

**DRAFT REPORT**

**FOR RACO ARMY AIRFIELD AND BOMARC MISSILE SITE  
RACO, MICHIGAN**

**SITE INVESTIGATION AND ASSOCIATED ACTIVITIES**

**April 2005**

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**INDEPENDENT TECHNICAL REVIEW CERTIFICATION FORM**

Draft Report  
Raco Army Airfield and Bomarc Missile Site  
Environmental Site Investigation and Associated Activities  
Raco, Michigan

Contract DACA27-97-D-0013  
Task Order 0007

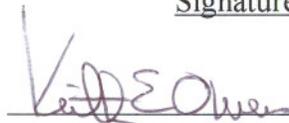
Earth Tech has completed the Draft Report for the Raco Airfield and Bomarc Missile Site. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy, principles and procedures utilizing justified and valid assumptions was verified. This included review of assumptions; methods, procedures, and material used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy. The independent technical review was completed by Earth Tech as outlined in the QCP.

All ITR comments have been incorporated into the contract document as agreed.

Discipline

Keith Owens  
Technical Manager

Signature

  
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Date

2/3/05  
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## LIST OF ACRONYMS AND ABBREVIATIONS

AAF	Army Airfield
AISL	Acute Inhalation Screening Levels
ASTM	American Society of Testing and Materials
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene
C°	Degrees Celcius
CCQC	Contractor Chemical Quality Control
CES	Contamination Evaluation Study
CQC	Chemical Quality Control
COC	Chain-of-Custody
cm/sec	centimeter per second
DCC	Direct Contact Criteria
DCQCR	Daily Chemical Quality Control Report
DOD	Department of Defense
DQO	Data Quality Objective
DWPC	Drinking Water Protection Criteria
EB	Equipment Blank
EM	Electromagnetic
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
FID	Flame-Ionization Detector
FSP	Field Sampling Plan
ft/ft	feet per feet
GCC	Groundwater Contact Criteria
GCPC	Groundwater Contact Protection Criteria
GSI	Groundwater Surface Water Interface Criteria
GSIPC	Groundwater Surface Water Interface Protection Criteria
GW	Groundwater
GWSIPC	Groundwater Surface Water Interface Protection Criteria
ICDWC	Industrial and Commercial II, III, and IV Drinking Water Criteria
ICP	Inductively Coupled Plasma
IDW	Investigation-Derived Waste
KAFB	Kincheloe Air Force Base
MDEQ	Michigan Department of Environmental Quality

**LIST OF ACRONYMS AND ABBREVIATIONS (continued)**

ml	Milliliters
mg/Kg	Micrograms per Kilogram
mg/L	Micrograms per Liter
mm	Millimeter
ms/cm	Microsiemens per Centimeter
mv	Milivolts
MW	Monitoring Well
NCR	Non-Conformance Report
NTU	Nephelometric Turbidity Units
PAH	Polyaromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCP	Pentachlorophenol
PID	Photoionization Detector
PPE	Personal Protective Equipment
PSIC	Particulate soil Inhalation Criteria
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAP	Remedial Action Plan
RCDWC	Residential and Commercial I Drinking water Criteria
RCGVIAAC	Residential and Commercial I Groundwater Volatilization to Indoor Inhalation Criteria
RFI	Remedial Field Investigations
RG	Monitoring Well
SB	Soil Samples
SDBL	Statewide Background Default Levels
SI	Site Investigation
SPLP	Synthetic Precipitation Leaching Procedure
SSHM	Site Safety and Health Manager
SSHP	Site Safety and Health Plan
SVAAIC	Soil Volatilization to Ambient Air Inhalation Criteria
SVIIC	Soil Volatilization to Indoor Air Inhalation Criteria
SVOC	Semi-volatile Organic Compounds
TB	Trip Blank
TCL	Target Compound List

**ACRONYMS AND ABBREVIATIONS (continued)**

TCLP	Toxicity Characteristic Leaching Procedure
TRPH	Total Recoverable Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USDAFS	United States Department of Agriculture Forest Service
USGS	United States Geological Survey
UST	Underground Storage Tank
µg/L	Micrograms per Liter
VOC	Volatile Organic Compound
WP	Work Plan

## **1.0 INTRODUCTION**

This report documents the Site Investigation and Associated Activities completed by Earth Tech for the U.S. Army Corps of Engineers (USACE), Louisville District Environmental Branch, at Raco Army Airfield and Bomarc Missile Site, hereafter referred to as Raco Army Airfield (AAF).

### **1.1 SCOPE OF SITE INVESTIGATION**

The scope of the project included the following components: 1) development of a work plan describing the planned field investigation at the site, 2) performance of the field investigation, and 3) preparation of a site investigation/closure report based on soil and groundwater analytical results.

### **1.2 PROJECT OBJECTIVES**

The objectives for the SI activities were to facilitate the resolution of environmental concerns regarding potential contamination remaining at the end, if applicable, to prepare the site for closure.

### **1.3 REPORT ORGANIZATION**

This report is organized into the following sections:

- Section 1.0 presents project objectives, and report organization
- Section 2.0 presents site description and a summary of the previous investigations completed
- Section 3.0 presents the environmental setting
- Section 4.0 presents the 2003 and 2004 sampling results
- Section 5.0 presents the contaminant screening and risk evaluation, using all data collected to date at the site, and
- Section 6.0 presents conclusions and recommendations drawn from the work performed.

## 2.0 SITE HISTORY AND CONTAMINANTS

### 2.1 INSTALLATION DESCRIPTION

The former Raco Army Airfield/Bomarc Missile site is located within the Hiawatha National Forest, near Raco Michigan (see Figure 2-1 and 2-2). Raco AAF occupies an area of approximately one square mile and is 18 air miles southwest of Sault Ste. Marie, Michigan. The Department of Defense (DOD) used the site as an airfield for 21 years and as a missile base for about 13 years. The triangular-shaped airfield with 5000 ft runways was in the western portion of the base and the 28 missile silos with support facilities were east of the airfield along with many underground utilities. Even when it was an active facility, Raco AAF base was used relatively little. The airmen and missile maintenance crews were housed at the former Kincheloe Air Force Base (KAFB) in nearby Kinross, Michigan.

Raco AAF has been intermittently controlled and used by DOD and its predecessor agencies since 1895. The site was placed under Department of Agriculture Forest Service (USDAFS) management, but was subject to certain reuse rights for defense purposes. The Secretary of Agriculture transferred 240 acres for airfield use by permit on August 27, 1942. The airfield was constructed between 1942 and 1943. Around 1960, the missile base was constructed on 153.54 acres of land southeast of the airfield. On January 19, 1964, the Air Force released the airfield property to the USDAFS, but retained the acreage covering the missile area. Since 1972, the airfield portion of the site has been used for automotive testing by Smithers Scientific Services, Inc (Smithers) under a special use permit by the USDAFS. In 2002, Smithers began seeking approval for modifications to the special use permit to install an additional well for use during winter testing.

On June 30, 1973, the missile area was released to the USDAFS. A special permit was issued to a local tribe in 1973 that allowed a sawmill to be operated in the composite building. In 1978, the USDAFS sold six buildings, a water tower, and 28 missile silo shelters to a private contractor for removal. A smaller building was sold at that time to Michigan Technological University and the building was removed from the site. Between 1981 and 1984, the USDAFS issued a special permit to a private contractor allowing broken concrete and other construction materials to be backfilled into the open missile silos.

In 1987, USACE Detroit District contracted with Anderson Excavating and Wrecking Company to remove the 14 underground storage tanks (UST's) located at the site and fill in the abandoned missile silos. The demolition and removal work was completed in 1988 (Barr Engineering 2002). Allegations have since been made by local environmental groups that approximately 44,000 gallons of hazardous material (lead-contaminated fuel sludge) still remain; either improperly buried at the site or illegally dumped in an area landfill. The project has now been transferred to USACE Louisville District for resolution of any environmental issues and, if possible, closure of the site.

## 2.2 PREVIOUS INVESTIGATIONS

The following investigations and studies have been performed at the site:

Envirodyne Engineers Inc. (Envirodyne) conducted a Contamination Evaluation Study (CES) between December 1986 and April 1987. This study included a review of records, site inspection, and limited field investigation (Envirodyne, 1987).

Removal of 14 UST's and associated soil sampling for total recoverable petroleum hydrocarbons (TRPH) between July and August 1988. This work is summarized in a USACE Memorandum for Record dated January 17, 1989 (USACE, 1989).

International Technology Corporation (IT Corp.) conducted a remedial investigation at the Site in 1991. This investigation included installation of monitoring wells and soil borings, aquifer testing, assessment of contaminant fate and transport, and a baseline risk assessment (IT Corp., 1994).

In 1996, BCM Engineers (BCM) conducted a soil probe investigation of the site focusing on the areas around former UST locations. This investigation included 113 soil borings and 200 soil samples taken from in and around the former UST locations (BCM, 1996).

Sverdrup Environmental, Inc (Sverdrup) conducted a supplemental remedial investigation at the site in 1996 and 1997. This investigation included installation of soil borings and sampling of existing monitoring wells. Elevated concentrations of lead were found during the 1996 sampling of the monitoring wells. As a result, the monitoring wells were redeveloped and sampled in 1997. Elevated lead was not detected in the 1997 round of sampling. The 1996 report was edited to include the 1997 data. (Neither the title of the report nor the date was changed.) (Sverdrup, 1996).

In 2002, Barr Engineering (Barr) completed a review of all information pertaining to the site. The review was on behalf of the USDAFS and to address complaints that had been made by local organizations (Barr Engineering, 2002). Local organizations believe that during demolition that certain materials were buried or spilled. Mr. James Traynor, who was a worker at the site during the demolition, has added credence to the locals concerns by his account of what occurred during this timeframe. The Barr report addressed these concerns and followed up with an interview with Mr. Traynor. The investigation revealed that documentation exists which shows that the materials which were of concern, hydrocarbon waste, asbestos, and PCB's, were in fact properly dealt with, or removed and disposed (Barr Engineering, 2002). The report further suggests that specifically investigating Mr. Traynor claims would help to refute or verify any concerns of possible debris being buried in those specific areas. The Barr report also addressed the sufficiency of the previous investigations. The report suggested that the subsurface had been properly delineated, both vertically and laterally. It also indicated that there were data gaps in the groundwater data. The report mentioned that it was unclear whether or not the existing wells were down-gradient of former UST's B-1, C-1, C-2, C-3, or of the former wastewater treatment lagoon. UST's C-1, C-2, and C-3 were located northwest in an area formerly called the fuel

depot area. The UST B-1 and the wastewater treatment lagoon are located in the former missile battery area. The accumulated data gathered from the previous reports and found in the Barr Engineering report are located in Appendix A. Locations of monitoring wells are shown in Figure 2-2. Historical soil boring locations are presented in Figures 2-3 and 2-4.



EXPLANATION

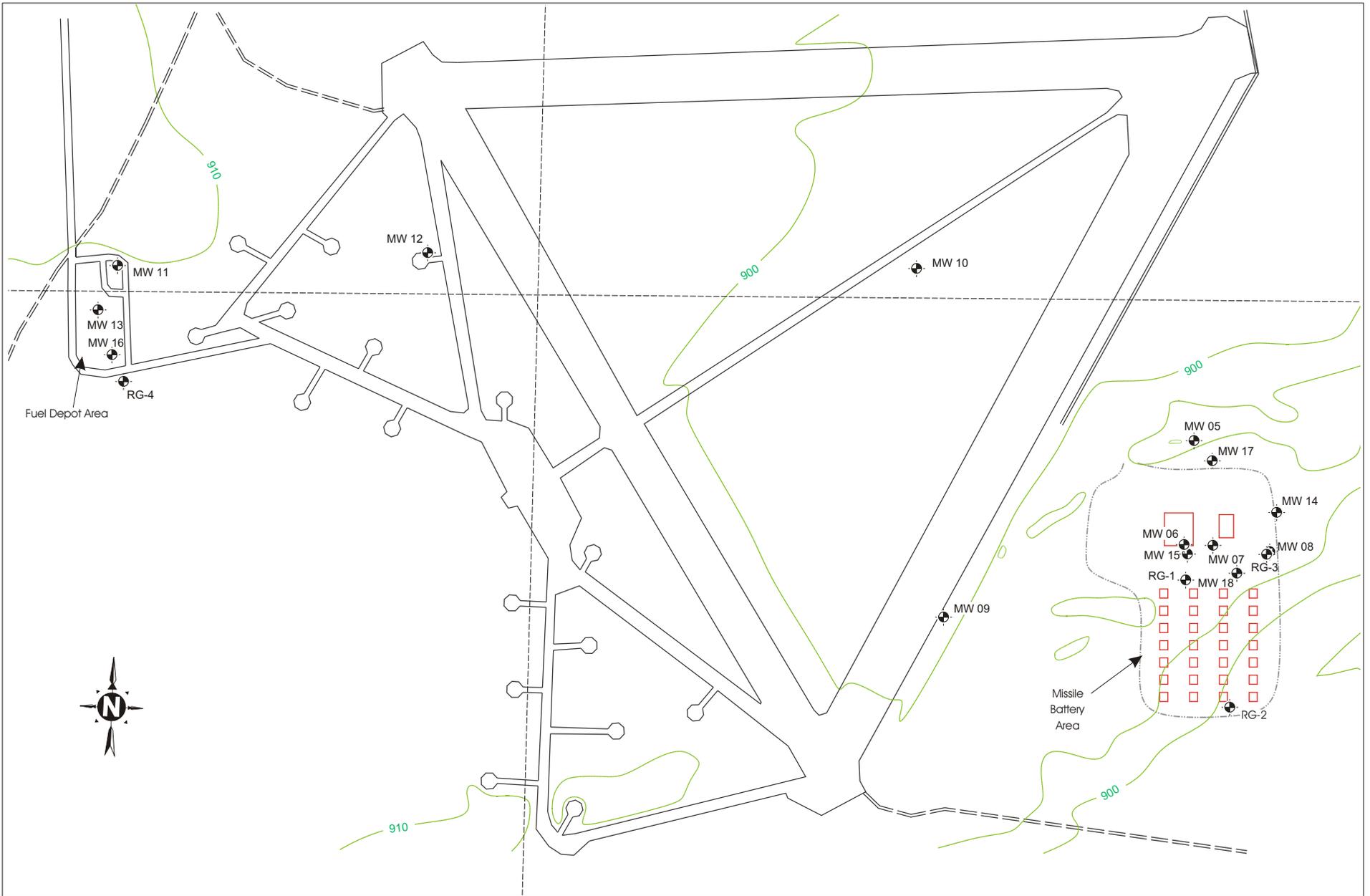
Not to Scale



**Regional Location Map**

**Racó Army Airfield  
and Bomarc Missile Site  
Racó, Michigan**

Figure 2-1



EXPLANATION

MW-13 Groundwater Monitoring Well

Outline of Former Building or Missile Silo (Now Removed)

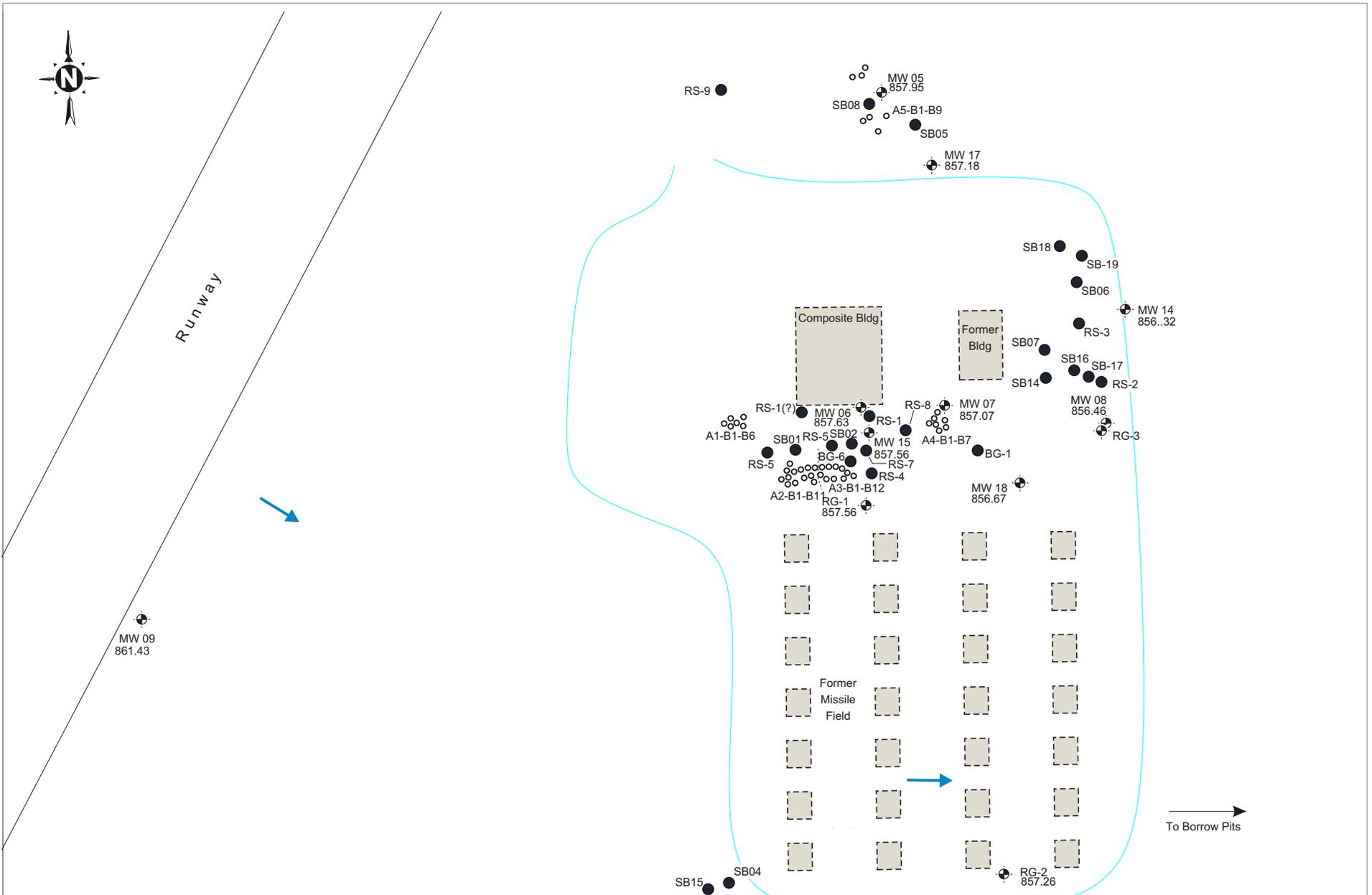
900 Topographic Line

Aircraft Hardstand



**Site Map and Location of Monitoring Wells Raco Army Airfield and Bomarc Missile Site Raco, Michigan**

**Figure 2-2**



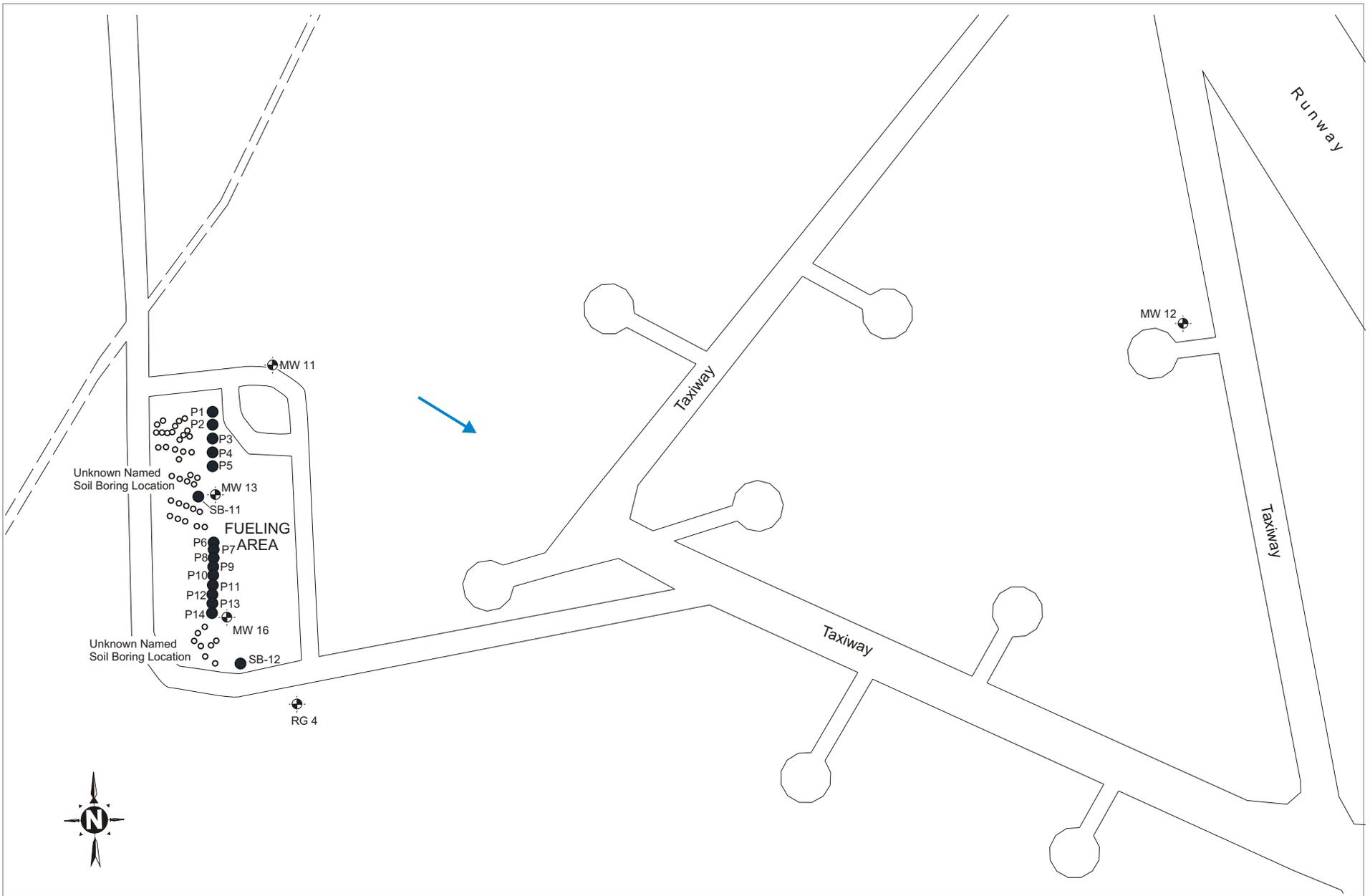
EXPLANATION

- MW-13 Groundwater Monitoring Well
- SB 1 Soil Boring (Approximate Location)
- Outline of Former Building or Missile Silo (Now Removed)
- Historical Boring locations are approximate
- Groundwater Flow Direction



**Historical Subsurface Sampling Locations and 2003 Subsurface Sampling Locations in the Missile Battery Area, Raco AAF**

Figure 2-3



EXPLANATION

-  MW-13 Groundwater Monitoring Well
-  SB 1 Soil Boring (Approximate Location)
-  Historical Boring locations are approximate
-  Aircraft Hardstand
-  Groundwater Flow Direction



**Historical Subsurface Sampling Locations in the Fuel Depot Area Raco Army Airfield**

Figure 2-4

### 3.0 SITE INVESTIGATION ACTIVITIES

This section describes the RFI activities conducted at the former Raco Army Airfield and Bomarc Missile Site from September 7 to October 5, 2003, May 10 to May 14, 2004, October 11 to October 15, 2004, and November 9 to November 12, 2004. The sampling methodologies and types of testing for chemical characterization of the site are presented in Table 3-1.

#### 3.1 2003 ACTIVITIES

Locations of the sampling areas are shown in Figures 3-1 and 3-2. The sampling strategy included installation of five soil borings to characterize a suspect soils area, redevelopment of existing wells, a geophysics survey of the former borrow pit area, the installation and development of three new wells, and two rounds of groundwater sampling (2003 and 2004).

##### 3.1.1 Soil Sampling

Discrete subsurface soil samples were collected from five boring locations in 2003. The locations of the subsurface soil boring locations are shown on Figures 3-1 and 3-2.

Soil samples were collected on 10-foot centers, at 2-foot intervals, up to a depth of approximately 50 feet or groundwater, using a mobile B-57 hollow stem auger rig. Each two-foot interval was field-screened with a photoionization detector (PID). Three of the borings were in the Missile Battery area. SB1 was completed at a spot determined by an interview with Mr. James Traynor. Mr. Traynor was involved in the de-commissioning of the site and located an area in which he believes debris was buried. SB2 was located 300 feet down-gradient of SB1. SB3 was located 150 feet south of SB2. Samples were collected every ten feet, up to 50.0 feet or groundwater, using a 3.0-inch split spoon. Groundwater was encountered at less than 50 feet. Two of the borings were located south east of the Missile Battery Area, down-gradient of borrow pits. SB4 was located down-gradient of the borrow pit and SB5, also located down-gradient from the borrow pit, and was located 100 feet south of SB4. Samples were collected every ten feet, up to 50 feet or groundwater, using a 3.0-inch split spoon. Groundwater was determined to be less than 50 feet at both locations. Each boring was visually inspected and logged. Samples were collected in accordance with the RFI WP (Earth Tech, 2003a) and QAPP (Earth Tech, 2003b). The samples were sent for laboratory analyses for VOCs, SVOCs, total metals, and dissolved metals.

Results of the chemical analyses are presented in Section 5.0. Field sampling forms, including bore logs can be found in Appendix B.

Decontamination of sampling equipment was accomplished in accordance with procedures specified in the RFI WP (Earth Tech, 2003). These procedures included washing with water and phosphate-free detergent, and rinsing alternately with water or steam cleaned where appropriate. Equipment was allowed to air dry. All equipment was decontaminated prior to the first sampling event, and then between each sampling event. The equipment was decontaminated before being taken off-site.

### 3.1.2 Well Installation

Three new wells were installed down-gradient of the USTs in the fuel depot area and the former wastewater lagoon in 2003. The designations for the wells are MW-16 (fuel depot area), MW-17, and, MW-18 waste water lagoon/missile battery area. A 4.25-inch hollow stem auger drill rig was used to drill the wells. The wells were drilled seven feet below the top of the water table. The schedule 40 PVC well construction, including the 10-foot screen, was placed through the center on the augers to set the well. Sand was used as a filter pack to 2 feet above the screen depth. Grout was then placed above the sand to a depth of 2 feet bgs to seal it off. A concrete pad was constructed around the wells and four 2-inch posts were then added as guards. The posts and steel outer casing were painted with a highly visible yellow paint. Well construction diagrams can be found in Appendix B. The wells were surveyed after completion; Appendix C contains the surveyors' professional certificate.

### 3.1.3 Well Development

In 2003, seventeen of the established wells and the three newly installed wells were re-developed or developed prior to sampling. RG-3 was not included in the re-development due to a down hole obstruction. The three new wells were developed at least 24 hours after construction was completed. Purge water was contained in polyurethane totes and after receipt of analytical results discharged onto the ground near the IDW storage area. Wells were considered developed after three consecutive water quality parameter readings, from a Horiba U-22, within a 10 percent range and the NTUs were less than 5. Development logs are found in Appendix B.

### 3.1.4 Groundwater Sampling

Groundwater sampling occurred at least two weeks after development had been completed in 2003. Groundwater samples were collected using the low-flow minimal draw down method. Wells were purged to parameter stabilization. All wells were sampled at five NTU's or less. A Horiba U-22 was used to monitor the water quality parameters. Measurements of pH, specific conductivity, temperature, turbidity, dissolved oxygen, salinity/total dissolved solids, and redox were conducted throughout the sampling event (Table 3-2).

Seventeen wells were sampled during this event. Fourteen were previously installed and three were newly installed wells. RG3 was not sampled because it was unable to be re-developed in 2003 due to an obstruction down hole. Samples were obtained through dedicated Teflon tubing and placed on ice. Water purged from the wells during the stabilization phase was containerized in polyurethane totes or 55-gallon drums and later released. Purge logs are included in Appendix B. Results of the chemical analyses are presented in Section 5.0.

### **3.1.5 Geophysics Survey**

A limited scope electromagnetic (EM) survey was performed in and around the borrow pit areas. The EM survey was concentrated in areas in which Mr. J. Traynor believed dumping occurred during demolition of the facility. The survey revealed that no anomalies were present in the borrow pit area. The location of the EM survey can be found in Figure 3-2.

## **3.2 MAY 2004 ACTIVITIES**

A second round of groundwater sampling was collected from the wells sampled in 2003. All procedures were as described in Section 3.4. Field parameter measurements are presented in Table 3-3. Results of the chemical analyses are presented in Section 5.0. Purge logs can be found in Appendix B.

## **3.3 OCTOBER 2004 ACTIVITIES**

### **3.3.1 Soil Sampling**

In October of 2004, five soil borings were drilled to a depth of 80 feet using 4 ¼ inch hollow stem augers. Soil samples were collected at depths of 10, 20, 40 feet bgs and groundwater samples were collected at 70 and 80 feet bgs. The samples were analyzed for VOCs only. Based on the results from the collected samples and historical information, four new wells were installed and developed. Boring locations are presented in Figure 3-3. Results of the chemical analyses are presented in Section 5.0. Field sampling forms can be found in Appendix B.

### **3.3.2 Well Installation**

The four new wells (MW-19, MW-20, MW-21, and MW-22) were installed to a depth of approximately 90.0 feet bgs. The wells were constructed using schedule 40 PVC and 0.010 slot 10 foot screens. The wells were initially to be drilled using 4 ¼ inch hollow stem augers. But due to lithologic conditions (heaving sands), mud rotary technique was used. A filter pack was placed in the annulus to at least two feet above the screen. A foot of fine sand was placed on top of the original filter pack to ensure no back flow of the grout. Grout was placed on top of the filter pack to approximately 3 feet bgs. Wells were completed with a concrete pad and four guard posts. Well construction diagrams can be found in Appendix B. The wells were surveyed after completion.

### **3.3.3 Well Development**

Wells were developed no sooner than forty-eight hours after the grout had been in place. Wells were considered developed after they had reached 5 NTUs or less, had three consecutive stable readings, or had been purged for eight hours. MW-21 was purged for eight hours and never cleared to 5 NTUs or less. Possible explanations for this may be the multi-parameter water quality meter (a Horiba U-22) went out of calibration after extensive use throughout the day or

due to changing barometric pressures. MW-21 reached a level of 45.0 NTU's and appeared to be clear. Development logs are found in Appendix B.

### **3.3.4 Groundwater Sampling**

Groundwater sampling occurred at least two weeks after development had been completed. Groundwater samples were collected using the low-flow minimal draw down method. Wells were purged to parameter stabilization. MW-20, MW-21, and MW-22 did not attain five NTU's or less. Additional filtered samples were collected from these wells. A Horiba U-22 was used to monitor the water quality parameters. Measurements of pH, specific conductivity, temperature, turbidity, dissolved oxygen, salinity/total dissolved solids, and redox were conducted throughout the sampling event (Table 3-4).

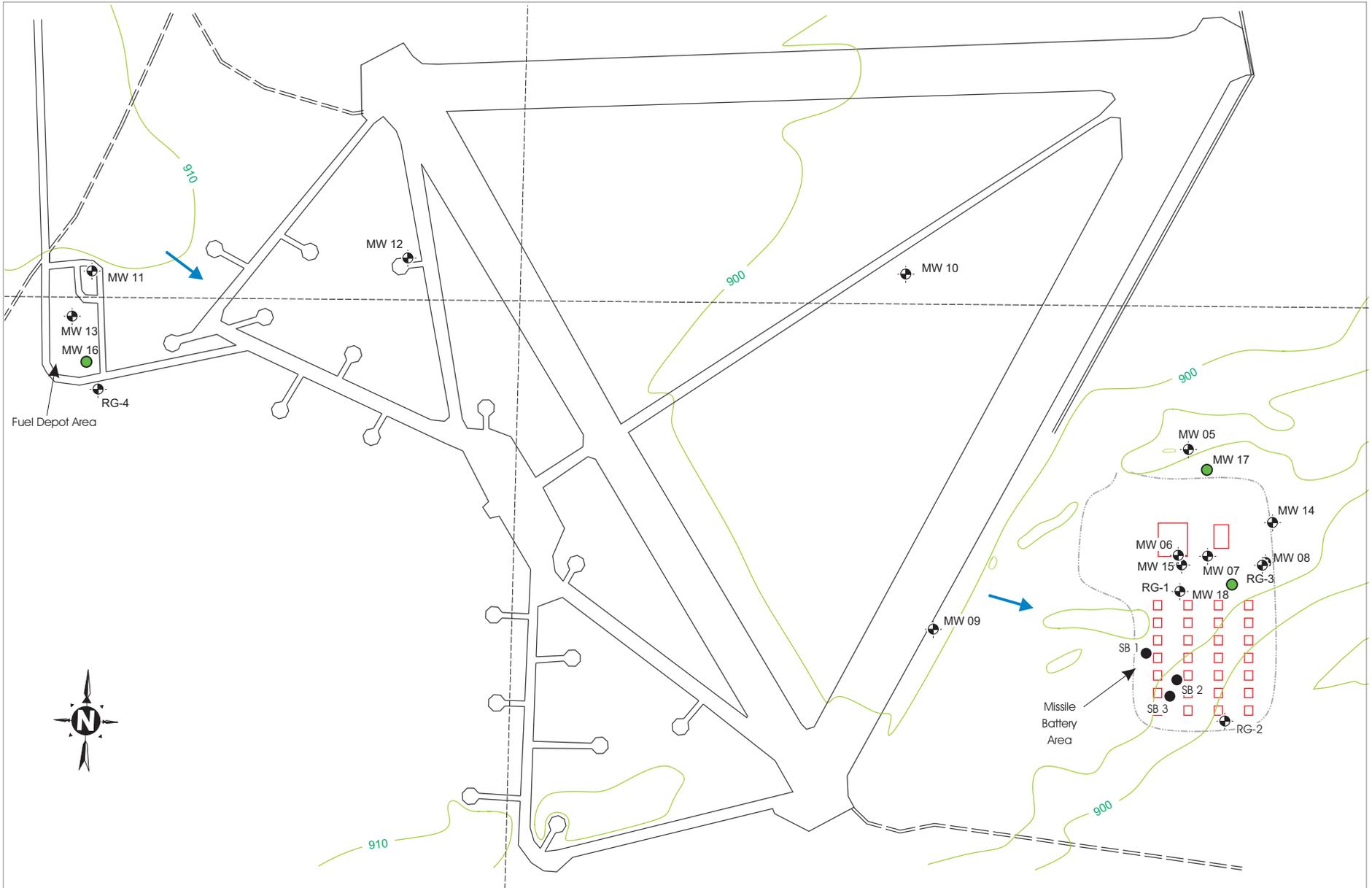
Eight monitoring wells were sampled during this event: the four newly installed wells were sampled for metals, VOCs, and PAHs. Existing wells MW-7, MW-8, MW-14, and MW-18 were sampled for VOCs only.

Results of the chemical analyses are presented in Section 5.0. Field sampling forms can be found in Appendix B.

## **3.4 INVESTIGATION-DERIVED WASTE MANAGEMENT**

Investigation-derived waste (IDW) was managed in accordance with the procedures specified in the RFI WP (Earth Tech, 2003) and with approval of the regulatory bodies associated with the site. The decontamination water, purge water, and the development water were containerized in two 250-gallon poly tanks during the 2003 sampling effort and in one 55-gallon drum during the 2004 event. Soil cuttings were containerized in 55-gallon drums. IDW sampling occurred on September 23. IDW was also sampled on May 13, 2004. All IDW was disposed of after receipt of the analytical results and approval by the MDEQ. All water generated was released in the IDW storage area on asphalt. The soil cuttings were thin spread at boring locations.

Disposal of the IDW generated in October 2004 has not been completed. Disposal was as described in the preceding paragraphs with the exception of four drums of purge/decontamination water that will be disposed at the Kenross IWTP and 4 drums of rotary mud that will be disposed of at the Waste Management landfill. Final acceptance of the rotary mud has not been received: disposal of the eight remaining drums (four to Kenross and four to Waste Management) will occur once final acceptance is received.



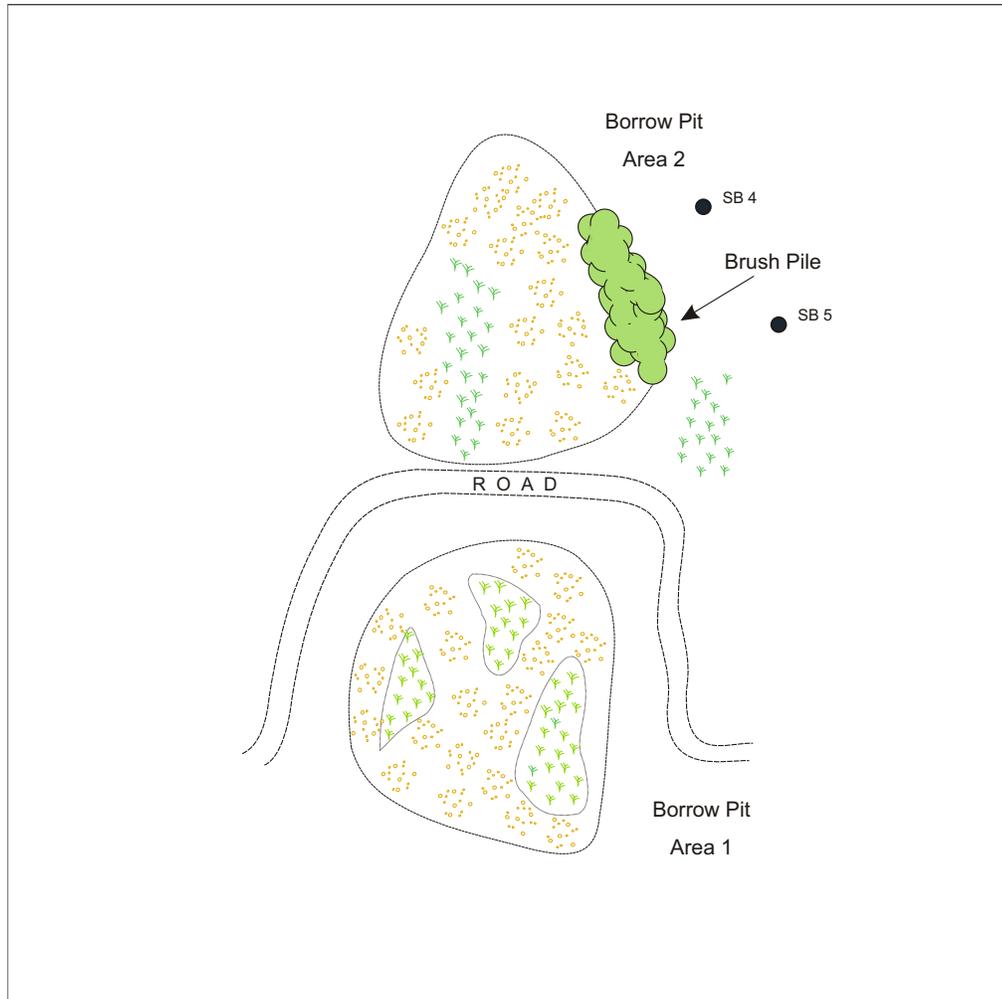
EXPLANATION

- MW-13 ● Groundwater Monitoring Well
- SB 3 ● Soil Boring (Approximate Location)
- Outline of Former Building or Missile Silo (Now Removed)
- MW-16 ● Installed 2003 Groundwater Monitoring Well
- 900 Topographic Line
- Aircraft Hardstand
- ➔ Groundwater Flow Direction



### Soil and Groundwater Sampling Locations Raco AAF

Figure 3-1



EXPLANATION

-  Vegetation
-  Sandy Area

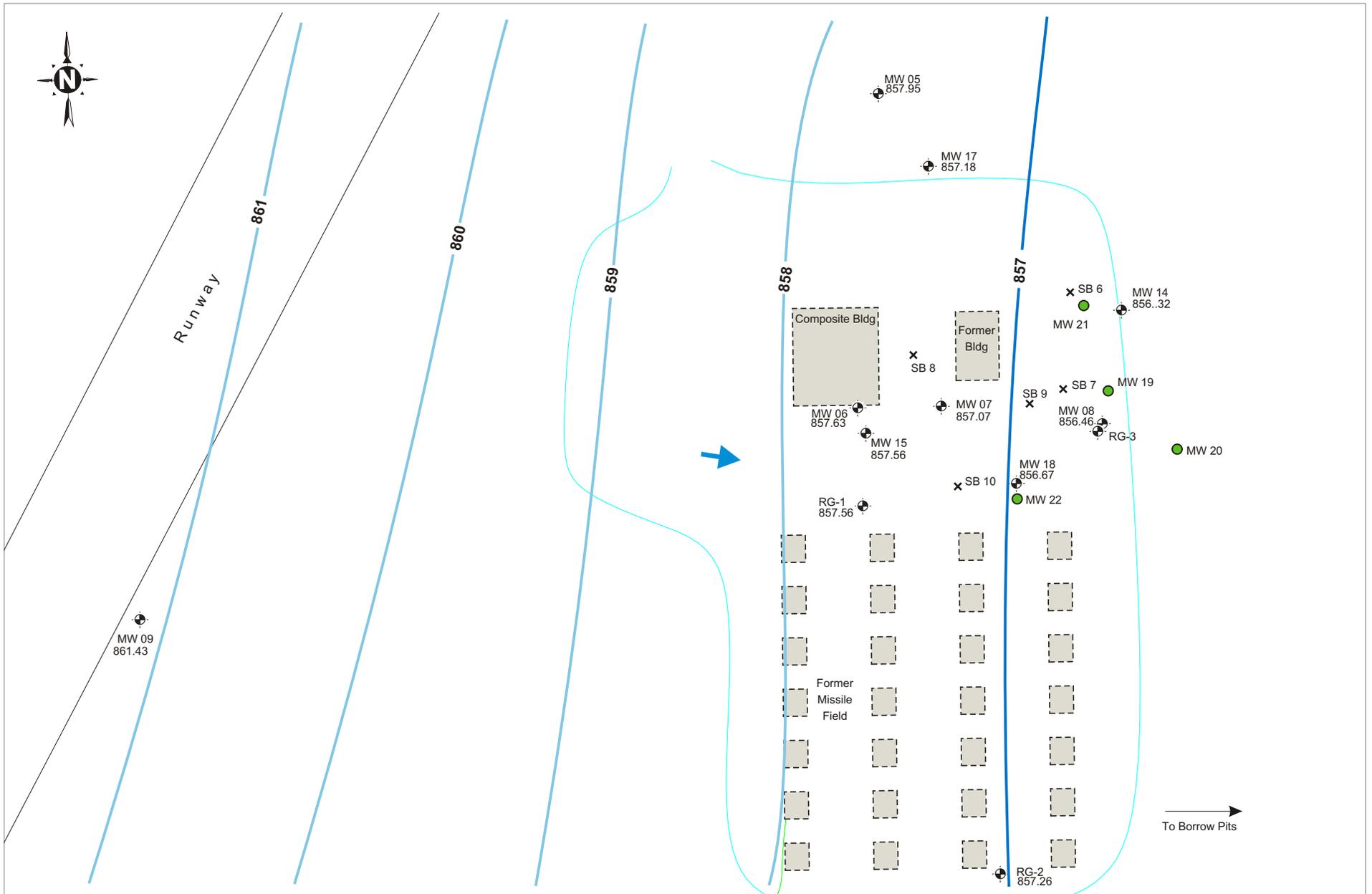
Not to Scale

- SB 4 ● Soil Boring (Approximate Location)

Approximately 100' between  
SB4 and SB5



**Site Sketch of  
Magnetometer and Soil Borings  
SB4 and SB5 Area  
Raco AAF**



EXPLANATION

- MW-13 Existing Groundwater Monitoring Well
- MW-13 Installed October 2004 Groundwater Monitoring Well
- SB 3 Soil Boring - October 2004
- Outline of Former Building or Missile Silo (Now Removed)

- Groundwater Flow Direction
- 854.86 Groundwater elevation in feet above mean sea level
- 860 Contour Line of Estimated Equal Groundwater Elevation Above Mean Sea Level

**Soil Borings and Monitoring Well Locations  
October 2004 Event  
Missile Battery Area  
Raco, AAF**

9/2004



**Table 3-1. Field Sampling Activities at Raco AAF/Bomarc Missile Site**

<b>Matrix</b>	<b>No. Samples</b>	<b>Analysis</b>	<b>Analytical Method</b>
Subsurface soil (2003)	20	TCL VOC	SW-846 5035/8260B
	20	TCL SVOC	SW-846 3550B/8270C
	20	Total/dissolved Metals	SW-846 3050B/6010B and 7000
Groundwater- two rounds of sampling (2003 and 2004)	17	TCL VOC	SW-846 5030B (25 ml purge)/8260B
	17	TCL SVOC <sup>1</sup>	SW-846 3510C or 3520C/8270C
	17	Total/dissolved Metals	SW-846 3010A or 3020A/6010B and 7000
Subsurface Soil October 2004	15	TCL VOC	SW-846 5035/8260B
Groundwater Screening October 2004	10	TCL VOC	SW-846 5035/8260B
Groundwater- November 2004 selected sampling	8	TCL VOC	SW-846 5030B (25 ml purge)/8260B

TCL Target Compound List

ml milliliters

VOC volatile organic compound

SVOC semi-volatile organic compound

<sup>1</sup> Including pentachlorophenol in Round 2004 for MW's 6, 7, and 15

**Table 3-2. Field Parameter Measurements During Groundwater Sampling at Raco AAF/Bomarc Missile Site 2003**

WELL ID	pH	Specific Conductivity ms/cm	Turbidity NTU	Dissolved Oxygen mg/l	Temperature °C	Redox mv
RG-1	6.26	0.043	0	10.91	8.01	-43
RG-2	6.47	0.079	0	11.12	6.85	-39
RG-3	Not	Sampled	Due	To	Obstruction	Down Hole
RG-4	5.67	0.018	0	11.67	6.83	52
MW-5	6.28	0.023	0	10.59	7.44	-14
MW-6	6.17	0.076	0	9.67	8.12	-23
MW-7	6.08	0.257	0	9.54	7.67	7
MW-8	6.49	0.058	4.7	10.81	9.43	-41
MW-9	7.28	0.075	0	11.80	9.13	-76
MW-10	6.46	0.064	3.9	10.96	7.82	-5
MW-11	6.01	0.019	0	9.97	7.11	86
MW-12	6.30	0.022	0	11.63	6.72	11
MW-13	6.07	0.037	0	10.25	8.08	75
MW-14	6.61	0.023	0	10.81	8.53	-55
MW-15	6.59	0.125	0.7	10.81	8.53	-37
MW-16	6.26	0.023	0	11.06	7.45	14
MW-17	6.73	0.175	1.7	10.41	7.98	-19
MW-18	6.56	0.072	1.2	11.33	8.69	-39

°C      degrees celsius  
mg/l    micrograms per liter  
ms/cm   micro siemens per centimeter  
mv      milivolts  
NTU     Nephelometric Turbidity Units

**Table 3-3. Field Parameter Measurements During Groundwater Sampling at Raco AAF/Bomarc Missile Site, May 2004**

WELL ID	pH	Specific Conductivity ms/cm	Turbidity NTU	Dissolved Oxygen mg/l	Temperature °C	Redox mv
RG-1	4.22	4.4	0	10.35	9.63	353
RG-2	4.31	6.1	0	12.35	10.85	362
RG-3	Not	Sampled	Due	To	Obstruction	Down Hole
RG-4	4.01	1.8	0	12.08	8.54	273
MW-5	4.62	2.4	0	10.69	10.62	326
MW-6	4.56	11.1	2.7	8.95	9.53	379
MW-7	3.80	41.5	0	9.60	10.05	356
MW-8	4.43	4.9	1.3	11.85	14.13	371
MW-9	3.96	7.1	0	10.61	13.98	347
MW-10	4.02	7.4	1.8	11.84	9.32	334
MW-11	4.86	2.1	2.4	11.77	9.60	369
MW-12	5.05	2.2	0	12.57	8.34	356
MW-13	4.04	3.0	3.7	11.64	10.15	307
MW-14	4.44	2.2	0	12.51	10.67	366
MW-15	5.10	20.0	0	12.54	10.12	353
MW-16	3.60	2.4	0	11.30	12.56	272
MW-17	4.58	16.8	0.5	10.04	12.39	325
MW-18	4.21	5.9	1.5	9.96	11.11	360

°C degrees celsius  
mg/l micrograms per liter  
ms/cm micro siemens per centimeter  
mv milivolts  
NTU Nephelometric Turbidity Units

**Table 3-4. Field Parameter Measurements During Groundwater Sampling at Raco AAF/Bomarc Missile Site, November 2004**

WELL ID	pH	Specific Conductivity ms/cm	Turbidity NTU	Dissolved Oxygen mg/l	Temperature °C	Redox mv
MW-7	6.38	0.205	3.6	10.54	8.3	308
MW-8	5.78	0.044	3.6	12.22	7.0	319
MW-14	5.74	0.023	2.8	11.89	8.0	377
MW-18	5.79	0.047	3.5	13.54	6.2	297
MW-19	7.56	0.244	3.5	6.99	7.5	281
MW-20	8.28	0.139	20.3	7.25	7.8	229
MW-21	8.37	0.207	275	8.38	6.2	189
MW-22	8.12	0.290	999	13.86	4.6	180

°C       degrees celsius  
mg/l      micrograms per liter  
ms/cm    micro siemens per centimeter  
mv        milivolts  
NTU      Nephelometric Turbidity Units

## 4.0 SITE CHARACTERISTICS

Raco AAF occupies an area of approximately one square mile and is eighteen (18) air miles southwest of Sault Ste. Marie, Michigan. The land that the former base now occupies is part of the Hiawatha National Forest. The Department of Defense (DOD) used the site as an airfield for 21 years and as a missile base for about 13 years. The triangular-shaped airfield with 5000 ft runways was in one area and the 28 missile silos with support facilities were east of the airfield along with many underground utilities. While active, Raco AAF base was used relatively little. The airmen and missile maintenance crews were housed at the former Kincheloe Air Force Base (KAFB) in nearby Kinross, Michigan.

Raco AAF has been intermittently controlled and used by DOD and its predecessor agencies since 1895. The site was placed under Department of Agriculture Forest Service (USDAFS) management, which was subject to certain reuse rights for defense purposes. The Secretary of Agriculture transferred 240 acres for airfield use by permit dated August 27, 1942. Based on United States Geological Survey (USGS) topographic maps, the airfield actually covers about 640 acres. The airfield was constructed between 1942 and 1943. Around 1960, the missile base was constructed on 153.54 acres of land southeast of the airfield. On January 19, 1964, the Air Force released the airfield property to the USDAFS, but retained the acreage covering the missile area. Since 1972, the airfield portion of the site has been used for automotive testing by Smithers Scientific Services, Inc (Smithers) under a special use permit by the USDAFS. In 2002, Smithers began seeking approval for modifications to the special use permit.

On June 30, 1973, the missile area was released to the USDAFS. A special permit was issued to a local tribe in 1973 that allowed a sawmill to be operated in the composite building. In 1978, the USDAFS sold six buildings, a water tower, and 28 missile silo shelters to a private contractor for removal. A smaller building was sold at that time to Michigan Technological University and the building was removed from the site. Between 1981 and 1984, the USDAFS issued a special permit to a private contractor allowing broken concrete and other construction materials to be backfilled into the open missile silos.

### 4.1 GEOLOGY

The geology at the site consists of a series of thick unconsolidated glacial deposits of the Quaternary Period. The deposits are composed of sand with traces of gravel and silt. Borings completed showed the glacial deposits to be, lithologically, homogeneous with no significant grain size or color changes, fine grained sands throughout with little fines and occasional gravel intermixed.

Depth to bedrock has not been established. A 260-foot deep well installed approximately 2.5 miles south from the site in 1994 did not encounter bedrock. A 2002 review of

documents estimated that bedrock might be as deep as 380 feet or more (Barr Engineering 2002).

## 4.2 HYDROGEOLOGY

Groundwater flow trends to east-southeast (Barr Engineering 2002). However, the groundwater flow is generally more easterly in the southern portion of the missile battery area. The horizontal hydraulic gradient across the site is approximately 0.002 ft/ft. Slug tests performed in 1994 used both falling and rising methods to determine hydraulic conductivity. The data collected using the rising head slug test, monitoring wells MW05 through MW15 (excluding MW08), produced results that ranged from 0.0242 cm/sec to 0.23 cm/sec. The Barr Engineering report (2002) suggests that the falling method may produce questionable data. A literature search conducted by Smithers in 2002 determined the hydraulic conductivity to be 0.002 cm/sec (Barr Engineering 2002).

## 5.0 NATURE AND EXTENT OF CONTAMINATION

This section presents the results from the 2003/2004 investigations. The data is presented and compared to background concentrations where appropriate. A preliminary screening against Michigan Act 201 criteria is presented in Section 6.0 for the 2003/2004 data as well as all other data collected to date at the site.

### 5.1 2003 ACTIVITIES

#### 5.1.1 Subsurface Soil

Five subsurface soil samples were collected during the 2003 site investigation. Analytical results for the investigation are summarized in Table 5-1. Figures 5-1 and 5-2 indicate the locations of the soil borings and any site-related contaminants. Chain of custody forms and complete analytical results are presented in Appendix D and E.

**Metals.** During the 2003 subsurface investigation, selenium was detected above default background levels in SB-5 (10 to 12 feet bgs) at 0.62 mg/kg. No other metals were detected above the default background levels.

**SVOCs.** No SVOCs were detected in any of the five soil boring locations.

**VOCs.** No VOCs were detected in any of the five soil borings.

#### 5.1.2 2003 Groundwater Sampling Results

Groundwater samples were collected from 17 well locations in 2003 and 2004. Analytical results for the investigation are summarized in Table 5-2 and Figures 5-3 through 5-6. Chain of custody forms and complete analytical results are presented in Appendix D and E, respectively. Table 5-2 presents both filtered and non-filtered results for metal analyses. Only non-filtered results are discussed below.

**Metals.** Metals that were observed in the 2003 non-filtered analytical results include: aluminum, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, thallium, vanadium, and zinc.

Thallium was detected in two wells, MW-7 and MW-17, at 0.24 µg/l and 0.33 µg/l, respectively. Vanadium was observed in one well, MW-8, at 1.4 µg/l.

Aluminum was detected at ranges from 42.6µg/l in MW-7 to 454µg/l at MW-8. Barium was detected, ranging from 9.3 µg/l (MW-14 and MW-16) to 165 µg/l at MW-7. Calcium was detected at concentrations ranging from 1630 µg/l (MW-11) to 30,400 µg/l at MW-7. Concentrations of chromium were observed with a range of 1.2 µg/l (MW-6)

to 7.6 µg/l at MW-8. Cobalt was detected in concentrations ranging from 0.037 µg/l (MW-5) to 0.44 in MW-18. Copper was observed in concentrations ranging from 1.6 µg/l (MW-5) to 9.3 µg/l in MW-16. Iron was detected in levels ranging from 60.1 µg/l at MW-5 to 1440 µg/l (RG-01). Lead was detected in concentrations ranging from 0.25 µg/l in MW-5 to 1.5 µg/l in MW-8. Magnesium was observed in concentrations ranging from 311 µg/l in RG-4 to 4780 µg/l in MW-17. Manganese was detected in concentrations ranging from 2.2 µg/l (MW-5) to 35.7 µg/l in MW-18. Nickel was detected ranging from 0.4 µg/l in MW-5 to 3.8 µg/l in MW-8. Potassium was detected in concentrations ranging from 422 µg/l (MW-11) to 10,300 µg/l in MW-7. Selenium was observed in concentrations ranging from 0.7 µg/l at MW-5 to 1.1 µg/l at MW-10. Sodium was detected ranging from 602 µg/l (MW-11) to 6800 µg/l at MW-7. Zinc was detected in concentrations ranging from 2.1 µg/l (MW-11) to 52 µg/l in MW-18.

**SVOCs.** No SVOCs were detected from samples collected during the 2003 sampling effort.

**VOCs.** Carbon disulfide was detected in groundwater samples collected in 2003. Carbon disulfide was detected in concentrations ranging from 5.5 µg/L in MW-11 to 18 µg/L in MW-8. Trichloroethene was detected in MW- 18 at 1.6µg/L and MW- 8 at 14 µg/L.

## 5.2 MAY 2004 ACTIVITIES

### 5.2.1 May 2004 Groundwater Sampling Results

**Metals.** Metals that were observed in the 2004 analytical results include: aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, thallium, zinc, and mercury.

Thallium was detected in two wells, RG-4 and MW-7, at 0.18 µg/l and 0.22 µg/l, respectively. Beryllium was observed in one well, RG-2, at 0.025 µg/l. Mercury was detected in RG-1 at a concentration of 0.12 µg/l.

Aluminum was detected at ranges from 10.1 µg/l (MW-9) to 62.9 µg/l at MW-12. Antimony was observed in concentrations from 0.13µg/l at MW-5 to 1.5 µg/l at MW-6. Arsenic was detected in five wells at concentrations ranging from 0.36 µg/l in MW-5 to 0.75µg/l in MW-9. Barium was detected, ranging from 9.1 µg/l (MW-14) to 116 µg/l at MW-15. Calcium was detected from ranges of 1680 µg/l at MW-11 to 28,700 µg/l (MW-7). Concentrations of chromium were observed with a range of 1.5 µg/l (MW-7) to 4.0 µg/l at MW-8. Cobalt was detected in concentrations ranging from 0.015 µg/l (MW-9) to 0.10 in MW-7. Copper was observed in concentrations ranging from 1.3 µg/l (RG-01) to 28.1 µg/l in RG-1. Iron was detected in levels ranging from 10.3 µg/l at MW-9 to 84.7 µg/l (MW-12). Lead was detected in concentrations ranging from 0.21 µg/l in MW-9 to 2.2 µg/l in MW-8. Magnesium was observed in concentrations ranging from 285 µg/l in RG-4 to 4160 µg/l in MW-7. Manganese was detected in concentrations ranging from 0.62 µg/l (MW-9) to 5.3 µg/l in MW-6. Nickel was detected ranging from 0.3 µg/l

in MW-11 and 1.9 µg/l in MW-18. Potassium was detected in concentrations ranging from 425 µg/l (RG-4) to 6200 µg/l in MW-7. Sodium was detected ranging from 832 µg/l (MW-9) to 5590 µg/l at MW-7. Zinc was detected in concentration ranging from 2.5 µg/l (MW-6 and MW-14) to 36.7 µg/l in MW-16.

**SVOCs.** No SVOCs were detected from samples collected during the 2004 sampling effort.

**VOCs.** Trichloroethene was detected in two groundwater samples collected in 2004. It was found in MW-18 at 0.56 µg/l and MW-8 at 19 µg/l. Chloromethane was detected in RG-2 at 0.61 µg/L.

### 5.3 OCTOBER 2004 ACTIVITIES

#### 5.3.1 Soil Boring and Groundwater Screening Sampling Results

In October 2004, an additional 5 soil borings were installed and sampled for VOCs at 10, 20 and 40 ft bgs. This data is presented in Table 5-4 and on Figure 5-7. Groundwater screening samples were also collected from the five borings. Groundwater data is presented in Table 5-5 and on Figure 5-7.

**VOCs- Soil.** Low concentrations of VOCs were detected in the soil borings. Acetone was detected in all soil borings at concentrations ranging from 2.3 µg/kg to 11 µg/kg. Tetrachloroethylene (0.51 µg/kg) was detected in SB9 at 40 ft. Toluene (0.47 µg/kg) was detected in SB7 at 10 ft. Trichloroethene (0.55 µg/kg) was detected in SB8 at 20 ft.

**VOCs- Groundwater.** Low concentrations of trichloroethene were detected in four of the five borings at concentrations ranging from 0.8 µg/l to 18 µg/l. This data was used in the selection of well locations and in the selection of existing wells to be sampled in the November sampling effort.

#### 5.3.2 November 2004 Groundwater Sampling Results

Groundwater samples were collected from 8 well locations in November 2004. The objective of the sampling program was to define the extent of TCE contamination. Analytical results for the investigation are summarized in Table 5-6 and Figures 5-8 and 5-9. Chain of custody forms and complete analytical results are presented in Appendix D and E, respectively.

**Metals.** The four new wells were sampled for metals. Metals that were observed include arsenic, barium, cadmium, chromium, lead, and selenium. Arsenic was detected in well MW22 at 25.4 µg/l. Barium was detected in all four wells at concentrations ranging from 15.0 µg/l to 308 µg/l. Cadmium was detected in MW22 at 0.64 µg/l. Chromium and lead were detected in MW -20, -21, and 22 at concentrations ranging from 3.8 µg/l to 14.1 µg/l for chromium and 8.8 µg/l to 94.8 µg/l for lead. Selenium was detected in MW-20 and 21 at concentrations of 3.7 and 3.4, respectively.

Filtered samples were collected from MW 20, 21, and 22 when the NTUs did not meet the recommended maximum of 5 during well purging. This data is presented in Table 5-6. Barium (maximum 24.2 µg/l), lead (2.8 µg/l), and selenium (maximum 3.7 µg/l) were detected in the filtered samples.

VOCs. Eight wells were sampled for VOCs. Compounds detected include 1,1,1-trichloroethane, chloromethane, tetrachloroethylene, toluene, and trichloroethene. 1,1,1-trichloroethane and tetrachloroethylene were detected in three wells ( MW-19, -20 and -22) at concentrations ranging from 0.32 µg/l to 0.74 µg/l for chloromethane and 0.44 µg/l to 0.69 µg/l for tetrachloroethylene. Chloromethane was detected in MW21 at 0.96 µg/l. Toluene was detected in MW -19, -20 and -21 at ranges of .4 µg/l to 0.79 µg/l. Trichloroethene was detected in MW-08, -18, -19, and -20 at concentrations ranging from 0.5 in MW20 to 19 µg/l in MW08.

The extent of TCE contamination is shown in Figure 5-10. MW08 appears to be downgradient of the former wastewater treatment lagoon. TCE has been detected in MW8 five times: 1990 (3 µg/l), 1991 (3 µg/l), 2002(11 µg/l), 2003(14 µg/l) and 2004 (19 µg/l). The newly installed wells, which are screened at depth, show low concentrations of TCE and indicate that the contamination is not widespread.

**Table 5-1 Summary of Analytes Detected in Subsurface Soil, Raco AAF. (page 1 of 5)**

Location	Default	SB1	SB1	SB1	SB1	SB1	
Sample Depth, ft bgs	Background	10-12	10-12B	20-22	30-32	40-42	
Collection Date	Levels (a)	9/30/03	9/30/03	9/30/03	9/30/03	9/30/03	
<i>SW6010B mg/kg</i>							
Aluminum	6900	807	1580	1080	506	479	
Antimony	NA	0.23	0.23	0.26	0.48		
Arsenic	5.8	0.32	0.29			0.26	
Barium	75	4	5.9	5.7	6.2	7.5	
Beryllium	NA	0.025	0.051	0.043	0.026	0.02	
Chromium	18	1.3	2.5	1.7	4.4	1.1	
Cobalt	6.8	0.32	0.67	0.41	0.25	0.23	
Copper	32	2.8	5.4	1.8	1.2	0.88	
Iron	12000	1140	1970	1510	1040	970	
Lead	21	0.4	1	0.69	0.51	0.48	
Manganese	440	21	25.9	27	20.8	16.5	
Nickel	20	0.62	1.5	0.87	1.4	0.38	
Selenium	.410			0.3			
Thallium	NA				0.43		
Zinc	47	2.6	3.2	2.5	1.3	1.6	

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) source: Part 201 Generic Cleanup Criteria and Screening Levels

**Table 5-1 Summary of Analytes Detected in Subsurface Soil, Raco AAF. (page 2 of 5)**

Location	Default	SB2	SB2	SB2	SB2		
Sample Depth, ft bgs	Background	10-12	20-22	30-32	40-42		
Collection Date	Levels	9/30/03	9/30/03	9/30/03	9/30/03		
<i>SW6010B mg/kg</i>							
Aluminum	6900	1030	498	414	455		
Antimony	NA	0.25		0.28	0.24		
Arsenic	5.8	0.3					
Barium	75	5.9	6.4	4.1	7.6		
Beryllium	NA	0.039	0.027	0.016	0.025		
Chromium	18	1.9	1	1.1	1.2		
Cobalt	6.8	0.43	0.22	0.24	0.26		
Copper	32	4.1	1	1.2	1.2		
Iron	12000	1650	958	869	1320		
Lead	21	0.71	0.38	0.37	0.5		
Manganese	440	28.8	19.8	15.2	23		
Nickel	20	0.89	0.41	0.52	0.45		
Selenium	.410						
Thallium	NA						
Zinc	47	2.3	1.2	1.7	1.3		

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) source: Part 201 Generic Cleanup Criteria and Screening Levels

**Table 5-1 Summary of Analytes Detected in Subsurface Soil, Raco AAF. (page 3 of 5)**

Location	Default	SB3	SB3	SB3	SB3		
Sample Depth, ft bgs	Background	10-12	20-22	30-32	40-42		
Collection Date	Levels	9/30/03	9/30/03	9/30/03	9/30/03		
<i>SW6010B mg/kg</i>							
Aluminum	6900	751	449	437	384		
Antimony	NA	0.22	0.19	0.39			
Arsenic	5.8						
Barium	75	4.4	4.3	4.3	4.2		
Beryllium	NA	0.025	0.018	0.017	0.018		
Chromium	18	1.1	1	1.1	0.97		
Cobalt	6.8	0.23	0.25	0.33	0.19		
Copper	32	1.4	0.93	1.1	0.87		
Iron	12000	937	968	966	905		
Lead	21	0.34	0.34	0.33	0.45		
Manganese	440	20.3	16.8	15.1	14.4		
Nickel	20	0.48	0.43	0.43	0.33		
Selenium	.410						
Thallium	NA				0.59		
Zinc	47	1.4	1.3	1.4	1.3		

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) source: Part 201 Generic Cleanup Criteria and Screening Levels

**Table 5-1 Summary of Analytes Detected in Subsurface Soil, Raco AAF. (page 4 of 5)**

Location	Default	SB4	SB4	SB4	SB4	SB4	
Sample Depth, ft bgs	Background	10-12	10-12B	20-22	30-32	40-42	
Collection Date	Levels (a)	9/30/03	9/30/03	9/30/03	9/30/03	9/30/03	
<i>SW6010B mg/kg</i>							
Aluminum	6900	824	843	589	568	782	
Antimony	NA	0.35	0.25		0.32	0.22	
Arsenic	5.8				0.35	0.54	
Barium	75	7.9	9.6	4	6.6	10.9	
Beryllium	NA	0.033	0.04	0.029	0.043	0.05	
Chromium	18	1.7	1.7	1.1	1.6	2	
Cobalt	6.8	0.48	0.41	0.27	0.38	0.5	
Copper	32	2.3	2.7	1.2	0.95	1.7	
Iron	12000	1420	1590	1000	1700	1910	
Lead	21	0.51	0.59	0.25	0.62	0.77	
Manganese	440	22.2	22.3	17.9	26.2	31.1	
Nickel	20	0.71	0.77	0.55	0.6	1	
Selenium	.410						
Thallium	NA						
Zinc	47	2.2	2.1	1.9	1.5	2.2	

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) source: Part 201 Generic Cleanup Criteria and Screening Levels

**Table 5-1 Summary of Analytes Detected in Subsurface Soil, Raco AAF. (page 5 of 5)**

Location	Default	SB5	SB5	SB5	SB5		
Sample Depth, ft bgs	Background	10-12	20-22	30-32	40-42		
Collection Date	Levels (a)	9/30/03	9/30/03	9/30/03	9/30/03		
<i>SW6010B mg/kg</i>							
Aluminum	6900	964	555	496	507		
Antimony	NA	0.33	0.43	0.43	0.39		
Arsenic	5.8			0.4	0.35		
Barium	75	12	4	3.8	5.6		
Beryllium	NA	0.044	0.023	0.023	0.027		
Chromium	18	2	1.2	1	1.2		
Cobalt	6.8	0.5	0.25	0.25	0.34		
Copper	32	2.9	1.1	0.97	0.98		
Iron	12000	1850	1360	960	1300		
Lead	21	0.94	0.41	0.26	0.39		
Manganese	440	29.7	18.8	15.4	20.7		
Nickel	20	1	0.53	0.45	0.63		
Selenium	.410	0.62	0.4		0.27		
Thallium	NA						
Zinc	47	2.2	1.4	1.5	1.5		

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) source: Part 201 Generic Cleanup Criteria and Screening Levels

**Table 5-2 Summary of Analytes Detected in Groundwater ( 2003 Sampling Round), Raco AAF. (page 1 of 7)**

Location	Background	RG01	RG01-F	RG02	RG02-F	RG04	RG04-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	10/04/2003	10/4/2003	10/5/2003	10/5/2003	10/2/2003	10/2/2003
<i>SW6020 ug/L</i>							
Aluminum		81.3	29.2	62.1	31.7	58.5	18.1
Antimony			1.2		2.1		1.2
Barium		15.4	15.5	35	34.3	21.3	20.3
Calcium		4920	4990	8090	7840	1790	1770
Chromium		2.9		2.6	1.8	2.1	
Cobalt		0.12	0.053	0.068	0.046	0.048	0.036
Copper		3.2	2.5	4.8	4.1	1.7	1.7
Iron		1440	36.2	133	47.6	92.5	113
Lead		0.56	0.52	0.78	0.49	1.1	0.28
Magnesium		942	963	1870	1830	311	292
Manganese		7	2.6	3.4	2	3.3	2.9
Nickel		1.8	0.91	1.2	0.45	1.3	
Potassium		814	804	586	598	440	417
Selenium			0.7		0.74		0.77
Sodium		890	920	934	967	619	626
Thallium							
Vanadium							
Zinc		7.2	10.3	2.7	3.8	3.9	4.2
<i>SW8260LL ug/L</i>							
Carbon Disulfide						2.7	
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background data available

sample locations ending with -F were filtered for metals analyse

**Table 5-2 Summary of Analytes Detected in Groundwater (2003 Sampling Round), Raco AAF. (page 2 of 7)**

Location	Background	MW05	MW05-F	MW05-Dup	MW05-DupF	MW06	MW06-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	10/03/2003	10/3/2003	10/3/2003	10/5/2003	10/4/2003	10/4/2003
<i>SW6020 ug/L</i>							
Aluminum		61.9	16.2	86.5	15.9	44.3	36.4
Antimony							0.61
Barium		10.2	9.7	9.8	9.4	108	112
Calcium		2070	2130	2140	2070	7980	8120
Chromium		1.9		1.4		1.2	1.3
Cobalt		0.086		0.037		0.051	
Copper		2.6	1.3	1.6	1.5	2.1	2.6
Iron		72.9	19.5	60.1	20.1	242	55.1
Lead		0.83	0.31	0.25	0.34	0.45	0.68
Magnesium		436	422	433	420	1170	1200
Manganese		2.4	0.89	2.2	1.3	5.9	4.7
Nickel		0.52		0.4		0.66	0.42
Potassium		781	795	775	780	4870	5060
Selenium		0.7	0.75		0.77		0.74
Sodium		769	805	769	775	866	982
Thallium							
Vanadium							
Zinc		3	1.7	4.9	2.1	6.3	2.5
<i>SW8260LL ug/L</i>							
Carbon Disulfide							
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) no reference background data available

sample locations ending with -F were filtered for metals analyses

**Table 5-2 Summary of Analytes Detected in Groundwater (2003 Sampling Round), Raco AAF. (page 3 of 7)**

Location	Screening	MW07	MW07-F	MW08-	MW08-F	MW09	MW09-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	10/04/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003	10/4/2003
<i>SW6020 ug/L</i>							
Aluminum		42.6	38.8	454	25.9	113	54.3
Antimony			1.4		1.9		1.3
Barium		165	156	56.3	49.2	32.1	31.8
Calcium		30400	30300	6680	6360	10900	11500
Chromium		3.4	1.2	7.6	1.3	2.3	
Cobalt		0.11	0.049	0.42	0.06	0.063	
Copper		2.3	3.1	4.2	1.9	2.6	3.5
Iron		248	178	842	46.2	183	73.7
Lead		0.59	0.53	1.5	0.47	0.54	0.89
Magnesium		4380	4350	1920	1810	1080	1140
Manganese		5	2	16	2.3	3.6	1.8
Nickel		1.8	0.56	3.8	0.66	0.51	
Potassium		10300	10300	983	659	448	425
Selenium		0.75	0.79	0.76			0.74
Sodium		6800	6770	1460	1290	659	729
Thallium		0.24					
Vanadium				1.4			
Zinc		2.7	3.2	4.1	7.4	22.6	4.3
<i>SW8260LL ug/L</i>							
Carbon Disulfide				18			
Trichloroethene				14			

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) reference background criteria not available

sample locations ending with -F were filtered for metals analyse

**Table 5-2 Summary of Analytes Detected in Groundwater (2003 Sampling Round, Raco AAF. (page 4 of 7)**

Location	Screening Criteria (a)	MW10	MW10-F	MW11-	MW11-F	MW11-Dup	MW11-DupF
Sample Depth, ft bg							
Collection Date		10/02/2003	10/02/2003	10/01/2003	10/01/2003	10/01/2003	10/01/2003
<i>SW6020 ug/L</i>							
Aluminum		413	43.6	93.8	21.8	86.4	25.8
Antimony			1.2		1.2		
Barium		45.7	39.5	10.8	9.5	10.7	10
Calcium		9370	9010	1630	1590	1650	1670
Chromium		2.3		2.8	1.6		
Cobalt		0.23	0.054	0.095		0.079	
Copper		4.7	3.6	2.2	2.1	2.1	2.3
Iron		434	73.2	138	18.2	141	15.3
Lead		0.9	0.71	0.38	0.23	0.38	0.4
Magnesium		1550	1450	314	295	317	310
Manganese		10.9	4	4.3	1.9	4.3	1.3
Nickel		1.2		1.7		0.47	
Potassium		657	611	422	395	422	421
Selenium		1.1	1				
Sodium		800	771	602	626	628	647
Thallium							
Vanadium							
Zinc		6.6	5.8	2.8	3	2.1	2.5
<i>SW8260LL ug/L</i>							
Carbon Disulfide				5.5		14	
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) reference background criteria not available

sample locations ending with -F were filtered for metals analyses

**Table 5-2 Summary of Analytes Detected in Groundwater (2003 Sampling Round), Raco AAF. (page 5 of 7)**

Location	Screening	MW12	MW12-F	MW13	MW13-F	MW14	MW14-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	10/02/2003	10/02/2003	10/01/2003	10/01/2003	10/04/2003	10/04/2003
<i>SW6020 ug/L</i>							
Aluminum		154	35.7	116	15.3	72.7	61.2
Antimony			1.4		0.9		1.6
Barium		17.5	15.3	45.9	44.2	9.3	9.1
Calcium		2450	2330	3890	3820	1980	2010
Chromium		2.2		2.2		1.5	1.1
Cobalt		0.11	0.039	0.11		0.067	0.039
Copper		3.6	2.7	2.3	1.9	1.8	3.9
Iron		195	22.9	220	33	159	18.9
Lead		0.9	0.62	0.4	0.29	0.49	1.4
Magnesium		433	398	720	691	378	352
Manganese		7.9	7.2	8.5	4.4	3.4	2.2
Nickel		1.1		1		0.51	0.43
Potassium		499	454	885	859	815	774
Selenium			0.86		0.71	0.79	0.78
Sodium		750	756	823	813	957	922
Thallium							
Vanadium							
Zinc		6.4	4.5	3	6.7	2.5	5.7
<i>SW8260LL ug/L</i>							
Carbon Disulfide				7.2			
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) reference background criteria not available

sample locations ending with-F were filtered for metal analyses

**Table 5-2 Summary of Analytes Detected in Groundwater (2003 Sampling Round), Raco AAF. (page 6 of 7)**

Location	Screening	MW15	MW15-F	MW16	MW16-F	MW17	MW17-F
Sample Depth, ft bgs	Criteria						
Collection Date	(a)	10/04/2003	10/04/2003	10/02/2003	10/02/2003	10/03/2003	10/03/2003
<i>SW6020 ug/L</i>							
Aluminum		54.4	31.4	90.6	22.3	170	36
Antimony			1.6		1.7		1.1
Barium		89.8	88.1	9.3	9.1	22.8	22
Calcium		15500	14900	2070	2040	24300	24600
Chromium		3.2	1.6			1.7	1.2
Cobalt		0.062	0.033	0.29	0.26	0.14	0.075
Copper		2.2	2.2	9.3	9	4.7	3.6
Iron		186	89.3	104	25.8	285	144
Lead		0.52	0.4	0.31	0.43	0.67	0.62
Magnesium		2260	2180	449	436	4780	4640
Manganese		4.3	2.1	26.8	23.9	11.7	8.9
Nickel		3.7		3	3	1.8	1.6
Potassium		6020	5850	727	704	618	601
Selenium		0.79	0.77	0.7		0.77	0.72
Sodium		1180	1090	649	680	1190	1120
Thallium						0.33	
Vanadium							
Zinc		3	16.8	12.9	17.2	6.4	7.2
<i>SW8260LL ug/L</i>							
Carbon Disulfide							
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) source: MDEQ OP Memo #18, Residential Commercial Drinking Water Criteria, June 7, 2000

b) qualifiers are lab qualifiers. Data has not been validated

**Table 5-2 Summary of Analytes Detected in Groundwater (2003 Sampling Round), Raco AAF. (page 7 of 7)**

Location	Screening	MW18	MW18-F				
Sample Depth, ft bg	Criteria						
Collection Date	(a)	10/04/2003	10/04/2003				
<i>SW6020 ug/L</i>							
Aluminum		263	40.9				
Antimony			2.2				
Barium		19.5	17				
Calcium		10400	9840				
Chromium		2.1	1.1				
Cobalt		0.44	0.33				
Copper		7.4	5.7				
Iron		365	66.6				
Lead		0.72	0.95				
Magnesium		2270	2160				
Manganese		35.7	24.3				
Nickel		3.7	3.1				
Potassium		1050	510				
Selenium			0.71				
Sodium		1150	1180				
Thallium							
Vanadium							
Zinc		52	7.6				
<i>SW8260LL ug/L</i>							
Carbon Disulfide							
Trichloroethene		1.6					

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) no reference background criteria available

sample locations ending with -F were filtered for metals analyses

**Table 5-3 Summary of Analytes Detected in Groundwater (May 2004 Sampling Round), Raco AAF. (page 1 of 7)**

Location	Background Criteria	RG01	RG01-F	RG01-DUP	RG01-DUPF	RG02	RG02-F
Collection Date	(a)	5/12/2004	5/12/2004	5/12/2004	5/12/2004	5/13/2004	5/13/2004
<i>SW6020 ug/L</i>							
Aluminum		13.6	6.7	15.6	5.6	13.7	
Antimony		0.17		0.18			
Arsenic							
Barium		16.4	16.1	16.7	16.6	31.6	31
Beryllium						0.025	
Calcium		5020	4840	4920	4890	7160	7170
Chromium		2.3	1.9	3.3	2.3	2.4	2.5
Cobalt		0.039	0.041	0.041	0.042	0.033	0.02
Copper		28.1	1.1	1.3	1.1	6.2	6.1
Iron		25	26.6	28.8	26.2	42.3	10.6
Lead		0.45	0.43	1.1		0.24	0.38
Magnesium		898	905	905	907	1640	1600
Manganese		1.7	2.5	2.4	2.6	1	0.61
Nickel		0.49	1.4	1.2	1.4	0.5	0.51
Potassium		1060	1060	1050	1030	1100	1080
Sodium		914	843	857	812	1120	1050
Thallium							
Zinc		4.5	4.5	3.2	3	3.9	3.2
<i>SW7470A ug/L</i>							
Mercury				0.12			
<i>SW8260LL ug/L</i>							
Chloromethane						0.61	
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background data available

sample locations ending with -F were filtered for metals analyses

**Table 5-3 Summary of Analytes Detected in Groundwater (May 2004 Sampling Round) , Raco AAF. (page 2 of 7)**

Location	Background	RG04	RF04-F	MW05	MW05-F	MW06	MW06-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	5/10/2004	5/10/2004	5/12/2004	5/12/2004	5/11/2004	5/11/2004
<i>SW6020 ug/L</i>							
Aluminum		14.1	7.2	28.6	11.6	13.5	25.4
Antimony		0.14		0.13	0.14	1.5	0.85
Arsenic				0.36			
Barium		19.3	18.7	9.9	9.7	105	104
Beryllium							
Calcium		1750	1610	2240	2200	11800	11900
Chromium		1.6	1.3	3.1	3	2.7	1.6
Cobalt		0.028	0.018	0.028	0.017	0.041	0.026
Copper		8.9	7.7	3.8	4.9	5.9	6.4
Iron		27.7	24.1	41.4	50.1	33.8	18.6
Lead		0.32	0.43	0.27	0.46	0.24	0.38
Magnesium		285	277	423	420	1530	1540
Manganese		2.1	1.6	1.2	0.77	5.3	4.8
Nickel		0.37	0.48	0.45	0.56	0.48	0.42
Potassium		425	428	772	796	2940	2910
Sodium		836	805	1080	964	1410	1460
Thallium		0.18	0.074				
Zinc		7	3.3	3.3	259	2.5	4.1
<i>SW7470A ug/L</i>							
Mercury							
<i>SW8260LL ug/L</i>							
Chloromethane							
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background data available

sample locations ending in -F were filtered for metals analyses

**Table 5-3 Summary of Analytes Detected in Groundwater (May 2004 Sampling Round), Raco AAF. (page 3 of 7)**

Location	Background	MW07	MW07-F	MW08-	MW08-F	MW09	MW09-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	5/11/2004	5/11/2004	5/12/2004	5/12/2004	5/11/2004	5/11/2004
<i>SW6020 ug/L</i>							
Aluminum		31.7		49.5		10.4	
Antimony							
Arsenic		0.44	0.37	0.66	0.43	0.75	
Barium		111	103	45.3	44.3	29	28.3
Beryllium							
Calcium		28700	28500	5670	5690	10700	10700
Chromium		1.5	1.3	4	2.6	2	2.1
Cobalt		0.1	0.032	0.054	0.018	0.015	
Copper		7.4	3.1	1.5	3.3	4.8	6.2
Iron		67.6		73	11.2	22.1	9.4
Lead		0.58	0.24	2.2	0.35	0.42	
Magnesium		4160	4040	1390	1410	968	956
Manganese		4.9	0.49	3	1.1	0.62	
Nickel		0.63	0.39	0.98	0.76	0.34	
Potassium		6200	5930	1040	1030	934	930
Sodium		5590	5320	1390	1340	832	805
Thallium		0.22					
Zinc		2.7	2.4	3.6	6.1	3.4	2.6
<i>SW7470A ug/L</i>							
Mercury							
<i>SW8260LL ug/L</i>							
Chloromethane							
Trichloroethene				19			

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background criteria available

sample locations ending in -F were filtered for metals analyses

**Table 5-3 Summary of Analytes Detected in Groundwater, (May 2004 Sampling Round), Raco AAF. (page 4 of 7)**

Location	Background Criteria	MW09	MW09-F	MW10	MW10-F**	MW11-	MW11-F
Collection Date	(a)	5/11/2004	5/11/2004	5/11/2004	5/11/2004	5/10/2004	5/10/2004
<i>SW6020 ug/L</i>							
Aluminum		10.1		42.1		26.3	
Antimony							
Arsenic		0.41		0.5			
Barium		28.3	28.9	33.6		9.2	9.1
Beryllium							
Calcium		10700	10600	9130		1680	1610
Chromium		1.6		2.1		2.5	2.1
Cobalt				0.045		0.029	
Copper		6.5	4.3	4.1		8.1	7.4
Iron		43.1	9.5	57.1		35.4	10.6
Lead			0.67	0.4		0.31	0.54
Magnesium		957	952	1870		300	275
Manganese		0.7		1.5		1.5	0.76
Nickel		0.31	0.36	0.35		0.31	0.43
Potassium		947	960	652		458	411
Sodium		913	824	992		837	787
Thallium							0.082
Zinc		2.5	4.3	4		3.1	4
<i>SW7470A ug/L</i>							
Mercury							
<i>SW8260LL ug/L</i>							
Chloromethane							
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background criteria available for groundwater sample locations ending in -F were filtered for metals analyses

\*\* No filtered analyses was performed for MW10

**Table 5-3 Summary of Analytes Detected in Groundwater (May 2004 Sampling Round), Raco AAF. (page 5 of 7)**

Location	Background	MW12	MW12-F	MW13	MW13-F	MW14	MW14-F
Sample Depth, ft bg	Criteria						
Collection Date	(a)	5/10/2004	5/10/2004	5/10/2004	5/13/2004	5/13/2004	5/13/2004
<i>SW6020 ug/L</i>							
Aluminum		62.9	6.3	13		17.1	19.6
Antimony						0.22	0.28
Arsenic							
Barium		14.4	13.3	35.4	35.1	9.1	8.7
Beryllium							
Calcium		2170	2090	2900	2810	2070	2060
Chromium		2.6	2.2	2.5		2.8	3.6
Cobalt		0.064	0.016	0.024	0.023	0.029	0.021
Copper		7.3	8.3	6.6	7.6	5.6	6.9
Iron		84.7	14.3	21.7	14.4	61.9	35
Lead		0.38	0.61	0.9	0.41	0.44	1.9
Magnesium		349	336	496	507	370	359
Manganese		3	1.1	3.1	2.8	1.2	0.88
Nickel		0.53	0.59	0.3	0.65	0.64	0.58
Potassium		497	519	1380	1330	818	772
Sodium		975	1040	905	1020	1030	1170
Thallium							
Zinc		3.5	116	2.5	4.4	5	7.3
<i>SW7470A ug/L</i>							
Mercury							
<i>SW8260LL ug/L</i>							
Chloromethane							
Trichloroethene							

NOTE: only compounds that were detected in one or more samples collected from the site are shown

a) No reference background criteria available

sample locations ending with -F were filtered for metals analyses

**Table 5-3 Summary of Analytes Detected in Groundwater (May 2004 Sampling Round), Raco AAF. (page 6 of 7)**

Location	Background Criteria	MW15	MW15-F	MW16	MW16-F	MW17	MW17-F
Collection Date	(a)	5/11/2004	5/11/2004	5/10/2004	5/10/2004	5/12/2004	5/12/2004
<i>SW6020 ug/L</i>							
Aluminum		19.4	18.6	11.4	5.7	42.8	14.6
Antimony				0.18			
Arsenic			0.36				
Barium		116	116	25.9	25.2	38.3	37.9
Beryllium							
Calcium		24700	24800	2050	1970	23400	23500
Chromium		1.7		3.7	1.4	3	2.2
Cobalt		0.046	0.032	0.035	0.034	0.044	0.039
Copper		3.1	9.3	9.5	6.7	7.9	6.1
Iron		48.4	27.1	24	12.7	31.6	26.6
Lead		0.21	0.64	0.52	0.62	0.32	0.43
Magnesium		3350	3340	396	392	4060	3990
Manganese		1.8	0.76	4.3	3.9	1.7	1.3
Nickel		0.52	0.48	0.54	0.58	0.6	0.78
Potassium		4380	4480	653	597	1500	1560
Sodium		2110	2300	1480	1410	1640	1390
Thallium							
Zinc		4.2	2.8	36.7	4.2	5.9	5.3
<i>SW7470A ug/L</i>							
Mercury							
<i>SW8260LL ug/L</i>							
Chloromethane							
Trichloroethene							

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

- a) No reference background criteria available
  - b) qualifiers are lab qualifiers. Data has not been validated
- sample locations ending in -F were filtered for metals analyse

**Table 5-3 Summary of Analytes Detected in Groundwater (May 2004 Sampling Round), Raco AAF. (page 7 of 7)**

Location	Background	MW18	MW18-F				
Sample Depth, ft bg	Criteria						
Collection Date	(a)	5/12/2004	5/12/2004				
<i>SW6020 ug/L</i>							
Aluminum		16.6					
Antimony							
Arsenic			0.44				
Barium		29.8	30.1				
Beryllium							
Calcium		6980	6720				
Chromium		2	2.4				
Cobalt		0.056	0.038				
Copper		1.4	1.2				
Iron		37.2					
Lead		0.3	0.48				
Magnesium		1510	1420				
Manganese		4.2	2.5				
Nickel		1.9	0.76				
Potassium		1030	1010				
Sodium		1270	1280				
Thallium							
Zinc		6.2	3.3				
<i>SW7470A ug/L</i>							
Mercury							
<i>SW8260LL ug/L</i>							
Chloromethane							
Trichloroethene		0.56					

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background criteria available

sample locations ending in -F were filtered for metals analyses

**Table 5-4 Initial VOC Screening Results from Soil Borings - October 2004 (page 1 of 2)**

Location	SB6-SS-10	SB6-SS-20	SB6-SS-40	SB7-SS-10	SB7-SS-20	SB7-SS-40	SB7-SS-40DUP	SB8-SS-10	SB8-SS-20	SB8-SS40
<b>Collection Date</b>	<b>10/12/2004</b>	<b>10/12/2004</b>	<b>10/12/2004</b>	<b>10/13/2004</b>	<b>10/13/2004</b>	<b>10/13/2004</b>	<b>10/13/2004</b>	<b>10/14/2004</b>	<b>10/14/2004</b>	<b>10/14/2004</b>
<i>SW8260B ug/kg</i>										
Acetone	11	3.1	4.1	11	6.4	6.4	34	8.5	8.5	2.3
Tetrachloroethylene										
Toluene				0.47						
Trichloroethene									0.55	

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

**abbreviations and footnote key on last page**

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**Table 5-4 Initial VOC Screening Results from Soil Borings - October 2004 (page 2 of 2)**

Location	SB9-SS-10	SB9-SS-20	SB9-SS-40	SB10-SS-10	SB10-SS-20	SB10-SS-40				
Collection Date	10/13/2004	10/13/2004	10/13/2004	10/14/2004	10/14/2004	10/14/2004				
<i>SW8260B ug/kg</i>										
Acetone	5.8	7.2	3.9	6.1	3.4	3.2				
Tetrachloroethylene			0.51							
Toluene										
Trichloroethene										

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

**abbreviations and footnote key on last page**

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**Table 5-5 Groundwater VOC Screening Results from Soil Borings - October 2004 (page 1 of 1)**

Location	SB6-GW-70	SB6-GW-80	SB7-GW-70	SB7-GW-80	SB8-GW-70	SB8-GW-80	SB9-GW-70	SB9-GW-80	SB10-GW-70	SB10-GW-80
Collection Date	10/13/2004	10/13/2004	10/13/2004	10/13/2004	10/14/2004	10/14/2004	10/13/2004	10/13/2004	10/14/2004	10/14/2004
<i>SW8260B ug/L</i>										
Trichloroethene			18	14	0.84		10	9.6		0.8

NOTE: only compounds that were detected in one or more samples collected from the site are shown

abbreviations and footnote key on last page

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**Table 5-6 Summary of Analytes Detected in Groundwater (November 2004 Sampling Event), Raco AAF. (page 1 of 2)**

Location	Background Criteria	MW07	MW07-DUP	MW08	MW14	MW18	MW19
Collection Date	(a)	11/10/2004	11/10/2004	11/09/2004	11/10/2004	11/09/200	11/10/2004
<i>SW6010B ug/L</i>							
Arsenic							
Barium							72.4
Cadmium							
Chromium							
Lead							
Selenium							
<i>SW8260LL ug/L</i>							
1,1,1-Trichloroethane							0.46
Chloromethane							
Tetrachloroethylene							0.44
Toluene							0.79
Trichloroethene				19		0.8	4.4

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background data available

sample locations ending with -F were filtered for metals analyses

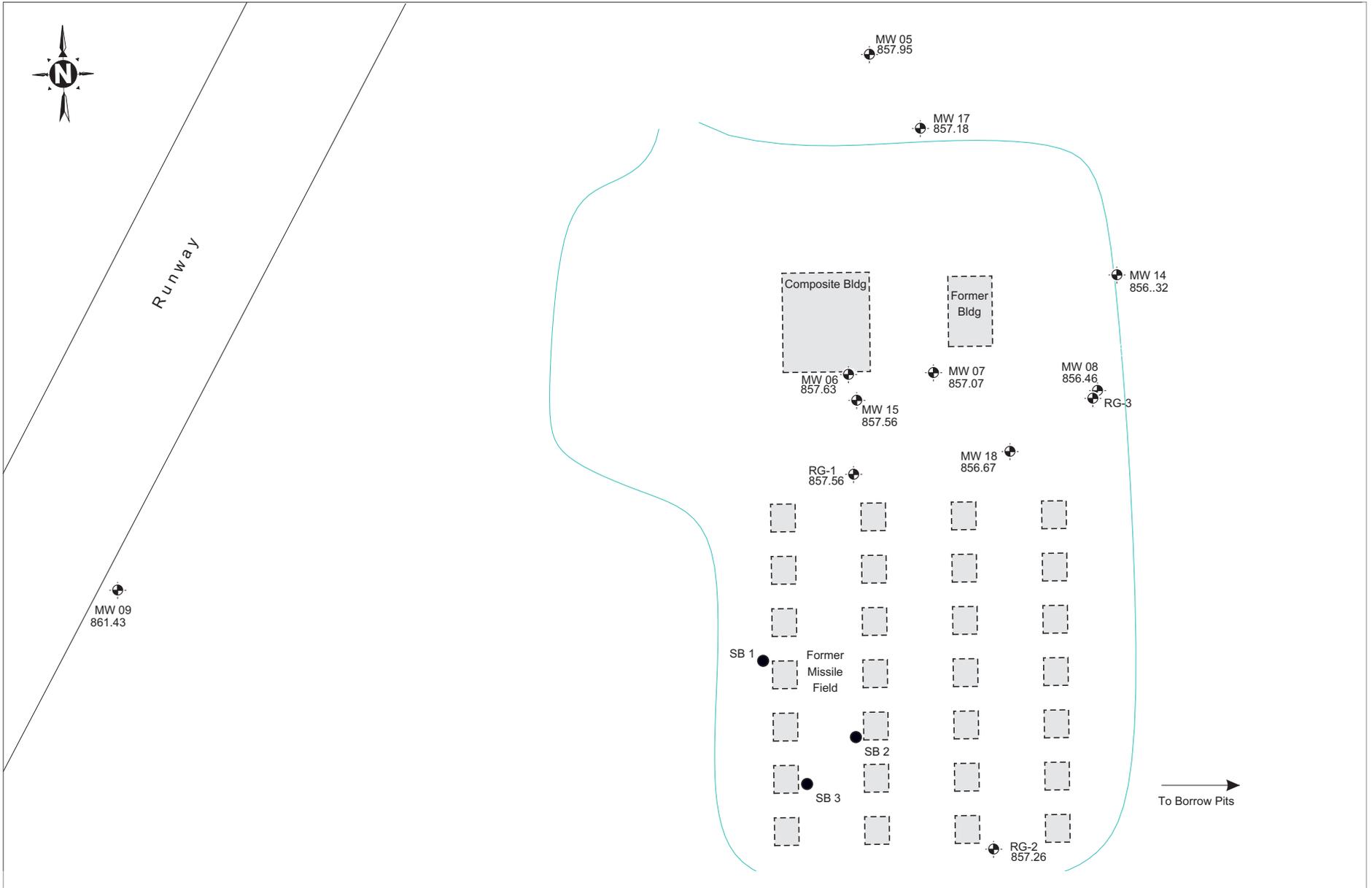
**Table 5-6 Summary of Analytes Detected in Groundwater (November 2004 Sampling Event), Raco AAF. (page 2 of 2)**

Location	Background Criteria	MW20	MW20-F	MW21	MW21-F	MW22	MW22-F
Collection Date	(a)	11/10/2004	11/10/2004	11/11/2004	11/11/2004	11/19/2004	11/11/2004
<i>SW6010B ug/L</i>							
Arsenic						25.4	
Barium		93.6	24.2	66.3	15.9	308	23.7
Cadmium						0.64	
Chromium		6		3.8		14.1	
Lead		9		8.8		94.8	2.8
Selenium		3.7	3.7	3.4	3.4		
<i>SW8260LL ug/L</i>							
1,1,1-Trichloroethane		0.74				0.32	
Chloromethane				0.96			
Tetrachloroethylene		0.54				0.69	
Toluene		0.4		0.44			
Trichloroethene		0.52					

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

a) No reference background data available

sample locations ending with -F were filtered for metals analyses



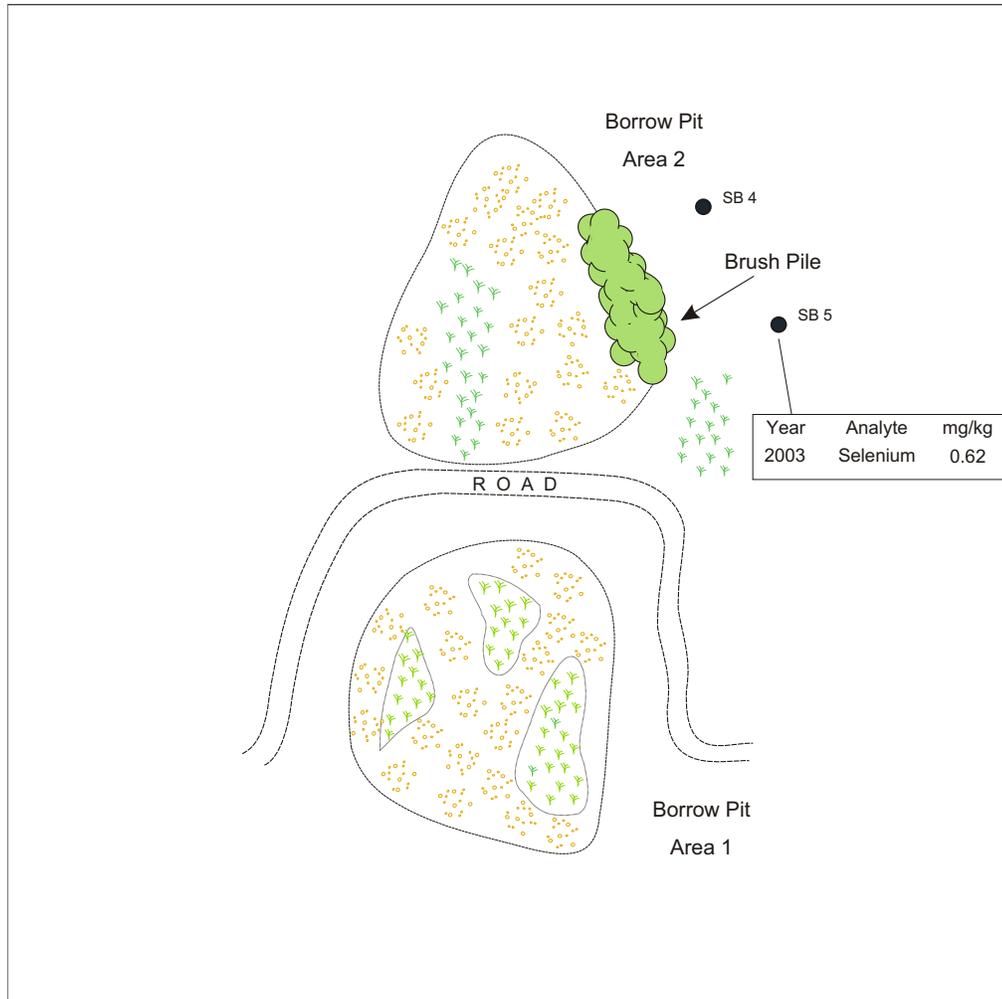
EXPLANATION

- MW-13 Groundwater Monitoring Well
- SB 1 Soil Boring (Approximate Location)
- Outline of Former Building or Missile Silo (Now Removed)
- Note: No metals detected above background levels.  
No VOCs or SVOCs detected.



**2003 Subsurface Soil  
Sampling Locations  
and Concentrations  
Raco AAF**

Figure 5-1



EXPLANATION

 Vegetation

 Sandy Area

Not to Scale

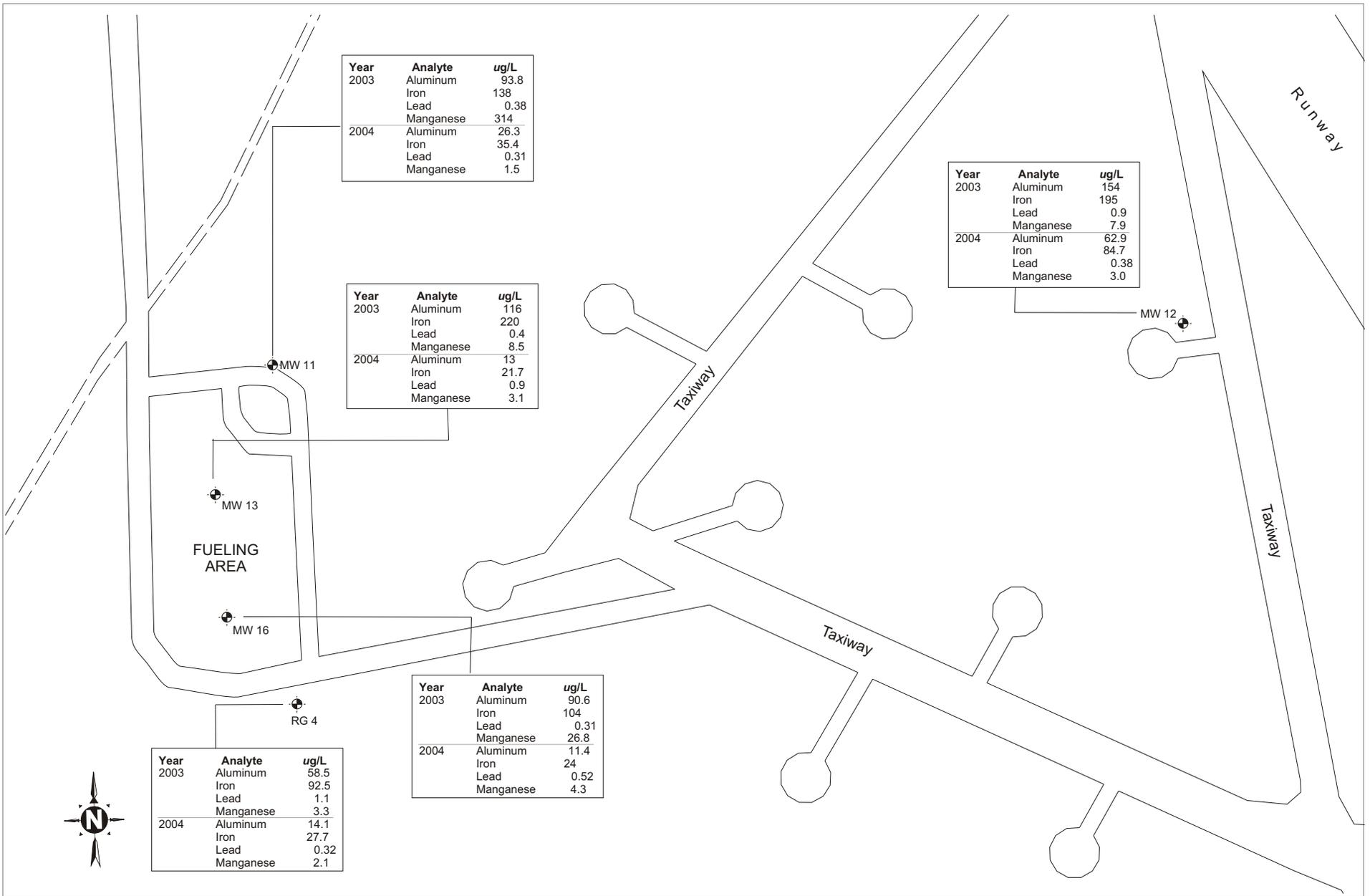
SB 4 ● Soil Boring (Approximate Location)

Approximately 100' between SB4 and SB5



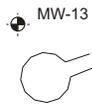
**Borrow Pit Sampling Locations and Metal Concentrations in Subsurface Soils Raco AAF**

Figure 5-2



EXPLANATION

2003/2004 Samples taken after Development/Redevelopment



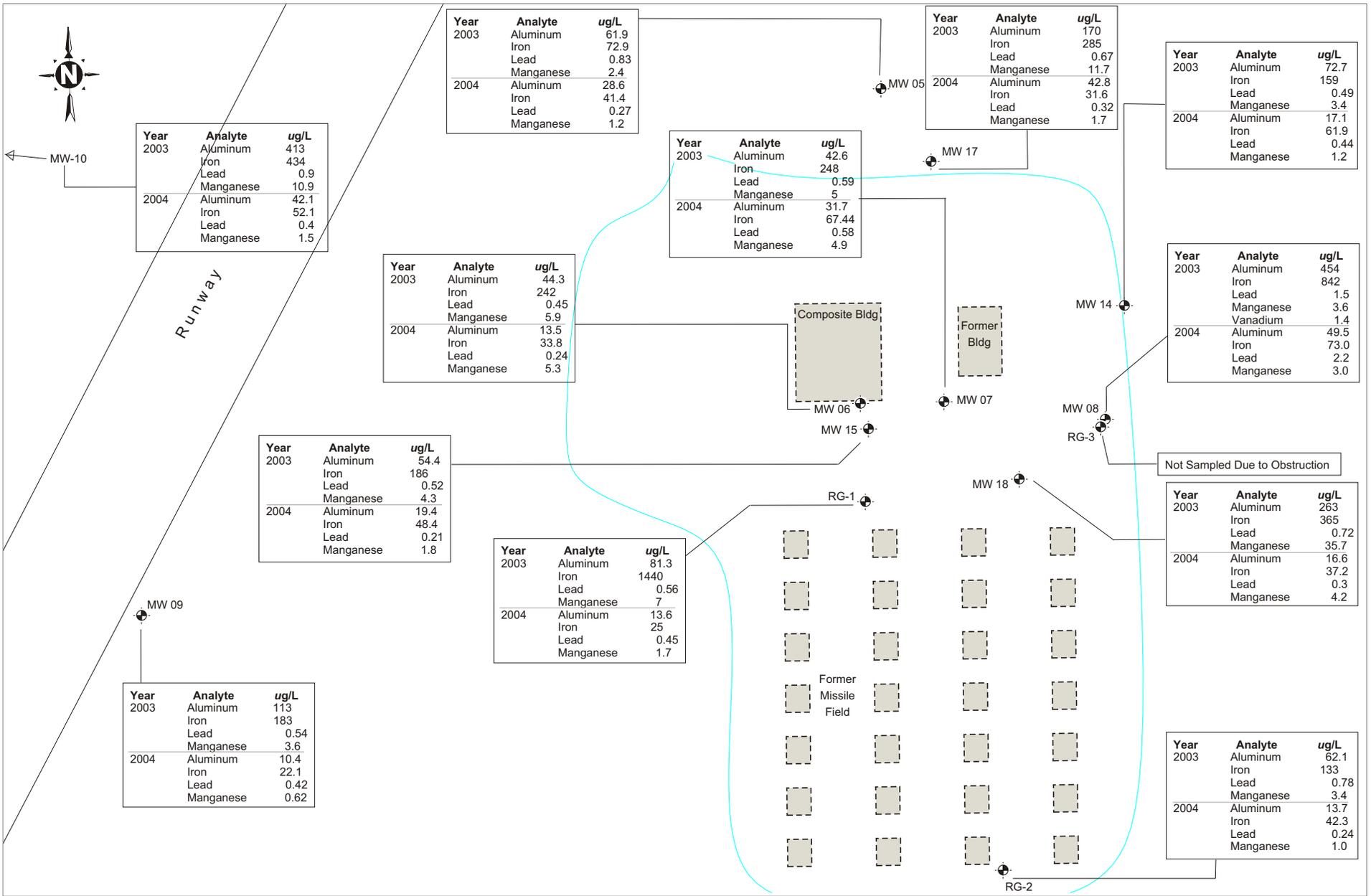
MW-13 Groundwater Monitoring Well

Aircraft Hardstand



**Fuel Depot Area  
Sampling Locations and  
Metal Concentrations  
in Groundwater  
(2003/2004 Sampling Rounds)  
Raco AAF**

Figure 5-3



EXPLANATION

2003/2004 Samples taken after Development/Redevelopment



MW-5 Groundwater Monitoring Well

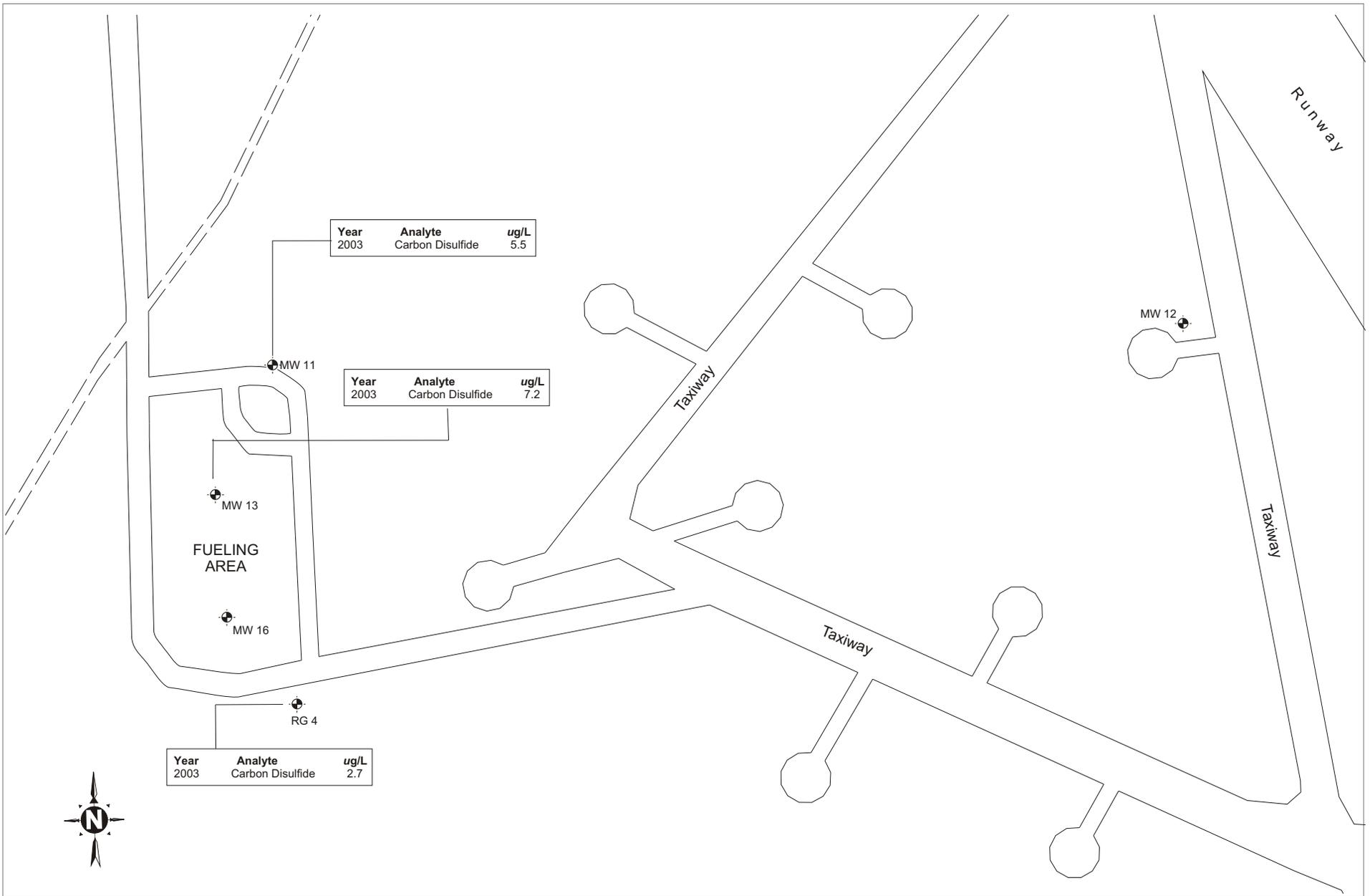


Outline of Former Building or Missile Silo (Now Removed)

Missile Battery Area Metal Concentrations in Groundwater (2003/2004 Sampling Rounds) Raco AAF

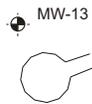
Figure 5-4





EXPLANATION

2003/2004 Samples taken after Development/Redevelopment



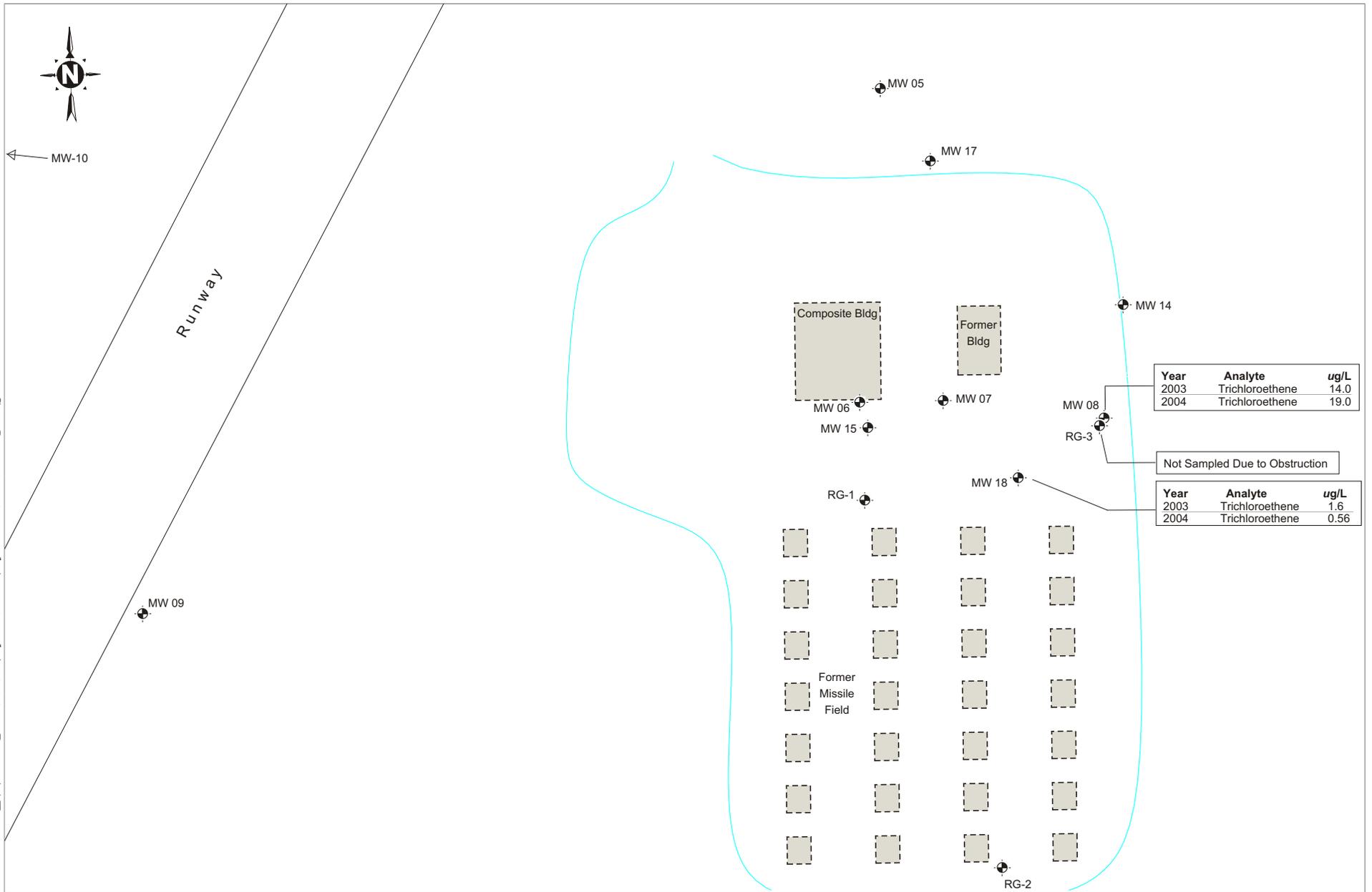
MW-13 Groundwater Monitoring Well

Aircraft Hardstand



**Fuel Depot Area  
Volatile and Semi-Volatile  
Groundwater Detections  
Raco AAF**

Figure 5-5



EXPLANATION

2003/2004 Samples taken after Development/Redevelopment



MW-5

Groundwater Monitoring Well

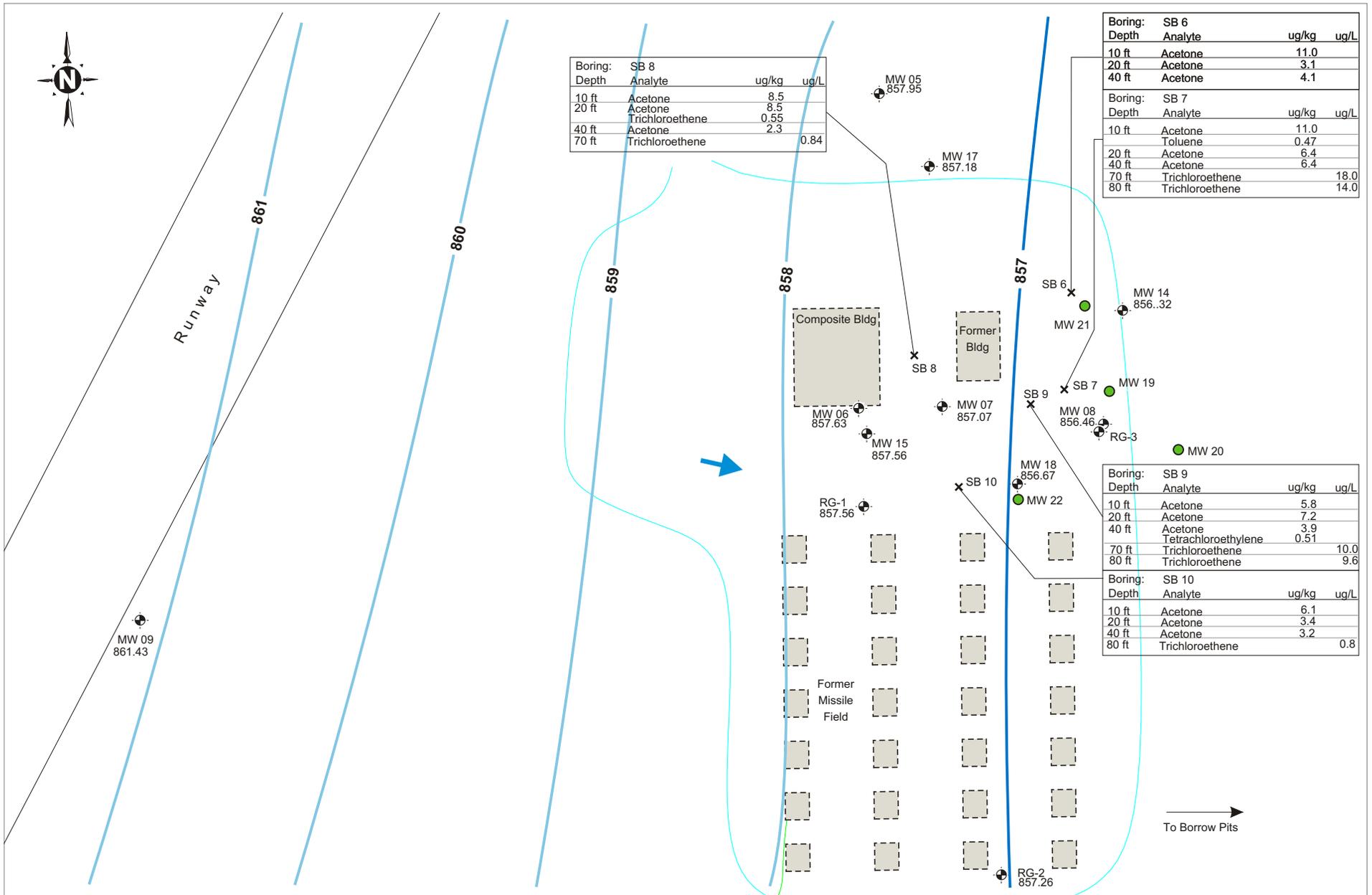


Outline of Former Building or Missile Silo (Now Removed)



Missile Battery Area Volatile and Semi-Volatile Groundwater Detections Raco AAF

Figure 5-6



EXPLANATION

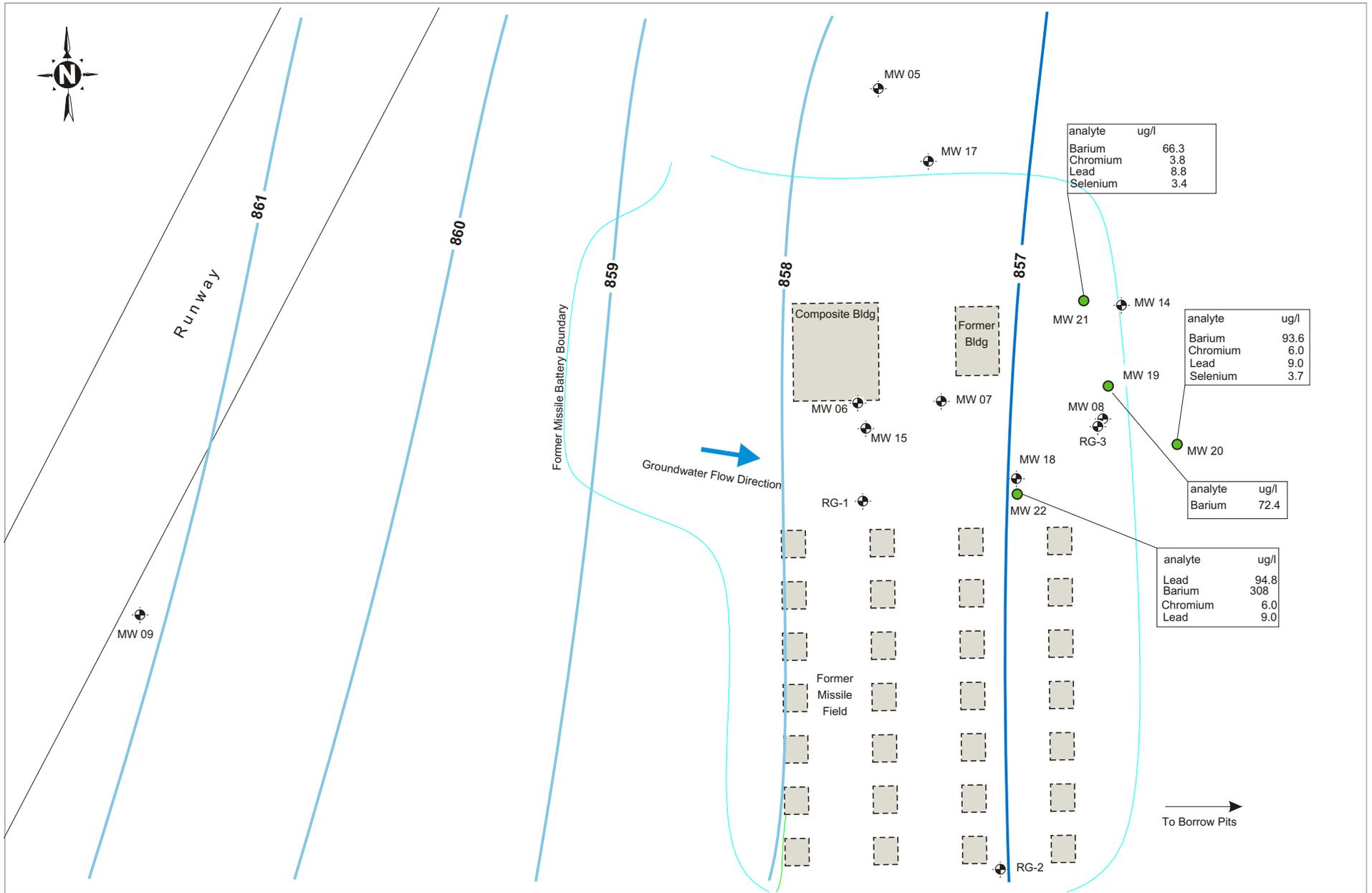
- MW-13 Existing Groundwater Monitoring Well
- MW-13 Installed October 2004 Groundwater Monitoring Well
- SB 3 Soil Boring - October 2004
- Outline of Former Building or Missile Silo (Now Removed)

- Groundwater Flow Direction
- 854.86 Groundwater elevation in feet above mean sea level
- 860 Contour Line of Estimated Equal Groundwater Elevation Above Mean Sea Level

**VOC Screening in Soil and Groundwater  
October 2004 Event  
Missile Battery Area  
Raco, AAF**

9/2004





EXPLANATION

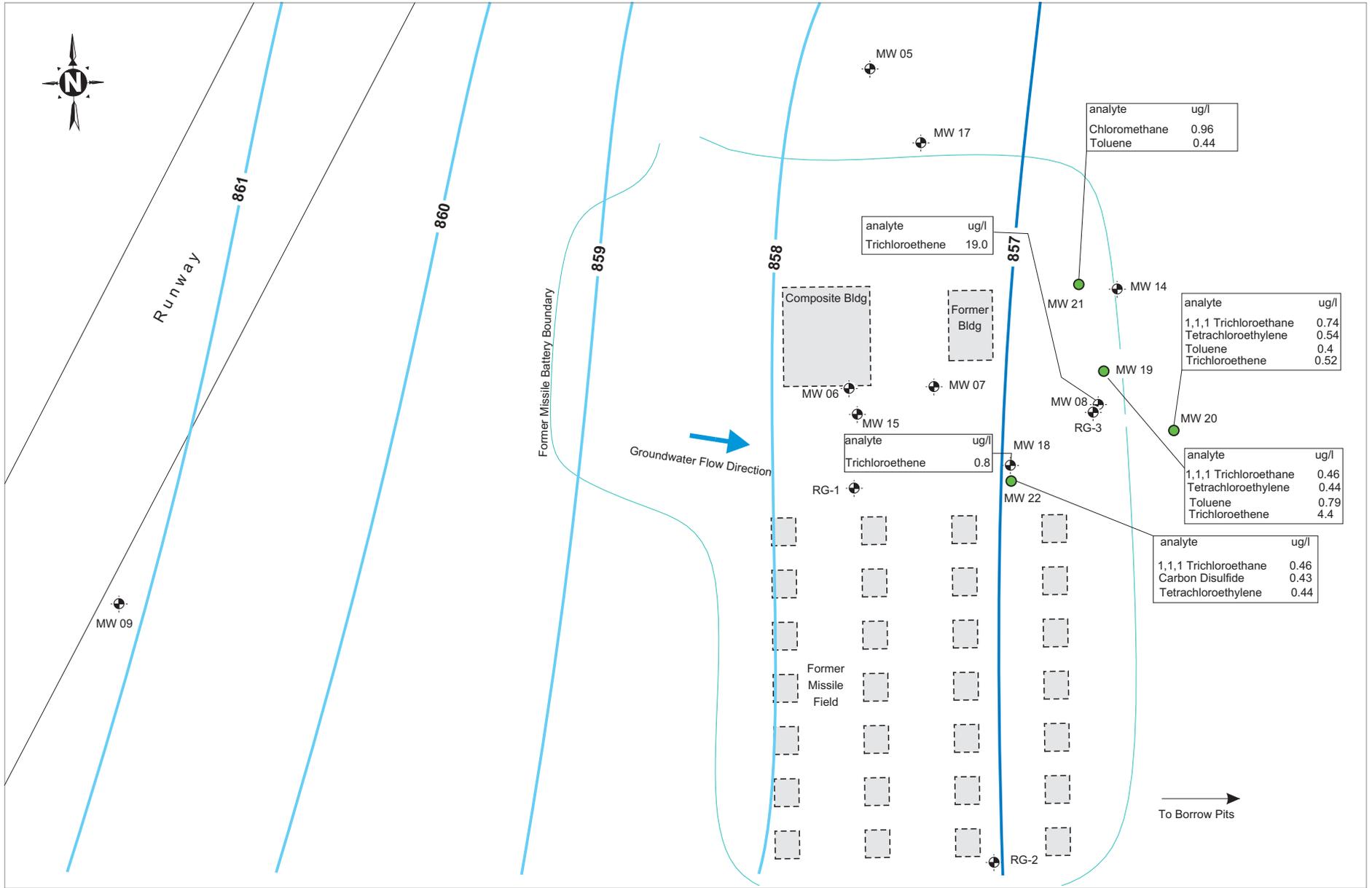
- MW-13 Existing Groundwater Monitoring Well
- MW-13 New Deep Groundwater Monitoring Well
- Groundwater Flow Direction
- Groundwater elevation in feet above mean sea level
- Contour Line of Estimated Equal Groundwater Elevation Above Mean Sea Level
- Outline of Former Building or Missile Silo (Now Removed)

**Missile Battery Area  
Detections in Groundwater,  
Metals-November 2004**

**Raco Army Airfield,  
Raco, MI**

9/2004





EXPLANATION

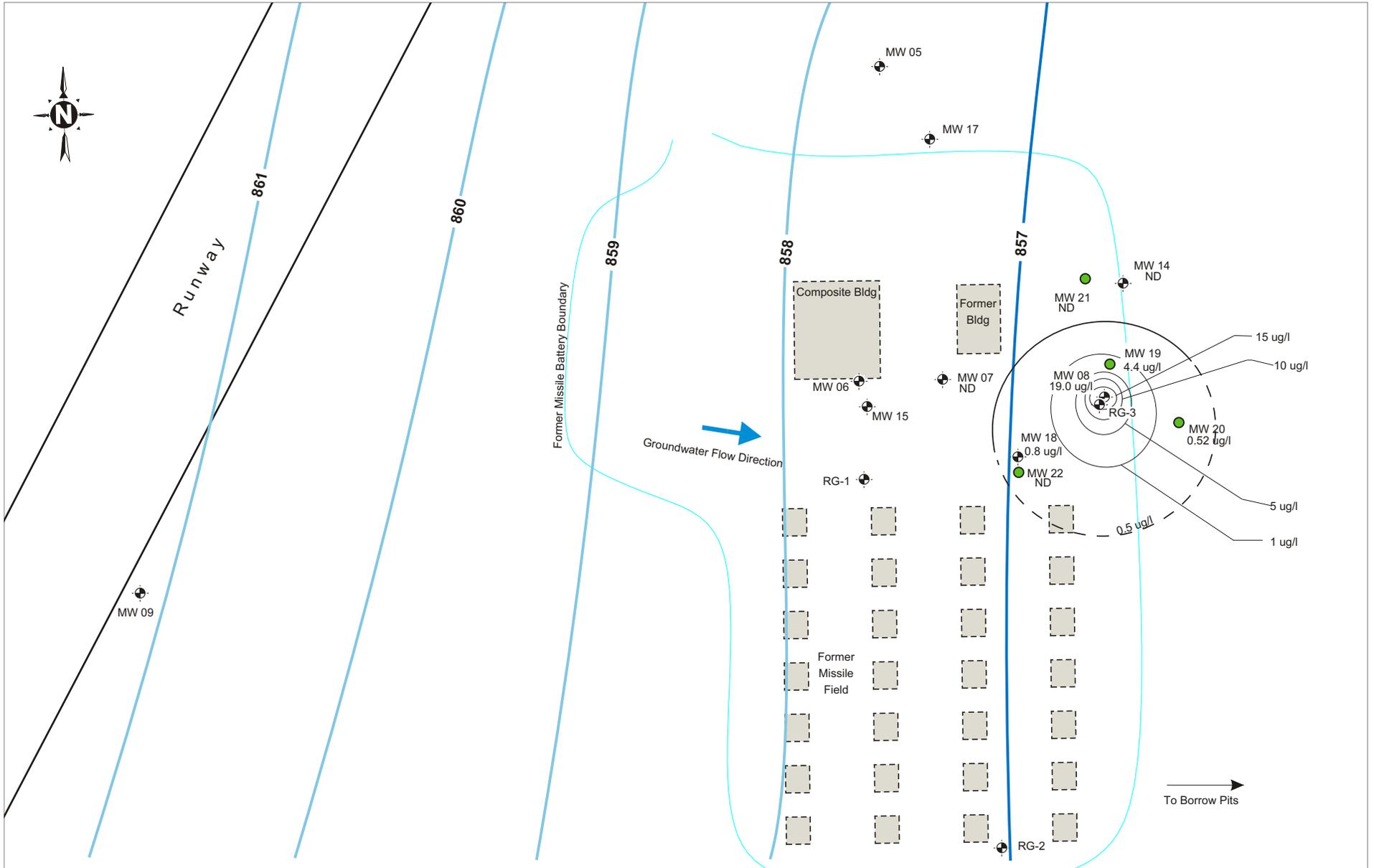
- MW-13 Existing Groundwater Monitoring Well
- MW-13 New Deep Groundwater Monitoring Well
- Outline of Former Building or Missile Silo (Now Removed)

- Groundwater Flow Direction
- 854.86 Groundwater elevation in feet above mean sea level
- 860 Contour Line of Estimated Equal Groundwater Elevation Above Mean Sea Level



**Missile Battery Area  
Detections in Groundwater,  
Volatiles -November 2004  
Raco Army Airfield,  
Raco, MI**

11/2004



EXPLANATION

- Existing Groundwater Monitoring Well
- New Deep Groundwater Monitoring Well
- Outline of Former Building or Missile Silo (Now Removed)
- ND Non Detect

- Groundwater Flow Direction
- Groundwater elevation in feet above mean sea level
- Contour Line of Estimated Equal Groundwater Elevation Above Mean Sea Level
- TCE Plume Contour Line

**TCE Plume Map-2004  
Missile Battery Area  
Raco Army Airfield,  
Raco, MI**



## 6.0 PART 201 SCREENING

### 6.1 INTRODUCTION

All available analytical results were compared to Michigan's cleanup criteria from Part 201 of Public Act 451 of 1994, as amended. These are cleanup criteria for groundwater and soil and for different exposure pathways and different land uses. The cleanup criteria are based on protection of human health and protection of surface water.

The Michigan Department of Environmental Quality (MDEQ) developed the following cleanup criteria for groundwater:

- Residential and commercial I drinking water criteria (RCDWC);
- Industrial and commercial II, III, and IV drinking water criteria (ICDWC);
- Groundwater surface water interface protection criteria (GWSIPC);
- Residential and commercial I groundwater volatilization to indoor air inhalation criteria (RCGVIAC);
- Industrial and commercial II, III and IV groundwater volatilization to indoor air inhalation criteria;
- Groundwater contact criteria (GCC);
- Flammability and Explosivity screening levels; and
- Acute inhalation screening levels (AISL).

The MDEQ developed the following cleanup criteria for soil:

- Statewide background default levels (SDBL);
- Drinking water protection criteria (DWPC);
- Groundwater surface water interface protection criteria (GSIPC);
- Groundwater contact protection criteria (GCCPCP);
- Soil volatilization to indoor air inhalation criteria; SVIIC);
- Soil volatilization to ambient air inhalation criteria (SVAAIC);
- Particulate soil inhalation criteria (PSIC);
- Direct contact criteria (DCC); and
- Soil saturation screening levels.

The groundwater criteria are from the Michigan Administrative Code, Rule 299.5744. The soil criteria are from Rule 299.5746. These are generic criteria. The rules provide for site-specific criteria based on site-specific information and subject to MDEQ review and approval. Part 201 and its administrative rules require use of residential criteria as a basis for determining if any remedial action is needed.

## 6.2 RESULTS

Tables 6-1 through 6-10 present the analytical data from different sampling events and compare these data to the Part 201 cleanup criteria.

### 6.2.1 Groundwater

Groundwater samples were collected from seventeen locations, submitted for laboratory analyses of total and dissolved metals utilizing method 6020, and volatile organic compounds, utilizing method 8260.

### 6.2.2 Metals

The most recent unfiltered data collected in May 2004 (see Table 6-1) was used in the evaluation. The November 2004 data was used for those wells that were sampled during that time and this data is presented in Table 6-2.

The following metals were detected in one or more sample locations at concentrations above analytical method detection limits:

- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Calcium
- Chromium
- Cobalt
- Copper
- Iron
- Lead
- Magnesium
- Manganese
- Nickel
- Potassium
- Sodium
- Thallium
- Zinc
- Mercury

Concentrations of most of these metals did not exceed Part 201 Generic Cleanup Criteria and Screening Levels for groundwater at the seventeen locations sampled. Aluminum in MW12 unfiltered sample exceeded the Part 201 residential drinking water criteria. This concentration of aluminum may be background concentrations, but there are no designated background monitoring wells to provide background data. Concentrations of all metals in filtered samples from the same well met all Part 201 criteria. The concentration of copper and mercury in RG01 duplicate pair exceeded the GSWIC criteria. The concentration of lead in unfiltered sample MW20 and unfiltered sample MW22 exceeded the Part 201 residential drinking water criteria. MW22 also exceeded the GSWIC criteria. Concentrations of the lead in the filtered samples from these wells met all Part 201 criteria. Filtered samples were collected for these wells because they failed to clean up to 5 NTUs during purging.

### 6.2.3 Organic Compounds

The following volatile organic compounds were detected in one or more sample locations at concentrations above analytical method detection limits:

- Chloromethane            1,1,1 Trichloroethane Tetrachloroethylene
- Trichloroethene        Toluene

Trichloroethene was detected in sample MW8 at a concentration of 19 micrograms per liter. The level of trichloroethene at this location exceeds Part 201 Residential and Commercial I Drinking Water criteria. The concentrations of all other compounds detected in the groundwater samples did not exceed any Part 201 criteria.

## 6.3 SOIL

Soil samples were collected from numerous locations during sampling events in 1985, 1986, 1987, 1990, 1991, 1995, 1996, and 2003. Soil samples were submitted for laboratory analyses of metals, volatile organic compounds, semi-volatile organic compounds and polychlorinated biphenyls. The data is presented in Tables 6-3 through 6-10.

### 6.3.1 Metals

The following metals were detected in one or more sample locations at concentrations above method detection limits:

- Aluminum                Cobalt            Mercury        Zinc
- Arsenic                  Copper            Nickel
- Barium                  Iron                Potassium
- Calcium                Lead                Selenium
- Beryllium              Magnesium       Sodium
- Chromium              Manganese       Vanadium

Aluminum, iron, and manganese concentrations exceeded Part 201 Drinking Water Protection criteria (DWPC) for soils in many samples. However, statewide background default levels were not exceeded and these compounds are therefore not considered chemicals of concern. Chromium was detected in two locations (SB13 and SB14) above statewide background default levels; however, they did not exceed any Part 201 criteria and are also not considered chemicals of concern.

Mercury was detected in one location (SB06-103) at a concentration that exceeded Part 201 Groundwater Surface Water Interface Protection criteria (GSIPC) as well as statewide background default levels.

Concentrations of the remaining metals were detected at levels below Part 201 criteria and statewide background default levels.

### 6.3.2 Organic Compounds

The following volatile organic compounds were detected in one or more sample locations at concentrations above method detection limits:

- Acetone                      Methylethyl ketone                      1,1,1-Trichloroethane
- Benzene                      Methylene chloride                      Xylenes
- Carbon disulfide                      Styrene
- Chlorobenzene                      Tetrachloroethylene
- Chloroform                      Trichloroethylene
- Ethylbenzene                      Toluene
- 

Benzene and toluene were detected at two locations at concentrations that exceed Part 201 criteria for DWPC, GSIPC, Groundwater Contact Protection criteria (GCPC) and Direct Contact criteria (DCC). Chlorobenzene was detected at one location at a concentration that exceeds Part 201 criteria for DWPC, GSIPC, GCPC and DCC. Ethyl benzene was detected at three locations at concentrations that exceed Part 201 criteria for GSIPC and at two locations at concentrations that exceed Part 201 criteria for DWPC, GCPC and DCC. Methylene chloride was detected at one location at concentrations that exceed Part 201 criteria for DWPC. Xylenes were detected at three locations at concentrations that exceed Part 201 criteria for DWPC and at four locations at concentrations that exceed Part 201 criteria for GSIPC. The remaining volatile organic compounds detected in the soil did not exceed any Part 201 criteria.

The following semi-volatile organic compounds were detected in one or more sample locations at concentrations above method detection limits:

- Acenaphthene                      Butyl benzyl phthalate
- Benzo(a)anthracene                      Chrysene
- Benzo(a)pyrene                      Di-n-butyl phthalate
- Benzo(b)fluoranthene                      Fluoranthene
- Benzo(g,h,i)perylene                      Pentachlorophenol
- Benzo(k)fluoranthene                      Phenantrene
- Bis(2-ethyl hexyl)phthalate                      Pyrene

Pentachlorophenol was detected at two locations at concentrations that exceeded Part 201 criteria for DWPC. The remaining semi-volatile organic compounds detected in the soil did not exceed any Part 201 criteria.

Polychlorinated biphenyls were not detected in soil samples above method detection limits.

## **6.4 SUMMARY AND CONCLUSIONS**

### **6.4.1 Groundwater**

Copper and mercury exceeded the GSWIC in the RG01 duplicate pair. The concentration of copper was exceeded in the sample but not in the duplicate. The concentration of mercury was exceeded in the duplicate only. Application of the GSWIC criteria involves best professional judgment, considering the presence of a hydraulic connection between groundwater and surface water, the proximity of surface water, the direction of groundwater movement, the presence of structures or natural features that could alter the direction of groundwater movement, the mass of the hazardous substance present, and evidence of natural attenuation at the site. In this case there probably is a hydraulic connection, the surface water is quite far (approximately one mile) from the impacted soil, there are no structures that could affect the direction of flow, the mass of contaminants is probably low and there is no evidence for natural attenuation. Based on these considerations, the GSWIC criteria are considered not applicable and copper and mercury are not considered chemicals of concern.

The concentration of TCE in one well (MW08) exceeds the cleanup criteria for residential, commercial, and industrial land uses. TCE concentrations in MW08 were also exceeded in the 2003 round of sampling (14 µg/l) and the 2002 round of sampling (11 µg/l). It was detected at low concentrations (3 µg/l in 1990 and 1991). TCE is considered a chemical of concern.

### **6.4.2 Soil**

Written documentation exists that the tanks and the soil were removed in the fuel depot area and disposed of properly (Barr, p.204, 2002). No chemicals of concern remain in this area.

No PCBs were detected in soils from the transformer areas and no chemicals of concern are present in this area.

PCP was detected in some soil borings at concentrations above the drinking water protection criterion for soil. Groundwater samples were analyzed for PCP in the 2004 monitoring round in MW6, MW7, and MW15. These wells are in the vicinity of the

detections of PCP in the soil. No PCP was detected in the groundwater samples and no additional investigation in this area appears warranted.

Mercury was detected in one soil sample (SB06-104 in 1990) at a concentration that slightly exceeded the GSIP criteria and the background criterion. Additionally, concentrations of benzene, ethylbenzene and xylene in SBA7B1 (10 to 12 feet, 1995 sampling) exceeded the soil criteria for protection of the GSIP criteria. Application of the GSIP criteria involves best professional judgment, considering the presence of a hydraulic connection between groundwater and surface water, the proximity of surface water, the direction of groundwater movement, the presence of structures or natural features that could alter the direction of groundwater movement, the mass of the hazardous substance present, and evidence of natural attenuation at the site. In this case there probably is a hydraulic connection, the surface water is quite far (approximately one mile) from the impacted soil, there are no structures that could affect the direction of flow, the mass of contaminants is probably low and there is no evidence for natural attenuation. Based on these considerations, the GSIP criteria are not considered applicable. These compounds are therefore not considered chemicals of concern.

**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004 sampling round(page 1 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					RG01	RG01-F	RG01-dup	RG01- dupF	RG02	RG02-F
	Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC AISL	5/12/2004	5/12/2004	5/12/2004	5/12/2004	5/13/2004	5/13/2004
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	13.6	6.7	15.6	5.6	13.7	
Antimony	6 {A}	130 {X}	NLV	68000	ID	0.17		0.18			
Arsenic	50 {A}	150 {X}	NLV	4300	ID						
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	16.4	16.1	16.7	16.6	31.6	31
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID					0.025	
Calcium	NA	NA	NA	NA	NA	5020	4840	4920	4890	7160	7170
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	2.3	1.9	3.3	2.3	2.4	2.5
Cobalt	40	100	NLV	2.4E+6	ID	0.039	0.041	0.041	0.042	0.033	0.02
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	28.1	1.1	1.3	1.1	6.2	6.1
Iron	300{E}	NA	NLV	5.8E+7	ID	25	26.6	28.8	26.2	42.3	10.6
Lead	4 {L}	14 {G,X}	NLV	ID	ID	0.45	0.43	1.1		0.24	0.38
Magnesium	4E+5	NA	NLV	1.0E+9	ID	898	905	905	907	1640	1600
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	1.7	2.5	2.4	2.6	1	0.61
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	0.49	1.4	1.2	1.4	0.5	0.51
Potassium	NA	NA	NA	NA	NA	1060	1060	1050	1030	1100	1080
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	914	843	857	812	1120	1050
Thallium	2 {A}	3.7 {X}	NLV	13000	ID						
Zinc	2400	170 {G}	NLV	1.1E+8	ID	4.5	4.5	3.2	3	3.9	3.2
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID			0.12			
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5					0.61	
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00						

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

**abbreviations and footnote key on last page**

sample locations ending in - F were filtered for metals analyses.

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criter

1/27/2005

**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004 (page 2 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					RG04	RG04-F	MW05	MW05-F	MW06	MW06-F
Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AISL	5/10/2004	5/10/2004	5/12/2004	5/12/2004	5/11/2004	5/11/2004
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	14.1	7.2	28.6	11.6	13.5	25.4
Antimony	6 {A}	130 {X}	NLV	68000	ID	0.14		0.13	0.14	1.5	0.85
Arsenic	50 {A}	150 {X}	NLV	4300	ID			0.36			
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	19.3	18.7	9.9	9.7	105	104
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID						
Calcium	NA	NA	NA	NA	NA	1750	1610	2240	2200	11800	11900
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	1.6	1.3	3.1	3	2.7	1.6
Cobalt	40	100	NLV	2.4E+6	ID	0.028	0.018	0.028	0.017	0.041	0.026
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	8.9	7.7	3.8	4.9	5.9	6.4
Iron	300{E}	NA	NLV	5.8E+7	ID	27.7	24.1	41.4	50.1	33.8	18.6
Lead	4 {L}	14 {G,X}	NLV	ID	ID	0.32	0.43	0.27	0.46	0.24	0.38
Magnesium	4E+5	NA	NLV	1.0E+9	ID	285	277	423	420	1530	1540
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	2.1	1.6	1.2	0.77	5.3	4.8
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	0.37	0.48	0.45	0.56	0.48	0.42
Potassium	NA	NA	NA	NA	NA	425	428	772	796	2940	2910
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	836	805	1080	964	1410	1460
Thallium	2 {A}	3.7 {X}	NLV	13000	ID	0.18	0.074				
Zinc	2400	170 {G}	NLV	1.1E+8	ID	7	3.3	3.3	259	2.5	4.1
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID						
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5						
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00						

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

**abbreviations and footnote key on last page**

sample locations ending in - F were filtered for metals analyses.

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criter

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**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004 (page 3 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW07	MW07-F	MW08	MW08-F	MW09	MW09-F
Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AISL	5/11/2004	5/11/2004	5/12/2004	5/12/2004	5/11/2004	5/11/2004
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	31.7		49.5		10.4	
Antimony	6 {A}	130 {X}	NLV	68000	ID						
Arsenic	50 {A}	150 {X}	NLV	4300	ID	0.44	0.37	0.66	0.43	0.75	
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	111	103	45.3	44.3	29	28.3
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID						
Calcium	NA	NA	NA	NA	NA	28700	28500	5670	5690	10700	10700
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	1.5	1.3	4	2.6	2	2.1
Cobalt	40	100	NLV	2.4E+6	ID	0.1	0.032	0.054	0.018	0.015	
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	7.4	3.1	1.5	3.3	4.8	6.2
Iron	300{E}	NA	NLV	5.8E+7	ID	67.6		73	11.2	22.1	9.4
Lead	4 {L}	14 {G,X}	NLV	ID	ID	0.58	0.24	2.2	0.35	0.42	
Magnesium	4E+5	NA	NLV	1.0E+9	ID	4160	4040	1390	1410	968	956
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	4.9	0.49	3	1.1	0.62	
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	0.63	0.39	0.98	0.76	0.34	
Potassium	NA	NA	NA	NA	NA	6200	5930	1040	1030	934	930
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	5590	5320	1390	1340	832	805
Thallium	2 {A}	3.7 {X}	NLV	13000	ID	0.22					
Zinc	2400	170 {G}	NLV	1.1E+8	ID	2.7	2.4	3.6	6.1	3.4	2.6
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID						
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5						
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00			19			

sample locations ending in - F were filtered for metals analyses.

abbreviations and footnote key on last page

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criter

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**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004(page 4 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW09 Dup	MW09 DupF	MW10	MW10-F*	MW11	MW11-F
	RCDWC	GSWIC	RCGVIAIC	GCC	AISL	5/11/2004	5/11/2004	5/11/2004	5/11/2004	5/10/2004	5/10/2004
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	10.1		42.1		26.3	
Antimony	6 {A}	130 {X}	NLV	68000	ID						
Arsenic	50 {A}	150 {X}	NLV	4300	ID	0.41		0.5			
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	28.3	28.9	33.6		9.2	9.1
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID						
Calcium	NA	NA	NA	NA	NA	10700	10600	9130		1680	1610
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	1.6		2.1		2.5	2.1
Cobalt	40	100	NLV	2.4E+6	ID			0.045		0.029	
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	6.5	4.3	4.1		8.1	7.4
Iron	300{E}	NA	NLV	5.8E+7	ID	43.1	9.5	57.1		35.4	10.6
Lead	4 {L}	14 {G,X}	NLV	ID	ID		0.67	0.4		0.31	0.54
Magnesium	4E+5	NA	NLV	1.0E+9	ID	957	952	1870		300	275
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	0.7		1.5		1.5	0.76
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	0.31	0.36	0.35		0.31	0.43
Potassium	NA	NA	NA	NA	NA	947	960	652		458	411
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	913	824	992		837	787
Thallium	2 {A}	3.7 {X}	NLV	13000	ID						0.082
Zinc	2400	170 {G}	NLV	1.1E+8	ID	2.5	4.3	4		3.1	4
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID						
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5						
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00						

filtered analyses not performed for MW10

sample locations ending in - F were filtered for metals analyses.

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criteria

abbreviations and footnote key on last page

**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004(page 5 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW12	MW12-F	MW13	MW13-F	MW14	MW14-F
Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AISL	5/10/2004	5/10/2004	5/10/2004	5/10/2004	5/13/2004	5/13/2004
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	62.9	6.3	13		17.1	19.6
Antimony	6 {A}	130 {X}	NLV	68000	ID					0.22	0.28
Arsenic	50 {A}	150 {X}	NLV	4300	ID						
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	14.4	13.3	35.4	35.1	9.1	8.7
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID						
Calcium	NA	NA	NA	NA	NA	2170	2090	2900	2810	2070	2060
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	2.6	2.2	2.5		2.8	3.6
Cobalt	40	100	NLV	2.4E+6	ID	0.064	0.016	0.024	0.023	0.029	0.021
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	7.3	8.3	6.6	7.6	5.6	6.9
Iron	300{E}	NA	NLV	5.8E+7	ID	84.7	14.3	21.7	14.4	61.9	35
Lead	4 {L}	14 {G,X}	NLV	ID	ID	0.38	0.61	0.9	0.41	0.44	1.9
Magnesium	4E+5	NA	NLV	1.0E+9	ID	349	336	496	507	370	359
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	3	1.1	3.1	2.8	1.2	0.88
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	0.53	0.59	0.3	0.65	0.64	0.58
Potassium	NA	NA	NA	NA	NA	497	519	1380	1330	818	772
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	975	1040	905	1020	1030	1170
Thallium	2 {A}	3.7 {X}	NLV	13000	ID						
Zinc	2400	170 {G}	NLV	1.1E+8	ID	3.5	116	2.5	4.4	5	7.3
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID						
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5						
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00						

sample locations ending in - F were filtered for metals analyses.

abbreviations and footnote key on last page

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criter

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**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004 (page 6 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW15	MW15-F	MW16	MW16-F	MW17	MW17-F
Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AISL	5/11/2004	5/11/2004	5/10/2004	5/10/2004	5/12/2004	5/12/2004
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	19.4	18.6	11.4	5.7	42.8	14.6
Antimony	6 {A}	130 {X}	NLV	68000	ID			0.18			
Arsenic	50 {A}	150 {X}	NLV	4300	ID		0.36				
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	116	116	25.9	25.2	38.3	37.9
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID						
Calcium	NA	NA	NA	NA	NA	24700	24800	2050	1970	23400	23500
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	1.7		3.7	1.4	3	2.2
Cobalt	40	100	NLV	2.4E+6	ID	0.046	0.032	0.035	0.034	0.044	0.039
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	3.1	9.3	9.5	6.7	7.9	6.1
Iron	300{E}	NA	NLV	5.8E+7	ID	48.4	27.1	24	12.7	31.6	26.6
Lead	4 {L}	14 {G,X}	NLV	ID	ID	0.21	0.64	0.52	0.62	0.32	0.43
Magnesium	4E+5	NA	NLV	1.0E+9	ID	3350	3340	396	392	4060	3990
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	1.8	0.76	4.3	3.9	1.7	1.3
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	0.52	0.48	0.54	0.58	0.6	0.78
Potassium	NA	NA	NA	NA	NA	4380	4480	653	597	1500	1560
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	2110	2300	1480	1410	1640	1390
Thallium	2 {A}	3.7 {X}	NLV	13000	ID						
Zinc	2400	170 {G}	NLV	1.1E+8	ID	4.2	2.8	36.7	4.2	5.9	5.3
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID						
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5						
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00						

sample locations ending in - F were filtered for metals analyses.

abbreviations and footnote key on last page

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criter

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**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004 (page 7 of 8)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW18	MW18-F				
Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AI SL	5/12/2004	5/12/2004				
<i>SW6020 ug/L</i>											
Aluminum	50 {V}	NA	NLV	6.4E+7	ID	16.6					
Antimony	6 {A}	130 {X}	NLV	68000	ID						
Arsenic	50 {A}	150 {X}	NLV	4300	ID	0.44					
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	29.8	30.1				
Beryllium	4 {A}	6.7 {G}	NLV	2.9E+5	ID						
Calcium	NA	NA	NA	NA	NA	6980	6720				
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID	2	2.4				
Cobalt	40	100	NLV	2.4E+6	ID	0.056	0.038				
Copper	1,000 {E}	13 {G}	NLV	7.4E+6	ID	1.4	1.2				
Iron	300{E}	NA	NLV	5.8E+7	ID	37.2					
Lead	4 {L}	14 {G,X}	NLV	ID	ID	0.3	0.48				
Magnesium	4E+5	NA	NLV	1.0E+9	ID	1510	1420				
Manganese	50	2.8 E+3{G,X}	NLV	9E+6	ID	4.2	2.5				
Nickel	100 {A}	73 {G}	NLV	7.4E+7	ID	1.9	0.76				
Potassium	NA	NA	NA	NA	NA	1030	1010				
Sodium	1.2 E+5	NA	NLV	1.0E+9	ID	1270	1280				
Thallium	2 {A}	3.7 {X}	NLV	13000	ID						
Zinc	2400	170 {G}	NLV	1.1E+8	ID	6.2	3.3				
<i>SW7470A ug/L</i>											
Mercury	2 {A}	1.3E-3 {Z}	NLV	56 {S}	ID						
<i>SW8260LL ug/L</i>											
Chloromethane	260	ID	8600	4.9E+5	2.1E+5						
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,00	0.56					

sample locations ending in - F were filtered for metals analyses.

abbreviations and footnote key on last page

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criterion

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**Table 6-1 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria May 2004 (page 8 of 8)**

**Abbreviation and Footnote Key**

- (1) = Residential and Commercial I Drinking Water Criteria (RCDWC)
- (2) = Groundwater Surface Water Interface Criteria (GSWIC)
- (3) = Residential and Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria (RCGVIAIC)
- (4) = Groundwater Contact Criteria (GCC)
- (5) = Acute Inhalation Screening Levels (AISL)

{A} = Criterion is State of Michigan drinking water standard established pursuant to section 5 of 1976 PA 399, MCL 325.1005.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{S} = Criterion defaults to the hazardous substance specific water solubility limit.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

ND = Criterion or value not detected above Method Detection Limits.

{E} = Criterion is aesthetic drinking water value, as required by section 20120a(5) of the act.

{G} = Groundwater surface water interface criterion depends on the pH or water hardness, which is estimated at 150,000.

{L} = Criteria for lead are derived using a biologically based model, as allowed for under section 20120a(10) of the act, and are not calculated using the algorithms and assumptions specified in pathway specific rules.

**Table 6-2 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria November 2004 (page 1 of 3)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW07	MW07-DUP	MW08	MW18	MW19	MW20	
	Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AI SL	11/10/2004	11/10/2004	11/09/2004	11/09/2004	5/10/2004	5/10/2004
<i>SW6010B ug/L</i>												
Arsenic	50 {A}	150 {X}	NLV	4300	ID							
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID					72.4	93.6	
Cadmium	5.0 {A}	2.5 {G,X}	NLV	1.9E+5	ID							
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID						6	
Lead	4 {L}	14 {G,X}	NLV	ID	ID						9	
Selenium	50 {A}	5	NLV	970000	ID						3.7	
<i>SW8260LL ug/L</i>												
1,1,1-Trichloroethane	200 {A}	200	6.6E+5{S}	1.3E+6{S}	1.3E+6{S}					0.46	0.74	
Chloromethane	260	ID	8600	4.9E+5	2.1E+5							
Tetrachloroethylene	5.0 {A}	45	25000	12000	2.0E+5{S}					0.44	0.54	
Toluene	790 {E}	140	5.3E+5{S}	5.3E+5{S}	ID					0.79	0.4	
Trichloroethene	5 {A}	200 {X}	15000	22000	1,100,000 {S}			19	0.8	4.4	0.52	

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

**abbreviations and footnote key on last page**

sample locations ending in - F were filtered for metals analyses.

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Criter

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**Table 6-2 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria (page 2 of 3)**

Location	Part 201 Residential and Commercial Generic Cleanup Criteria					MW20-F	MW21	MW21-F	MW22	MW22-F	
	Collection Date	RCDWC	GSWIC	RCGVIAIC	GCC	AI SL	11/10/2004	11/10/2004	11/10/2004	11/12/2004	11/12/2004
<i>SW6010B ug/L</i>											
Arsenic	50 {A}	150 {X}	NLV	4300	ID				25.4		
Barium	2,000 {A}	670 {G,X}	NLV	1.4E+7	ID	24.2	66.3	15.9	308	23.7	
Cadmium	5.0 {A}	2.5 {G,X}	NLV	1.9E+5	ID				0.64		
Chromium	100 {A}	100 {G,X}	NLV	2.9E+8	ID		3.8		14.1		
Lead	4 {L}	14 {G,X}	NLV	ID	ID		8.8		94.8	2.8	
Selenium	50 {A}	5	NLV	970000	ID	3.7	3.4	3.4			
<i>SW8260LL ug/L</i>											
1,1,1-Trichloroethane	200 {A}	200	6.6E+5{S}	1.3E+6{S}	1.3E+6{S}				0.32		
Chloromethane	260	ID	8600	4.9E+5	2.1E+5		0.96				
Tetrachloroethylene	5.0 {A}	45	25000	12000	2.0E+5{S}				0.69		
Toluene	790 {E}	140	5.3E+5{S}	5.3E+5{S}	ID		0.44				
Trichloroethene	5 {A}	200 {X}	15000	22000	00,000 {S}						

**NOTE: only compounds that were detected in one or more samples collected from the site are shown**

**abbreviations and footnote key on last page**

sample locations ending in - F were filtered for metals analyses.

shading indicates that concentrations exceeds one or more Part 201 Generic Cleanup Crit

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**Table 6-2 Groundwater Investigation Results Compared to Part 201 Cleanup Criteria November 2004 (page 3 of**

**Abbreviation and Footnote Key**

- (1) = Residential and Commercial I Drinking Water Criteria (RCDWC)
- (2) = Groundwater Surface Water Interface Criteria (GSWIC)
- (3) = Residential and Commercial I Groundwater Volatilization to Indoor Air Inhalation Criteria (RCGVIAIC)
- (4) = Groundwater Contact Criteria (GCC)
- (5) = Acute Inhalation Screening Levels (AISL)

{A} = Criterion is State of Michigan drinking water standard established pursuant to section 5 of 1976 PA 399, MCL 325.1005.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{S} = Criterion defaults to the hazardous substance specific water solubility limit.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

ND = Criterion or value not detected above Method Detection Limits.

{E} = Criterion is aesthetic drinking water value, as required by section 20120a(5) of the act.

{G} = Groundwater surface water interface criterion depends on the pH or water hardness, which is estimated at 150,000.

{L} = Criteria for lead are derived using a biologically based model, as allowed for under section 20120a(10) of the act, and are not calculated using the algorithms and assumptions specified in pathway specific rules.

**Table 6-3 1985 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 1 of 1)**

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria					Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	Tank C-1	Tank C-2	Tank C-3	Trans 3				
Polychlorinated Biphenyls													
Total PCBs	NLL	NLL	NLL	5,200,000	{T}	ND	ND	ND	ND				

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follow:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)

{T} = Part 201 soil direct contact criteria, as provided in the table, of 4,000 ppb is used with the assumption that TSCA standards are not applicable

NLL = Hazardous substance is not likely to leach under most soil conditions

ND = Not detected above Method Detection Limit (MDL)

Table 6-4 1986 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF, Raco, Michigan ( page 1 of 1 )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	RS2	RS3	RS4	RS5	RS6	RS7	RS9	
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	1.1	ND	ND	ND	8.4	ND	
Methylene Chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	42.8	36.2	36.2	24.7	21.3	50.9	19.5	
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	1.1	ND	ND	ND	ND	2.4	ND	
<b>Metals</b>														
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	1,440	ND	800	560	470	640	710	
Barium	1,300,000	98,000 {G,X}	1,000,000,000 {D}	330,000,000	3,700,000	75,000	7,300	ND	5,900	5,800	8,100	6,300	2,900	
Chromium	1,000,000,000 {D}	4,300,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	4,900	3,100	2,100	2,300	2,800	2,400	2,900	
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	12,400	ND	ND	ND	ND	ND	ND	

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

ID = Insufficient data to develop criterion.

ND = Not detected above Method Detection Limit (MDL).

Table 6-5 1987 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 1 of 1 )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GPCPC	PSIC	DCC	SBDL	RS-1	RS-1 DUP	RS-1	RS-8	Tank 2S (S)	Tank 7N (S)	Tank B-1 (S)	Tank C-1
<b>Volatile Organic Compounds</b>														
Benzene	100	4,000 {X}	220,000	380,000,000	180,000	NA	ND	ND	ND	ND	4,200,000 (1,2,3,5)	1,100,000 (1,2,3,5)	ND	ND
Chlorobenzene	2,000	940	260,000 {C}	4,700,000,000	260,000 {C}	NA	ND	ND	ND	ND	1,100,000 (1,2,3,5)	ND	ND	ND
Chloroform	2,000 {W}	3,400 {X}	1,500,000 {C}	1,300,000,000	120,000	NA	ND	ND	54	ND	ND	ND	ND	ND
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	0.6	17,000,000 (1,2,3,5)	5,100,000 (1,2,3,5)	ND	ND
Methylene Chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	130.6 (1)	28.3	6	25.5	ND	ND	ND	ND
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	9.7	3.6	4	ND	42,000,000 (1,2,3,5)	18,000,000 (1,2,3,5)	ND	ND
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	NA	NA	NA	NA	310,000,000 (1,2,5)	85,000,000 (1,2,5)	380,000 (1,2)	ND
<b>Metals</b>														
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	1,480	1,150	ND	1,060	NA	NA	NA	NA
Barium	1,300,000	98,000 {G,X}	1,000,000,000 {D}	330,000,000	3,700,000	75,000	8,400	8,700	8,600	6,100	NA	NA	NA	NA
Cadmium	6,000	180,000 {G,X}	230,000,000	1,700,000	550,000	1,200	ND	ND	440	ND	NA	NA	NA	NA
Chromium	1,000,000,000 {D}	4,300,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	4,300	3,100	2,300	3,000	NA	NA	NA	NA

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GPCPC	PSIC	DCC	SBDL	Tank C-2							
<b>Volatile Organic Compounds</b>														
Benzene	100	4,000 {X}	220,000	380,000,000	180,000	NA	ND							
Chlorobenzene	2,000	940	260,000 {C}	4,700,000,000	260,000 {C}	NA	ND							
Chloroform	2,000 {W}	3,400 {X}	1,500,000 {C}	1,300,000,000	120,000	NA	ND							
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND							
Methylene Chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	ND							
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND							
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND							
<b>Metals</b>														
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA							
Barium	1,300,000	98,000 {G,X}	1,000,000,000 {D}	330,000,000	3,700,000	75,000	NA							
Cadmium	6,000	180,000 {G,X}	230,000,000	1,700,000	550,000	1,200	NA							
Chromium	1,000,000,000 {D}	4,300,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA							

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GPCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{W} = Concentrations of trihalomethanes shall be added together to determine compliance with the drinking water protection criterion of 2,000 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

ND = Not detected above Method Detection Limit (MDL).

Table 6-6 1990 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 1 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location								
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB01-101	SB01-102	SB01-103	SB01-104	SB01-105	SB02-101	SB02-102	SB02-103	
<b>Volatile Organic Compounds</b>															
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	ND	ND	ND	ND	27	ND	ND	27	
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	9	ND							
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	ND	ND	14	ND	ND	83	ND	
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	18	8	ND	11	9	21	16	13	
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	ND	32	ND	9	ND	ND	30	ND	
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND	
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND	
<b>Polynuclear Aromatic Hydrocarbons</b>															
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	620	1100	390	460	30	220	330	240	
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	ND	52	ND	ND	ND	ND	ND	ND	
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	40	71	43	39	ND	30	ND	ND	
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Pentachlorophenol	22	17,000 {G,X}	4,300	100,000,000	90,000	NA	69 (1)	ND	ND	ND	78 (1)	ND	ND	ND	
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
<b>Metals</b>															
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA	NA	NA	NA	NA	NA	
Antimony	4,300	94,000	49,000,000	13,000,000	180,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA	NA	NA	NA	NA	NA	
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA	NA	NA	NA	NA	NA	
Calcium	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA	
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA	NA	NA	NA	NA	NA	
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA	NA	NA	NA	NA	NA	
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA	NA	NA	NA	NA	NA	
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA	
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA	NA	NA	NA	NA	NA	
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	NA	NA	NA	NA	NA	NA	NA	NA	
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA	NA	NA	NA	NA	NA	
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA	NA	NA	NA	NA	NA	

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{W} = Concentrations of trihalomethanes shall be added together to determine compliance with the drinking water protection criterion of 2,000 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-6 1990 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 2 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB02-104	SB02-105	SB03-101	SB03-102	SB03-102 DUP	SB03-103	SB03-104	SB03-105
<b>Volatile Organic Compounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	ND	ND	NA	NA	NA	NA	NA	NA
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	15	ND	NA	NA	NA	NA	NA	NA
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	ND	27	NA	NA	NA	NA	NA	NA
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	27	NA	NA	NA	NA	NA	NA
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	ND	22	NA	NA	NA	NA	NA	NA
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	ND	10	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	ND	ND	NA	NA	NA	NA	NA	NA
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND	ND	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	ND	ND	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	NA	NA	NA	NA	NA	NA
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	35	ND	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	43	ND	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	320	110	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	ND	61	NA	NA	NA	NA	NA	NA
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	29	ND	NA	NA	NA	NA	NA	NA
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	ND	42	NA	NA	NA	NA	NA	NA
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	NA	NA	NA	NA	NA	NA
Pentachlorophenol	22	{G,X}	4,300	100,000,000	90,000	NA	ND	ND	NA	NA	NA	NA	NA	NA
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	11	NA	NA	NA	NA	NA	NA
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	NA	NA	NA	NA	NA	NA
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	4,300	94,000	49,000,000	13,000,000	180,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA	NA	NA	NA	NA	NA
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA	NA	NA	NA	NA	NA
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA	NA	NA	NA	NA	NA
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
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- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{W} = Concentrations of trihalomethanes shall be added together to determine compliance with the drinking water protection criterion of 2,000 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-6 1990 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 3 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB04-101	SB04-102	SB04-103	SB04-103 DUP	SB04-104	SB04-104 DUP	SB04-105	SB04-107
<b>Volatile Organic Compounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	8	ND	ND	61	70	21	ND	10
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	180	ND	49	ND	ND	66	ND	ND
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	27	72	13	35	ND	34	25	39
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	14	ND	47	ND	ND	7	28	ND
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	ND	ND	ND	ND	ND	ND	4	ND
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND	ND	ND	2	ND	ND	ND	ND
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	ND	ND	ND	ND	ND	ND	14	ND
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	280	380	66	180	ND	160	53	ND
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	38	41	39	51	ND	55	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	27	ND	13	ND	ND
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	33	ND	ND	44	ND	47	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	22	{G,X}	4,300	100,000,000	90,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	22	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	26	ND	ND	ND	ND
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	4,300	94,000	49,000,000	13,000,000	180,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA	NA	NA	NA	NA	NA
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA	NA	NA	NA	NA	NA
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA	NA	NA	NA	NA	NA
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{W} = Concentrations of trihalomethanes shall be added together to determine compliance with the drinking water protection criterion of 2,000 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-6 1990 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 4 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location								
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB05-107	SB05-108	SB05-109	SB06-101	SB06-102	SB06-103	SB06-104	SB06-105	
<b>Volatile Organic Compounds</b>															
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	NA	NA	NA	ND	<b>10</b>	<b>13</b>	<b>29</b>	<b>65</b>	
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	NA	NA	NA	ND	ND	ND	ND	ND	
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	NA	NA	NA	ND	ND	ND	ND	<b>2</b>	
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	NA	NA	NA	ND	ND	ND	ND	ND	
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	NA	NA	NA	<b>150 (1)</b>	<b>27</b>	<b>28</b>	<b>46</b>	<b>29</b>	
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	NA	NA	NA	ND	ND	ND	ND	ND	
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	NA	NA	NA	ND	ND	ND	ND	ND	
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	NA	NA	NA	ND	ND	ND	ND	ND	
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	NA	NA	NA	ND	ND	ND	ND	ND	
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	NA	NA	NA	<b>4</b>	ND	ND	ND	ND	
<b>Polynuclear Aromatic Hydrocarbons</b>															
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	<b>31</b>	ND	ND	ND	ND	ND	ND	
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	<b>45</b>	ND	ND	ND	ND	ND	ND	
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	<b>270</b>	<b>530</b>	<b>71,000</b>	<b>30</b>	ND	ND	ND	ND	
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	ND	ND	ND	ND	ND	ND	<b>52</b>	ND	
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	ND	<b>53</b>	<b>31</b>	<b>25</b>	ND	ND	<b>48</b>	ND	
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Pentachlorophenol	22	{G,X}	4,300	100,000,000	90,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND	
<b>Metals</b>															
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA	<b>862,000 (1)</b>	<b>724,000 (1)</b>	<b>552,000 (1)</b>	<b>569,000 (1)</b>	<b>564,000 (1)</b>	
Antimony	4,300	94,000	49,000,000	13,000,000	180,000	NA	NA	NA	NA	ND	<b>410</b>	ND	ND	ND	
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA	<b>190</b>	<b>160</b>	<b>130</b>	<b>150</b>	<b>130</b>	
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA	<b>8,300</b>	<b>5,700</b>	<b>4,300</b>	<b>6,300</b>	<b>7,900</b>	
Calcium	-	-	-	-	-	-	NA	NA	NA	<b>173,000</b>	<b>159,000</b>	<b>95,900</b>	<b>180,000</b>	<b>229,000</b>	
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA	<b>1,100</b>	<b>4,300</b>	<b>720</b>	<b>1,600</b>	<b>2,400</b>	
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA	<b>1,000</b>	ND	ND	<b>860</b>	<b>840</b>	
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA	<b>694,000 (1)</b>	<b>663,000 (1)</b>	<b>478,000 (1)</b>	<b>698,000 (1)</b>	<b>736,000 (1)</b>	
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	<b>840</b>	<b>650</b>	<b>1,700</b>	<b>19,000</b>	<b>700</b>	
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA	<b>201,000</b>	<b>181,000</b>	<b>139,000</b>	<b>177,000</b>	<b>181,000</b>	
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA	<b>30,700 (1)</b>	<b>19,500 (1)</b>	<b>10,800 (1)</b>	<b>17,600 (1)</b>	<b>16,200 (1)</b>	
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	NA	NA	NA	ND	ND	<b>200 (2,6)</b>	ND	ND	
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA	ND	<b>60</b>	ND	<b>50</b>	<b>50</b>	
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA	<b>19,200</b>	<b>8,400</b>	ND	<b>13,600</b>	<b>8,800</b>	
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	NA	NA	NA	ND	<b>100</b>	<b>90</b>	ND	ND	
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA	<b>1,400</b>	<b>2,000</b>	ND	<b>1,200</b>	<b>1,400</b>	
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA	<b>4,000</b>	<b>2,500</b>	<b>1,800</b>	<b>2,000</b>	<b>2,600</b>	

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Raco, Michigan (page 5 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB06-106	SB07-101	SB07-102	SB07-103	SB07-104	SB07-105*	SB07-105*	SB07-105 DUP
<b>Volatile Organic Compounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	ND	11	ND	4	ND	NA	8	12
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	ND	5	ND	NA	ND	ND	ND
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	2	ND	ND	ND	NA	ND	ND	ND
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	ND	ND	ND	NA	ND	ND	ND
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	27	76	86	7	95	NA	59	89
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	ND	ND	ND	ND	NA	ND	ND	ND
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND	ND	ND	ND	NA	ND	ND	ND
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	14	ND	ND	ND	NA	ND	ND	ND
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	NA	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	220	1800	190	67	150	NA	230	180
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	35	ND	ND	ND	NA	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	ND	ND	ND	ND	NA	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Pentachlorophenol	22	{G,X}	4,300	100,000,000	90,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	NA	ND	ND	ND
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	568,000 (1)	782,000 (1)	582,000 (1)	671,000 (1)	414,000 (1)	354,000(1)	670,000 (1)	571,000 (1)
Antimony	4,300	94,000	49,000,000	13,000,000	180,000	NA	ND	320	320	320	310	320	ND	310
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	150	190	ND	ND	ND	ND	ND	ND
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	9,600	39,000	3,700	5,200	5,500	620	9,500	6,800
Calcium	-	-	-	-	-	-	302,000	NA	NA	NA	NA	NA	NA	NA
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	1,100	NA	NA	NA	NA	NA	NA	NA
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	930	NA	NA	NA	NA	NA	NA	NA
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	684,000	NA	NA	NA	NA	NA	NA	NA
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	690	NA	NA	NA	NA	NA	NA	NA
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	180,000	NA	NA	NA	NA	NA	NA	NA
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	20,300 (1)	15,100 (1)	12,100 (1)	16,500 (1)	16,000 (1)	17,100 (1)	25,800 (1)	22,500 (1)
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	ND	NA	NA	NA	NA	NA	NA	NA
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	110	110	110	100	110	ND	100
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	8,100	29,200	18,300	25,600	24,300	27,200	34,600	22,500
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	1,100	2,000	2,700	2,200	2,100	2,200	2,600	1,900
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	1,900	520	6,800	9,100	940	ND	2,700	1,700

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{W} = Concentrations of trihalomethanes shall be added together to determine compliance with the drinking water protection criterion of 2,000 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-6 1990 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 6 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB07-106	SB08-101	SB08-102	SB08-103	SB08-104	SB08-104 DUP	SB08-105	SB08-106
<b>Volatile Organic Compounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	ND	NA	NA	NA	NA	NA	NA	NA
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	NA	NA	NA	NA	NA	NA	NA
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	ND	NA	NA	NA	NA	NA	NA	NA
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	<b>84</b>	NA	NA	NA	NA	NA	NA	NA
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	ND	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	ND	NA	NA	NA	NA	NA	NA	NA
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	ND	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	NA	NA	NA	NA	NA	NA	NA
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	<b>1500</b>	<b>400</b>	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	<b>160</b>	<b>86</b>	<b>480</b>	ND	<b>86</b>	<b>97</b>	<b>230</b>	<b>350</b>
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	<b>100</b>	ND	ND	ND	ND	ND
Pentachlorophenol	22	{G,X}	4,300	100,000,000	90,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	<b>300</b>	<b>130</b>	ND	ND	ND	ND
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	500 {M}	94,000	49,000,000	13,000,000	180,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA	NA	NA	NA	NA	NA
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA	NA	NA	NA	NA	NA
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA	NA	NA	NA	NA	NA
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA	NA	NA	NA	NA	NA
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

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- (6) = Statewide Background Default Levels (SBDL)

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{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{W} = Concentrations of trihalomethanes shall be added together to determine compliance with the drinking water protection criterion of 2,000 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

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Table 6-6 1990 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 7 of 7 pages )

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location						
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB08-107	SB08-108	SB08-109				
<b>Volatile Organic Compounds</b>													
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	NA	NA	NA				
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	NA	NA	NA				
Chloroform	1,600	3,400 {X}	1,500,000 {C}	1,300,000,000	1,200,000	NA	NA	NA	NA				
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	NA	NA	NA				
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	NA	NA	NA				
Styrene	2,700	2,200	270,000	5,500,000,000	400,000	NA	NA	NA	NA				
Tetrachloroethylene	100	900 {X}	88,000 {C}	5,400,000,000	88,000 {C}	NA	NA	NA	NA				
Toluene	16,000	2,800	250,000 {C}	27,000,000,000	250,000 {C}	NA	NA	NA	NA				
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	NA	NA	NA				
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	NA	NA	NA				
<b>Polynuclear Aromatic Hydrocarbons</b>													
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND				
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND				
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND				
Benzo(k)fluoranthene	NLL	NLL	NLL	ID	200,000	NA	ND	ND	ND				
Bis(2-ethylhexyl)phthalate	NLL	NLL	NLL	700,000,000	2,800,000	NA	ND	ND	ND				
Butyl benzyl phthalate	310,000 {C}	26,000 {X}	310,000 {C}	47,000,000,000	310,000 {C}	NA	ND	<b>114</b>	<b>1600</b>				
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND				
Di-n-butyl phthalate	760,000 {C}	11,000	760,000 {C}	3,300,000,000	760,000 {C}	NA	ND	ND	ND				
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND				
Pentachlorophenol	22	{G,X}	4,300	100,000,000	90,000	NA	ND	ND	ND				
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND				
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND				
<b>Metals</b>													
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA				
Antimony	500 {M}	94,000	49,000,000	13,000,000	180,000	NA	NA	NA	NA				
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA				
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA				
Calcium	-	-	-	-	-	-	NA	NA	NA				
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA				
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA				
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA				
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA				
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA				
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA				
Mercury	1,700	50 {M}	47,000	20,000,000	160,000	130	NA	NA	NA				
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA				
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA				
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	NA	NA	NA				
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA				
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA				

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
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{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

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Table 6-7 1991 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 1 of 5 pages)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB13-101	SB13-102	SB13-103	SB13-104	SB13-105	SB13-106	SB13-107	SB13-107 DUP
<b>Volatile Organic Copmounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	ND	ND	ND	ND	ND	ND	ND	NA
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	NA
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	NA
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	ND	ND	ND	ND	ND	ND	ND	NA
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	NA
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	865,000 (1)	972,000 (1)	788,000 (1)	487,000 (1)	574,000 (1)	721,000 (1)	615,000 (1)	808,000 (1)
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	ND	ND	210	ND	ND	ND	ND	ND
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	4,100	8,400	7,700	4,700	5,400	5,500	5,800	7,200
Calcium	-	-	-	-	-	-	191,000	337,000	324,000	215,000	235,000	301,000	310,000	331,000
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	2,200	3,500	21,100	4,400	2,800	3,000	4,400	15,600
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	2,500	1,900	2,100	1,800	1,500	1,800	2,400	2,200
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	1,440,000 (1)	2,110,000 (1)	2,960,000 (1)	1,470,000 (1)	1,440,000 (1)	2,000,000 (1)	1,630,000 (1)	1,990,000 (1)
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	400	350	590	500	470	490	360	800
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	251,000	255,000	251,000	174,000	204,000	253,000	195,000	264,000
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	17,500 (1)	22,400 (1)	26,300 (1)	17,400 (1)	23,200 (1)	22,600 (1)	19,700 (1)	24,100 (1)
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	ND	ND	ND	ND	ND	ND	ND	4,300
Potassium	-	-	-	-	-	-	106,000	130,000	127,000	ND	ND	127,000	142,000	154,000
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	210	ND						
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	30,100	36,900	37,000	30,200	31,400	35,500	35,900	42,100
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	2,800	3,400	5,400	2,800	2,500	3,600	3,000	3,500
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	5,000	3,700	3,300	4,000	3,900	3,900	4,000	3,600

**Notes:**

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{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

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Table 6-7 1991 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 2 of 5 pages)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB13-108	SB13-109	SB14-101	SB14-102	SB14-103	SB14-104	SB14-105	SB14-106
<b>Volatile Organic Copmounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	570,000 (1)	661,000 (1)	1,100,000 (1)	866,000 (1)	744,000 (1)	810,000 (1)	618,000 (1)	634,000 (1)
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	210	230	210	210	ND	ND	ND	220
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	4,900	6,400	4,200	5,000	8,900	10,000	4,200	8,500
Calcium	-	-	-	-	-	-	247,000	395,000	319,000	247,000	216,000	286,000	244,000	258,000
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	10,900	5,500	2,600	2,500	24,500	27,300	3,000	5,300
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	1,700	1,700	1,700	2,200	2,500	2,500	2,100	2,000
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	1,400,000 (1)	1,950,000 (1)	2,730,000 (1)	2,630,000 (1)	1,850,000 (1)	2,260,000 (1)	1,530,000 (1)	1,300,000 (1)
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	440	570	740	550	790	440	590	620
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	240,000	233,000	252,000	253,000	211,000	216,000	255,000	227,000
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	16,900 (1)	19,900 (1)	27,600 (1)	22,400 (1)	20,700 (1)	25,800 (1)	28,600 (1)	17,300 (1)
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	ND	2,900	ND	ND	8,800	7,600	ND	ND
Potassium	-	-	-	-	-	-	ND	127,000	127,000	ND	147,000	162,000	ND	ND
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	ND	ND	210	ND	ND	ND	ND
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	39,600	41,800	31,600	33,800	40,400	48,300	31,600	36,100
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	2,500	3,700	55	5,200	3,300	3,700	2,800	1,900
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	3,500	3,400	6,300	6,500	3,900	3,500	4,900	3,500

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-7 1991 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 3 of 5 pages)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB14-106 DUP	SB14-107	SB14-108	SB14-109	SB15-101	SB15-102	SB15-103	SB15-104
<b>Volatile Organic Copmounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	NA	ND	ND	ND	ND	2	ND	ND
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	NA	ND	ND	ND	46	13	14	44
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	NA	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	NA	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	NA	ND	ND	ND	150	32	32	160
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	462,000 (1)	606,000 (1)	733,000 (1)	579,000 (1)	1,000,000 (1)	680,000 (1)	630,000 (1)	530,000 (1)
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7.600	5,800	220	ND	ND	ND	300	200	ND	ND
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	5,400	6,100	7,400	5,400	4,900	3,600	5,800	7,900
Calcium	-	-	-	-	-	-	231,000	247,000	334,000	269,000	220,000	160,000	150,000	170,000
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	2,100	25,200 (6)	8,000	3,100	1,500	ND	ND	ND
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	2,100	2,100	2,200	2,100	1,300	ND	ND	ND
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	982,000 (1)	1,560,000 (1)	1,830,000 (1)	1,430,000 (1)	1,500,000 (1)	1,100,000 (10)	1,000,000 (1)	890,000 (1)
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	340	490	450	640	780	620	640	360
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	176,000	204,000	246,000	206,000	290,000	210,000	210,000	13,000
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	15,000	18,600	22,800	17,700	21,000	20,000	23,000	19,000
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	ND	4,300 (6)	ND	ND	ND	ND	ND	ND
Potassium	-	-	-	-	-	-	ND	136,000	152,000	ND	ND	ND	ND	ND
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	31,600	46,900	44,600	34,900	47,000	43,000	46,000	40,000
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	1,700	2,600	3,300	2,700	3,000	2,300	ND	2,200
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	4,400	3,700	4,100	3,800	3,600	2,200	2,100	2,100

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-7 1991 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 4 of 5 pages)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB15-105	SB15-106	SB16-101	SB16-102	SB16-103	SB16-104	SB16-105	SB16-106
<b>Volatile Organic Copounds</b>														
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	4	ND	5	6	5	4	5	5
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	42	5	20	ND	20	15	29	19
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	3	ND	ND	ND	ND	ND	ND
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	29	10	22	30	26	ND	25	21
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	530,000 (1)	450,000 (1)	NA	NA	NA	NA	NA	NA
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	ND	ND	NA	NA	NA	NA	NA	NA
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	7,800	4,200	NA	NA	NA	NA	NA	NA
Calcium	-	-	-	-	-	-	180,000	200,000	NA	NA	NA	NA	NA	NA
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	ND	ND	NA	NA	NA	NA	NA	NA
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	ND	ND	NA	NA	NA	NA	NA	NA
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	910,000 (1)	880,000 (1)	NA	NA	NA	NA	NA	NA
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	560	620	NA	NA	NA	NA	NA	NA
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	210,000	240,000	NA	NA	NA	NA	NA	NA
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	21,000 (1)	18,000 (1)	NA	NA	NA	NA	NA	NA
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	ND	ND	NA	NA	NA	NA	NA	NA
Potassium	-	-	-	-	-	-	ND	ND	NA	NA	NA	NA	NA	NA
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	ND	NA	NA	NA	NA	NA	NA
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	58,000	37,000	NA	NA	NA	NA	NA	NA
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	ND	ND	NA	NA	NA	NA	NA	NA
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	4,500	1,800	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
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{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-7 1991 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 5 of 5 pages)**

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location						
	DWPC	GSIPC	G CPC	PSIC	DCC	SBDL	SB16-107	SB16-108	SB16-109				
<b>Volatile Organic Copmounds</b>													
Acetone	15,000	34,000	110,000,000 {C}	390,000,000,000	23000000	NA	4	5	4				
Carbon disulfide	16,000	ID	280,000 {C}	47,000,000,000	280,000 {C,DD}	NA	ND	12	17				
Methylethyl ketone	260,000	44,000	27,000,000 {C}	67,000,000,000	27,000,000 {C,DD}	NA	ND	ND	ND				
Methylene chloride	100	19,000 {X}	2,300,000 {C}	6,600,000,000	1,300,000	NA	ND	10	ND				
1,1,1-Trichloroethane	4,000	4,000	460,000 {C}	67,000,000,000	460,000 {C}	NA	30	23	25				
<b>Metals</b>													
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	NA	NA	NA				
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	NA	NA	NA				
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	NA	NA	NA				
Calcium	-	-	-	-	-	-	NA	NA	NA				
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	NA	NA	NA				
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	NA	NA	NA				
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	NA	NA	NA				
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA				
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	NA	NA	NA				
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	NA	NA	NA				
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	NA	NA	NA				
Potassium	-	-	-	-	-	-	NA	NA	NA				
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	NA	NA	NA				
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	NA	NA	NA				
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	NA	NA	NA				
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	NA	NA	NA				

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
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- (3) = Groundwater Contact Protection Criteria (GCPC)
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- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

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{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Racó AAF**  
**Racó, Michigan (page 1 of 13 pages)**

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A1B1 5-7'	A1B1 10-12'	A1B2 2-4'	A1B2 5-7'	A1B3 2-4'	A1B3 5-7'	A1B4 2-4'	A1B4 6-8'
<b>Volatile Organic Copmounds</b>														
Ethylbnezene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	26	ND	ND	ND	ND	ND	ND	ND
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	320	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	330	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	290	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	340	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	1,300	NA	1,100	NA	NA	NA	NA	ND

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A1B4 10-12'	A1B5 2-4'	A1B5 5-7'	A1B6 5-7'	A1B6 10-12'	A2B1 10-12'	A2B1 14-16'	A2B2 11-12'
<b>Volatile Organic Copmounds</b>														
Ethylbnezene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	ND	ND	ND	ND	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	2,500	NA	NA	NA	900	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 2 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A2B2 14-16'	A2B2A 23-24'	A2B2A 26-28'	A2B3 10-12'	A2B3 14-16'	A2B4 14-16'	A2B4 18-20'	A2B5 14-16'
<b>Volatile Organic Copmounds</b>														
Ethylbnezene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	570	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	400	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	ND	NA	NA	NA	NA	NA	NA	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A2B5 18-20'	A2B6 10-12'	A2B6 14-16'	A2B7 10-12'	A2B8 10-12'	A2B9 10-12'	A2B9 14-16'	A2B10 10-12'
<b>Volatile Organic Copmounds</b>														
Ethylbnezene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	ND	NA	ND	NA	ND	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 3 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A2B10 14-16'	A2B11 2-4'	A2B11 10-12'	A3B1 10-12'	A3B1 14-16'	A3B2 10-12'	A3B2 14-16'	A3B3 10-12'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	ND	NA	ND	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A3B3 14-16'	A3B4 10-12'	A3B4 14-16'	A3B5 10-12'	A3B5 18-20'	A3B6 10-12'	A3B6 18-20'	A3B7 10-12'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	ND	NA	ND	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 4 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A3B7 18-20'	A3B8 10-12'	A3B8 18-20'	A3B9 10-12'	A3B9 14-16'	A3B10 10-12'	A3B10 14-16'	A3B11 14-16'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	ND	NA	NA	NA	NA	NA	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A3B11 22-24'	A3B12 2-4'	A3B12 11-12'	A3B13 2-4'	A3B13 11-12'	A4B1 6-8'	A4B1 14-16'	A4B2 6-8'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27,000,000,000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1,800,000,000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	ND	ND	ND
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	ND	NA	2,400

**Notes:**

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- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Racó AAF**  
**Racó, Michigan (page 5 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A4B2 14-16'	A4B3 6-8'	A4B3 10-12'	A4B4 6-8'	A4B4 14-16'	A4B5 8-10'	A4B5 14-16'	A4B6 8-10'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	5,600	700	1,000,000,000 {D}	290,000,000,000	170,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	ND	NA	NA	ND	NA	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A4B6 14-16'	A4B7 2-4'	A4B7 8-9'	A5B1 10-12'	A5B1 18-20'	A5B2 14-16'	A5B2 22-24'	A5B3 10-12'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	ND	ND	ND	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	380	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	560	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	ND	NA	NA	ND	NA	ND	NA	ND

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 6 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A5B3 18-20'	A5B4 14-16'	A5B4 18-20'	A5B5 10-12'	A5B5 18-20'	A5B6 10-12'	A5B6 18-20'	A5B7 10-12'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	57	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	580	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	3,700	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	ND	ND	NA	NA	NA	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A5B7 18-20'	A5B8 10-12'	A5B8 14-16'	A5B9 2-4'	A5B9 6-8'	A6B2 16-17'	A6B3 10-12'	A6B3 18-20'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	ND	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 7 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A6B4 14-16'	A6B4 22-24'	A6B5 10-12'	A6B5 18-20'	A6B6 10-12'	A6B6 18-20'	A6B7 10-12'	A6B7 18-20'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	ND	ND	NA	NA	ND	NA	ND

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A6B8 10-12'	A6B8 18-20'	A6B9 10-12'	A6B9 18-20'	A6B10 10-12'	A6B10 14-16'	A6B11 10-12'	A6B11 18-20'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-8  
1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF  
Raco, Michigan (page 8 of 13 pages)

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A6B12 14-15'	A6B13 2-4'	A6B13 14-15'	A7B1 10-12'	A7B1 28-30'	A7B1 36-38'	A7B2 14-16'	A7B2 22-24'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	510 (2)	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	560	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	3400 (2)	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	960	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	370	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	310	ID	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	320	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	1400	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	860	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	ND

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A7B3 14-16'	A7B3 18-20'	A7B4 14-15'	A7B5 10-12'	A7B5 18-20'	A7B6 10-12'	A7B6 18-20'	A7B7 18-20'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	ND	NA	NA	ND	NA	ND	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Racó AAF**  
**Racó, Michigan (page 9 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A7B7 22-24'	A7B7 28-30'	A7B8 10-12'	A7B8 18-20'	A7B9 14-16'	A7B9 18-20'	A7B10 14-16'	A7B10 22-24'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	ND	NA	NA	NA	NA	ND	NA	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A7B12 10-12'	A7B12 18-20'	A7B13 10-12'	A7B13 18-20'	A7B14 2-4'	A7B14 14-15'	A7B16 2-4'	A7B16 14-15'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 10 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A8B1 10-12'	A8B1 18-20'	A8B2 18-20'	A8B2 22-24'	A8B3 10-12'	A8B3 18-20'	A8B4 18-20'	A8B4 22-24'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	ND	NA	NA	ND	NA	ND

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A8B5 10-12'	A8B5 18-20'	A8B6 18-20'	A8B6 22-24'	A8B7 10-12'	A8B7 18-20'	A8B9 10-12'	A8B9 18-20'
<b>Volatile Organic Compounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	150,000 {C}	290,000,000,000	150,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	ND	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 11 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A8B10 10-12'	A8B10 18-20'	A8B11 2-4'	A8B11 15-16'	A8B12 2-4'	A8B12 15-16'	A9B1 10-12'	A9B1 18-20'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	1,000,000,000 {D}	ID	170,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	ND

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A9B2 10-12'	A9B2 18-20'	A9B3 10-12'	A9B3 18-20'	A9B4 14-16'	A9B4 18-20'	A9B5 10-12'	A9B5 18-20'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	1,000,000,000 {D}	ID	170,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pheanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	ND	ND	NA	ND	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

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**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 12 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	A9B6 10-12'	A9B6 18-20'	A9B7 2-4'	A9B7 15-16'	A9B8 2-4'	A9B8 14-15'	BG1 6-8'	BG2 10-12'
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	NA	NA
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	NA	NA
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	1,000,000,000 {D}	ID	170,000,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	NA	NA
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	530	ND	ND	NA	NA
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	ND	350	NA	NA
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	ND	NA	NA	NA	NA	ND	ND

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	BKgrnd3 10-12'	BKgrnd4 10-12'	P1	P2	P3	P3 3-4'	P4	P5
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	NA	NA	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	NA	NA	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	1,000,000,000 {D}	ID	170,000,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	NA	NA	ND	ND	ND	280	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	NA	NA	ND	ND	ND	940	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	NA	NA	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	NA	NA	ND	ND	ND	350	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	ND	ND	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

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**Table 6-8**  
**1995 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF**  
**Raco, Michigan (page 13 of 13 pages)**

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	P6	P7	P8	P8 3-4'	P9	P10	P11	P12
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	1,000,000,000 {D}	ID	170,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA

Compound	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	P13	P13 3-4'	P14					
<b>Volatile Organic Copmounds</b>														
Ethylbenzene	1,500	360	140,000 {C}	10,000,000,000	140,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16000	2800	250,000 {C}	27000000000	250,000 {C}	NA	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	100	4,000 {X}	440000	1800000000	500,000 {C,DD}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes	5,600	700	1,000,000,000 {D}	ID	170,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
<b>Polynuclear Aromatic Hydrocarbons</b>														
Acenaphthene	300,000	4,400	970,000	14,000,000,000	41,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	41,000	ID	41,000	67,000,000,000	230,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	NLL	NLL	NLL	1,500,000	2,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	NLL	NLL	NLL	ID	20,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	NLL	NLL	NLL	800,000,000	2,500,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	NLL	NLL	NLL	ID	2,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	730,000	5,500	730,000	9,300,000,000	46,000,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	56,000	5,300	1,100,000	6,700,000	1,600,000	NA	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	480,000	ID	480,000	6,700,000,000	29,000,000	NA	ND	ND	ND	ND	350	ND	ND	ND
<b>Metals</b>														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (C<sub>sat</sub>) since the calculated risk-based criterion is greater than C<sub>sat</sub>.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

**Table 6-9**  
**1996 Soil Investigation Results Compared to Part 201 Cleanup Criteria, Raco AAF Site, Raco, Michigan (page 1 of 1)**

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB16 0-1'	SB16 5-6'	SB16 10-11'	SB16 15-16'	SB16 20-21'	SB16 25-26'	SB16 30-31'	SB16 35-36'
Metals														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	7,400	900	600	600	500	600	500	500

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB16 40-41'	SB16 45-46'	SB17 0-1'	SB17 5-7'	SB17 10-11'	SB17 15-16'	SB17 20-21'	SB17 25-26'
Metals														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	700	600	2,200	400	900	500	600	600

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB17 30-31'	SB17 35-36'	SB17 40-42'	SB17 45-46'	SB18 0-1'	SB18 5-6'	SB18 10-11'	SB18 15-16'
Metals														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	400	500	700	700	1330	500	700	400

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB18 20-21'	SB18 25-26'	SB18 30-31'	SB18 35-36'	SB18 40-41'	SB18 45-46'	SB19 0-1'	SB19 5-6'
Metals														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	500	400	400	500	700	400	4,800	500

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	SB19 10-11'	SB19 14-16'	SB19 20-21'	SB19 25-26'	SB19 29-31'	SB19 35-36'	SB19 40-41'	SB19 45-46'
Metals														
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	400	600	400	500	300	600	700	1,000

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

ID = Insufficient data to develop criterion.

Table 6-10 2003 Soil Investigation Results Compared to Part 201 Cleanup Criteria, RAco AAF, Raco Michigan (Page 1 of 3)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	RACO-03-SB-1-10-12	RACO-03-SB-1-10-12-B	RACO-03-SB-1-20-22	RACO-03-SB-1-30-32	RACO-03-SB-1-40-42	RACO-03-SB-2-10-12	RACO-03-SB-2-20-22	RACO-03-SB-2-30-32
<b>Volatile Organic Copmounds</b>														
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	807,000 (1)	1,580,000 (1)	1,080,000 (1)	506,000 (1)	479,000 (1)	1,030,000 (1)	498,000 (1)	414,000 (1)
Antimony	4,300	94,000	49,000,000	13,000,000	18,000	N/A	230	230	260	480	ND	250	ND	280
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	320	290	ND	ND	260	300	ND	ND
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	4,000	5,900	5,700	6,200	7,500	5,900	6,400	4,100
Beryllium	51,000	84,000 {G}	1,000,000,000 {D}	1,300,000	410,000	NA	ND	51	43	ND	ND	39	ND	ND
Calcium	-	-	-	-	-	-	167,000	391,000	294,000	202,000	176,000	211,000	144,000	161,000
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	1,300	2,500	1,700	4,400	1,100	1,900	1,000	1,100
Cobalt	800	2,000	480,000,000	13,000,000	2,600,000	6,800	320	670	410	250	230	430	220	240
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	2,800	5,400	1,800	1,200	880	4,100	1,000	1,200
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	1,140,000 (1)	1,970,000 (1)	1,510,000 (1)	1,040,000 (1)	970,000 (1)	1,650,000 (1)	958,000 (1)	869,000 (1)
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	ND	1,000	690	ND	ND	710	ND	ND
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	215,000	358,000	273,000	167,000	174,000	285,000	160,000	182,000
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	21,000 (1)	25,900 (1)	27,000 (1)	20,800 (1)	16,500 (1)	28,800 (1)	19,800 (1)	15,200 (1)
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	620 (6)	1,500 (6)	870 (6)	1,400 (6)	ND	890 (6)	ND	520 (6)
Potassium	-	-	-	-	-	-	95,400	161,000	129,000	91,000	91,100	121,000	81,300	71,100
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	ND	300	ND	ND	ND	ND	ND
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	37,200	42,600	39,800	37,100	40,800	44,300	35,000	39,300
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	N/A	ND	ND	ND	430	ND	ND	ND	ND
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	2,400	4,400	3,600	1,900	1,800	3,700	2,100	1,700
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	2,600	3,200	2,500	1,300	1,600	2,300	1,200	1,700

**Notes:**

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- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-10 2003 Soil Investigation Results Compared to Part 201 Cleanup Criteria, RAco AAF, Raco Michigan (Page 2 of 3)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location							
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	RACO-03-SB-2-40-42	RACO-03-SB-3-10-12	RACO-03-SB-3-20-22	RACO-03-SB-3-30-32	RACO-03-SB-3-40-42	RACO-03-SB-4-10-12	RACO-03-SB-4-10-12-B	RACO-03-SB-4-20-22
<b>Metals</b>														
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	455,000 (1)	751,000 (1)	449,000 (1)	437,000 (1)	384,000 (1)	824,000 (1)	843,000 (1)	589,000 (1)
Antimony	4,300	94,000	49,000,000	13,000,000	18,000	N/A	240	220	190	390	ND	350	250	ND
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	ND	ND						
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	7,600	4,400	4,300	4,300	4,200	7,900	9,600	4,000
Beryllium	51,000	84,000 {G}	1,000,000,000 {D}	1,300,000	410,000	NA	ND	ND	ND	ND	ND	ND	40	ND
Calcium	-	-	-	-	-	-	1,620,000	126,000	158,000	151,000	174,000	221,000	261,000	151,000
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	1,200	1,100	1,000	1,100	970	1,700	1,700	1,100
Cobalt	800	2,000	480,000,000	13,000,000	2,600,000	6,800	260	230	250	330	190	480	410	270
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	1,200	1,400	930	1,100	870	2,300	2,700	1,200
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	1,320,000 (1)	937,000 (1)	968,000 (1)	966,000 (1)	905,000 (1)	1,420,000 (1)	1,590,000 (1)	1,000,000 (1)
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	ND	ND	ND	ND	ND	ND	590	ND
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	603,000	196,000	190,000	203,000	161,000	321,000	288,000	216,000
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	23,000 (1)	20,300 (1)	16,800 (1)	15,100 (1)	14,400 (1)	22,200 (1)	22,300 (1)	17,900 (1)
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	ND	ND	ND	ND	ND	710 (6)	770 (6)	550 (6)
Potassium	-	-	-	-	-	-	103,000	88,900	72,100	78,000	77,000	99,600	104,000	94,100
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	ND						
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	42,600	34,000	31,200	50,400	42,500	60,000	37,600	32,600
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	N/A	ND	ND	ND	ND	590	ND	ND	ND
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	2,700	1,900	2,000	1,900	1,900	3,100	3,700	1,900
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	1,300	1,400	1,300	1,400	1,300	2,200	2,100	1,900

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
- (2) = Groundwater Surface Water Interface Protection Criteria (GSIPC)
- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

Table 6-10 2003 Soil Investigation Results Compared to Part 201 Cleanup Criteria, RAco AAF, Raco Michigan (Page 3 of 3)

COMPOUND	Part 201 Residential and Commercial Generic Cleanup Criteria						Sample Location						
	DWPC	GSIPC	GCPC	PSIC	DCC	SBDL	RACO-03-SB-4-30-32	RACO-03-SB-4-40-42	RACO-03-SB-5-10-12	RACO-03-SB-5-20-22	RACO-03-SB-5-30-32	RACO-03-SB-5-40-42	
<b>Volatile Organic Compounds</b>													
<b>Metals</b>													
Aluminum	1,000	NA	1,000,000,000 {D}	ID	50,000,000 {DD}	6,900,000	568,000 (1)	782,000 (1)	964,000 (1)	555,000 (1)	496,000 (1)	507,000 (1)	
Antimony	4,300	94,000	49,000,000	13,000,000	18,000	NA	320	220	330	430	430	390	
Arsenic	23,000	70,000 {X}	2,000,000	720,000	7,600	5,800	350	540	ND	ND	400	350	
Barium	1,300,000	44,000 {G,X}	1,000,000,000 {D}	330,000,000	37,000,000	75,000	6,600	10,900	12,000	4,000	3,800	5,600	
Beryllium	51,000	84,000 {G}	1,000,000,000 {D}	1,300,000	410,000	NA	43	50	44	ND	ND	ND	
Calcium	-	-	-	-	-	-	361,000	630,000	354,000	155,000	167,000	286,000	
Chromium	1,000,000,000 {D}	4,000,000,000 {G,X}	1,000,000,000 {D}	330,000,000	790,000,000	18,000	1,600	2,000	2,000	1,200	1,000	1,200	
Cobalt	800	2,000	480,000,000	13,000,000	2,600,000	6,800	380	500	500	250	250	340	
Copper	5,800,000	73,000 {G}	1,000,000,000 {D}	130,000,000	20,000,000	32,000	950	1,700	2,900	1,100	970	980	
Iron	6,000	NA	1,000,000,000 {D}	ID	160,000,000	12,000,000	1,700,000 (1)	1,910,000 (1)	1,850,000 (1)	1,360,000 (1)	960,000 (1)	1,300,000 (1)	
Lead	700,000	2,500,000	ID	100,000,000	400,000	21,000	620	770	940	ND	ND	ND	
Magnesium	8,000,000	NA	1,000,000,000 {D}	6,700,000,000	1,000,000,000 {D}	NA	211,000	358,000	275,000	170,000	187,000	213,000	
Manganese	1,000	55,000 {G,X}	180,000,000	3,300,000	25,000,000	440,000	26,200 (1)	31,100 (1)	29,700 (1)	18,800 (1)	15,400 (1)	20,700 (1)	
Nickel	100,000	76,000 {G}	1,000,000,000 {D}	13,000,000	40,000,000	20,000	600 (6)	1,000 (6)	1,000 (6)	530 (6)	ND	630 (6)	
Potassium	-	-	-	-	-	-	121,000	158,000	129,000	91,000	85,600	104,000	
Selenium	4,000	400	78,000,000	130,000,000	2,600,000	410	ND	ND	620	400	ND	270	
Sodium	2,500,000	NA	1,000,000,000 {D}	ID	1,000,000,000 {D}	NA	54,500	64,500	42,600	39,800	ND	43,900	
Thallium	2,300	4,200 {X}	15,000,000	ID	35,000	NA	ND	ND	ND	ND	ND	ND	
Vanadium	72,000	190,000	1,000,000,000 {D}	ID	750,000 {DD}	NA	3,700	4,200	4,000	2,300	1,700	2,800	
Zinc	2,400,000	170,000 {G}	1,000,000,000 {D}	ID	170,000,000	47,000	1,500	2,200	2,200	1,400	1,500	1,500	

**Notes:**

All results reported in micrograms per kilogram (ug/kg), which is equivalent to parts per billion (ppb)

Shading indicates that concentration exceeds one or more Part 201 Residential and Commercial Generic Cleanup criteria for soils, as follows:

- (1) = Drinking Water Protection Criteria (DWPC)
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- (3) = Groundwater Contact Protection Criteria (GCPC)
- (4) = Particulate Soil Inhalation Criteria (PSIC)
- (5) = Direct Contact Criteria (DCC)
- (6) = Statewide Background Default Levels (SBDL)

{C} = Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat.

{D} = Calculated criterion exceeds 100%, hence it is reduced to 100% or 1.0E+9 ppb.

{G} = Groundwater surface water interface criteria is dependent on the water hardness, which is estimated at 150,000.

{X} = The GSI criterion shown is not protective for surface water that is used as a drinking water source.

{DD} = Hazardous substance causes developmental defects. Residential and Commercial I direct contact criteria are protective of both prenatal and post natal exposure.

ID = Insufficient data to develop criterion.

NA = Criterion or value is not available or not applicable.

ND = Not detected above Method Detection Limit (MDL).

NLL = Hazardous substance is not likely to leach under most soil conditions.

## 7.0 SUMMARY, CONCLUSIONS AND RECOMENDATIONS

The 2003 investigation was designed to: (1) address citizen concerns regarding improper disposal practices that may have occurred at the site; (2) install additional monitoring wells, redevelop the existing monitoring wells; (3) collect two rounds of additional groundwater data; and (4) evaluate the site for potential closure. The supplemental sampling and well installation completed in 2004 was designed to evaluate the extent of TCE contamination in the Missile Battery Area.

### 7.1 SUMMARY OF 2003 ACTIVITIES

#### 7.1.1 Summary of Soil Boring Investigation

An EM survey was conducted and 2 soil borings were drilled in the borrow pit areas in locations indicated by Mr. Traynor, a former employee, as those areas most likely to have been used for improper disposal. Three additional soil borings were drilled in the Missile Battery Area to address Mr. Traynor's concerns in that area. Results of the investigation did not indicate the presence of contamination in these areas.

#### 7.1.2 Monitoring Well Installation

Three additional monitoring wells were installed to address the following data gaps:

- Installation of MW17 to address the discrepancies in the historical reports regarding the location of UST B-1.
- Installation of MW18 to address USTs C-2 and C-3.
- Installation of MW16 to address the Fuel Depot Area.

No chemicals were detected above the Part 201 screening level in these wells. It should be noted that TCE was detected in MW18 at low concentrations in the 2003 and 2004 sampling rounds (1.6 µg/l and 0.56 µg/l, respectively).

#### 7.1.3 Redevelopment and Re-Sampling of Groundwater Wells

All existing wells were redeveloped and re-sampled in 2003 and 2004. Previous sampling rounds had indicated a potential lead problem, which was believed to be a result of the conditions of the wells. The 2003/2004 sampling rounds indicate that the lead concentrations in the redeveloped wells are below Part 201 criteria.

## 7.2 2004 ACTIVITIES

### 7.2.1 Summary of Soil Boring Investigation

Five borings were installed to a depth of 80 ft in the composite building, sludge drying bed, and wastewater treatment lagoon area. The objective was to investigate those areas deemed most likely to be a source of the TCE contamination detected in the groundwater and to determine the optimum placement for additional wells. Samples were collected at 10, 20 and 40 ft bgs. Groundwater samples were also collected at 70 and 80 ft. The soil data indicated no evidence of a source area for the TCE. The groundwater data, however, indicated TCE present in the groundwater samples from SB7 and SB9 and trace levels present in SB8 and SB10.

### 7.2.2 Summary of Well Installation and Groundwater Sampling

Based on the results of the soil boring investigation, four new wells were installed and screened at 70 ft bgs: MW19, MW20, MW21, and MW22. Existing wells MW7, MW8, MW14, and MW18 were also sampled for VOCs.

TCE was detected in MW8, MW18, MW19, and MW20. The concentration of lead in unfiltered sample MW20 and unfiltered sample MW22 exceeded the Part 201 residential drinking water criteria. MW22 also exceeded the GSWIC criteria. Concentrations of the lead in the unfiltered samples from these wells met all Part 201 criteria. Filtered samples were collected for these wells because they failed to clean up to 5 NTUs during purging.

## 7.3 SITE EVALUATION FOR POTENTIAL CLOSURE

All data collected from the site was screened against the most stringent residential Part 201 criteria to evaluate what if any chemicals of concern remain at the site. Results of the screening indicate the following:

### 7.3.1 Groundwater

Copper and mercury exceeded the GSWIC in the RG01 duplicate pair. The concentration of copper was exceeded in the sample but not in the duplicate. GSWIC criteria are not considered applicable for this site. Concentrations of lead exceeded the drinking water criteria for wells MW20 and MW22. These wells failed to clean up to 5 NTUs during purging and the elevated results are likely a result of the high turbidity. Filtered samples from these wells met all criteria.

TCE is present in the groundwater at concentrations that exceed the screening criteria in MW08. It was also detected at low concentrations in MW18, MW19, and MW20. MW 19 and MW 20 are screened at lower depths as is MW08. The data suggest that the extent of the TCE plume above 5 µg/l (Part 201 screening criteria) is limited to an area approximately 150 ft in diameter. The TCE will require further evaluation before

closure can be achieved. The presence of lead above Part 201 criteria in two of the newly installed wells appears to be a result of high turbidity in the wells. Filtered samples were below all Part 201 criteria.

### **7.3.2 Soil**

Contamination in the soil in the fuel depot area that exceeded the Part 201 screening criteria appear to have been removed from the site, based on historical documentation. No chemicals of concern in the soil appear to remain based on the historical data.

No PCBs were detected in the soil from the transformer area and no chemicals of concern are present.

PCP was detected in some soil borings at concentrations above the DWPC. PCP was analyzed in nearby wells MW6, MW7, and MW15 in May 2004. No PCP was detected and no additional investigation appears warranted.

No obvious source for the TCE detected in the groundwater can be discerned from the soil data collected from the site. MW08 appears to be down-gradient of the former wastewater treatment lagoon. SB7 and SB9 were installed to investigate potential sources in the lagoon area (the area surrounding MW8). Soil samples collected to 40 ft bgs do not indicate the presence of a source in the site soils. Former sludge drying beds were located in the SB6 area. The data do not indicate the presence of a source in the site soils. SB8 was installed to investigate the composite building area. The data do not indicate the presence of a source in these site soils.

## **7.4 RECOMMENDATIONS**

Action will be required for the TCE detected in the groundwater. The horizontal extent of TCE in the groundwater appears to be defined. In order to obtain closure with unrestricted use of the site, a generic residential remedial action will be required. It is recommended that a remedial action plan be developed to remediate the TCE in the groundwater.

## 8.0 REFERENCES

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# **Appendix A Historical Data**

## **Appendix B**

### **Field Logs**

## **Appendix C**

### **Survey Certification**

## **Appendix D**

### **Chain of Custodies**

## **Appendix E**

### **Current Analytical**