contaminated soils and sludge;
- Creation of a legislatively-enacted institutional control to convert the Site to a permanent wildlife preserve within two years of ROD signing;
- Implementation of a groundwater monitoring network to monitor for releases of chromium into the groundwater;
- Performance of a groundwater, surface water, and sediment monitoring program and contingencies based on the monitoring results;
- Creation of compensatory wetlands on-site to replace the wetlands lost due to covering the pits and lagoons; and
- Performance of five-year reviews.

The source control component of the remedy specified construction of cover systems for all the pits and lagoons. Based on a review of the sampling data and other factors, the ROD did not require additional sampling to confirm the extent of contamination since, except for two discrete areas, the available data indicated that the contaminated soils and sludge were confined to the waste pits and lagoons. The two areas of the Site, located near Waste Pit 9 and a seep area near Chromium Lagoon 2 (see Figure 2), required further investigation prior to construction of the cover system. Sediment beyond Waste Pit 9 contained chromium and lead concentrations that were attributed to a break in the pit berm. Sediment beyond the lagoon seep contained high arsenic concentrations. The ROD established the cleanup target levels shown below to determine the extent of remediation required for these two areas.

Contaminant	Target Cleanup Level (mg/kg)
Antimony	30
Arsenic	60
Total Chromium	2,000
Lead	125

The ROD required the design and installation of a monitoring network and established action levels for the groundwater/surface water monitoring program. If the action levels were exceeded, the ROD required a further evaluation of the remedial action via contingencies described in the ROD. Safe Drinking Water Act Maximum Contaminant Levels (MCLs) were

set as the action levels, or standards, for all groundwater contaminants, except for arsenic at four locations. EPA established Alternate Concentration Limits (ACLs) for four site monitoring wells (MW-101, MW-103, MW-111B, MW-114B) based on the maximum concentrations observed in the four wells during the RI. The arsenic ACLs for the four monitoring wells are shown in the table below.

Contaminant	ACL (µg/l)	Where Applicable
Arsenic	123	MW-103
Arsenic	77	MW-114B
Arsenic	64	MW-111B
Arsenic	70	MW-101

The ROD required quarterly groundwater monitoring for the five COC target compounds (arsenic, lead, manganese, monochlorobenzene, and bis(2-ethylhexyl) phthalate) and annual monitoring for Target Compound List (TCL) metals, VOCs and SVOCs. Monitoring of residential wells located contiguous to the Site was also included in the ROD. The residential well program included periodic collection and analysis of samples for TCL metals, VOCs and SVOCs from existing and new wells. Should new residential wells be installed, the ROD required the collection of water level data using continuous recorders to check for possible changes in groundwater flow patterns. The ROD specified that surface water and sediment samples be collected from on-site streams twice a year (low/high flow seasons) and analyzed, at a minimum, for the five target compounds.

The groundwater, residential well, surface water and sediment monitoring programs specified in the ROD were required for at least three years following completion of the soil cover systems. At that point, the ROD allowed for an evaluation of the data and a possible reduction in the monitoring program. Following the initial reassessment, the monitoring program would be reassessed periodically based on the data and trends. At a minimum the ROD required a reassessment at the time of each five-year review.

The ROD also included several contingencies to evaluate the need for additional remedial actions based on the results of the required monitoring. The first contingency was associated with the results of the groundwater monitoring program. A second contingency was associated specifically with chromium in groundwater. If chromium was detected in groundwater from any of the wells along the property boundary at concentrations of 500 µg/l, (i.e., ten times the MCL for chromium), a source control remedial alternative using a treatment technology would be selected and implemented.

Since implementation of the selected remedy would result in contaminants remaining on the Site, the ROD required that EPA conduct five-year reviews. The reviews are required to assess site data to ensure that the remedial action continues to be protective of human health and the environment.

On January 16, 1993, EPA signed an Explanation of Significant Differences (ESD) which changed several provisions of the ROD. Rather than off-site treatment and disposal of the standing water from the waste pits and lagoons, the approximately 569,000 gallons of water were treated on-site and subsequently used for dust control on the three miles of dirt roads during the construction of the soil cover systems. In addition, the ESD changed the ROD requirement for creation of on-site compensatory wetlands because there was insufficient acreage on the Site to create wetlands to compensate for the 9.6 acres lost during construction of the remedy. The ESD documented the purchase of off-site wetlands by MEDEP as the State's ten percent cost share for the remedial action.

Remedy Implementation

The source control remedial activities were divided into two phases to accommodate the short construction season in Maine. Site preparation activities were completed between October and December 1992; the soil cover/compensatory wetlands activities were completed between March and October 1993.

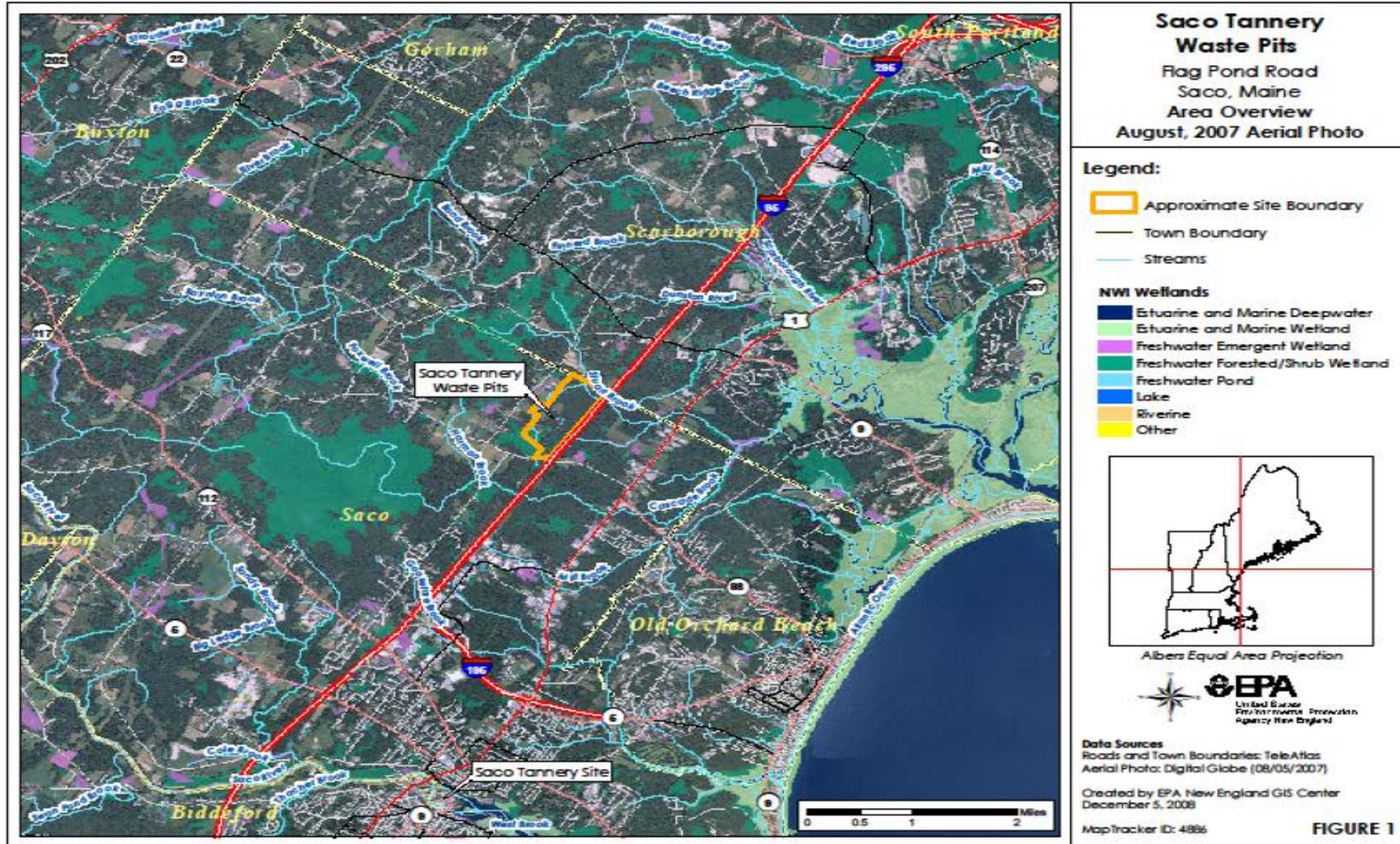
Following a post-ROD assessment that determined there was insufficient acreage onsite to satisfy the requirements for wetlands creation under the ROD, EPA and MEDEP structured the 1993 SSC to allow the purchase of compensatory off-site wetlands to serve as the State's cost share for the remedial action. MEDEP negotiated the purchase of 247 acre parcel within the Saco Heath, a unique habitat where northern range and southern range species overlapped. The owners of this parcel had a peat mining permit which if implemented would have significantly altered the heath.

On May 22, 1989, the Maine state legislature passed a resolution which permanently converted the Site to a wildlife preserve. The resolution prohibits development for residential or commercial use, excavation that penetrates the soil cover and/or utilization of the groundwater as a drinking water source. In addition to the legislative action, a deed restriction in the form of a Conservation Easement was implemented on the property as a further assurance of the restrictions on future land use. MEDEP and FAME signed a Memorandum of Agreement in 1991, and amended it in 2001. These agreements established rules and regulations governing the use of the preserve and the agencies' responsibilities for O&M.

System Operation/Operation and Maintenance

The first O&M plan for the Site was prepared as part of the September 1992 Remedial Design Report, and it was included in the 1993 SSC. MEDEP updated the O&M Plan on April 5, 1995 and again in February 2009. The O&M activities include periodic inspection and maintenance, annual mowing of and around the soil covers, perform necessary repairs due to erosion, burrowing animals, off-road vehicles, and other forms of cover destruction with adequate materials. Inspection observations and details of any maintenance and repairs are required to be documented in an Inspection and Maintenance Report that is to be submitted after each site inspection is conducted.

APPENDIX B – ADDITIONAL FIGURES FOR REFERENCE



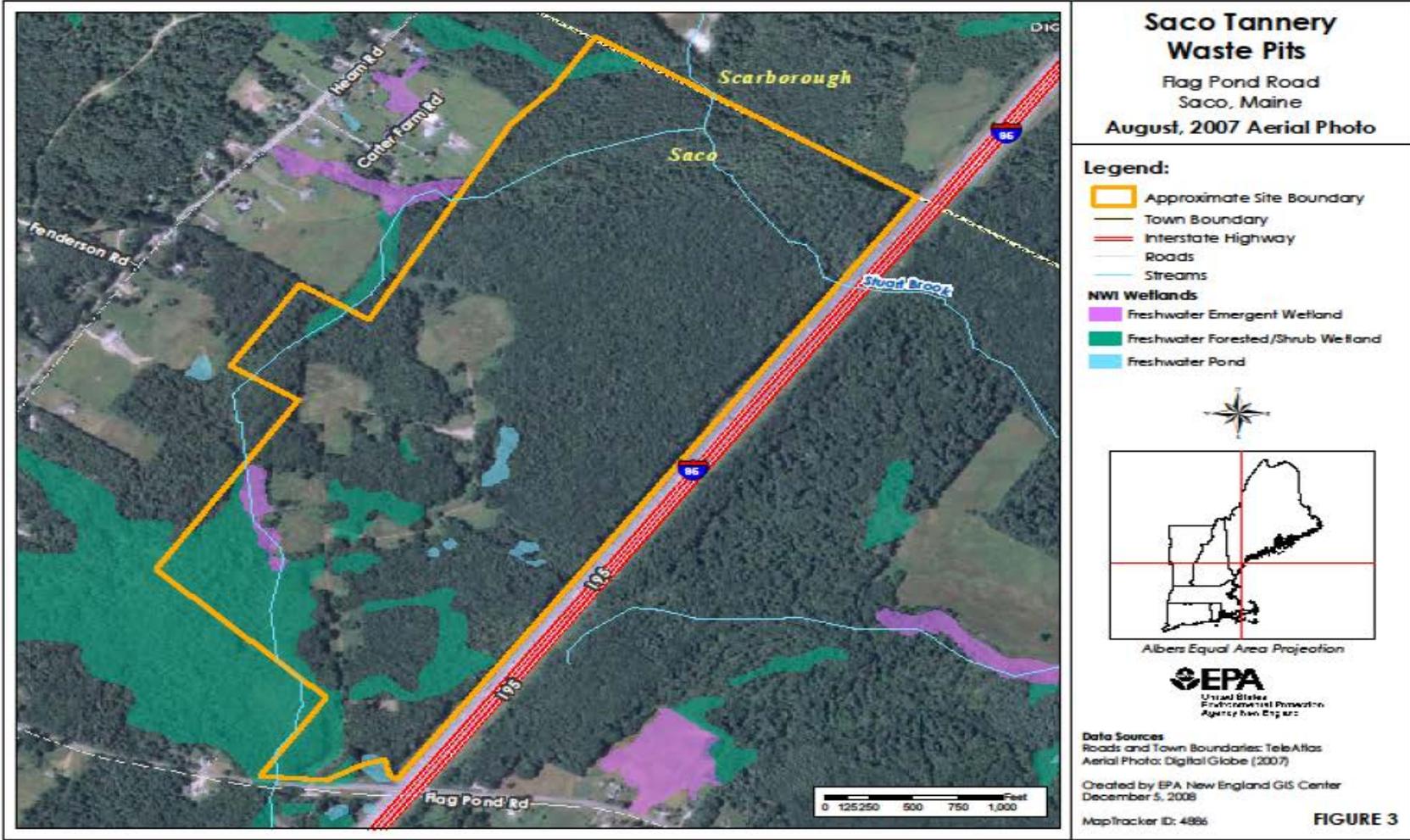
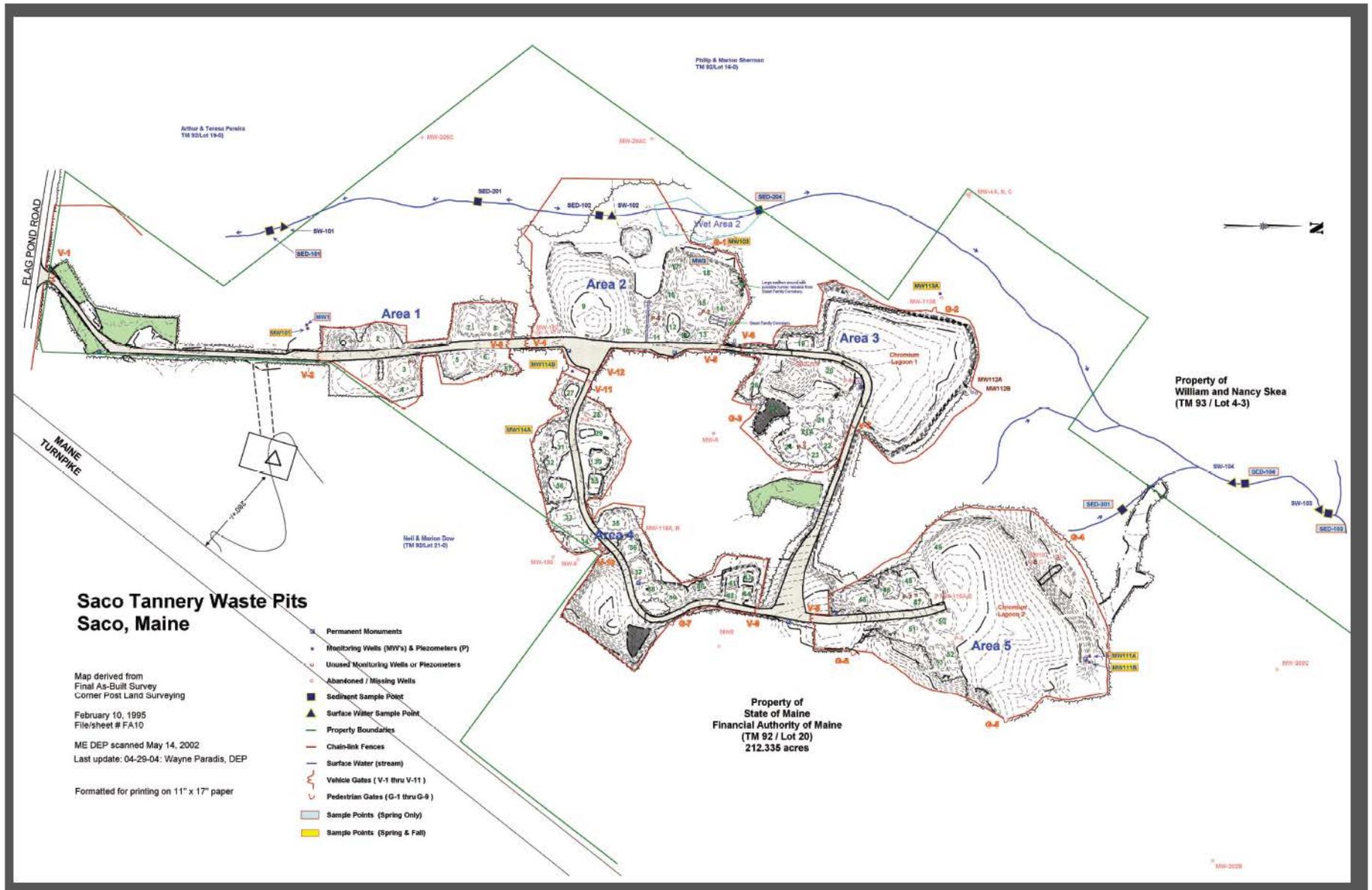


FIGURE 3



APPENDIX C

PRESS RELEASE ANNOUNCING FIVE-YEAR REVIEW



News Release

U.S. Environmental Protection Agency

New England Regional Office

May 9, 2013

Contact: David Deegan, (617) 918-1017

EPA Conducts “Five-Year Review” for 16 New England Superfund Sites

(Boston, Mass. – May 9, 2013) – EPA is beginning the process of routine Five-Year Reviews of 16 Superfund sites across New England.

EPA conducts evaluations every five years on previously-completed clean up and remediation work performed at sites listed on the “National Priorities List” (aka Superfund sites) to determine whether the implemented remedies at the sites continue to be protective of human health and the environment. Further, five year review evaluations identify any deficiencies to the previous work and, if called for, recommend action(s) necessary to address them.

In addition to a careful evaluation of technical work at the sites, during the Five Year Review process EPA also provides the public with an opportunity to evaluate preliminary findings and to provide input on potential follow up activity that may be required following the review process.

The Superfund sites at which EPA is performing Five Year Reviews over the following several months include the following sites. Please note, the Web link provided after each site provides detailed information on site status and past assessment and cleanup activity.

Massachusetts

Iron Horse Park, North Billerica <http://www.epa.gov/region1/superfund/sites/ironhorse>

Nyanza Chemical Waste Dump, Ashland <http://www.epa.gov/region1/superfund/sites/nyanza>

Re-Solve, Inc., North Dartmouth <http://www.epa.gov/region1/superfund/sites/resolve>

Sullivan's Ledge, New Bedford <http://www.epa.gov/region1/superfund/sites/sullivansledge>

Maine

McKin Co., Gray <http://www.epa.gov/region1/superfund/sites/mckin>

Saco Tannery Waste Pits, Saco <http://www.epa.gov/region1/superfund/sites/sacotannery>

West Site/Howe's Corner, Plymouth <http://www.epa.gov/region1/superfund/sites/howe>

New Hampshire

Kearsarge Metallurgical Corp., Conway <http://www.epa.gov/region1/superfund/sites/kearsarge>

Ottati & Goss, Kingston <http://www.epa.gov/region1/superfund/sites/o&g>

South Municipal Water Supply Well, Peterborough <http://www.epa.gov/region1/superfund/sites/southmuni>

Tinkham Garage, Londonderry <http://www.epa.gov/region1/superfund/sites/tinkham>

Town Garage/Radio Beacon, Londonderry <http://www.epa.gov/region1/superfund/sites/towngarage>

Rhode Island

Central Landfill, Johnston <http://www.epa.gov/region1/superfund/sites/central>

Picillo Farm, Coventry <http://www.epa.gov/region1/superfund/sites/picillo>

Vermont

Elizabeth Mine, Strafford <http://www.epa.gov/region1/superfund/sites/elizmine>

Old Springfield Landfill, Springfield <http://www.epa.gov/region1/superfund/sites/oldspringfield>

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APPENDIX D

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