

## SECTION 3

### SAMPLING ACTIVITIES AND ANALYTICAL RESULTS

#### 3.1 OBJECTIVES AND SCOPE

As mentioned in Section 1, a sampling SI is primarily intended to gather sufficient data to enable evaluation of a site's potential for inclusion on the NPL. Accordingly, the following sampling objectives were defined for the Tricon Mining sampling SI:

- To characterize and assess the extent of on-site contamination.
- To confirm the absence/presence of contaminants in nearby groundwater.
- To assess the potential for contaminants to impact human health and/or the environment.

To accomplish these objectives, the following general field activities were conducted:

- A site reconnaissance visit was performed on 16 May 1994.
- Field sampling was conducted from 19 to 21 July 1994, which included:
  - the collection of soil samples from the primary tailings pond and secondary tailings pond
  - the collection of groundwater samples from on-site monitoring wells and downgradient domestic wells
  - the collection of soil samples from off-site locations and the collection of groundwater samples from upgradient wells to establish background concentrations.

#### 3.2 SAMPLE TYPES, NUMBERS, LOCATIONS AND RATIONALE

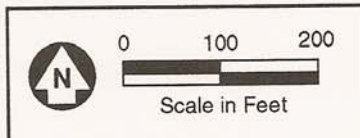
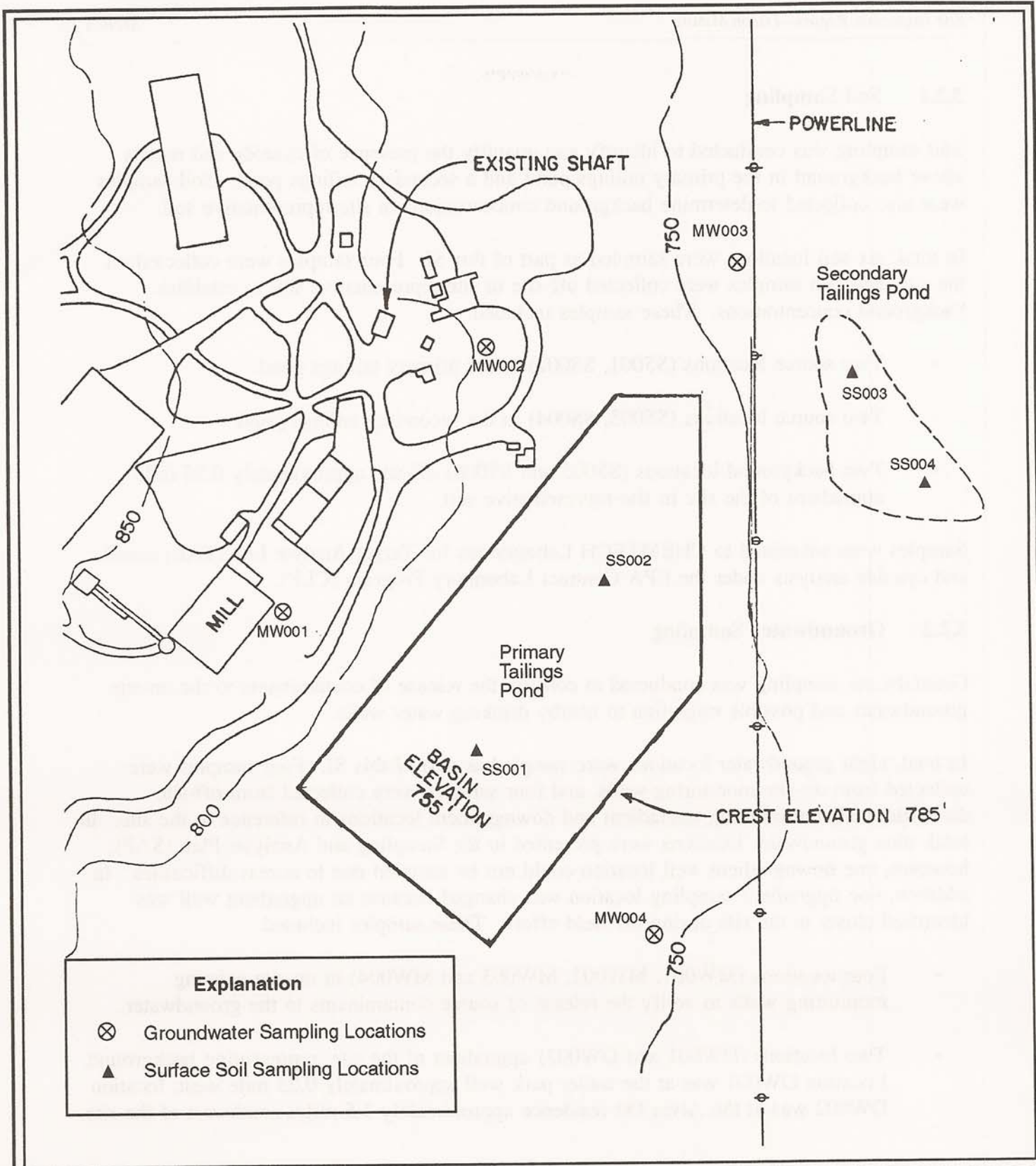
A total of six soil samples (plus one co-located) and eight groundwater samples (plus one field duplicate and one transfer blank) were collected by WESTON between 19 and 21 July 1994 in accordance with the Sampling and Analysis Plan (WESTON, 1994). The co-located sample was collected next to another sample and not homogenized. The duplicate sample was collected next to another sample and homogenized. Modifications to the groundwater portion of the sampling plan occurred, based on difficulty in gaining access to private domestic wells; this is documented in the following sections. Sampling locations and rationale are summarized in Table 3-1 and sampling locations are shown in Figure 3-1.

**Table 3-1—Sampling Strategy for Tricon Mine, Fairbanks, Alaska**

SI Sample ID	Location	Rationale
Soil		
06-SS-SS001-0005	Primary tailings pond	To characterize potential sources
06-SS-SS002-0005	Primary tailings pond	To characterize potential sources
06-SS-SS002-1005	Primary tailings pond	Field duplicate
06-SS-SS003-0005*	Secondary tailings pond	To characterize potential sources
06-SS-SS004-0005	Secondary tailings pond	To characterize potential sources
06-SS-SS005-0005	0.25 mile NW of site and upgradient	To characterize background conditions
06-SS-SS006-0005	0.25 mile SW of site and upgradient	To characterize background conditions
Groundwater		
06-GW-MW001-0001	On-site monitoring well; MW001	To characterize on-site groundwater
06-GW-MW002-0001	On-site monitoring well; MW002	To characterize on-site groundwater
06-GW-MW003-0001	On-site monitoring well; MW003	To characterize on-site groundwater
06-GW-MW003-1001	On-site monitoring well; MW003	Field duplicate
06-ND-MW003-3001	Near on-site monitoring well; MW003	Ambient transfer blank
06-GW-MW004-0001*	On-site monitoring well; MW004	To characterize on-site groundwater
06-GW-DW001-0001	Trailer park well—0.25 mile west and upgradient	To characterize background conditions
06-GW-DW002-0001	Alvin Ott residence—1.5 mile SW and upgradient	To characterize background conditions
06-GW-DW003-0001	Happy Creek Nursery—0.5 mile NE and downgradient	To identify potential migration of contamination
06-GW-DW004-0001	Annes Greenhouse—0.5 mile NE and downgradient	To identify potential migration of contamination

\* Laboratory QA/QC Sample—collected double the volume.

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Source:  
Tricon Mining Site Plan,  
(ADEC, 1994)

# Tricon Mining Site Plan SI Sampling Locations



4000-19-06-4100  
April 1995

FIGURE  
**3-1**

### 3.2.1 Soil Sampling

Soil sampling was conducted to identify and quantify the presence of cyanide and metals above background in the primary tailings pond and a secondary tailings pond. Soil samples were also collected to determine background concentrations in site-representative soil.

In total, six soil locations were sampled as part of this SI. Four samples were collected on the site, and two samples were collected off-site in site representative soil to establish background concentrations. These samples included:

- Two source locations (SS001, SS002) in the primary tailings pond.
- Two source locations (SS003, SS004) in the secondary tailings pond.
- Two background locations (SS005 and SS006) off-site approximately 0.25 mile upgradient of the site in site-representative soil.

Samples were submitted to CHEMTECH Laboratories for Target Analyte List (TAL) metals and cyanide analysis under the EPA Contract Laboratory Program (CLP).

### 3.2.2 Groundwater Sampling

Groundwater sampling was conducted to confirm the release of contaminants to the on-site groundwater and possible migration to nearby drinking water wells.

In total, eight groundwater locations were sampled as part of this SI. Four samples were collected from on-site monitoring wells, and four samples were collected from off-site domestic wells representing upgradient and downgradient locations in reference to the site. In total, nine groundwater locations were presented in the Sampling and Analysis Plan (SAP); however, one downgradient well location could not be sampled due to access difficulties. In addition, one upgradient sampling location was changed because an upgradient well was identified closer to the site during the field effort. These samples included:

- Four locations (MW001, MW002, MW003 and MW004) in on-site existing monitoring wells to verify the release of source contaminants to the groundwater.
- Two locations (DW001 and DW002) upgradient of the site, representing background. Location DW001 was at the trailer park well approximately 0.25 mile west; location DW002 was at the Alvin Ott residence approximately 1.5 miles southwest of the site.

- Two locations (DW003 and DW004) downgradient of the site to identify possible migration of contaminants to nearby domestic wells. Location DW003 was at the Happy Creek Nursery, and location DW004 was at Anne's Greenhouse. These wells were located approximately 0.5 mile northeast of the site.

Samples were submitted to the EPA Region X Manchester laboratory in Port Orchard, Washington, for analysis of TAL metals and cyanide.

### 3.3 SAMPLING METHODS AND ANALYTICAL REQUIREMENTS

#### 3.3.1 Soil Sampling

Grab soil samples were collected from a depth of 0 to 0.5 feet for metals and cyanide analysis using a disposable polyethylene trowel. All organic material was removed prior to sampling. The samples were placed into appropriately labeled, laboratory cleaned sample jars and placed on ice for shipment.

#### 3.3.2 Groundwater Sampling

The groundwater samples were collected from both monitoring wells and drinking water wells. Groundwater levels were estimated, based on well installation information and local groundwater information because every well sampled contained a dedicated pump that blocked access of an electronic water depth indicator. Prior to the actual groundwater sampling of both types of wells, the field team determined an adequate purging volume (minimum of three casing volumes) depending on well depth, depth to groundwater, and casing diameter, using the equation below.

$$\text{Purge Volume (gal)} = \text{water column height (ft)} \times K \times 3 \text{ casing volumes}$$

Where K is a constant dependent on well diameter.

For those wells with holding tanks, water in the tanks was drained at the time of purging, before sampling. Field parameters (temperature, pH, conductivity, and redox potential) were measured during and following purging. Field parameter readings were stabilized before sampling occurred.

Monitoring well samples were collected directly from existing dedicated well pump spigots. Drinking water well samples were collected directly from a tap as close as possible to the well, located before holding tanks, water conditioners, or filtering systems when possible. Transfer devices (bailers or portable pumps) were not used. Immediately following sampling, each groundwater sample was tested for oxidizers and sulfides, but all tested negative and no further fixation of the samples was needed.

### 3.3.3 Sample Analytical and Handling Requirements

Sample analytical requirements for the Tricon Mining SI are summarized in Table 3-2. Included in this table are descriptions of requested analytes, the analytical methods used, sample preservation, and maximum sample holding times. The bottle requirements for samples collected during this investigation are described in the EPA's *User's Guide to the Contract Laboratory Program* (EPA, 1991).

All samples were submitted for analysis through the CLP or EPA Region X Manchester Laboratory and were handled and documented in accordance with procedures specified in EPA's *User's Guide to the Contract Laboratory Program* (EPA, 1991), CLP Statements of Work (EPA, 1990) and *National Enforcement Investigations Center Policies and Procedures* (EPA, 1985). Duplicates were collected at 5 percent for each matrix. Quality control samples were collected at 5 percent of each matrix. Sample packaging conformed with applicable Department of Transportation (DOT) regulations (49 CFR 171-177) and/or International Air Transport Association (IATA) guidelines (IATA, 1993). Shipment was via an overnight delivery service.

### 3.3.4 Equipment Decontamination

Dedicated disposable sampling equipment was used to reduce the possibility of cross contamination and to eliminate decontamination wastewater. WESTON had sufficient sampling equipment available to eliminate decontamination during the Tricon Mining SI field effort. Sampling and personal protective equipment were disposed of at the facility with other municipal solid waste.

Table 3-2—Sample Analytical Requirements, Tricon Mining

Analysis	Analytical Method	Method Description	Matrix	Preservation	Holding time
TAL Metals	CLP SOW ILM03.0	ICP, GFAAS, CVAAS	Soil	none	6 months (mercury-28 days)
Cyanide	CLP SOW ILM03.0	Distillation/Colorimetric	Soil	none	14 days
Low Concentration TAL Metals	EPA ILC01.0	ICP, GFAAS, CVAAS	Groundwater	HN03 to pH<2	6 months (mercury-28 days)
Cyanide	EPA ILC01.0	Distillation/Colorimetric	Groundwater	NaOH to pH>12*	14 days

\*Tested for sulfide and oxidizing agents.  
 ICP = Inductively coupled plasma emission  
 GFAAS = Graphite furnace atomic absorption spectroscopy  
 CVAAS = Cold vapor atomic absorption spectroscopy

## SECTION 4

### SAMPLING RESULTS AND DISCUSSION

The following sections present analytical data developed during this SI. Photographic documentation is presented in Appendix B, chain-of-custody forms are presented in Appendix C, and data validation reports are presented in Appendix D.

Tables presented in the following sections include all data for analytes identified in at least one sample above individual sample detection limits reported in analytical laboratory results. Soil concentrations are expressed in milligram per kilogram (mg/kg) and groundwater concentrations in microgram per Liter ( $\mu\text{g/L}$ ).

For the purposes of this report, "elevated" concentrations are defined, using Table 2-3 of the Hazard Ranking System; Final Rule. They are defined as follows:

- If the sample measurement is less than the sample quantitation limit (SQL), no observed release is established.
- If the sample measurement is greater than or equal to the SQL and the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the SQL.
- If the sample measurement is greater than or equal to the SQL and the background concentration equals or exceeds the detection limit, an observed release is established when the sample measurement is 3 times or more above the background concentration.

In general, the data discussed in the following sections are those that were determined to be observed releases. Aluminum, calcium, iron, magnesium, sodium, and potassium are common earth crust inorganics and are not included in the following discussions or in the tables. In the groundwater tables in this section, bold values indicate an observed release.

Similarly, the HRS criteria described above, were used to identify areas of observed contamination (as opposed to observed releases) when evaluating source soil data. This applies to the secondary tailings pond since it was not designed and constructed as a surface impoundment, like the primary tailings pond was. In the source soil tables in this section, bold values indicate an area of observed contamination.

In total, seven soil samples were collected from the Tricon Mining site and analyzed for TAL metals and cyanide. Three soil samples were collected from the primary tailings pond, including a co-located sample, and two soil samples were collected from the secondary



tailings pond to characterize the sources. Two background samples were collected from upgradient locations in site characteristic soils that did not appear to be impacted by mining activities.

In total, eight groundwater samples were collected as part of the Tricon Mining SI and analyzed for TAL metals and cyanide. Four on-site monitoring well samples were collected to identify a potential release of contamination to the local aquifer. Two off-site domestic well samples were collected downgradient of the site to identify migration of potential groundwater contamination. Two background samples were collected from off-site domestic wells upgradient of the site to determine background groundwater conditions.

The following sections summarize source and release sample results.

## 4.1 SOURCE SAMPLES

### 4.1.1 Inorganics

#### *Primary Tailings Pond*

Results for inorganic analysis for source samples collected in the primary tailings pond are shown in Table 4-1. The analytical results of background samples SS005 and SS006 are included in the table for comparison purposes. Antimony was detected at all soil sample locations in the primary tailings pond at concentrations of 870 to 1950 mg/kg. Arsenic was detected at all sample locations at concentrations of 3210 to 3600 mg/kg. Barium was detected at all sample locations at concentrations of 12.3 to 54.5 mg/kg. Beryllium was detected at all sample locations at concentrations of 0.31 to 0.47 mg/kg. Chromium was detected at all sample locations at concentrations of 16 to 31.7 mg/kg. Cobalt was detected at all sample locations at concentrations of 6.2 to 8 mg/kg. Copper was detected at all sample locations at concentrations of 30.4 to 45.9 mg/kg. Cyanide was detected at sample location SS001 at a concentration of 8.6 mg/kg. Lead was detected at all sample locations at concentrations of 83 to 188 mg/kg. Manganese was detected at all sample locations at concentrations of 267 to 393 mg/kg. Mercury was detected at sample locations SS001 and SS002-C at concentrations of 1.0 mg/kg and 1.3 mg/kg, respectively. Nickel was detected at all sample locations at concentrations of 23.7 to 30.4 mg/kg. Silver was detected at all sample locations at concentrations of 5.7 to 9.6 mg/kg. Vanadium was detected at all sample locations at concentrations of 7.7 to 12 mg/kg. Zinc was detected at all sample locations at concentrations of 54.3 to 78.5 mg/kg. Sample results for inorganics analysis performed on all soil samples can be found in Appendix E, Data Validation Reports.

Table 4-1—Source Soil Data from Primary Tailings Pond (mg/kg)

Compound	Background		Primary Tailings Pond		
	SS005	SS006	SS001	SS002	SS002-C <sup>a</sup>
Antimony	1.4 J*	3.5 J*	1950	1320	870
Arsenic	10.6 J	72.7 J	3600 J	3230 J	3210 J
Barium	193	171	54.5 J*	12.3 J*	15.5 J*
Beryllium	0.23 U	0.25 U	0.47 J*	0.31 J*	0.32 J*
Chromium	31.2	26.4	31.7	16.6	16
Cobalt	13.3	10.8 J*	8 J*	6.6 J*	6.2 J*
Copper	34.4	29.7	45.9	31.5	30.4
Cyanide	1.1 U	1.3 U	8.6	1.1 U	1.1 U
Lead	12.8	21.2	188	100	83
Manganese	455	356	393	312	267
Mercury	0.11 U	0.13 U	1	0.11 U	1.3
Nickel	29	22.7	30.4	29	23.7
Silver	0.68 UJ	0.76 UJ	5.7 J	9.6 J	6 J
Vanadium	52	46.5	12 J*	7.7 J*	7.8 J*
Zinc	62.6	61.1	78.5	78.5	54.3

## Note:

This table includes only those compounds detected in one of the presented samples.

U = analyte is undetected at specified detection limit.

J = analyte concentration is estimated.

mg/kg = milligrams per kilogram.

\* values are positively identified but are less than the CRDL.

<sup>a</sup> co-located sample.

### *Secondary Tailings Pond (Contaminated Soil)*

Results for inorganic analysis for source samples collected from the secondary tailings pond are shown in Table 4-2. The analytical results of background samples SS005 and SS006 are included in the table for comparison purposes. Antimony was detected at both sample locations SS003 and SS004 at concentrations of 26.3 mg/kg and 21.1 mg/kg, respectively. Arsenic was detected at both sample locations at concentrations of 1260 mg/kg and 2580 mg/kg. Barium was detected at both sample locations at concentrations of 46.1 and 67.6 mg/kg. Beryllium was detected at both sample locations at concentrations of 0.5 and 0.62 mg/kg. Chromium was detected at both sample locations at concentrations of 10.2 and 14.6 mg/kg. Cobalt was detected at both sample locations at concentrations of 5.7 and 8.3 mg/kg. Copper was detected at both sample locations at concentrations of 35.3 and 47.8 mg/kg. Lead was detected at both sample locations at concentrations of 174 and 339 mg/kg. Manganese was detected at both sample locations at concentrations of 273 and 383 mg/kg. Mercury was detected at sample location SS004 at a concentration of 0.42 mg/kg. Nickel was detected at both sample locations at concentrations of 17.8 and 24.5 mg/kg. Silver was detected at both sample locations at concentrations of 12.1 and 13.7 mg/kg. Vanadium was detected at both sample locations at concentrations of 12.6 and 16 mg/kg. Zinc was detected at both sample locations at concentrations of 55.7 and 73.4 mg/kg. Sample results for inorganics on all soil samples can be found in Appendix E, Data Validation Reports.

## **4.2 GROUNDWATER SAMPLES**

Groundwater samples include samples collected from on-site monitoring wells and from downgradient domestic off-site wells. Samples collected from upgradient domestic wells DW001 and DW002 are designated as background and used in comparison with the downgradient data. Only those data determined to be observed releases are discussed.

### **4.2.1 Inorganics**

#### *On-Site Monitoring Wells*

Results for inorganics in on-site monitoring wells are shown in Table 4-3. Cadmium, cobalt, cyanide, lead, mercury, nickel, silver and vanadium were elevated in on-site monitoring well samples.

Cadmium was elevated in a sample collected from monitoring well MW003 at a concentration of 0.77 µg/L. Cobalt was elevated in samples collected from monitoring wells MW003 and MW004 at concentrations of 200 µg/L and 13 µg/L, respectively. Cyanide was elevated in samples collected from monitoring wells MW002, MW003 and MW004 at concentrations of 7 µg/L, 162 µg/L and 8 µg/L, respectively. Lead was elevated in samples collected from all

**Table 4-2—Source Soil Data from Contaminated Soil Samples in Secondary Tailings Pond (mg/kg)**

Compound	Background		Secondary Tailings Pond	
	SS005	SS006	SS003	SS004
Antimony	1.4 J*	3.5 J*	<b>26.3</b>	<b>21.1</b>
Arsenic	10.6 J	72.7 J	<b>1260 J</b>	<b>2580 J</b>
Barium	193	171	46.1 J*	67.6
Beryllium	0.23 U	0.25 U	0.5 J*	0.62 J*
Chromium	31.2	26.4	10.2	14.6
Cobalt	13.3	10.8 J*	5.7 J*	8.3 J*
Copper	34.4	29.7	35.3	47.8
Lead	12.8	21.2	<b>174</b>	<b>339</b>
Manganese	455	356	273	383
Mercury	0.11 U	0.13 U	0.12 U	<b>0.42</b>
Nickel	29	22.7	17.8	24.5
Silver	0.68 UJ	0.76 UJ	<b>12.1 J</b>	<b>13.7 J</b>
Vanadium	52	46.5	12.6	16
Zinc	62.6	61.1	55.7	73.4

Note:

This table includes only those compounds detected in one of the presented samples. Bold concentrations represent observed contamination as defined at the beginning of Section 4.

U = analyte is undetected at specified detection limit.

J = analyte concentration is estimated.

mg/kg = milligrams per kilogram.

\* values are positively identified but are less than the CRDL.

Table 4-3—Groundwater Data from On-Site Monitoring Well Samples (µg/L)

Compound	EPA Drinking Water Standard (MCL)	Background		On-Site Monitoring Wells					
		DW001	DW002	MW001	MW002	MW003	MW003-D <sup>a</sup>	MW004	
Arsenic	50	1040	1180	485	347	244	241	41.3	
Barium	2000	23.3	55	3.3 J	7.27	15.5	15.3	73.2	
Cadmium	5	0.6 U	0.3 U	0.3 U	0.3 U	<b>0.77 J</b>	<b>0.73 J</b>	1.2 U	
Cobalt	NA	10 U	10 U	10 U	10 U	<b>198</b>	<b>200</b>	<b>13 J</b>	
Copper	1300	3 U	30.9	6.9 J	11.1	8.5 J	3.4 J	6.9 J	
Cyanide	200	5 U	5 U	5 U	7	<b>162</b>	<b>114</b>	<b>8</b>	
Lead	15	1.2 J	0.54 J	<b>7.54</b>	<b>5.91</b>	<b>33.1</b>	<b>16</b>	<b>4.91</b>	
Manganese	50 <sup>b</sup>	135	1 U	8.27	24.1	5.9	4.9 J	22.6	
Mercury	2	0.2 U	0.2 U	0.2 U	<b>18.5</b>	<b>0.23</b>	<b>0.35</b>	0.2 U	
Nickel	NA	10 U	10 U	10 U	10 U	10 U	10 U	<b>13 J</b>	
Selenium	50	2 U	15.8	1.5 J	2.5 J	5.09	5.31	6.8 J	
Silver	100 <sup>b</sup>	3 U	3 U	<b>3 J</b>	<b>734</b>	3 U	3 U	3 U	
Vanadium	NA	3 U	3 U	3 U	3 U	3 U	3 U	<b>3 J</b>	
Zinc	5000 <sup>b</sup>	547	13 J	506	64.9	18 J	11 J	12 J	

## Note:

This table includes only those compounds detected in one of the presented samples.

Bold concentrations represent observed releases as defined in the beginning of Section 4.

U = analyte is undetected at specified detection limit.

J = analyte concentration is estimated.

µg/L = micrograms per liter.

NA = not available

<sup>a</sup> Duplicate sample.

<sup>b</sup> Secondary EPA Drinking Water Standards, unenforceable federal guidelines regarding taste, odor, color—and certain other non-aesthetic effects—of drinking water.

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monitoring wells from concentrations of 4.91 to 33.1 µg/L. Mercury was elevated in samples collected from monitoring wells MW002 and MW003 at concentrations of 18.5 µg/L and 0.35 µg/L, respectively. Nickel was elevated in one sample, collected from monitoring well MW004 at a concentration of 13 µg/L. Silver was elevated in samples collected from monitoring wells MW001 and MW002 at concentrations of 3 µg/L and 734 µg/L, respectively. Vanadium was elevated in one sample, collected from monitoring well MW004 at a concentration of 3 µg/L. Sample results for inorganics in all groundwater samples can be found in Appendix E, Data Validation Reports.

#### *Off-Site Domestic Wells*

Results for inorganics in off-site downgradient domestic wells are shown in Table 4-4. Barium and manganese were elevated in off-source domestic wells.

Barium was elevated in one sample collected from domestic well DW004 at a concentration of 166 µg/L. Manganese was elevated in samples collected from both domestic wells (DW003 and DW004) at concentrations of 1080 µg/L and 544 µg/L, respectively. Sample results for inorganics analysis performed on all groundwater samples can be found in Appendix E, Data Validation Reports.

### 4.3 DATA SUMMARY

Inorganics detected in source samples and elevated in samples collected from on-site monitoring wells are summarized below. For comparison and attribution purposes, only the source samples that have analytes that are 3 times greater than background concentrations or that have analytes that were detected in source samples above the background SQL but undetected in background samples are discussed. These are referred to as being "detected in the source."

- Primary Tailings Pond—Cyanide, lead, mercury, nickel, and silver detected in source samples collected from the primary tailings pond were also elevated in groundwater samples collected from on-site monitoring wells. The elevated inorganics detected in off-site downgradient domestic wells were not detected in source samples collected from the primary tailings pond or elevated in groundwater samples collected from on-site monitoring wells.
- Secondary Tailings pond—Since the secondary tailings pond is located hydrogeologically downgradient from the on-site monitoring wells, elevated concentrations of inorganics in on-site monitoring wells could not be attributed to the inorganics detected in the secondary tailings pond. In addition, the elevated inorganics detected in off-site downgradient domestic wells were not detected in source samples collected from the secondary tailings pond.

**Table 4-4—Groundwater Data from Off-Site Domestic Well Samples (µg/L)**

Compound	EPA Drinking Water Standard (MCL)	Background		Off-Site Domestic Wells	
		DW001	DW002	DW003	DW004
Arsenic	50	1040	1180	43	2060
Barium	2000	23.3	55	31.4	<b>166</b>
Copper	1300	3 U	30.9	6.1 J	24.5
Lead	15	1.2 J	0.54 J	0.79 J	1.9 J
Manganese	50 <sup>a</sup>	135	1 U	<b>1080</b>	<b>544</b>
Selenium	50	2 U	15.8	1.3 J	2 U
Zinc	5000 <sup>a</sup>	547	13 J	42.5	253

**Note:**

This table includes only those compounds detected in one of the presented samples.  
 Bold concentrations represent observed releases as defined in the beginning of Section 4.

U = analyte is undetected at specified detection limit.

J = analyte concentration is estimated.

µg/L = micrograms per liter.

<sup>a</sup> Secondary EPA Drinking Water Standards, unenforceable federal guidelines regarding taste, odor—and certain other non-aesthetic effects—of drinking water.

## SECTION 5

### CONCLUSIONS

The following conclusions can be made from information from this SI:

Two sources of contamination have been identified on the site. The first source is a surface impoundment (primary tailings pond) approximately 80,000 square feet. The second source is an area of contaminated soil (secondary tailings pond) approximately 40,000 square feet. Analytical results from sampling conducted as part of this SI identified metals in both sources.

An observed release of cyanide and other metals to the on-site groundwater was confirmed by sample results obtained as part of this SI. Sampling in off-site domestic wells approximately 0.5 mile from the site indicate that the contamination in on-site groundwater has not migrated to the off-site wells. Estimating the numbers of well owners in the area drinking the groundwater is difficult as many people have water brought in from outlying areas due to high background levels of arsenic, high likelihood of mineralization, and poor taste. Although analytical results from this investigation do not indicate a release of contaminants to off-site drinking water wells, the potential for contaminants to impact downgradient domestic wells does exist.

Surface water is able to reach both tailings ponds; however, the berms surrounding the primary tailings pond and those on the downgradient side of the secondary tailings pond, help minimize surface water from being released from the ponds. In addition, topographic barriers and trees inhibit surface runoff from reaching the closest surface water bodies. There are also no surface water intakes within 15 miles of the site.

Soil exposure is minimal because the primary tailings pond is enclosed in a maintained fence, and the secondary tailings pond is overgrown with vegetation. In addition, the site is approximately 8 miles out of the city of Fairbanks, and access to the site is via an unfrequented dirt road.

Air exposure is minimal because the secondary tailings pond is overgrown with vegetation and there are few activities to resuspend particulates in the primary and secondary tailings ponds. In addition, there are less than 50 people within 1 mile of the site, and only one worker on-site who works within 200 feet of the tailings ponds.



## SECTION 6

### REFERENCES

Alaska Department of Environmental Conservation (ADEC). 1994. Information from the Tricon Mining files from the Northern Regional Office, Fairbanks, Alaska.

Alaska Department of Natural Resources (DNR). 1994. Search for wells within four miles of the Tricon Mining site, Fairbanks, Alaska.

Armstrong, Edward J. 1989. Vice President, Tricon Mining. Personal communication with W. Richards, E&E. 29 September 1989.

Armstrong, Edward J. 1994. Vice President, Tricon Mining. Personal communication during on-site visit with K. Ritenburg, Roy F. Weston, Inc.

Ecology and Environment, Inc. (E&E). 1989. Preliminary Assessment Report for Tricon Mining, Fairbanks, Alaska. December 1989.

Fadley, Janey. September 1994. Endangered Species Specialist, U.S. Department of Fish and Wildlife Conservation, Personal Communication with K. Ritenburg, Roy F. Weston, Inc.

Hawkins, Dan. May 1994. Professor of Geochemistry, University of Alaska, Fairbanks, Emeritus. Personal Communication with K. Ritenburg, Roy F. Weston, Inc.

International Air Transport Association (IATA). 1993. Dangerous Goods Regulations, 34th Edition.

McCallister, Ron. May 1994. ADEC, Personal communication during on-site visit with K. Ritenburg, Roy F. Weston, Inc.

Murton, Wayne. 1989. Vice President, Tricon Mining, Inc. Letter to Dennis Ward (ADEC), regarding industrial solid wastes, Grant Mine. April 1989.

Roy F. Weston, Inc. (WESTON). 1994. Sampling and Analysis Plan for the Tricon Mining SI, July 1994.

Shannon and Wilson, Inc. 1985. Geotechnical Investigation for the Proposed Grant Mine Tailings Pond, Fairbanks, Alaska.

U.S. Department of Agriculture (USDA). 1968. Potential Evapotranspiration and Climate in Alaska by Thornthwaite's Classification. Forest Service Research Paper PNW-71.

- U.S. Department of Commerce (USDC). 1990. The 1990 Census of Population and Housing, Summary of Population and housing characteristics, Alaska.
- U.S. Department of Commerce (USDC). 1963. Probable Maximum Rainfall Frequency Data for Alaska, Technical Paper No. 47.
- U.S. Environmental Protection Agency (EPA). 1994. GIS Database for Site Investigations.
- U.S. Environmental Protection Agency (EPA). 1992. Revised Hazard Ranking System.
- U.S. Environmental Protection Agency (EPA). 1991. User's Guide to the Contract Laboratory Program, OSWER directive 9240.0-01D.
- U.S. Environmental Protection Agency (EPA). 1990. Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration, ILM03.0.
- U.S. Environmental Protection Agency (EPA). 1985. National Enforcement Investigations Center, Policies and Procedures.
- U.S. Geological Survey (USGS). 1994. Water Well Inventory for the area within four miles of the Tricon Mining site, Fairbanks, Alaska.
- U.S. Geological Survey (USGS). 1992. Water Resources Data, Alaska, Water Year 1992.
- U.S. Geological Survey (USGS). 1978. Hydrogeologic Information for Land-Use Planning, Fairbanks Vicinity, Alaska.
- U.S. Geological Survey (USGS). 1963. Ground-Water Resources of the Fairbanks Area, Alaska, Water Supply Paper 1590.
- U.S. Geological Survey (USGS). 1954. Topographic Map (15 minute series): Fairbanks D-2, Revised 1975.
- U.S. Department of the Interior (USDI). 1992. Fish and Wildlife Service, National Wetlands Inventory Map, Fairbanks D-2, Alaska Quadrangle.
- Walther, Martin. 1987. Report of Pumping Test, Grant Mine, Ester Dome near Fairbanks, Alaska.
- Winters, Jack. 1994. Habitat Biologist, Alaska Department of Fish & Game, Fairbanks. Personal communication with K. Ritenburg, Roy F. Weston, Inc.

Viavant, Tim. 1994. Fisheries Biologist, Alaska Department of Fish and Game, Fairbanks. Personal communication with K. Ritenburg, Roy F. Weston, Inc.