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RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Appendix D

Groundwater Monitoring in Support of
VCAP Risk Assessment
(Step 2)

GROUNDWATER MONITORING
IN SUPPORT OF
VCAP RISK ASSESSMENT
(STEP 2)

Pratt & Whitney
Pent Road
(Willgoos)
East Hartford, CT

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Pratt & Whitney, VCAP Connecticut Facilities

1. SUMMARY

A second round of groundwater monitoring was performed at the Pratt & Whitney, Pent Road (Willgoos) facility in East Hartford, Connecticut, in support of the Voluntary Corrective Action Program (VCAP) Risk Assessment. Groundwater samples were collected on May 11 and 12, 1999 from 12 monitoring wells on site. The samples collected were analyzed for filtered and unfiltered metals (arsenic, barium, beryllium, cadmium, chromium (total and hexavalent), copper, lead, mercury, nickel, selenium, silver, and zinc), and cyanide. Four wells were re-sampled on October 28, 1999 for filtered and unfiltered samples to supplement the data obtained during the earlier monitoring round. The re-sampling was necessary since some labels were detached from the sampling jars due to shipping complications during the initial round.

2. FACILITY INFORMATION

The Pent Road facility, also known as the Andrew Willgoos turbine laboratory, is located on Pent Road in East Hartford, Connecticut. The site occupies approximately 58 acres and lies to the east of the Connecticut River. The Pent Road facility is a jet engine test facility used for the experimental testing of jet engines and jet engine components.

3. METHODOLOGY

Groundwater samples were collected by LEA personnel on May 11 and 12, 1999, from 12 installed monitoring wells. Four wells were re-sampled on October 28, 1999. Upon opening the well the headspace was screened using a portable analyzer equipped with a photoionization detector (PID). Samples of the standing groundwater in the well were retrieved using a bailer and evaluated visually for the presence of non-aqueous phase liquids.

Prior to sampling, the depth to water and total depth of each monitoring well were recorded. From this information, the total volume of water contained in each monitoring well was calculated. The water was purged initially and parameters such as pH, temperature, and specific conductance were recorded. Once the initial volume of water was removed, the monitoring well was purged a minimum of three times the standing water volume. The turbidity of the groundwater was measured upon purging three well volumes. If the turbidity exceeded 5 NTU additional purging was performed (up to 5 well volumes). Samples were collected using a peristaltic pump equipped with dedicated polyethylene tubing. The filtered metal samples were filtered in the field using a dedicated 0.45-micron in-line filter assembly. Unfiltered samples were collected as well. The containers were sealed, placed in a cooler with ice, and shipped to Lancaster Laboratories under chain-of-custody procedures for analysis for metals (arsenic,

barium, beryllium, cadmium, copper, lead, mercury, nickel, selenium, silver, and zinc) and cyanide. The cyanide samples were not filtered. Samples were also sent to Averill Laboratories to be tested for hexavalent and total chromium using the same procedures described above.

In addition, one equipment blank, one duplicate sample, and two performance evaluation samples were submitted for analysis for quality assurance/quality control (QA/QC) purposes. The locations of the monitoring wells sampled are shown in Drawing D1.

4. RESULTS

The analytical results obtained for the May 11, 1999 and May 12, 1999 sampling are summarized in the following paragraphs and are presented in tabular form in Tables D1 through D4. Table D1 presents a summary of sampling and analytical information; Table D2 presents a list of detected constituents; and Table D3 summarizes all analytical results obtained. Table D4 presents a list of exceedances over applicable VCAP screening levels. The unfiltered samples are designated as total concentrations ('total') in the tables. A list of qualifiers is included at the end of the Table section in this report. The locations of the groundwater monitoring wells sampled are shown in Drawing D1. It should be noted that due to shipping complications a number of labels became detached from some of the bottles, and consequently analyses could not be performed for samples from four wells, one equipment blank, and one duplicate sample. In response, a supplemental monitoring round was performed on October 28, 1999 to allow collection of filtered and unfiltered metals from four on-site wells for which some of the initial samples could not be identified. The data obtained during the supplemental monitoring round are presented in Tables D5 (summary of analyses performed), D6 (detected values), and D7 (all analytical data).

Relatively low metal concentrations were detected in the monitoring wells sampled. In general the higher metal concentrations were detected in the unfiltered samples. The highest detected metal concentrations in the unfiltered samples during the initial monitoring round (May 11 and 12, 1999) included arsenic at 0.0550 mg/l; barium at 0.2030 mg/l; cadmium at 0.0045 mg/l; chromium (total) at 0.0390 mg/l; copper at 0.1020 mg/l; lead at 0.1090 mg/l; nickel at 0.0725 mg/l; selenium at 0.0039 mg/l; and zinc at 0.3420 mg/l. The concentrations detected in the unfiltered samples during the supplemental monitoring round (October 28, 1999) were within the same ranges.

The filtered samples also detected low concentrations of metals in monitoring wells sampled. The highest metal concentrations detected in the filtered samples during the initial monitoring round included arsenic at 0.0023 mg/l; barium at 0.054 mg/l; cadmium at 0.0016 mg/l; lead at

0.0044 mg/l; nickel at 0.0165 mg/l; and zinc at 0.0937 mg/l. The concentrations detected in the filtered samples during the supplemental monitoring round were within the same ranges.

In general, the trend observed was that the unfiltered sample exhibited higher concentrations than the corresponding filtered ones. Also certain metals were detected only in the unfiltered sample from a certain well while they remained undetected in the filtered sample. A typical well sampled (SW-MW-01) exhibited concentrations of barium (0.0554 mg/l in the filtered sample and 0.203 mg/l in the unfiltered), cadmium (0.0016 mg/l in the filtered sample and 0.0045 mg/l in the unfiltered), nickel (0.0126 mg/l in the filtered sample and 0.0725 mg/l in the unfiltered), and zinc (0.0937 mg/l in the filtered sample and 0.342 mg/l in the unfiltered). Metals detected in the unfiltered sample from well SW-MW-01 but absent in the filtered sample included arsenic (0.0104 mg/l), copper (0.102 mg/l), lead (0.109 mg/l), and mercury (0.00026 mg/l).

Comparison of the groundwater data against applicable VCAP screening levels indicated several exceedances over site-specific screening levels. Specifically, the groundwater data were compared to the numeric criteria published in Tables 3-5 and 3-7 of the *Conceptual Site Models and Screening Levels for Pratt & Whitney's VCAP Connecticut Facilities*, prepared by Gradient Corporation, issued on December 19, 1997 revised on September 18, 1998 and finalized on September 15, 1999. Table 3-5 is titled, *Generic P&W Off-Site Groundwater Screening Levels (SLs) Based on Residential Indoor Air Inhalation, P&W VCAP, Connecticut Facilities* and Table 3-7 is titled, *Generic P&W Groundwater Screening Levels (SLs) Based on Surface Water Protection, P&W VCAP, Connecticut Facilities*. There were no identified exceedances of Table 3-5 criteria.

The comparison yielded an arsenic concentration over Table 3-7 groundwater screening levels for surface water protection in three wells: SW-MW-01 (0.0104 mg/l), NW-MW-08 (0.0045 mg/l), and NW-MW-09 (0.0550 mg/l). Monitoring well SW-MW-01 also exhibited copper (0.102 mg/l), lead (0.109 mg/l), and zinc (0.342 mg/l) concentrations over groundwater screening levels for surface water protection. The groundwater screening levels for surface water protection for these constituents are as follows: arsenic (0.004 mg/l); copper (0.048 mg/l); lead (0.0013 mg/l); and zinc (0.123 mg/l). all of the above concentrations were observed in the unfiltered samples.

Table D4 presents a list of exceedances over applicable VCAP screening levels. It should be noted that the screening levels listed in the conceptual site model (CSM) were developed based on readily available published criteria. More specifically, the maximum contaminant levels (MCLs) multiplied by a dilution and attenuation factor of 10 were used as the generic P&W groundwater screening levels based on surface water protection for arsenic (0.05x10 = 0.5 mg/l),

copper (action level 1.3x10 = 13 mg/l) and lead (treatment standard 0.015x10 = 0.15 mg/l). The secondary MCL was used for zinc multiplied by a factor of 10 (5x10 = 50 mg/l). The modified generic screening levels based on discharge to surface water developed by Gradient are provided on page 4 in Attachment D1. Comparison with these criteria did not indicate any exceedances in groundwater.

A comparison of results from the duplicate samples collected indicated good agreement. The samples submitted to Averill Environmental Laboratory for chromium and hexavalent chromium exhibited relative percent differences of zero. The relative percent differences for the other compounds could not be calculated for the initial monitoring round because only one set of filtered and unfiltered samples was analyzed. As noted earlier, the sample labels became detached from the bottles due to shipping complications and consequently the complete analysis was not performed. The duplicate samples collected during the re-sampling event (October 28, 1999) exhibited relative percent differences up to 16%, which is satisfactory for the low concentrations detected. It should be noted that lead (at 0.0022 mg/l) was detected in only one of the unfiltered samples, and nickel (at 0.0055 mg/l) was detected in only one of the filtered samples. Such differences are to be expected however in the low concentrations reported.

In the equipment blank collected during the initial round (unfiltered sample) arsenic (0.0028 mg/l), barium (0.0233 mg/l), and zinc (0.0071 mg/l) were detected at low concentrations. Low concentration levels of zinc (0.0052 mg/l) were detected in the equipment blank collected during the re-sampling monitoring round.

Two performance samples were collected. The first one (1839129) was submitted to Lancaster Laboratories for analysis of cyanide, cadmium and mercury on May 11, 1999. The value reported for cyanide was 0.461 mg/l, which lies between the vendor-specified acceptance limits (0.353-0.615 mg/l). The value reported for cadmium was 0.0934 mg/l, which lies within the vendor-specified acceptance limits (0.082-0.118 mg/l). The value reported for mercury was 0.0078 mg/l, which lies within the vendor-specified acceptance limits (0.0075-0.0125 mg/l). Also detected were trace concentrations of arsenic (0.003 mg/l), copper (0.0128 mg/l), and zinc (0.0091 mg/l), none of which were expected to be in the performance sample (false positives). Lancaster conducted an investigation of these results and did not identify any errors in the analytical procedure. It also noted that these concentrations are below the limit of quantitation and could be due to low level of contamination. The second performance evaluation sample (1839128) was submitted to Averill Laboratories for chromium analysis on May 11, 1999. The value reported for chromium was 0.403 mg/l, which lies between the vendor-specified acceptance limits (0.328-0.472 mg/l). These results were obtained for quality assurance/quality control (QA/QC) purposes.

TABLES

Table D1
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

Sample Information						Analysis Information							
Location ID	Sample ID	Sample Date	From (ft)	To (ft)	Class	Portable GC	Volatile Organics	Semivolatile Organics	Herbicides	Pesticides	PCBs	Metals	Miscellaneous
EQUIPMENT	1839095	5/12/99			BKE							X	x
NW-MW-04	1839088	5/12/99	8.1	18.1	GW							X	x
NW-MW-05	1839093	5/12/99	14.4	24.4	GW							X	x
NW-MW-08	1839089	5/12/99	9.0	19.0	GW							X	x
NW-MW-09	1839090	5/12/99	12.0	22.0	GW							X	x
NW-MW-10	1839092	5/12/99	12.0	22.0	GW							X	x
NW-MW-10	1839096	5/12/99	12.0	22.0	GW							X	x
NW-MW-11	1839091	5/12/99	12.0	21.0	GW							X	x
SW-MW-01	1839083	5/11/99	3.0	18.0	GW							X	x
SW-MW-04	1839084	5/11/99	3.0	18.0	GW							X	x
SW-MW-05	1839085	5/11/99	3.00	18.00	GW							X	x
SW-MW-12	1839094	5/12/99	11.0	20.0	GW							X	x
SW-MW-B2	1839087	5/11/99	2.5	12.5	GW							X	x
SW-MW-D2	1839086	5/11/99	1.0	10.0	GW							X	x
performance	1839128	5/11/99			PEW							X	
performance	1839129	5/11/99			PEW							X	X

Notes: 1. Legend: x - mass, t - TCLP, s - SPLP, e - EPTOX, z - ZHE; Capitalized - at least one analyte detected
2. Printed on 08/28/01

Table D2
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION (DETECTS)
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	EQUIPMENT	NW-MW-04	NW-MW-04	NW-MW-05	NW-MW-08	NW-MW-08	NW-MW-08
	Sample ID	1839095	1839088	1839088	1839093	1839089	1839089	1839089
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	12:30	10:20	10:20	14:15	10:45	10:45	10:45
	Sample Depth		8.1' - 18.1'	8.1' - 18.1'	14.4' - 24.4'	9.0' - 19.0'	9.0' - 19.0'	9.0' - 19.0'
	Laboratory	LANC	LANC	LANC	LANC	AEL	LANC	LANC
	Lab. Number	3151756	3151751	3151763	3151768	AEL99004717	3151752	3151764
Constituent	Units							
Depth of Well	FT		19.91	19.91	23.77	18.81	18.81	18.81
Depth to Water	FT		13.92	13.92	16.02	13.58	13.58	13.58
Specific Conductivity (field)	µmhos		376	376	402	312	312	312
Water Elevation	FT		22.98	22.98	22.71	21.51	21.51	21.51
pH (field)	SU		6.25	6.25	6.89	6.97	6.97	6.97
Date Metals Analyzed	-	05/18/1999	05/18/1999	05/19/1999	05/19/1999	05/19/1999	05/18/1999	05/19/1999
Date Physical Analyzed	-							
Arsenic	mg/L							
Arsenic (Unfiltered)	mg/L	0.0028 B	0.0030 B				0.0045 B	
Barium	mg/L			0.0349 B	0.0200 B			0.0248 B
Barium (Unfiltered)	mg/L	0.0233 B	0.0364 B				0.0828 B	
Cadmium	mg/L							
Cadmium (Unfiltered)	mg/L							
Chromium (Unfiltered)	mg/L					0.017		
Copper (Unfiltered)	mg/L						0.0122 B	
Lead	mg/L							0.0024 BJ
Lead (Unfiltered)	mg/L						0.0041	
Mercury	mg/L			0.000051 BV				
Mercury (Unfiltered)	mg/L							
Nickel	mg/L							
Nickel (Unfiltered)	mg/L						0.0136 B	
Selenium (Unfiltered)	mg/L							
Zinc	mg/L			0.0079 B	0.0048 B			0.0056 B
Zinc (Unfiltered)	mg/L	0.0071 B	0.0037 B				0.0330	
Cyanide (Unfiltered)	mg/l							

Notes: 1. Only Detects Shown
2. Printed on 08/28/01

Table D2
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION (DETECTS)
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-09	NW-MW-09	NW-MW-10	NW-MW-10	NW-MW-11	NW-MW-11	SW-MW-01
	Sample ID	1839090	1839090	1839092	1839096	1839091	1839091	1839083
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/11/1999
	Sample Time	11:15	11:15	11:50	11:50	11:50	11:50	10:40
	Sample Depth	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 21.0'	12.0' - 21.0'	3.0' - 18.0'
	Laboratory	LANC	LANC	LANC	LANC	LANC	LANC	AEL
	Lab. Number	3151753	3151765	3151767	3151757	3151754	3151766	AEL99004641
Constituent	Units							
Depth of Well	FT	22.11	22.11	20.21	20.21	22.09	22.09	19.59
Depth to Water	FT	17.32	17.32	17.12	17.12	17.61	17.61	11.92
Specific Conductivity (field)	µmhos	105.1	105.1	160.1	160.1			104.5
Water Elevation	FT	21.38	21.38	21.09	21.09	21.38	21.38	6.54
pH (field)	SU	5.89	5.89	6.38	6.38			5.20
Date Metals Analyzed	-	05/18/1999	05/19/1999	05/19/1999	05/18/1999	05/18/1999	05/19/1999	05/14/1999
Date Physical Analyzed	-							
Arsenic	mg/L							
Arsenic (Unfiltered)	mg/L	0.0550			0.0029 B	0.0032 B		
Barium	mg/L		0.0323 B	0.0182 B			0.0327 B	
Barium (Unfiltered)	mg/L	0.0634 B			0.0266 B	0.0338 B		
Cadmium	mg/L		0.00018 B					
Cadmium (Unfiltered)	mg/L	0.00086						
Chromium (Unfiltered)	mg/L							0.039
Copper (Unfiltered)	mg/L	0.0140 B						
Lead	mg/L		0.0023 BJ					
Lead (Unfiltered)	mg/L	0.0027 B						
Mercury	mg/L							
Mercury (Unfiltered)	mg/L							
Nickel	mg/L							
Nickel (Unfiltered)	mg/L	0.0207 B						
Selenium (Unfiltered)	mg/L	0.0039 B						
Zinc	mg/L		0.0045 B	0.0031 B			0.0081 B	
Zinc (Unfiltered)	mg/L	0.0179 B			0.0065 B	0.0095 B		
Cyanide (Unfiltered)	mg/l							

Notes: 1. Only Detects Shown
2. Printed on 08/28/01

Table D2
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION (DETECTS)
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-01	SW-MW-01	SW-MW-04	SW-MW-05	SW-MW-05	SW-MW-12	SW-MW-12
	Sample ID	1839083	1839083	1839084	1839085	1839085	1839094	1839094
	Sample Date	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/12/1999	05/12/1999
	Sample Time	10:40	10:40	11:10	11:30	11:30	14:40	14:40
	Sample Depth	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'	3.00' - 18.00	3.00' - 18.00	11.0' - 20.0'	11.0' - 20.0'
	Laboratory	LANC	LANC	LANC	LANC	LANC	LANC	LANC
	Lab. Number	3151745	3151760	3151746	3151747	3151761	3151759	3151769
Constituent	Units							
Depth of Well	FT	19.59	19.59	19.24	19.55	19.55	19.55	19.55
Depth to Water	FT	11.92	11.92	12.96	13.60	13.60	17.15	17.15
Specific Conductivity (field)	µmhos	104.5	104.5	108.9	172.3	172.3	399	399
Water Elevation	FT	6.54	6.54	3.40	7.55	7.55	19.50	19.50
pH (field)	SU	5.20	5.20	5.54	5.89	5.89	6.73	6.73
Date Metals Analyzed	-	05/18/1999	05/19/1999	05/18/1999	05/18/1999	05/19/1999	05/18/1999	05/19/1999
Date Physical Analyzed	-							
Arsenic	mg/L					0.0023 BJ		
Arsenic (Unfiltered)	mg/L	0.0104		0.0031 B	0.0040 B		0.0022 B	
Barium	mg/L		0.0554 BJ			0.0263 B		0.0375 B
Barium (Unfiltered)	mg/L	0.203		0.0503 B	0.0268 B		0.0392 B	
Cadmium	mg/L		0.0016					
Cadmium (Unfiltered)	mg/L	0.0045		0.0017	0.00022 B			
Chromium (Unfiltered)	mg/L							
Copper (Unfiltered)	mg/L	0.102		0.0087 B				
Lead	mg/L							
Lead (Unfiltered)	mg/L	0.109						
Mercury	mg/L							
Mercury (Unfiltered)	mg/L	0.00026 N						
Nickel	mg/L		0.0126 B					0.0165 B
Nickel (Unfiltered)	mg/L	0.0725		0.0128 B			0.0207 B	
Selenium (Unfiltered)	mg/L							
Zinc	mg/L		0.0937			0.0101 B		0.0049 B
Zinc (Unfiltered)	mg/L	0.342		0.0712	0.0114 B		0.0047 B	
Cyanide (Unfiltered)	mg/l							

Notes: 1. Only Detects Shown
2. Printed on 08/28/01

Table D2
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION (DETECTS)
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-B2	SW-MW-D2	SW-MW-D2	performance	performance		
	Sample ID	1839087	1839086	1839086	1839128	1839129		
	Sample Date	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999		
	Sample Time	14:00	13:45	13:45	14:45	14:50		
	Sample Depth	2.5' - 12.5'	1.0' - 10.0'	1.0' - 10.0'				
	Laboratory	LANC	LANC	LANC	AEL	LANC		
	Lab. Number	3151749	3151748	3151762	AEL99004651	3151750		
Constituent	Units							
Depth of Well	FT	12.38	10.25	10.25				
Depth to Water	FT	10.12	9.05	9.05				
Specific Conductivity (field)	µmhos	61.6	123.8	123.8				
Water Elevation	FT	21.60	21.75	21.75				
pH (field)	SU	6.10	6.02	6.02				
Date Metals Analyzed	-	05/18/1999	05/18/1999	05/19/1999	05/14/1999	05/18/1999		
Date Physical Analyzed	-					05/20/1999		
Arsenic	mg/L							
Arsenic (Unfiltered)	mg/L	0.0034 B	0.0038 B			0.0030 B		
Barium	mg/L			0.0393 B				
Barium (Unfiltered)	mg/L	0.0254 B	0.0374 B					
Cadmium	mg/L							
Cadmium (Unfiltered)	mg/L	0.00059	0.00028 B			0.0934		
Chromium (Unfiltered)	mg/L				0.403			
Copper (Unfiltered)	mg/L					0.0128 B		
Lead	mg/L			0.0044 SJ				
Lead (Unfiltered)	mg/L	0.0034	0.0020 B					
Mercury	mg/L							
Mercury (Unfiltered)	mg/L					0.0078 N		
Nickel	mg/L							
Nickel (Unfiltered)	mg/L							
Selenium (Unfiltered)	mg/L							
Zinc	mg/L			0.0068 B				
Zinc (Unfiltered)	mg/L	0.0239 B	0.0071 B			0.0091 B		
Cyanide (Unfiltered)	mg/l					0.461		

Notes: 1. Only Detects Shown
2. Printed on 08/28/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	EQUIPMENT	EQUIPMENT	EQUIPMENT	NW-MW-04	NW-MW-04	NW-MW-04	NW-MW-04
	Sample ID	1839095	1839095	1839095	1839088	1839088	1839088	1839088
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	12:30	12:30	12:30	10:20	10:20	10:20	10:20
	Sample Depth				8.1' - 18.1'	8.1' - 18.1'	8.1' - 18.1'	8.1' - 18.1'
	Laboratory	AEL	AEL	LANC	AEL	AEL	LANC	LANC
	Lab. Number	AEL99004723	AEL99004732	3151756	AEL99004716	AEL99004725	3151751	3151763
Constituent	Units							
Depth of Well	FT				19.91	19.91	19.91	19.91
Depth to Water	FT				13.92	13.92	13.92	13.92
Specific Conductivity (field)	µmhos				376	376	376	376
Water Elevation	FT				22.98	22.98	22.98	22.98
pH (field)	SU				6.25	6.25	6.25	6.25
Date Metals Analyzed	-	05/12/1999	05/18/1999	05/18/1999	05/12/1999	05/18/1999	05/18/1999	05/19/1999
Date Physical Analyzed	-			05/20/1999			05/20/1999	
Arsenic	mg/L							<0.00100 UJ
Arsenic (Unfiltered)	mg/L			0.0028 B			0.0030 B	
Barium	mg/L							0.0349 B
Barium (Unfiltered)	mg/L			0.0233 B			0.0364 B	
Beryllium	mg/L							<0.0017 U
Beryllium (Unfiltered)	mg/L			<0.0017 U			<0.0017 U	
Cadmium	mg/L							<0.00011 U
Cadmium (Unfiltered)	mg/L			<0.00011 U			<0.00011 U	
Chromium	mg/L		<0.01			<0.01		
Chromium (Unfiltered)	mg/L	<0.01			<0.01			
Chromium (Filtered)	mg/L							
Chromium, hexavalent	mg/L	<0.01			<0.01			
Copper	mg/L							<0.0058 U
Copper (Unfiltered)	mg/L			<0.0058 U			<0.0058 U	
Lead	mg/L							<0.0019 UJ
Lead (Unfiltered)	mg/L			<0.0019 U			<0.0019 U	
Mercury	mg/L							0.000051 BV
Mercury (Unfiltered)	mg/L			<0.000042 U			<0.000042 U	
Nickel	mg/L							<0.0054 U
Nickel (Unfiltered)	mg/L			<0.0054 U			<0.0054 U	
Selenium	mg/L							<0.0016 UJ

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	EQUIPMENT	EQUIPMENT	EQUIPMENT	NW-MW-04	NW-MW-04	NW-MW-04	NW-MW-04
	Sample ID	1839095	1839095	1839095	1839088	1839088	1839088	1839088
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	12:30	12:30	12:30	10:20	10:20	10:20	10:20
	Sample Depth				8.1' - 18.1'	8.1' - 18.1'	8.1' - 18.1'	8.1' - 18.1'
	Laboratory	AEL	AEL	LANC	AEL	AEL	LANC	LANC
	Lab. Number	AEL99004723	AEL99004732	3151756	AEL99004716	AEL99004725	3151751	3151763
Constituent	Units							
Selenium (Unfiltered)	mg/L			<0.0016 U			<0.0016 U	
Silver	mg/L							<0.0057 U
Silver (Unfiltered)	mg/L			<0.0057 U			<0.0057 U	
Zinc	mg/L							0.0079 B
Zinc (Unfiltered)	mg/L			0.0071 B			0.0037 B	
Cyanide (Unfiltered)	mg/l			<0.0040 U			<0.0040 U	

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-05	NW-MW-05	NW-MW-05	NW-MW-05	NW-MW-08	NW-MW-08	NW-MW-08
	Sample ID	1839093	1839093	1839093	1839093	1839089	1839089	1839089
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	14:15	14:15	14:15	14:15	10:45	10:45	10:45
	Sample Depth	14.4' - 24.4'	14.4' - 24.4'	14.4' - 24.4'	14.4' - 24.4'	9.0' - 19.0'	9.0' - 19.0'	9.0' - 19.0'
	Laboratory	AEL	AEL	LANC	LANC	AEL	AEL	LANC
	Lab. Number	AEL99004721	AEL99004730	3151758	3151768	AEL99004717	AEL99004726	3151752
Constituent	Units							
Depth of Well	FT	23.77	23.77	23.77	23.77	18.81	18.81	18.81
Depth to Water	FT	16.02	16.02	16.02	16.02	13.58	13.58	13.58
Specific Conductivity (field)	µmhos	402	402	402	402	312	312	312
Water Elevation	FT	22.71	22.71	22.71	22.71	21.51	21.51	21.51
pH (field)	SU	6.89	6.89	6.89	6.89	6.97	6.97	6.97
Date Metals Analyzed	-	05/12/1999	05/18/1999		05/19/1999	05/12/1999	05/18/1999	05/18/1999
Date Physical Analyzed	-			05/20/1999				05/20/1999
Arsenic	mg/L				<0.00100 UJ			
Arsenic (Unfiltered)	mg/L							0.0045 B
Barium	mg/L				0.0200 B			
Barium (Unfiltered)	mg/L							0.0828 B
Beryllium	mg/L				<0.0017 U			
Beryllium (Unfiltered)	mg/L							<0.0017 U
Cadmium	mg/L				<0.00011 U			
Cadmium (Unfiltered)	mg/L							<0.00011 U
Chromium	mg/L		<0.01				<0.01	
Chromium (Unfiltered)	mg/L	<0.01				0.017		
Chromium (Filtered)	mg/L							
Chromium, hexavalent	mg/L	<0.01				<0.01		
Copper	mg/L				<0.0058 U			
Copper (Unfiltered)	mg/L							0.0122 B
Lead	mg/L				<0.0019 UJ			
Lead (Unfiltered)	mg/L							0.0041
Mercury	mg/L				<0.000042 U			
Mercury (Unfiltered)	mg/L							<0.000042 U
Nickel	mg/L				<0.0054 U			
Nickel (Unfiltered)	mg/L							0.0136 B
Selenium	mg/L				<0.0016 UJ			

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-05	NW-MW-05	NW-MW-05	NW-MW-05	NW-MW-08	NW-MW-08	NW-MW-08
	Sample ID	1839093	1839093	1839093	1839093	1839089	1839089	1839089
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	14:15	14:15	14:15	14:15	10:45	10:45	10:45
	Sample Depth	14.4' - 24.4'	14.4' - 24.4'	14.4' - 24.4'	14.4' - 24.4'	9.0' - 19.0'	9.0' - 19.0'	9.0' - 19.0'
	Laboratory	AEL	AEL	LANC	LANC	AEL	AEL	LANC
	Lab. Number	AEL99004721	AEL99004730	3151758	3151768	AEL99004717	AEL99004726	3151752
Constituent	Units							
Selenium (Unfiltered)	mg/L							<0.0016 U
Silver	mg/L				<0.0057 U			
Silver (Unfiltered)	mg/L							<0.0057 U
Zinc	mg/L				0.0048 B			
Zinc (Unfiltered)	mg/L							0.0330
Cyanide (Unfiltered)	mg/l			<0.0040 U				<0.0040 U

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-08	NW-MW-09	NW-MW-09	NW-MW-09	NW-MW-09	NW-MW-10	NW-MW-10
	Sample ID	1839089	1839090	1839090	1839090	1839090	1839092	1839092
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	10:45	11:15	11:15	11:15	11:15	11:50	11:50
	Sample Depth	9.0' - 19.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'
	Laboratory	LANC	AEL	AEL	LANC	LANC	AEL	AEL
	Lab. Number	3151764	AEL99004718	AEL99004727	3151753	3151765	AEL99004720	AEL99004729
Constituent	Units							
Depth of Well	FT	18.81	22.11	22.11	22.11	22.11	20.21	20.21
Depth to Water	FT	13.58	17.32	17.32	17.32	17.32	17.12	17.12
Specific Conductivity (field)	µmhos	312	105.1	105.1	105.1	105.1	160.1	160.1
Water Elevation	FT	21.51	21.38	21.38	21.38	21.38	21.09	21.09
pH (field)	SU	6.97	5.89	5.89	5.89	5.89	6.38	6.38
Date Metals Analyzed	-	05/19/1999	05/12/1999	05/18/1999	05/18/1999	05/19/1999	05/12/1999	05/18/1999
Date Physical Analyzed	-				05/20/1999			
Arsenic	mg/L	<0.00100 UJ				<0.00100 UJ		
Arsenic (Unfiltered)	mg/L				0.0550			
Barium	mg/L	0.0248 B				0.0323 B		
Barium (Unfiltered)	mg/L				0.0634 B			
Beryllium	mg/L	<0.0017 U				<0.0017 U		
Beryllium (Unfiltered)	mg/L				<0.0017 U			
Cadmium	mg/L	<0.00011 U				0.00018 B		
Cadmium (Unfiltered)	mg/L				0.00086			
Chromium	mg/L			<0.01				<0.01
Chromium (Unfiltered)	mg/L		<0.01				<0.01	
Chromium (Filtered)	mg/L							
Chromium, hexavalent	mg/L		<0.01				<0.01	
Copper	mg/L	<0.0058 U				<0.0058 U		
Copper (Unfiltered)	mg/L				0.0140 B			
Lead	mg/L	0.0024 BJ				0.0023 BJ		
Lead (Unfiltered)	mg/L				0.0027 B			
Mercury	mg/L	<0.000042 U				<0.000042 U		
Mercury (Unfiltered)	mg/L				<0.000042 U			
Nickel	mg/L	<0.0054 U				<0.0054 U		
Nickel (Unfiltered)	mg/L				0.0207 B			
Selenium	mg/L	<0.0016 UJ				<0.0016 UJ		

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-08	NW-MW-09	NW-MW-09	NW-MW-09	NW-MW-09	NW-MW-10	NW-MW-10
	Sample ID	1839089	1839090	1839090	1839090	1839090	1839092	1839092
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	10:45	11:15	11:15	11:15	11:15	11:50	11:50
	Sample Depth	9.0' - 19.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'
	Laboratory	LANC	AEL	AEL	LANC	LANC	AEL	AEL
	Lab. Number	3151764	AEL99004718	AEL99004727	3151753	3151765	AEL99004720	AEL99004729
Constituent	Units							
Selenium (Unfiltered)	mg/L				0.0039 B			
Silver	mg/L	<0.0057 U				<0.0057 U		
Silver (Unfiltered)	mg/L				<0.0057 U			
Zinc	mg/L	0.0056 B				0.0045 B		
Zinc (Unfiltered)	mg/L				0.0179 B			
Cyanide (Unfiltered)	mg/l				<0.0040 U			

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-10	NW-MW-10	NW-MW-10	NW-MW-10	NW-MW-10	NW-MW-11	NW-MW-11
	Sample ID	1839092	1839092	1839096	1839096	1839096	1839091	1839091
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	11:50	11:50	11:50	11:50	11:50	11:50	11:50
	Sample Depth	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 21.0'	12.0' - 21.0'
	Laboratory	LANC	LANC	AEL	AEL	LANC	AEL	AEL
	Lab. Number	3151755	3151767	AEL99004724	AEL99004733	3151757	AEL99004719	AEL99004728
Constituent	Units							
Depth of Well	FT	20.21	20.21	20.21	20.21	20.21	22.09	22.09
Depth to Water	FT	17.12	17.12	17.12	17.12	17.12	17.61	17.61
Specific Conductivity (field)	µmhos	160.1	160.1	160.1	160.1	160.1		
Water Elevation	FT	21.09	21.09	21.09	21.09	21.09	21.38	21.38
pH (field)	SU	6.38	6.38	6.38	6.38	6.38		
Date Metals Analyzed	-		05/19/1999	05/12/1999	05/18/1999	05/18/1999	05/12/1999	05/18/1999
Date Physical Analyzed	-	05/20/1999				05/20/1999		
Arsenic	mg/L		<0.00100 UJ					
Arsenic (Unfiltered)	mg/L					0.0029 B		
Barium	mg/L		0.0182 B					
Barium (Unfiltered)	mg/L					0.0266 B		
Beryllium	mg/L		<0.0017 U					
Beryllium (Unfiltered)	mg/L					<0.0017 U		
Cadmium	mg/L		<0.00011 U					
Cadmium (Unfiltered)	mg/L					<0.00011 U		
Chromium	mg/L				<0.01			<0.01
Chromium (Unfiltered)	mg/L			<0.01			<0.01	
Chromium (Filtered)	mg/L							
Chromium, hexavalent	mg/L			<0.01			<0.01	
Copper	mg/L		<0.0058 U					
Copper (Unfiltered)	mg/L					<0.0058 U		
Lead	mg/L		<0.0019 UJ					
Lead (Unfiltered)	mg/L					<0.0019 U		
Mercury	mg/L		<0.000042 U					
Mercury (Unfiltered)	mg/L					<0.000042 U		
Nickel	mg/L		<0.0054 U					
Nickel (Unfiltered)	mg/L					<0.0054 U		
Selenium	mg/L		<0.0016 UJ					

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-10	NW-MW-10	NW-MW-10	NW-MW-10	NW-MW-10	NW-MW-11	NW-MW-11
	Sample ID	1839092	1839092	1839096	1839096	1839096	1839091	1839091
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999	05/12/1999
	Sample Time	11:50	11:50	11:50	11:50	11:50	11:50	11:50
	Sample Depth	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 22.0'	12.0' - 21.0'	12.0' - 21.0'
	Laboratory	LANC	LANC	AEL	AEL	LANC	AEL	AEL
	Lab. Number	3151755	3151767	AEL99004724	AEL99004733	3151757	AEL99004719	AEL99004728
Constituent	Units							
Selenium (Unfiltered)	mg/L					<0.0016 U		
Silver	mg/L		<0.0057 U					
Silver (Unfiltered)	mg/L					<0.0057 U		
Zinc	mg/L		0.0031 B					
Zinc (Unfiltered)	mg/L					0.0065 B		
Cyanide (Unfiltered)	mg/l	<0.0040 U				<0.0040 U		

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-11	NW-MW-11	SW-MW-01	SW-MW-01	SW-MW-01	SW-MW-01	SW-MW-04
	Sample ID	1839091	1839091	1839083	1839083	1839083	1839083	1839084
	Sample Date	05/12/1999	05/12/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999
	Sample Time	11:50	11:50	10:40	10:40	10:40	10:40	11:10
	Sample Depth	12.0' - 21.0'	12.0' - 21.0'	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'
	Laboratory	LANC	LANC	AEL	AEL	LANC	LANC	AEL
	Lab. Number	3151754	3151766	AEL99004641	AEL99004646	3151745	3151760	AEL99004642
Constituent	Units							
Depth of Well	FT	22.09	22.09	19.59	19.59	19.59	19.59	19.24
Depth to Water	FT	17.61	17.61	11.92	11.92	11.92	11.92	12.96
Specific Conductivity (field)	µmhos			104.5	104.5	104.5	104.5	108.9
Water Elevation	FT	21.38	21.38	6.54	6.54	6.54	6.54	3.40
pH (field)	SU			5.20	5.20	5.20	5.20	5.54
Date Metals Analyzed	-	05/18/1999	05/19/1999	05/11/1999	05/12/1999	05/18/1999	05/19/1999	05/11/1999
Date Physical Analyzed	-	05/20/1999				05/20/1999		
Arsenic	mg/L		<0.00100 UJ				<0.00100 UJ	
Arsenic (Unfiltered)	mg/L	0.0032 B				0.0104		
Barium	mg/L		0.0327 B				0.0554 BJ	
Barium (Unfiltered)	mg/L	0.0338 B				0.203		
Beryllium	mg/L		<0.0017 U				<0.0017 U	
Beryllium (Unfiltered)	mg/L	<0.0017 U				<0.0017 U		
Cadmium	mg/L		<0.00011 U				0.0016	
Cadmium (Unfiltered)	mg/L	<0.00011 U				0.0045		
Chromium	mg/L							
Chromium (Unfiltered)	mg/L			0.039				<0.01
Chromium (Filtered)	mg/L				<0.01 F			
Chromium, hexavalent	mg/L			<0.01				<0.01
Copper	mg/L		<0.0058 U				<0.0058 U	
Copper (Unfiltered)	mg/L	<0.0058 U				0.102		
Lead	mg/L		<0.0019 UJ				<0.0019 UJ	
Lead (Unfiltered)	mg/L	<0.0019 U				0.109		
Mercury	mg/L		<0.000042 U				<0.000042 U	
Mercury (Unfiltered)	mg/L	<0.000042 U				0.00026 N		
Nickel	mg/L		<0.0054 U				0.0126 B	
Nickel (Unfiltered)	mg/L	<0.0054 U				0.0725		
Selenium	mg/L		<0.0016 UJ				<0.0016 U	

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-11	NW-MW-11	SW-MW-01	SW-MW-01	SW-MW-01	SW-MW-01	SW-MW-04
	Sample ID	1839091	1839091	1839083	1839083	1839083	1839083	1839084
	Sample Date	05/12/1999	05/12/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999
	Sample Time	11:50	11:50	10:40	10:40	10:40	10:40	11:10
	Sample Depth	12.0' - 21.0'	12.0' - 21.0'	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'	3.0' - 18.0'
	Laboratory	LANC	LANC	AEL	AEL	LANC	LANC	AEL
	Lab. Number	3151754	3151766	AEL99004641	AEL99004646	3151745	3151760	AEL99004642
Constituent	Units							
Selenium (Unfiltered)	mg/L	<0.0016 U				<0.0016 U		
Silver	mg/L		<0.0057 U				<0.0057 U	
Silver (Unfiltered)	mg/L	<0.0057 U				<0.0057 U		
Zinc	mg/L		0.0081 B				0.0937	
Zinc (Unfiltered)	mg/L	0.0095 B				0.342		
Cyanide (Unfiltered)	mg/l	<0.0040 U				<0.0040 U		

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-04	SW-MW-04	SW-MW-05	SW-MW-05	SW-MW-05	SW-MW-05	SW-MW-12
	Sample ID	1839084	1839084	1839085	1839085	1839085	1839085	1839094
	Sample Date	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/12/1999
	Sample Time	11:10	11:10	11:30	11:30	11:30	11:30	14:40
	Sample Depth	3.0' - 18.0'	3.0' - 18.0'	3.00' - 18.00	3.00' - 18.00	3.00' - 18.00	3.00' - 18.00	11.0' - 20.0'
	Laboratory	AEL	LANC	AEL	AEL	LANC	LANC	AEL
	Lab. Number	AEL99004647	3151746	AEL99004643	AEL99004648	3151747	3151761	AEL99004722
Constituent	Units							
Depth of Well	FT	19.24	19.24	19.55	19.55	19.55	19.55	19.55
Depth to Water	FT	12.96	12.96	13.60	13.60	13.60	13.60	17.15
Specific Conductivity (field)	µmhos	108.9	108.9	172.3	172.3	172.3	172.3	399
Water Elevation	FT	3.40	3.40	7.55	7.55	7.55	7.55	19.50
pH (field)	SU	5.54	5.54	5.89	5.89	5.89	5.89	6.73
Date Metals Analyzed	-	05/12/1999	05/18/1999	05/11/1999	05/12/1999	05/18/1999	05/19/1999	05/12/1999
Date Physical Analyzed	-		05/20/1999			05/20/1999		
Arsenic	mg/L						0.0023 BJ	
Arsenic (Unfiltered)	mg/L		0.0031 B			0.0040 B		
Barium	mg/L						0.0263 B	
Barium (Unfiltered)	mg/L		0.0503 B			0.0268 B		
Beryllium	mg/L						<0.0017 U	
Beryllium (Unfiltered)	mg/L		<0.0017 U			<0.0017 U		
Cadmium	mg/L						<0.00011 U	
Cadmium (Unfiltered)	mg/L		0.0017			0.00022 B		
Chromium	mg/L							
Chromium (Unfiltered)	mg/L			<0.01				<0.01
Chromium (Filtered)	mg/L	<0.01 F			<0.01 F			
Chromium, hexavalent	mg/L			<0.01				<0.01
Copper	mg/L						<0.0058 U	
Copper (Unfiltered)	mg/L		0.0087 B			<0.0058 U		
Lead	mg/L						<0.0019 UJ	
Lead (Unfiltered)	mg/L		<0.0019 U			<0.0019 U		
Mercury	mg/L						<0.000042 U	
Mercury (Unfiltered)	mg/L		<0.000042 U			<0.000042 U		
Nickel	mg/L						<0.0054 U	
Nickel (Unfiltered)	mg/L		0.0128 B			<0.0054 U		
Selenium	mg/L						<0.0016 UJ	

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-04	SW-MW-04	SW-MW-05	SW-MW-05	SW-MW-05	SW-MW-05	SW-MW-12
	Sample ID	1839084	1839084	1839085	1839085	1839085	1839085	1839094
	Sample Date	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/12/1999
	Sample Time	11:10	11:10	11:30	11:30	11:30	11:30	14:40
	Sample Depth	3.0' - 18.0'	3.0' - 18.0'	3.00' - 18.00	3.00' - 18.00	3.00' - 18.00	3.00' - 18.00	11.0' - 20.0'
	Laboratory	AEL	LANC	AEL	AEL	LANC	LANC	AEL
	Lab. Number	AEL99004647	3151746	AEL99004643	AEL99004648	3151747	3151761	AEL99004722
Constituent	Units							
Selenium (Unfiltered)	mg/L		<0.0016 U			<0.0016 U		
Silver	mg/L						<0.0057 U	
Silver (Unfiltered)	mg/L		<0.0057 U			<0.0057 U		
Zinc	mg/L						0.0101 B	
Zinc (Unfiltered)	mg/L		0.0712			0.0114 B		
Cyanide (Unfiltered)	mg/l		<0.0040 U			<0.0040 U		

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-12	SW-MW-12	SW-MW-12	SW-MW-B2	SW-MW-B2	SW-MW-B2	SW-MW-D2
	Sample ID	1839094	1839094	1839094	1839087	1839087	1839087	1839086
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999
	Sample Time	14:40	14:40	14:40	14:00	14:00	14:00	13:45
	Sample Depth	11.0' - 20.0'	11.0' - 20.0'	11.0' - 20.0'	2.5' - 12.5'	2.5' - 12.5'	2.5' - 12.5'	1.0' - 10.0'
	Laboratory	AEL	LANC	LANC	AEL	AEL	LANC	AEL
	Lab. Number	AEL99004731	3151759	3151769	AEL99004645	AEL99004650	3151749	AEL99004644
Constituent	Units							
Depth of Well	FT	19.55	19.55	19.55	12.38	12.38	12.38	10.25
Depth to Water	FT	17.15	17.15	17.15	10.12	10.12	10.12	9.05
Specific Conductivity (field)	µmhos	399	399	399	61.6	61.6	61.6	123.8
Water Elevation	FT	19.50	19.50	19.50	21.60	21.60	21.60	21.75
pH (field)	SU	6.73	6.73	6.73	6.10	6.10	6.10	6.02
Date Metals Analyzed	-	05/18/1999	05/18/1999	05/19/1999	05/11/1999	05/12/1999	05/18/1999	05/11/1999
Date Physical Analyzed	-		05/20/1999				05/20/1999	
Arsenic	mg/L			<0.00100 UJ				
Arsenic (Unfiltered)	mg/L		0.0022 B				0.0034 B	
Barium	mg/L			0.0375 B				
Barium (Unfiltered)	mg/L		0.0392 B				0.0254 B	
Beryllium	mg/L			<0.0017 U				
Beryllium (Unfiltered)	mg/L		<0.0017 U				<0.0017 U	
Cadmium	mg/L			<0.00011 U				
Cadmium (Unfiltered)	mg/L		<0.00011 U				0.00059	
Chromium	mg/L	<0.01						
Chromium (Unfiltered)	mg/L				<0.01			<0.01
Chromium (Filtered)	mg/L					<0.01 F		
Chromium, hexavalent	mg/L				<0.01			<0.01
Copper	mg/L			<0.0058 U				
Copper (Unfiltered)	mg/L		<0.0058 U				<0.0058 U	
Lead	mg/L			<0.0019 UJ				
Lead (Unfiltered)	mg/L		<0.0019 U				0.0034	
Mercury	mg/L			<0.000042 U				
Mercury (Unfiltered)	mg/L		<0.000042 U				<0.000042 U	
Nickel	mg/L			0.0165 B				
Nickel (Unfiltered)	mg/L		0.0207 B				<0.0054 U	
Selenium	mg/L			<0.0016 UJ				

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-12	SW-MW-12	SW-MW-12	SW-MW-B2	SW-MW-B2	SW-MW-B2	SW-MW-D2
	Sample ID	1839094	1839094	1839094	1839087	1839087	1839087	1839086
	Sample Date	05/12/1999	05/12/1999	05/12/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999
	Sample Time	14:40	14:40	14:40	14:00	14:00	14:00	13:45
	Sample Depth	11.0' - 20.0'	11.0' - 20.0'	11.0' - 20.0'	2.5' - 12.5'	2.5' - 12.5'	2.5' - 12.5'	1.0' - 10.0'
	Laboratory	AEL	LANC	LANC	AEL	AEL	LANC	AEL
	Lab. Number	AEL99004731	3151759	3151769	AEL99004645	AEL99004650	3151749	AEL99004644
Constituent	Units							
Selenium (Unfiltered)	mg/L		<0.0016 U				<0.0016 U	
Silver	mg/L			<0.0057 U				
Silver (Unfiltered)	mg/L		<0.0057 U				<0.0057 U	
Zinc	mg/L			0.0049 B				
Zinc (Unfiltered)	mg/L		0.0047 B				0.0239 B	
Cyanide (Unfiltered)	mg/l		<0.0040 U				<0.0040 U	

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-D2	SW-MW-D2	SW-MW-D2	performance	performance		
	Sample ID	1839086	1839086	1839086	1839128	1839129		
	Sample Date	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999		
	Sample Time	13:45	13:45	13:45	14:45	14:50		
	Sample Depth	1.0' - 10.0'	1.0' - 10.0'	1.0' - 10.0'				
	Laboratory	AEL	LANC	LANC	AEL	LANC		
	Lab. Number	AEL99004649	3151748	3151762	AEL99004651	3151750		
Constituent	Units							
Depth of Well	FT	10.25	10.25	10.25				
Depth to Water	FT	9.05	9.05	9.05				
Specific Conductivity (field)	µmhos	123.8	123.8	123.8				
Water Elevation	FT	21.75	21.75	21.75				
pH (field)	SU	6.02	6.02	6.02				
Date Metals Analyzed	-	05/12/1999	05/18/1999	05/19/1999	05/14/1999	05/18/1999		
Date Physical Analyzed	-		05/20/1999			05/20/1999		
Arsenic	mg/L			<0.00100 UJ				
Arsenic (Unfiltered)	mg/L		0.0038 B			0.0030 B		
Barium	mg/L			0.0393 B				
Barium (Unfiltered)	mg/L		0.0374 B			<0.0015 U		
Beryllium	mg/L			<0.0017 U				
Beryllium (Unfiltered)	mg/L		<0.0017 U			<0.0017 U		
Cadmium	mg/L			<0.00011 U				
Cadmium (Unfiltered)	mg/L		0.00028 B			0.0934		
Chromium	mg/L	<0.01 F						
Chromium (Unfiltered)	mg/L				0.403			
Chromium (Filtered)	mg/L							
Chromium, hexavalent	mg/L							
Copper	mg/L			<0.0058 U				
Copper (Unfiltered)	mg/L		<0.0058 U			0.0128 B		
Lead	mg/L			0.0044 SJ				
Lead (Unfiltered)	mg/L		0.0020 B			<0.0019 U		
Mercury	mg/L			<0.000042 U				
Mercury (Unfiltered)	mg/L		<0.000042 U			0.0078 N		
Nickel	mg/L			<0.0054 U				
Nickel (Unfiltered)	mg/L		<0.0054 U			<0.0054 U		
Selenium	mg/L			<0.0016 UJ				

Notes: 1. Printed on 08/29/01

Table D3
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-D2	SW-MW-D2	SW-MW-D2	performance	performance		
	Sample ID	1839086	1839086	1839086	1839128	1839129		
	Sample Date	05/11/1999	05/11/1999	05/11/1999	05/11/1999	05/11/1999		
	Sample Time	13:45	13:45	13:45	14:45	14:50		
	Sample Depth	1.0' - 10.0'	1.0' - 10.0'	1.0' - 10.0'				
	Laboratory	AEL	LANC	LANC	AEL	LANC		
	Lab. Number	AEL99004649	3151748	3151762	AEL99004651	3151750		
Constituent	Units							
Selenium (Unfiltered)	mg/L		<0.0016 U			<0.0016 U		
Silver	mg/L			<0.0057 U				
Silver (Unfiltered)	mg/L		<0.0057 U			<0.0057 U		
Zinc	mg/L			0.0068 B				
Zinc (Unfiltered)	mg/L		0.0071 B			0.0091 B		
Cyanide (Unfiltered)	mg/l		<0.0040 U			0.461		

Notes: 1. Printed on 08/29/01

Table D4
EXCEEDANCES OF P & W VCAP RISK BASED GW LIMITS BASED ON CT SURFACE WATER
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	NW-MW-08	NW-MW-09	SW-MW-01				
	Sample ID	1839089	1839090	1839083				
	Sample Date	05/12/1999	05/12/1999	05/11/1999				
	Sample Time	10:45	11:15	10:40				
	Sample Depth	9.0' - 19.0'	12.0' - 22.0'	3.0' - 18.0'				
	Laboratory	LANC	LANC	LANC				
	Lab. Number	3151752	3151753	3151745				
Constituent	Units							
Depth of Well	FT	18.81	22.11	19.59				
Depth to Water	FT	13.58	17.32	11.92				
Water Elevation	FT	21.51	21.38	6.54				
Date Metals Analyzed	-	05/24/1999	05/24/1999	05/18/1999				
Arsenic (Unfiltered)	mg/L	0.0045 B	0.0550	0.0104				
Copper (Unfiltered)	mg/L			0.102				
Lead (Unfiltered)	mg/L			0.109				
Zinc (Unfiltered)	mg/L			0.342				

Notes: 1. Only Exceedances Shown
2. Printed on 08/28/01

Table D5
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

Sample Information						Analysis Information							
Location ID	Sample ID	Sample Date	From (ft)	To (ft)	Class	Portable GC	Volatile Organics	Semivolatile Organics	Herbicides	Pesticides	PCBs	Metals	Miscellaneous
EQUIPMENT	1848677	10/28/99			BKE							X	
NW-MW-05	1848675	10/28/99	14.4	24.4	GW							X	
NW-MW-10	1848674	10/28/99	12.0	22.0	GW							X	
SW-MW-04	1848673	10/28/99	3.0	18.0	GW							X	
SW-MW-B2	1848672	10/28/99	2.5	12.5	GW							X	
SW-MW-B2	1848676	10/28/99	2.5	12.5	GW							X	

Notes: 1. Legend: x - mass, t - TCLP, s - SPLP, e - EPTOX, z - ZHE; Capitalized - at least one analyte detected
2. Printed on 08/28/01

Table D6
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION (DETECTS)
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	EQUIPMENT	NW-MW-05	NW-MW-05	NW-MW-10	NW-MW-10	SW-MW-04	SW-MW-04
	Sample ID	1848677	1848675	1848675	1848674	1848674	1848673	1848673
	Sample Date	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999
	Sample Time	14:10	14:00	14:00	15:15	15:15	12:45	12:45
	Sample Depth		14.4' - 24.4'	14.4' - 24.4'	12.0' - 22.0'	12.0' - 22.0'	3.0' - 18.0'	3.0' - 18.0'
	Laboratory	LANC	LANC	LANC	LANC	LANC	LANC	LANC
	Lab. Number	3261800	3261798	3261804	3261797	3261803	3261796	3261802
Constituent	Units							
Depth of Well	FT		23.65	23.65	22.15	22.15	19.00	19.00
Depth to Water	FT		16.03	16.03	17.80	17.80	10.75	10.75
Specific Conductivity (field)	µmhos		494	494	233	233	188	188
Water Elevation	FT		22.70	22.70	20.41	20.41	5.61	5.61
pH (field)	SU		6.48	6.48	6.17	6.17	5.33	5.33
Date Metals Analyzed	-	11/08/1999	11/08/1999	11/08/1999	11/08/1999	11/08/1999	11/08/1999	11/08/1999
Barium	mg/L		0.0183 B		0.0133 B		0.0502 B	
Barium (Unfiltered)	mg/L			0.0190 B		0.0193 B		0.0455 B
Cadmium	mg/L						0.0011	
Cadmium (Unfiltered)	mg/L							0.00098
Lead (Unfiltered)	mg/L							
Nickel	mg/L						0.0119 B	
Nickel (Unfiltered)	mg/L							0.0089 B
Zinc	mg/L	0.0052 B	0.0050 B		0.0053 B		0.0465	
Zinc (Unfiltered)	mg/L			0.0035 B		0.0089 B		0.0362

Notes: 1. Only Detects Shown
2. Printed on 08/28/01

Table D6
SUMMARY OF SAMPLING AND ANALYTICAL INFORMATION (DETECTS)
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-B2	SW-MW-B2	SW-MW-B2	SW-MW-B2			
	Sample ID	1848672	1848672	1848676	1848676			
	Sample Date	10/28/1999	10/28/1999	10/28/1999	10/28/1999			
	Sample Time	11:30	11:30	11:31	11:31			
	Sample Depth	2.5' - 12.5'	2.5' - 12.5'	2.5' - 12.5'	2.5' - 12.5'			
	Laboratory	LANC	LANC	LANC	LANC			
	Lab. Number	3261795	3261801	3261799	3261805			
Constituent	Units							
Depth of Well	FT	12.50	12.50	12.50	12.50			
Depth to Water	FT	9.70	9.70	9.70	9.70			
Specific Conductivity (field)	µmhos	199	199	199	199			
Water Elevation	FT	22.02	22.02	22.02	22.02			
pH (field)	SU	5.68	5.68	5.68	5.68			
Date Metals Analyzed	-	11/08/1999	11/08/1999	11/08/1999	11/08/1999			
Barium	mg/L	0.0434 B		0.0441 B				
Barium (Unfiltered)	mg/L		0.0436 B		0.0431 B			
Cadmium	mg/L							
Cadmium (Unfiltered)	mg/L							
Lead (Unfiltered)	mg/L				0.0022 B			
Nickel	mg/L	0.0055 B						
Nickel (Unfiltered)	mg/L							
Zinc	mg/L	0.0053 B		0.0057 B				
Zinc (Unfiltered)	mg/L		0.0046 B		0.0054 B			

Notes: 1. Only Detects Shown
2. Printed on 08/28/01

Table D7
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	EQUIPMENT	NW-MW-05	NW-MW-05	NW-MW-10	NW-MW-10	SW-MW-04	SW-MW-04
	Sample ID	1848677	1848675	1848675	1848674	1848674	1848673	1848673
	Sample Date	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999	10/28/1999
	Sample Time	14:10	14:00	14:00	15:15	15:15	12:45	12:45
	Sample Depth		14.4' - 24.4'	14.4' - 24.4'	12.0' - 22.0'	12.0' - 22.0'	3.0' - 18.0'	3.0' - 18.0'
	Laboratory	LANC	LANC	LANC	LANC	LANC	LANC	LANC
	Lab. Number	3261800	3261798	3261804	3261797	3261803	3261796	3261802
Constituent	Units							
Depth of Well	FT		23.65	23.65	22.15	22.15	19.00	19.00
Depth to Water	FT		16.03	16.03	17.80	17.80	10.75	10.75
Specific Conductivity (field)	µmhos		494	494	233	233	188	188
Water Elevation	FT		22.70	22.70	20.41	20.41	5.61	5.61
pH (field)	SU		6.48	6.48	6.17	6.17	5.33	5.33
Date Metals Analyzed	-	11/08/1999	11/08/1999	11/08/1999	11/08/1999	11/08/1999	11/08/1999	11/08/1999
Arsenic	mg/L	<0.00100 U	<0.00100 U		<0.00100 U		<0.00100 U	
Arsenic (Unfiltered)	mg/L			<0.00100 U		<0.00100 U		<0.00100 U
Barium	mg/L	<0.0015 U	0.0183 B		0.0133 B		0.0502 B	
Barium (Unfiltered)	mg/L			0.0190 B		0.0193 B		0.0455 B
Beryllium	mg/L	<0.0017 U	<0.0017 U		<0.0017 U		<0.0017 U	
Beryllium (Unfiltered)	mg/L			<0.0017 U		<0.0017 U		<0.0017 U
Cadmium	mg/L	<0.00011 U	<0.00011 U		<0.00011 U		0.0011	
Cadmium (Unfiltered)	mg/L			<0.00011 U		<0.00011 U		0.00098
Copper	mg/L	<0.0058 U	<0.0058 U		<0.0058 U		<0.0058 U	
Copper (Unfiltered)	mg/L			<0.0058 U		<0.0058 U		<0.0058 U
Lead	mg/L	<0.0019 U	<0.0019 U		<0.0019 U		<0.0019 U	
Lead (Unfiltered)	mg/L			<0.0019 U		<0.0019 U		<0.0019 U
Mercury	mg/L	<0.000042 U	<0.000042 U		<0.000042 U		<0.000042 U	
Mercury (Unfiltered)	mg/L			<0.000042 U		<0.000042 U		<0.000042 U
Nickel	mg/L	<0.0054 U	<0.0054 U		<0.0054 U		0.0119 B	
Nickel (Unfiltered)	mg/L			<0.0054 U		<0.0054 U		0.0089 B
Selenium	mg/L	<0.0016 U	<0.0016 U		<0.0016 U		<0.0016 U	
Selenium (Unfiltered)	mg/L			<0.0016 U		<0.0016 U		<0.0016 U
Silver	mg/L	<0.0057 U	<0.0057 U		<0.0057 U		<0.0057 U	
Silver (Unfiltered)	mg/L			<0.0057 U		<0.0057 U		<0.0057 U
Zinc	mg/L	0.0052 B	0.0050 B		0.0053 B		0.0465	
Zinc (Unfiltered)	mg/L			0.0035 B		0.0089 B		0.0362

Notes: 1. Printed on 08/29/01

Table D7
SUMMARY OF ANALYTICAL RESULTS
Pratt & Whitney, Pent Road, East Hartford, CT (Willgoos) - Groundwater Monitoring - Step 2

	Location ID	SW-MW-B2	SW-MW-B2	SW-MW-B2	SW-MW-B2			
	Sample ID	1848672	1848672	1848676	1848676			
	Sample Date	10/28/1999	10/28/1999	10/28/1999	10/28/1999			
	Sample Time	11:30	11:30	11:31	11:31			
	Sample Depth	2.5' - 12.5'	2.5' - 12.5'	2.5' - 12.5'	2.5' - 12.5'			
	Laboratory	LANC	LANC	LANC	LANC			
	Lab. Number	3261795	3261801	3261799	3261805			
Constituent	Units							
Depth of Well	FT	12.50	12.50	12.50	12.50			
Depth to Water	FT	9.70	9.70	9.70	9.70			
Specific Conductivity (field)	µmhos	199	199	199	199			
Water Elevation	FT	22.02	22.02	22.02	22.02			
pH (field)	SU	5.68	5.68	5.68	5.68			
Date Metals Analyzed	-	11/08/1999	11/08/1999	11/08/1999	11/08/1999			
Arsenic	mg/L	<0.00100 U		<0.00100 U				
Arsenic (Unfiltered)	mg/L		<0.00100 U		<0.00100 U			
Barium	mg/L	0.0434 B		0.0441 B				
Barium (Unfiltered)	mg/L		0.0436 B		0.0431 B			
Beryllium	mg/L	<0.0017 U		<0.0017 U				
Beryllium (Unfiltered)	mg/L		<0.0017 U		<0.0017 U			
Cadmium	mg/L	<0.00011 U		<0.00011 U				
Cadmium (Unfiltered)	mg/L		<0.00011 U		<0.00011 U			
Copper	mg/L	<0.0058 U		<0.0058 U				
Copper (Unfiltered)	mg/L		<0.0058 U		<0.0058 U			
Lead	mg/L	<0.0019 U		<0.0019 U				
Lead (Unfiltered)	mg/L		<0.0019 U		0.0022 B			
Mercury	mg/L	<0.000042 U		<0.000042 U				
Mercury (Unfiltered)	mg/L		<0.000042 U		<0.000042 U			
Nickel	mg/L	0.0055 B		<0.0054 U				
Nickel (Unfiltered)	mg/L		<0.0054 U		<0.0054 U			
Selenium	mg/L	<0.0016 U		<0.0016 U				
Selenium (Unfiltered)	mg/L		<0.0016 U		<0.0016 U			
Silver	mg/L	<0.0057 U		<0.0057 U				
Silver (Unfiltered)	mg/L		<0.0057 U		<0.0057 U			
Zinc	mg/L	0.0053 B		0.0057 B				
Zinc (Unfiltered)	mg/L		0.0046 B		0.0054 B			

Notes: 1. Printed on 08/29/01

LIST OF QUALIFIERS

Organic Qualifiers

A	Tentatively Identified Compound (TIC) is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentation exceeds the calibration range of the instrument
J	Estimated value
N	Presumptive evidence of a compound (TOCs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is < contract required detection limit CRDL, but > instrument detection limit
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

DRAWING

US EPA New England
RCRA Document Management System (RDMS)
Image Target Sheet

RDMS Document ID# 768

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ATTACHMENT D1

Development of Modified Generic Screening Levels

Pratt & Whitney, VCAP Connecticut Facilities

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Introduction

This document presents the development of modified generic screening levels for the Pratt & Whitney (P&W) facilities being addressed under the Voluntary Corrective Action Program (VCAP).[1] Modified generic screening levels were developed for chemicals that exceeded the screening levels developed in the Conceptual Site Model (CSM) report (Gradient, 1999).[2] Modified generic screening levels were developed for two media: surface water and groundwater (protective of discharge to surface water). Since the program objective is to achieve "stabilization" at the P&W facilities, the modified screening levels were developed to be protective of human health. The following sub-sections present the approach used in developing the screening levels.

Modified Generic Screening Levels for Surface Water

In the CSM report, surface water quality standards promulgated by the Connecticut Department of Environmental Protection (CTDEP) had been defined as surface water screening levels. However, these screening levels were overly conservative for application at the P&W facilities because they were based on surface water being the source of drinking water, a condition not satisfied at any of the VCAP facilities. In addition, these standards also considered potential ecological effects, which do not need to addressed as part of "stabilization." We were aware of these conservative assumptions, but proposed the CTDEP standards as screening levels since these standards were readily available. Given the conservative nature of the screening levels proposed in the CSM report, some exceedances of the screening levels were expected. When surface water data collected at the facilities was screened against the screening levels (Table 3-6 in the CSM report), surface water exceedances were noted for the following chemicals: arsenic, copper, chromium, lead, nickel, zinc, cis-1,2-dichloroethene, trichloroethene, vinyl chloride, methyl-t-butyl-ether (MTBE), benzene, 1,1-dichloroethene, 1,1,1-trichloroethane, and tetrachloroethene. Therefore, modified generic screening levels were developed for these chemicals.

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[1] The screening levels developed in this document are being referred to as "generic" levels since they are applicable to all P&W facilities being addressed by the VCAP.

Two approaches were used in the development of the modified generic surface water screening levels: 1) for some contaminants, the USEPA-promulgated Maximum Contaminant Levels (MCLs) for drinking water were used; 2) for other chemicals, risk-based screening levels (protective of human health) were developed assuming incidental ingestion of and dermal contact with surface water for the three receptor groups, Trespassers, Off-Site Recreators, and Samplers, likely to be exposed to surface water at the P&W facilities (see Figure 2-1 of the CSM report). The modified screening levels are presented in Table 1. It should be noted that the choice of MCLs as surface water screening criteria is extremely health-protective since surface water at none of the P&W facilities is used for drinking; alternate, risk-based values might be proposed later, if necessary.

Development of Risk-Based Surface Water Screening Levels

Risk-based screening levels were developed for Trespassers, Off-site Recreators, and Samplers considering incidental ingestion of and dermal contact with surface water. The equations used for calculating the screening levels are as follows:

Carcinogens

$$SL = \frac{Target\ Cancer\ Risk}{\left[IF_d * K_p * \left(CSF / Oral_{abs}\right) + IF_{ing} * CSF\right]}$$

where:

SL	=	Screen Level (mg/l)
IF_d	=	Dermal Intake Factor = (SA*ET*EF*ED*CF)/(BW*AT)
IF_{ing}	=	Ingestion Intake Factor = (IR*ET*EF*ED)/(BW*AT)
ET	=	Exposure Time (hours/event)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (year)
BW	=	Body Weight (kgs)
AT	=	Averaging Time (days)

[2] Gradient Corporation. 1999. Conceptual Site Models and Screening Levels for Pratt & Whitney's VCAP Connecticut Facilities. September 15.

SA	=	Body Surface Area Exposed to Surface Water (cm^2)
CF	=	Conversion Factor
IR	=	Surface Water Ingestion Rate (L/hour)
$Oral_{abs}$	=	Oral Absorption (unitless)
CSF	=	Cancer Slope Factor $(mg\text{-}kg/day)^{-1}$
K_p	=	Dermal Permeability (cm/hr)

Non-carcinogens

$$SL = \frac{Target\ Hazard\ Quotient}{\left[\left(IF_d * K_p \,/\, \left(RfD * Oral_{abs}\right)\right) + \left(IF_{ing} \,/\, RfD\right)\right]}$$

where:

SL	=	Screening Level
IF_d	=	Dermal Intake Factor = (SA*ET*EF*ED*CF)/(BW*AT)
IF_{ing}	=	Ingestion Intake Factor = (IR*ET*EF*ED)/(BW*AT)
ET	=	Exposure Time (hours/event)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kgs)
AT	=	Averaging Time (days)
SA	=	Body Surface Area Exposed to Surface Water (cm^2)
CF	=	Conversion Factor
IR	=	Surface Water Ingestion Rate (L/hour)
RfD	=	Reference Dose (mg/kg-d)
$Oral_{abs}$	=	Oral Absorption (unitless)
K_p	=	Dermal Permeability (cm/hr)

A target cancer risk of 10^{-6} and a target hazard quotient of 1.0 was used. Exposure factor values for all parameters, except exposure time (ET), body surface area exposed to surface water (SA), and surface water incidental ingestion rate (IR), had been defined in the CSM report for the three receptors listed above. The parameter values defined in the CSM report were used as-is. Also in the CSM report, the exposure factor values for Trespassers were identical to the exposure factors values for Off-Site Recreators, since at the P&W facilities, Off-site Recreators are believed to be the most likely receptors to trespass onto the property. Therefore, two sets of calculations were performed: Trespassers/Recreators (Table 2) and Samplers (Table 3). The exposure factor values used for the three surface water exposure-specific variable (ET, SA, and IR) are discussed below.

Trespassers/Recreators

The exposure factor values used for Trespassers/Recreators, exposure time of 2 hours per event, skin surface area of 5,242 cm^2 (hands, forearms, lower legs), and an incidental ingestion rate of 0.05 litres per hour are health-protective. On-site surface water bodies at the P&W facilities are small brooks or streams. The small size of these water bodies greatly limits the potential for surface water exposure to Trespassers. The most likely off-site recreational activity that might result in exposure to surface water is fishing or canoeing in rivers adjacent to some of the facilities (*e.g.*, Quinnipiac River adjacent to the North Haven facility). However, the exposure parameter values used in the calculations reflect a much greater level of exposure. For example, the incidental surface water ingestion rate value chosen (0.05 litres per hour) corresponds to the EPA-recommended ingestion rate while swimming. Similarly, the skin surface area and exposure time values chosen are also expected to be health-protective for a fishing/canoeing exposure scenario.

Samplers

Exposure factor values used for Samplers, exposure time of 2 hours per event, skin surface area of 2270 cm^2 (hands and forearms), and an incidental ingestion rate of 0.005 litres per hour, are also health-protective because Samples are likely to wear gloves while collecting samples. This is likely to eliminate or greatly limit their potential exposure to surface water.

Modified Generic Screening Levels for Groundwater Discharge to Surface Water

Modified groundwater screening levels, protective of human exposures to surface water, were developed for four metals: arsenic, copper, lead, and zinc. MCLs were chosen as conservative criteria to be met in surface water for these metals. A default dilution and attenuation factor of 10, same as that used by CTDEP in developing their groundwater criteria, was used (Table 4). Since surface water at the P&W facilities is not used as a source of drinking water at or near any of the P&W facilities, alternate screening criteria based on more realistic exposure scenarios might be developed later, if necessary.