38019
7389

ANALYTICAL RESULTS REPORT
RICHARDSON FLAT TAILINGS
SUMMIT COUNTY, UTAH

TDD R8-8508-07

EPA REGIONAL SITE PROJECT OFFICER: ERIC JOHNSON

E&E PROJECT OFFICER: SUSAN KENNEDY
REVIEWED BY KARL FORD

SUBMITTED TO: KEITH SCHWAB, FIT-DPO
WILLIAM GEISE, REM-FIT COORDINATOR

DATE SUBMITTED: OCTOBER 25, 1985

TABLE OF CONTENTS

PAGE

LISTS OF TABLES AND FIGURES i

I. INTRODUCTION. 1

II. QUALITY ASSURANCE REVIEW. 2

III. ANALYTICAL RESULTS AND CONCLUSIONS. 2

A. GROUND WATER SAMPLES. 2

B. SURFACE WATER SAMPLES 3

C. SOIL AND TAILINGS SAMPLES 5

IV. SUMMARY 6

V. RECOMMENDATIONS 6

REFERENCES. 7

APPENDICES

A. SITE INSPECTION REPORT

B. RICHARDSON FLAT TAILINGS RAW DATA

LIST OF FIGURES

FIGURE 1 GENERAL SITE LOCATION, RICHARDSON FLAT TAILINGS, UTAH

FIGURE 2 SITE MAP AND SAMPLE LOCATIONS, RICHARDSON FLAT TAILINGS, UTAH

LIST OF TABLES

TABLE 1 ANALYTICAL DATA FOR UNFILTERED GROUND WATER SAMPLES (TOTAL METALS)

TABLE 2 ANALYTICAL DATA FOR FILTERED GROUND WATER SAMPLES (DISSOLVED METALS)

TABLE 3 ANALYTICAL DATA FOR SURFACE WATER SAMPLES

TABLE 4 ANALYTICAL DATA FOR SURFACE SOIL AND TAILINGS SAMPLES

TABLE 5 ANALYTICAL DATA FOR SUBSURFACE SOIL AND TAILINGS SAMPLES

ANALYTICAL RESULTS REPORT
RICHARDSON FLAT TAILINGS
SUMMIT COUNTY, UTAH

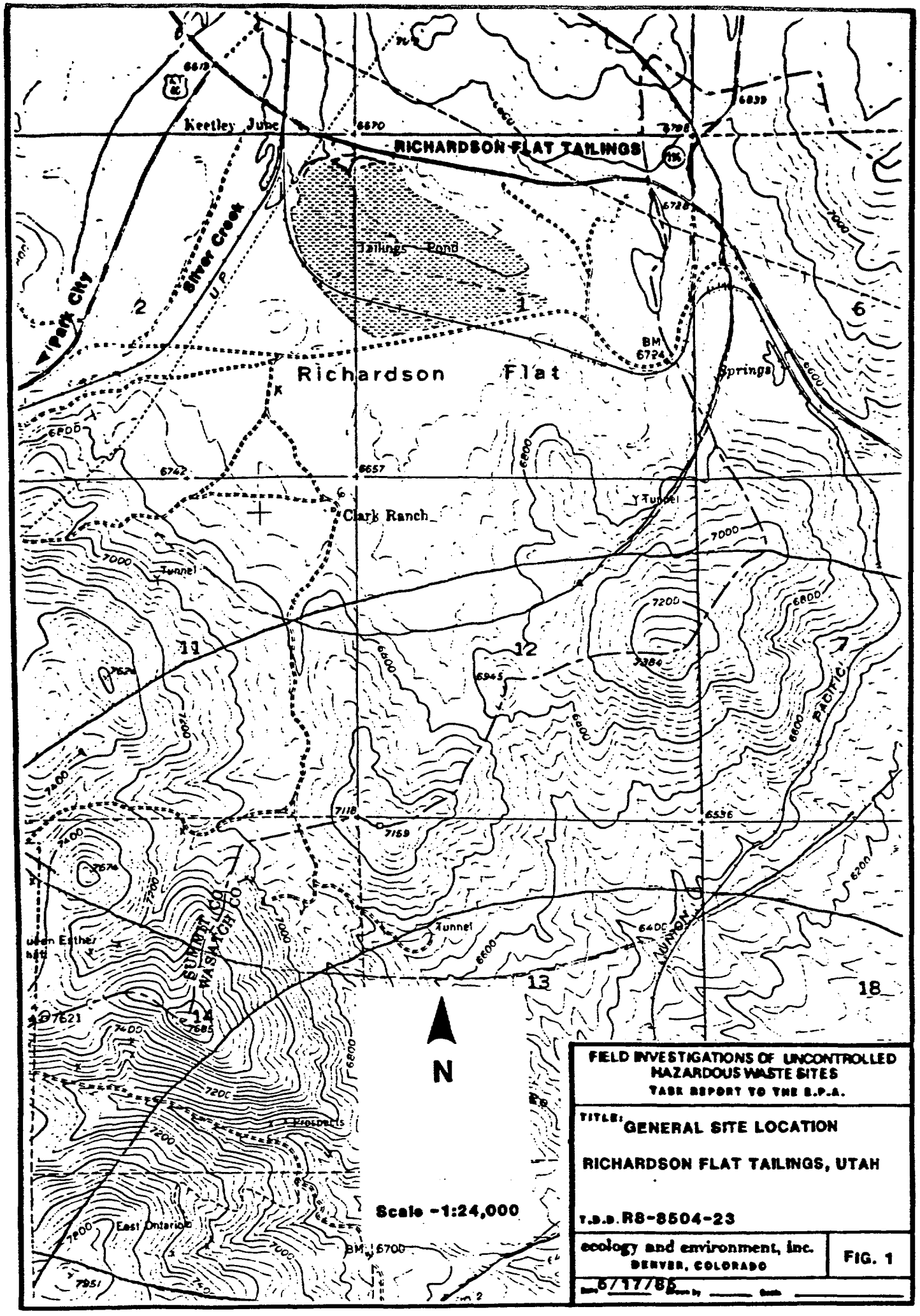
I. INTRODUCTION

This report was prepared to satisfy the requirements of Technical Directive Document (TDD) R8-8508-07, issued to Ecology and Environment, Inc., Field Investigation Team (E&E FIT) by the Region VIII Environmental Protection Agency (EPA).

The samples discussed in this report were collected by the FIT on June 19 and 20, and July 30 through August 2, 1985 from Richardson Flat Tailings near Park City, Utah (Figure 1). Two previous reports, the Report of Sampling Activities (R8-8505-27) and the Sampling Plan (R8-8504-23), present discussions regarding project objectives, site description, sampling procedures, quality control, sample documentation and field observations.

The sampling results discussed in this report consist of three ground water, six surface water, one surface soil, four surface tailings, two subsurface soil and four subsurface tailings samples collected during this investigation.

Richardson Flat Tailings is located in Summit County, Utah, approximately 3.5 miles northeast of Park City. The tailings cover approximately 160 acres in the NW 1/4, Section 1, Township 2 South, Range 1 East, and were piped from the Keetley Ontario Mine Shaft south of Park City. An ephemeral pond overlies the northeastern portion of the tailings, and is contained by a dam at the northwestern end. The site is currently owned by United Park City Mines Company (UPCM) who maintains six monitoring wells located near the base of the dam.



FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES
TASK REPORT TO THE E.P.A.

TITLE: GENERAL SITE LOCATION

RICHARDSON FLAT TAILINGS, UTAH

T.D.D. R8-8504-23

ecology and environment, inc.
DENVER, COLORADO

FIG. 1

Date 6/17/85 Drawn by ____ Scale ____

II. QUALITY ASSURANCE REVIEW

All samples collected at Richardson Flat Tailings were low hazard, and were analyzed for Task 1 and 2 metals. In addition, surface water samples were analyzed for sulfate, and ground water samples were analyzed for sulfate and cyanide. Subsurface tailings samples were also analyzed for cyanide.

A triple volume surface water sample was collected at station RT-SW-6 for laboratory quality assurance. A duplicate ground water sample (RF-GW-4) was collected from station RF-GW-3 to check laboratory procedures, accuracy and precision.

A review of spike recovery and duplicate sample data was performed at EPA Region VIII Lab, and indicated the analytical procedures used were acceptable. Soil cyanide data were reviewed by E&E FIT chemists and were judged acceptable.

III. ANALYTICAL RESULTS

Analytical results for the 1985 sampling effort at Richardson Flat Tailings have been compiled in Tables 1, 2, 3, 4 and 5. Corresponding sample locations are illustrated in Figure 2. The raw data are attached as Appendix B.

A review of the analytical data allows the following observations and conclusions.

A. GROUND WATER SAMPLES

Upgradient ground water sample RF-GW-1 was collected from the newly installed monitoring well south of the tailings. Samples RF-GW-2 and RF-GW-3 were collected from UPCM monitoring wells located near the base of the dam. RF-GW-4 is a duplicate of sample RF-GW-3.

The ground water samples were analyzed for total metals, cyanide and sulfate, and dissolved metals. Ground water samples are generally analyzed for dissolved metals rather than total metals, but for purposes of comparison, both analyses were performed.

Total metals analyses of downgradient ground water samples (RF-GW-2, RF-GW-3 and RF-GW-4 averaged) revealed ten-fold increases in aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, silver, vanadium and zinc over the background ground water sample RF-GW-1. In contrast, dissolved metals analyses revealed elevated levels of arsenic, cobalt, iron, manganese and zinc using the same comparison. Only manganese, however, is present in higher concentrations than allowed by National Interim Primary drinking water standards (Table 1).

Total cyanide was found at a concentration of 200 ppb in downgradient sample RF-GW-2 as compared to non-detectable levels in the background sample RF-GW-1. However, a notation on the data sheet states the largest part of the RF-GW-2 value is due to an interference.

Based on these findings, an observed release of contaminants to the ground water can be scored according to the Mitre Model for Hazardous Waste Site Ranking using dissolved metals data. A drinking water well, used as a back-up source for Park City residents, is located two and a half miles from the contaminated wells at Richardson Flat Tailings. Hydrologic continuity between the drinking water well and the contaminated wells is unlikely, however, due to the prevailing direction of ground water movement through the unconsolidated deposits (Reference G).

B. SURFACE WATER SAMPLES

Surface water samples RT-SW-1, RT-SW-2 and RT-SW-3 were collected from the east bank of Silver Creek, and RT-SW-4, RT-SW-5 and RT-SW-6 were collected from the intermittent stream which flows through the tailings.

II. QUALITY ASSURANCE REVIEW

All samples collected at Richardson Flat Tailings were low hazard, and were analyzed for Task 1 and 2 metals. In addition, surface water samples were analyzed for sulfate, and ground water samples were analyzed for sulfate and cyanide. Subsurface tailings samples were also analyzed for cyanide.

A triple volume surface water sample was collected at station RT-SW-6 for laboratory quality assurance. A duplicate ground water sample (RF-GW-4) was collected from station RF-GW-3 to check laboratory procedures, accuracy and precision.

A review of spike recovery and duplicate sample data was performed at EPA Region VIII Lab, and indicated the analytical procedures used were acceptable. Soil cyanide data were reviewed by E&E FIT chemists and were judged acceptable.

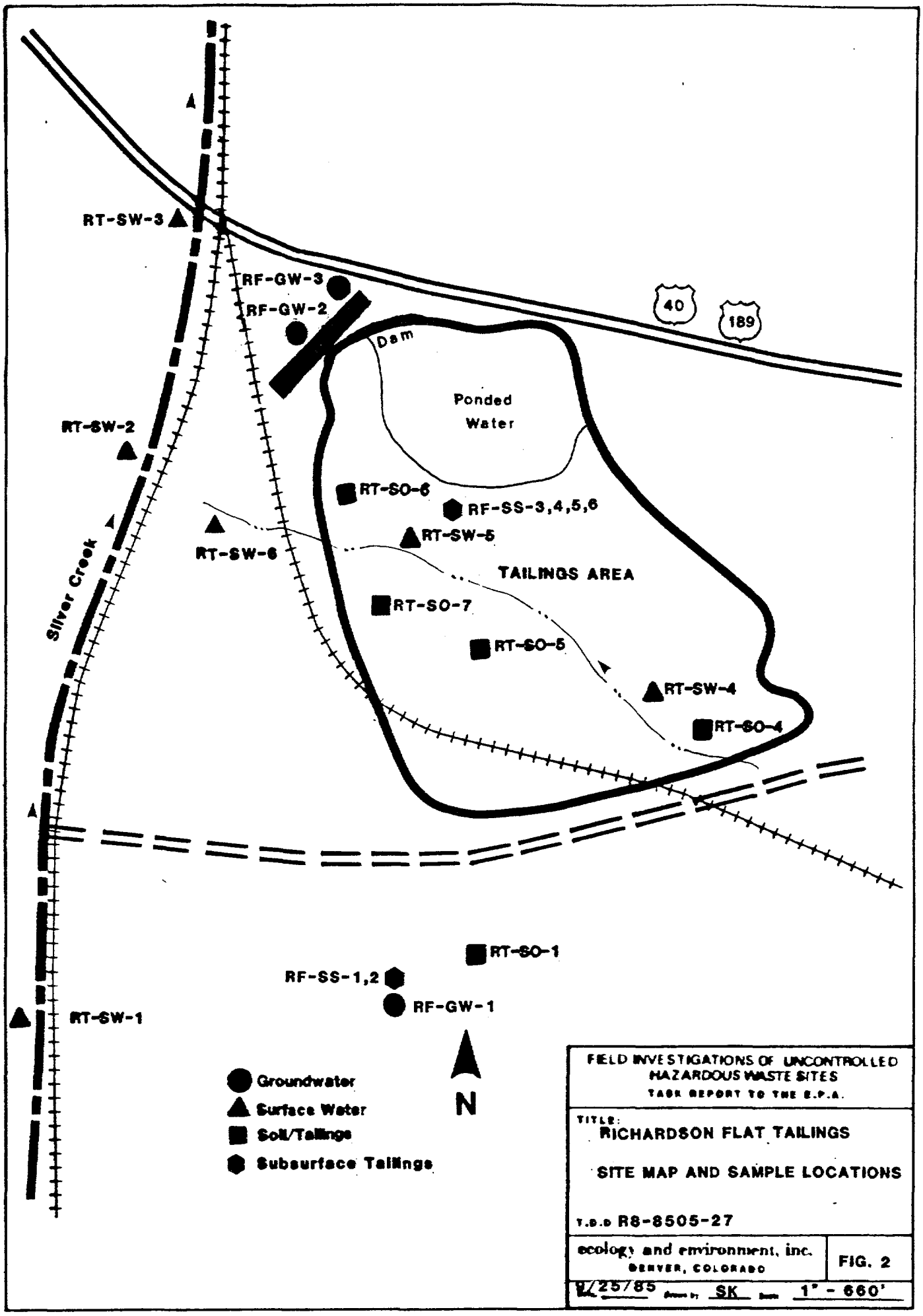
III. ANALYTICAL RESULTS

Analytical results for the 1985 sampling effort at Richardson Flat Tailings have been compiled in Tables 1, 2, 3, 4 and 5. Corresponding sample locations are illustrated in Figure 2. The raw data are attached as Appendix B.

A review of the analytical data allows the following observations and conclusions.

A. GROUND WATER SAMPLES

Upgradient ground water sample RF-GW-1 was collected from the newly installed monitoring well south of the tailings. Samples RF-GW-2 and RF-GW-3 were collected from UPCM monitoring wells located near the base of the dam. RF-GW-4 is a duplicate of sample RF-GW-3.


RT-SW-3
RF-GW-3
RF-GW-2
40
189
Dam
Ponded Water
RT-SW-2
RT-SO-6
RF-SS-3,4,5,6
RT-SW-5
RT-SW-6
TAILINGS AREA
Silver Creek
RT-SO-7
RT-SO-5
RT-SW-4
RT-SO-4
RT-SO-1
RF-SS-1,2
RF-GW-1
RT-SW-1
N
Groundwater
Surface Water
Soil/Tailings
Subsurface Tailings
FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES
TASK REPORT TO THE E.P.A.
TITLE:
RICHARDSON FLAT TAILINGS
SITE MAP AND SAMPLE LOCATIONS
T.D.D R8-8505-27
ecology and environment, inc.
DENVER, COLORADO
FIG. 2
9/25/85
SK
1" - 660'

A comparison of the upgradient Silver Creek sample RT-SW-1 to downgradient samples RT-SW-2 and RT-SW-3 reveals concentrations of aluminum, antimony, arsenic, calcium, copper, iron, lead, manganese, mercury, and zinc are higher in the background sample (RT-SW-1) than the midstream sample (RT-SW-2). This is likely attributed to the Prospector Square Tailings which lie alongside Silver Creek less than two miles upstream of Richardson Flat.

Concentrations of the above constituents are relatively high in the background sample RT-SW-1 collected approximately one mile downstream of Prospector Square Tailings. Concentrations are lowest in sample RT-SW-2 collected one and a half miles downstream of Prospector Square Tailings and upgradient of Richardson Flat Tailings. Highest concentrations, however, are found in sample RT-SW-3, immediately downstream of Richardson Flat Tailings.

In spite of relatively high levels of Task 1 and 2 metals in the background sample RT-SW-1, a ten-fold increased concentration of lead was found in downgradient sample RT-SW-3 when compared with the background sample. In addition, a four fold increase of arsenic levels was found in RT-SW-3. Thus, the surface water data can be used as direct evidence of an observed release, as stipulated by HRS scoring guidelines.

Surface water from Silver Creek is diverted approximately 1,000 feet downstream of Richardson Flat Tailings, and is used to irrigate pasture land and hay fields. Silver Creek is not used as a drinking water source for human populations.

Analyses of surface water samples RT-SW-4, RT-SW-5 and RT-SW-6 collected from the intermittent on-site diversion ditch revealed elevated levels of aluminum, antimony, arsenic, barium, calcium, lead, magnesium and sodium. Water in the diversion ditch flows to a marshy area located just west of the dam, and into Silver Creek directly upstream of RT-SW-3.

C. SOIL AND TAILINGS SAMPLES

Analytical data for surface tailings samples (RT-SO-4, RT-SO-5, RT-SO-6 and RT-SO-7) reveal elevated concentrations of arsenic, cadmium, calcium, copper, lead, magnesium, mercury, silver, sodium and zinc, as compared to the off-site background soil sample (RT-SO-1). Elevated levels of the above constituents are typical in metal mine tailings, however, the off-site background soil sample contains substantially higher levels of arsenic, cadmium, lead, mercury and zinc as compared to mean concentrations for the Western United States (Table 4). Wind-blown tailings material is probably the primary source of contamination to nearby off-site surface soil. This idea is substantiated by comparison of the background surface soil sample data (RT-SO-1) to subsurface soil data (RF-SS-1, RF-SS-2). Most of the elemental constituents are elevated in the surface soil, but are greatly reduced in subsurface soil samples.

Data from subsurface tailings samples RF-SS-3, RF-SS-4 and RF-SS-5 indicate downward migration of antimony, arsenic, cadmium, copper, lead, magnesium, mercury, silver, sodium and zinc. As a result, soil beneath the tailings (RF-SS-6) contains elevated concentrations of all of the above constituents. Subsurface tailings data are presented in Table 5.

IV. SUMMARY

Although other upstream tailings or mining operations may be contributing inorganic contaminants to Silver Creek, a significant increase in surface water lead concentrations can be attributed to Richardson Flat Tailings. Water from Silver Creek is used for local irrigation.

A significant release of arsenic, cobalt, iron, manganese and zinc to downgradient ground water was demonstrated. However, hydrologic continuity between the contaminated aquifer and current

drinking water sources is unlikely. Any expansion of the Park City water supply should be thoroughly evaluated based on these findings.

Surface and subsurface tailings material contain high concentrations of heavy metals and arsenic. Subsurface tailings sample data indicate downward movement of contaminants in the solid matrix.

Elevated levels of metals and arsenic in nearby off-site soil may be attributed to wind-blown tailings from Richardson Flat.

V. RECOMMENDATIONS

1. An observed release of contaminants to the air route was scored based on photo-documentation of air-borne tailings material during collection of surface tailings sample (RT-SO-7). It is recommended that high-volume air sampling be conducted at the site to further substantiate and complete the HRS package.

2. Because the tailings material contains high concentrations of metals and arsenic, the area should be fenced to prevent on-site grazing by domestic sheep and cattle, and to keep people off the site.

3. Further surface water and sediment sampling is recommended to fully assess the hazard associated with irrigating area pasture land with water diverted directly downstream from Richardson Flat.

TABLE 1. ANALYTICAL DATA FOR UNFILTERED GROUND WATER SAMPLES
COLLECTED AT RICHARDSON FLAT TAILINGS, UTAH.
(Results in ug/l, ppb)

Parameter	Hole #1 RF-GW-1 Totals	UPCM #2 RF-GW-2 Totals	UPCM #1 RF-GW-3 Totals	UPCM #1 RF-GW-4 Totals	Drinking Water Criteria
TASK 1&2 METALS					
Aluminum	1,040	4,920	80,700	83,400	5,000(c)
Antimony	<5	63sc	<5	<5	146(b)
Arsenic	<5	349sc	78	70	50(a)
Barium	83	2,665sc	1,534	1,354	1,000(a)
Beryllium	<10	<10	<10	<10	0.037(b)
Cadmium	<5	16	42	48	10(a)
Calcium*	45	314	352	332	
Chromium	<5	42	98	104	50(a)
Cobalt	<5	80	46	48	
Copper	<5	190	1,583	1,350	1,000(b)
Iron	958	26,300	126,000	130,000	700(d)
Lead	<30	1,080	588	527	50(a)
Magnesium*	9.9	72	88	85	
Manganese	20	10,400	2,230	2,070	50(a)
Mercury	<0.1	0.1	0.70	0.60	2.0(a)
Nickel	<30	30	88	82	13.4(b)
Potassium					
Selenium	<5	<5	<5	<5	10(a)
Silver	<5	17	<5	<5	50(a)
Sodium*	16	54	44	44	
Thallium	<100	<100	<100	<100	13(b)
Tin					
Vanadium	<10	17	262	266	
Zinc	<5	2,790	650	569	5,000(b)
TASK 3 METAL					
Cyanide	<10	200	<10	<10	200(c)
SPECIAL ANION					
Sulfate*	35	775	625	1,025	250,000(c)

*mg/l or ppm

TABLE 2. ANALYTICAL DATA FOR FILTERED GROUND WATER SAMPLES COLLECTED AT RICHARDSON FLAT TAILINGS, UTAH.
(Results in ug/l, ppb)

Parameter	Hole #1 RF-GW-1 Dissolved	UPCM #2 RF-GW-2 Dissolved	UPCM #1 RF-GW-3 Dissolved	UPCM #1 RF-GW-4 Dissolved
TASK 1&2 METALS				
Aluminum	<30	<30	<30	<30
Antimony	<5	<5	<5	<5
Arsenic	<5	9	<5	9
Barium	78	99	104	104
Beryllium	<10	<10	<10	<10
Cadmium	<5	<5	<5	<5
Calcium*	47	307	254	254
Chromium	<5	<5	<5	<5
Cobalt	<5	67	10	10
Copper	<5	<5	<5	<5
Iron	<10	14,800	376	300
Lead	<30	<30	<30	<30
Magnesium*	9.8	70	56	56
Manganese	11	9,990	924	903
Mercury	<0.1	<0.1	<0.1	<0.1
Nickel	<30	<30	<30	<30
Potassium				
Selenium	<5	<5	<5	<5
Silver	<5	<5	<5	<5
Sodium*	16	52	42	44
Thallium	<100	<100	<100	<100
Tin				
Vanadium	<10	<10	<10	<10
Zinc	6	144	<5	<5
TASK 3 METAL				
Cyanide				

*mg/l or ppm

TABLE 3. ANALYTICAL DATA FOR SURFACE WATER
COLLECTED AT RICHARDSON FLAT TAILINGS, UTAH.
(Results in ug/l, ppb)

Parameter	Upstream SC RT-SW-1	Midstream SC RT-SW-2	Downstream SC RT-SW-3	Southeast IS RT-SW-4	Mid IS RT-SW-5	West IS RT-SW-6
TASK 1&2 METALS	Total	Total	Total	Total	Total	Total
Aluminum	172	77	370	450	<30	35
Antimony	21	15	35	19	13	7
Arsenic	14	11	65	33	27	12
Barium	36	41	53	119	26	27
Beryllium	<10	<10	<10	<10	<10	<10
Cadmium	<5	<5	<5	<5	<5	<5
Calcium	137,000	119,000	124,000	128,000	252,000	287,000
Chromium	<5	<5	<5	<5	<5	<5
Cobalt	<5	<5	<5	<5	<5	<5
Copper	12	9	60	18	<5	<5
Iron	725	389	2,290	1,570	507	215
Lead	147	93	1,985	237	42	<30
Magnesium	22,200	24,000	26,000	35,400	55,400	59,200
Manganese	764	434	727	602	1,654	2,566
Mercury	0.2	0.1	0.57	0.1	<0.1	<0.1
Nickel	<30	<30	<30	<30	<30	<30
Potassium						
Selenium	<5	<5	<5	<5	<5	<5
Silver	<5	<5	<5	<5	<5	<5
Sodium	31,700	25,600	25,200	36,500	29,000	37,300
Thallium	<100	<100	<100	<100	<100	<100
Tin						
Vanadium	<10	<10	<10	<10	<10	<10
Zinc	2,690	1,650	2,730	350	1,410	812
SPECIAL ANION						
Sulfate	284	222	210	218	963	909
Chloride	47	27	28	50	40	33
pH	7.33	7.54	7.47	7.26	7.40	7.40
Conductivity**	600	600	550	700	1,200	1,400
Temperature °C	21	21	19	20	21	21

SC - Silver Creek
IS - Intermittent Stream
** - umhos/cm

TABLE 4. ANALYTICAL DATA FOR SURFACE SOIL AND TAILINGS SAMPLES COLLECTED AT RICHARDSON FLAT TAILINGS, UTAH. (Results in ug/g, ppm)

Parameter	Background Soil RT-SO-1	Southeast Tailings RT-SO-4	Middle Tailings RT-SO-5	Northwest Tailings RT-SO-6	North Tailings RT-SO-7	Mean for Western US*
TASK 1&2 METALS						
Aluminum	14,400	3,440	863	794	1,340	58,000
Antimony	39	<200	<200	<400	<300	0.47
Arsenic	58	3,600	1,500	900	600	5.5
Barium	178	105	58	6.2	27	580
Beryllium	<1.6	<1.9	<1.4	<1.8	<1.5	0.68
Cadmium	17	47	40	80	58	0.2
Calcium	8,200	45,600	49,500	16,900	75,200	
Chromium	24	60	15	7.8	19	41
Cobalt	11	6.9	2.3	<0.9	1.5	7.1
Copper	94	227	181	371	961	21
Iron	24,000	30,700	19,900	154,000	106,000	21,000
Lead	1,110	3,320	2,650	7,010	8,530	17
Magnesium	4,990	14,600	15,300	3,960	13,100	
Manganese	879	1,650	1,810	510	5,150	380
Mercury	0.59	1.70	2.61	0.14	0.50	0.05
Nickel	12	59	5.2	9.6	16	15
Potassium						
Selenium	<16	<20	<300	<400	<300	0.23
Silver	6.7	20	19	24	22	0.2
Sodium	1,020	3,470	2,960	3,280	2,280	
Thallium	<16	<19	<14	<18	<15	0.2
Tin						
Vanadium	37	9.1	3.5	4.8	6.5	70
Zinc	1,570	6,360	5,400	5,870	3,780	55
% Solids	97.4	95.8	96.9	90.6	93.7	

* Reference f

TABLE 5. ANALYTICAL DATA FOR SUBSURFACE SOIL AND TAILINGS SAMPLES COLLECTED AT RICHARDSON FLAT TAILINGS, UTAH.
(Results in ug/g, ppm)

Parameter	Soil 5-7' RF-SS-1	Soil 10-12' RF-SS-2	Oxidized Tailing RF-SS-3	Reduced Tailings RF-SS-4	Tailings/ Soil Contact RF-SS-5	Soil beneath Tailings RF-SS-6
TASK 1&2 METALS						
Aluminum	16,900	16,700	844	484	1410	12,400
Antimony	<1	<1	31	49	171	14
Arsenic	6.5	6.3	311	328	218	34
Barium	125	147	31	86	64	235
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	6.8	7.4	53	169	61	15
Calcium	6,190	5,020	81,600	117,000	54,200	9,200
Chromium	19	19	6.3	16	14	15
Cobalt	8.7	9.5	<1	<1	4.5	16
Copper	14	17	225	225	335	105
Iron	18,500	19,700	80,800	68,000	22,600	15,100
Lead	37	37	2,770	4,720	4,920	1,090
Magnesium	6,240	7,620	11,100	12,900	13,300	4,530
Manganese	471	625	5,990	5,880	1,630	1,220
Mercury	<.05	<.05	0.94	1.97	2.26	0.40
Nickel	21	22	7	<6	<6	16
Potassium						
Selenium	<1	<1	1.0	<1	9.4	1.3
Silver	<1	<1	7.9	13	26	6.9
Sodium	308	279	2,230	11,300	6,100	1,010
Thallium	<20	<20	<20	<20	<20	<20
Tin						
Vanadium	31	28	3.1	<2	5.4	30
Zinc	70	44	3,980	23,200	12,700	1,510
% Solids	79.2	77.4	86.4	88.3	88.9	79.1
Task 3 Metal						
Cyanide	<0.4	<0.4	<0.4	5.2	<0.3	--

REFERENCES

(a) National Interim Primary Drinking Water Regulations. (EPA-570/9-76-003.) U.S. Environmental Protection Agency, Office of Drinking Water, 1976.

(b) U.S. EPA Water Quality Criteria. 1980. Federal Register 45 (231): 203-220.

(c) Safe Drinking Water Committee, 1982, Drinking Water and Health, National Academy Press, 4:166.

(d) U.S. EPA, 1976, Quality Criteria for Water.

(e) Clean Water Act, Code of Federal Regulations (Vol. 40, Parts 100 to 149), July 1, 1982.

(f) Shacklette, J.T., and Boerngen, J.G.; 1984: Elemental Concentrations in Soil and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Professional Paper 1270. 105pp.

(g) Baker, C.H., Jr.; 1970: Water Resources of the Heber-Kamas-Park City Area, North-Central Utah. U.S. Geological Survey Technical Publication No. 27. 79pp.

APPENDIX A

SITE INSPECTION REPORT

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-13
July, 1981

Rich. Flats.

EPA

Potential Hazardous Waste Site

Site Inspection Report

1

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Richardson Flat Tailings	~3.5 miles NE of Park City, Utah

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Park City	UT	84060	Summit	043	UT-03

09 COORDINATES — LATITUDE: 40 40 50.__ LONGITUDE: 111 26 40.__

10 TYPE OF OWNERSHIP (Check one): ☒ A. PRIVATE ☐ B. FEDERAL ____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION: 6, 19, 85 * (MONTH DAY YEAR)

02 SITE STATUS: ☐ ACTIVE ☒ INACTIVE

03 YEARS OF OPERATION: late 1960's | 1981 (BEGINNING YEAR | ENDING YEAR) ____ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply): ☐ A. EPA ☒ B. EPA CONTRACTOR Ecology & Environment, Inc (E&E) (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ____ (Name of firm) ☐ E. STATE ☐ F. STATE CONTRACTOR ____ (Name of firm) ☐ G. OTHER ____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO
Susan Kennedy	Reclamation Biologist	E&E FIT8	(303) 757-4984

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO
Eric Johnson	EPA Reg. Site Project Officer	EPA-Region 8	(303) 293-1519
Jeff Holcomb	Chemical Engineer	E&E FIT 8	(303) 757-4984
Tom Smith	Safety Officer	E&E FIT8	(303) 757-4984
Wade Hansen	Geologist	Utah Dept. Env. Health	(801) 533-4145
Rob Smith Dave Tuesday	Chief Hydrogeologist Geochemist	E&E FIT 8	(303) 757-4984

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
E.L. Osika, Jr.	Vice President	United Park City Mines 309 Kearns Bldg., SLC, UT	(801) 532-4631
Kerry C. Gee	Geologist/Engineer	same as above	(801) 532-4631
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT		varied

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Eric Johnson	EPA - Region VIII Denver	(303) 293-1519

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Susan Kennedy	EPA	E&E FIT8	(303) 757-4984	8 27 85 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

* 6/19, 20/85
7/30, 31/85
8/1, 2/85

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	0980952840

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [x] A SOLID
- [x] B POWDER, FINES
- [ ] C SLUDGE
- [x] E SLURRY
- [ ] F LIQUID
- [ ] G GAS
- [ ] D OTHER _____ (Specify)

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS >7 million

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- [x] A TOXIC
- [ ] B CORROSIVE
- [ ] C RADIOACTIVE
- [x] D PERSISTENT
- [x] E SOLUBLE
- [ ] F INFECTIOUS
- [ ] G FLAMMABLE
- [ ] H IGNITABLE
- [ ] I HIGHLY VOLATILE
- [ ] J EXPLOSIVE
- [ ] K REACTIVE
- [ ] L INCOMPATIBLE
- [ ] M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS	Elevated	arsenic and	Sodium, cyanide
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	Heavy metals	in tailings	material; at least 7 million tons of tailings

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
IOC	Arsenic	999	Surface impoundment	1650	µg/g *
MES	Cadmium	999	(tailings)	56	µg/g
MES	Copper	999		435	µg/g
MES	Lead	999		538	µg/g
MES	Manganese	999		2280	µg/g
MES	Mercury	999		1.24	µg/g
MES	Nickel	7440-02-0		23	µg/g
MES	Silver	999		21	µg/g
IOC	Sodium	999		2998	µg/g
MES	Zinc	999		5353	µg/g
IOC	Cyanide	999		5.2	µg/g

* Concentration figures are averages of 4 surface tailings samples (RT-SO-4,5,6 & 7). Total metals.

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	None		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Ecology & Environment, Inc. files - raw data
Sampling Activities Report

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980953840

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION — 02 [ ] OBSERVED (DATE 8/2/85) — [ ] POTENTIAL — [X] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
Groundwater samples from upgradient wells (RT-GW-2, RT-GW-3) were collected and analyzed. Dissolved metals analyses revealed elevated levels of arsenic, cobalt, iron, manganese, and zinc. A drinking water well, used as a back-up source for Park City residents, is located two and a half miles from the contaminated wells at Richardson Flat. Hydrologic continuity between the drinking water well and the contaminated wells is unlikely, however, due to the prevailing direction*

01 [X] B. SURFACE WATER CONTAMINATION — 02 [X] OBSERVED (DATE 6/20/85) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED 878 — 04 NARRATIVE DESCRIPTION
Surface water samples from Silver Creek, collected downgradient of the site contained elevated levels of lead. RT-SW-3 (downgradient) contained 1985 µg/l lead as compared to RT-SW-1 (upgradient) containing 147 µg/l lead. Arsenic levels were also elevated, but not an order of magnitude higher than the upgradient sample.

01 [X] C. CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
Air-borne tailings particles were observed during afternoon gusty winds on June 19, 1985. The EPA FIT did not conduct HIVOL air monitoring at Richardson Flat, however.

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
No recorded history -- fire and explosive conditions do not exist at the site.

01 [X] E. DIRECT CONTACT — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
The site is not secured from public access or access by domestic livestock. On June 19 and 20, vehicles were observed driving near the tailings area along the access road. Sheep and cattle were observed walking on the tailings on June 19 and 20, 1985.

01 [X] F. CONTAMINATION OF SOIL — 02 [ ] OBSERVED (DATE 8/2/85) — [ ] POTENTIAL — [X] ALLEGED
03 AREA POTENTIALLY AFFECTED 640 (acres) (RF-SS-6) — 04 NARRATIVE DESCRIPTION
Soil beneath the tailings contains elevated concentrations of antimony, arsenic, cadmium, copper, lead, magnesium, mercury, silver, sodium and zinc. Off site surface soil (RT-SS-1) contained elevated levels of arsenic, cadmium, lead, mercury and zinc probably due to wind-blown tailings material.

01 [X] G. DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
The Pacific Bridge well (located ~2.5 mi from the site) is not likely to be affected by contaminants from Richardson Flat Tailings. The well is used only as a backup source of municipal water for Park City residents, with other sources available. Surface water from Silver Creek is not used for drinking water.

01 [X] H. WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
The tailings are being leased by Mr. Kay Worthy to be used as backfill for sewer lines and road base. In addition, FIT members observed heavy equipment operators dumping what appeared to be native soil on the tailings area.

01 [X] I. POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ — 04 NARRATIVE DESCRIPTION
No recorded history of population exposure or injury, however, the site is not secured from public access or domestic livestock grazing.

EPA FORM 2070-13 (7-81)

* of ground water movement through the unconsolidated deposits.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: UT
02 SITE NUMBER: UT0980952840

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 [X] J. DAMAGE TO FLORA — 02 [X] OBSERVED (DATE 6/19/85) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Peripheral tailings support vegetation including Juncus sp., Salix sp. & Verbascum thapsus predominantly, but most of the tailings are denuded due to high levels of soluble salts and metals.

01 [X] K. DAMAGE TO FAUNA — 02 [ ] OBSERVED (DATE ____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)
No apparent damage to area fauna. Two muskrats were observed swimming in the drainage ditch on site (near RT-SW-4). Fish in Silver Creek could potentially be affected by lead and arsenic being released from the tailings.

01 [X] L. CONTAMINATION OF FOOD CHAIN — 02 [ ] OBSERVED (DATE ____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
The possibility exists for metals to move through the food chain if 1) domestic livestock are feeding on local vegetation that has taken up and stored metals in edible portions of the plant, 2) if local populations of fish in Silver Creek are concentrating metals, and are eaten by other animals or man.

01 [X] M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids/Leaking drums) — 02 [ ] OBSERVED (DATE ____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED ____ — 04 NARRATIVE DESCRIPTION
Tailings piles are uncovered and therefore susceptible to gusty winds which carry fine-grain tailings material off-site. A dam constructed at the northwest end of the tailings prevents massive movement of solid material off-site.

01 [X] N. DAMAGE TO OFFSITE PROPERTY — 02 [ ] OBSERVED (DATE ____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
The potential exists for damage to off-site property because the tailings material is allegedly being used as sewer line backfill and road base in the Park City area.

01 [X] O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 [ ] OBSERVED (DATE ____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
If tailings material is being used as sewer line backfill, the potential exists for sewer contamination by metals.

01 [ ] P. ILLEGAL/UNAUTHORIZED DUMPING — 02 [ ] OBSERVED (DATE ____) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Dumping of native soil on to the tailings was observed by FIT members, but is under the supervision of United Park City Mines.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
No other hazards are known.

III. TOTAL POPULATION POTENTIALLY AFFECTED: ____

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
Ecology & Environment, Inc. files - Log book
Sampling Activities Report
State of Utah DSHW Site Investigation and PA

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A NPDES				
☐ B UIC				
☐ C AIR				
☐ D RCRA				
☐ E RCRA INTERIM STATUS				
☐ F SPCC PLAN				
☐ G STATE (Specify)				
☐ H LOCAL (Specify)				
☐ I OTHER (Specify)				
☒ J NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☒ A SURFACE IMPOUNDMENT	> 1 million	tons
☐ B PILES		
☐ C DRUMS, ABOVE GROUND		
☐ D TANK, ABOVE GROUND		
☐ E TANK, BELOW GROUND		
☐ F LANDFILL		
☐ G LANDFARM		
☐ H OPEN DUMP		
☐ I OTHER (Specify)		

04 TREATMENT (Check all that apply)
- ☐ A INCENERATION
- ☐ B UNDERGROUND INJECTION
- ☐ C CHEMICAL/PHYSICAL
- ☐ D BIOLOGICAL
- ☐ E WASTE OIL PROCESSING
- ☐ F SOLVENT RECOVERY
- ☐ G OTHER RECYCLING/RECOVERY
- ☐ H OTHER (Specify)

05 OTHER
- ☐ A BUILDINGS ON SITE

None

06 AREA OF SITE: 170 (Acres)

07 COMMENTS

Slurry, generated from milling activities, was piped to the Richardson Flat area and currently covers approximately 160 acres. The metal, cyanide, and carbonate-containing tailings material is primarily a solid matrix. An ephemeral pond borders a portion of the tailings.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A ADEQUATE, SECURE ☐ B MODERATE ☒ C INADEQUATE, POOR ☐ D INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC

A dam at the northwest extension of the tailings is the only form of artificial containment on site. The tailings material is uncovered, and no underlying liner is present.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ☒ YES ☐ NO

02 COMMENTS

The site is not secured from public access or domestic livestock grazing.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

Ecology & Environment - files, logbook, Sampling Activities Report

6

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)	SURFACE	WELL	02 STATUS: ENDANGERED	AFFECTED	MONITORED	03 DISTANCE TO SITE
COMMUNITY	A. ☐	B. ☒	A. ☒	B. ☐	C. ☐	A. 2.5 (mi)
NON-COMMUNITY	C. ☐	D. ☐	D. ☐	E. ☐	F. ☐	B. ____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☒ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 4500

03 DISTANCE TO NEAREST DRINKING WATER WELL 2.5 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
20 (ft)	North	20 (ft)	60,000 (gpd)	☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

Pacific Bridge Well, within 3 miles of the site, is used as a backup municipal water source for the 4500 residents of Park City, Utah. The well, however, has not been tapped since the summer of 1983. Hydrologic continuity between the well and the contaminated aquifer is unlikely.

10 RECHARGE AREA	COMMENTS	11 DISCHARGE AREA	COMMENTS
☒ YES ☐ NO		☐ YES ☒ NO	

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ☒ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Silver Creek	☒	~300 ft (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 0 NO. OF PERSONS	B. 8 NO. OF PERSONS	C. 95 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 1.9 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 2

04 DISTANCE TO NEAREST OFF-SITE BUILDING 1.9 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Park City, Utah is approximately 3.25 miles southwest of the site. The population fluctuates from 4500 to 10,000 during the winter ski season. The year-round permanent population is approximately 4500.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☒ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☒ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
60 (ft)	Unknown (ft)	7.74

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
-12 (in)	1.25 (in)	0-5 %	NNE	0-5 %

09 FLOOD POTENTIAL: SITE IS IN 100 YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum): ESTUARINE A. NA (mi) OTHER B. _____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species): NA (mi)

ENDANGERED SPECIES: No endangered species in Park City area

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS, NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 3.5 (mi)	B. 3 (mi)	C. NA (mi)	D. adjacent to site (mi) pastureland, hay

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Richardson Flat is a slight natural depression at the base of the Wasatch Range, adjacent to Silver Creek.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Ecology & Environment, Inc. file.
Personal Communication w/ USFWS Salt Lake City
Baker, C.M. Jr. 1970. Water Resources of the Heber-Kamas Park City Area, North-Central, Utah. Utah Dept. of Nat. Res. Tech. Publ. No. 27.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	UT980952840

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	3	EPA Region 8 Laboratory - Lakewood, CO	Rec'd 10/16/85
SURFACE WATER	6	" " " " " "	Rec'd 7/12/85
WASTE Tailings Surface	4	" " " " " "	Rec'd 7/12/85
WASTE Subsurface	4	EPA Region 8 Lab and Versar Inc, Springfield, VA	Rec'd 10/16/85
AIR			
RUNOFF			
SPILL			
SOIL Surface	1	EPA Region 8 Lab	Rec'd 7/12/85
SOIL Subsurface	2	EPA Region 8 Lab and Versar, Inc, Springfield, VA	Rec'd 10/16/85
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
pH	Groundwater samples ranged from 6.43 to 6.89 Surface water samples (Silver Cr., tailings ditch) ranged from 7.26 to 7.54
temperature	Groundwater - 9.5°C to 11°C Surface water - 19°C to 20°C
conductivity	Groundwater - 350 to 1450 µmhos/cm Surface water - 550 to 1400 µmhos/cm
volatile organics (HNu)	no readings greater than background
radiation	no readings greater than background

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF E&E FIT 8 files (Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS E&E FIT 8 files

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Ecology & Environment, Inc. files - Logbook
Sampling Activities Report
Raw Data

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
United Park City Mines Co.		309 Kearns Bldg.		Salt Lake City	UT	84101

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE
NA						

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (If applicable, list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Ecology & Environment, Inc. files

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME: United Park City Mines, Co.	02 D+B NUMBER:	10 NAME: NA	11 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 309 Kearns Bldg.	04 SIC CODE:	12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
05 CITY: Salt Lake City; 06 STATE: UT	07 ZIP CODE: 84101	14 CITY:	15 STATE: / 16 ZIP CODE:
08 YEARS OF OPERATION:	09 NAME OF OWNER: Same as above		

OPERATOR'S PARENT COMPANY (If applicable)

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME:	02 D+B NUMBER:	10 NAME:	11 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):	04 SIC CODE:	12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
05 CITY: / 06 STATE:	07 ZIP CODE:	14 CITY: / 15 STATE:	16 ZIP CODE:
08 YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:		
01 NAME:	02 D+B NUMBER:	10 NAME:	11 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):	04 SIC CODE:	12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
05 CITY: / 06 STATE:	07 ZIP CODE:	14 CITY: / 15 STATE:	16 ZIP CODE:
08 YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:		
01 NAME:	02 D+B NUMBER:	10 NAME:	11 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):	04 SIC CODE:	12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
05 CITY: / 06 STATE:	07 ZIP CODE:	14 CITY: / 15 STATE:	16 ZIP CODE:
08 YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:		

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Ecology & Environment, Inc. files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
None	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
None			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Mr. Ray Wortey *			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
unknown			

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

* allegedly removes tailings material for use as sewer line back fill and roadbed

Ecology & Environment, Inc. files - letter from Dale Parker, Utah SHWC to Eric Johnson, EPA

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
UT	D980952840

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No recorded history

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☒ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION A dam was built at the northwestern extension of the tailings to contain the ponded water.

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
UT	D980952840

II. PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

Ecology & Environment, Inc. files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
UT	0980952840

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

- No agency enforcement action taken at this site.
- SI performed by State of Utah BSMW 12/21/84
- SI performed by EPA FIT 8 6,7 & 8/85

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Ecology & Environment, Inc. files

APPENDIX B

RICHARDSON FLAT TAILINGS RAW DATA

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, DENVER, COLORADO

LABORATORY SERVICES REQUEST

PROJECT NAME Richardson Flat Tailings PROJECT CODE R8-8505-27 SAMPLES COLL. BY S. Kennedy DATE 6/20/85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS																
	STATION CODE								RT-SW-1		RTSW-2		RT-SW-3		RT-SW-4	
	SAMPLE COLL. TIME								1055		1245		1110		1025	
	STATION DESCRIPTION AND REMARKS		GW-1 Background well #1		GW-2 Well #2		GW-3 Well #3		SW-1 Background Silver Creek 6-20-85		SW-2 mid-Silver Creek 6-20-85		drum gradient Silver Creek 6-20-85		SE Tailings 6-20-85	
	CODE	PARAMETER														
	1-l poly (water)	TASK 1&2 METALS		Dissolved		Dissolved		Dissolved		Total ~~Dissolved~~ *		Total ~~Dissolved~~ *		Total ~~Dissolved~~ *		Total ~~Dissolved~~ *
		Aluminum	✓		✓		✓		✓	172	✓	77	✓	370	✓	450
		Antimony	✓		✓		✓		✓	21	✓	15	✓	35	✓	19
		Arsenic	✓		✓		✓		✓	14	✓	11	✓	65	✓	33
		Barium	✓		✓		✓		✓	36	✓	41	✓	53	✓	119
		Beryllium	✓		✓		✓		✓	<10	✓	<10	✓	<10	✓	<10
		Cadmium	✓		✓		✓		✓	<5	✓	<5	✓	<5	✓	<5
		Calcium	✓		✓		✓		✓	137000	✓	119000	✓	124000	✓	128000
		Chromium	✓		✓		✓		✓	<5	✓	<5	✓	<5	✓	<5
		Cobalt	✓		✓		✓		✓	<5	✓	<5	✓	<5	✓	<5
		Copper	✓		✓		✓		✓	12	✓	9	✓	60	✓	18
		Iron	✓		✓		✓		✓	725	✓	389	✓	2290	✓	1570
		Lead	✓		✓		✓		✓	147	✓	93	✓	1985	✓	237
		Magnesium	✓		✓		✓		✓	22200	✓	24000	✓	26000	✓	35400
		Manganese	✓		✓		✓		✓	764	✓	434	✓	727	✓	602
		Mercury	✓		✓		✓		✓	0.2	✓	0.1	✓	0.57	✓	0.1

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µ mhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012 (Rev. 11-82)

pH:	7.33	7.54	7.47	7.32
Temp: °C	21	21	19	20
Conductance	600	600	550	700

EP___ONM___L P___TIC___GEI___
REGION VIII, DENVER, COLORADO

RT-2

LABORATORY SERVICES REQUEST

PROJECT NAME Richardson Flat Tailings PROJECT CODE R8-8505-27 SAMPLES COLL. BY S Kennedy DATE 6/20/85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE								RT-SW-1		RT-SW-2		RT-SW-3		RT-SW-4	
SAMPLE COLL. TIME								1055		1245		1110		1025	
STATION DESCRIPTION		GW-1		GW-2		GW-3		SW-1		SW-2		SW-3		SW-4	
AND REMARKS Station Numbers on Container tops for SW-2 & SW-5 are opposite designation on tags. $SO_4^=$ data indicate, suggest tag reversal. M.W. Lammering		Background Well #1		Well #2		Well #3		Background Silver Creek 6-20-85		mid-Silver Creek 6-20-85		down-gradient Silver Creek 6-20-85		SE Tailings 6-20-85	
CODE	PARAMETER		Dissolved		Dissolved		Dissolved		Total ~~Dissolved~~	SK	Total ~~Dissolved~~	SK	Total ~~Dissolved~~	SK	Total ~~Dissolved~~
1l-poly (H_2O)	Nickel	✓		✓		✓		✓	<30	✓	<30	✓	<30	✓	<30
	Potassium	✓		✓		✓		✓		✓		✓		✓	
	Selenium	✓		✓		✓		✓	<5	✓	<5	✓	<5	✓	<5
	Silver	✓		✓		✓		✓	<5	✓	<5	✓	<5	✓	<5
	Sodium	✓		✓		✓		✓	31700	✓	25600	✓	25200	✓	36500
	Thallium	✓		✓		✓		✓	<100	✓	<100	✓	<100	✓	<100
	Tin	✓		✓		✓		✓		✓		✓		✓	
	Vanadium	✓		✓		✓		✓	<10	✓	<10		<10		<10
	Zinc	✓		✓		✓			2690		1650		2730		350
	TASK 3 METAL														
	Cyanide	✓		✓		✓		✓		X	OAH	X	OAH	X	OAH
	SPECIAL ANION														
	Sulfate	✓		✓		✓		✓	284	✓	963	✓	210	✓	218
	Chloride								47		27		38		50

Results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µmhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012 (Rev. 11-82)

pH:	7.33	7.54	7.47	7.26
temp: °C	21	21	19	20
[illegible]	600	600	550	700

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, DENVER, COLORADO

LABORATORY SERVICES REQUEST

RT-5 6/19/85

PROJECT NAME Richardson Flat Tailings PROJECT CODE R8-8505-27 SAMPLES COLL. BY S. Kennedy DATE 6/20/85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS	STATION CODE		RT-SW-5		RT-SW-6		RT-SO-1						RT-SO-4		RT-SO-5	
	SAMPLE COLL. TIME		1220		1240		1510						1540		1545	
	STATION DESCRIPTION AND REMARKS		SW-5 mid-tailings 6-20-85		SW-6 downgradient tailings 6-20-85		SO-1 background soil 6-19-85		SO-2 downgradient soil (E) SL		SO-3 downgradient soil (W) SL		SO-4 SE Tailings		SO-5 mid-tailings	
	CODE	PARAMETER														
	1-l poly (water)	TASK 1&2 METALS		Total		Total										
		Aluminum	✓	230	✓	35	✓	14400	✓		✓		✓	3440	✓	863
	8-oz jar (soil)	Antimony	✓	13	✓	7	✓	39	✓		✓		✓	<200	✓	<200
		Arsenic	✓	27	✓	12	✓	58	✓		✓		✓	3600	✓	1500
		Barium	✓	26	✓	27	✓	178	✓		✓		✓	105	✓	58
		Beryllium	✓	<10	✓	<10	✓	<1.6	✓		✓		✓	<1.9	✓	<1.4
		Cadmium	✓	<5	✓	<5	✓	17	✓		✓		✓	47	✓	40
		Calcium	✓	252000	✓	287000	✓	8200	✓		✓		✓	45600	✓	49500
		Chromium	✓	<5	✓	<5	✓	24	✓		✓		✓	60	✓	15
		Cobalt	✓	<5	✓	<5	✓	11	✓		✓		✓	6.9	✓	2.3
		Copper	✓	<5	✓	<5	✓	94	✓		✓		✓	227	✓	181
		Iron	✓	507	✓	215	✓	24000	✓		✓		✓	30700	✓	19900
		Lead	✓	42	✓	<30	✓	1110	✓		✓		✓	3320	✓	2650
		Magnesium	✓	55400	✓	59200	✓	4990	✓		✓		✓	14600	✓	15300
		Manganese	✓	1654	✓	2566	✓	879	✓		✓		✓	1650	✓	1810
		Mercury	✓	<0.1	✓	<0.1	✓	0.59	✓		✓		✓	1.70	✓	2.61

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µmhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012 (Rev. 11-82)

pH:		7.40	7.40
temp	°C	21	21

EN[illegible]ONM[illegible]L P[illegible]IC[illegible]GEN[illegible]
REGION VIII, DENV[illegible] COLORADO

LABORATORY SERVICES REQUEST

RT-4
6/19/85
6/20/85

PROJECT NAME Richardson Flat Tailings PROJECT CODE R8-8505-27 SAMPLES COLL. BY S Kennedy DATE 6/20/85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS	STATION CODE		RT-SW-5	RT-SW-6	RT-SO-1			RT-SO-4	RT-SO-5
	SAMPLE COLL. TIME		1220	1240				1540	1545
	STATION DESCRIPTION AND REMARKS		SW-5 mid-tailings 6-20-85	SW-6 down-gradient tailings 6-20-85	SO-1 background soil 6-19-85	SO-2 down-gradient soil (E) SK	SO-3 down-gradient soil (W) SK	SO-4 SE tailings 6-19-85	SO-5 mid-tailings 6-19-85
	CODE	PARAMETER		Total	Total				
		Nickel	✓	<30	✓ <30	✓ 12	✓	✓ 59	✓ 502
		Potassium	✓		✓	✓	✓	✓	✓
		Selenium	✓	<5	✓ <5	✓ <16	✓	✓ <20	✓ <300
		Silver	✓	<5	✓ <5	✓ 6.7	✓	✓ 20	✓ 19
		Sodium	✓	29000	✓ 37300	✓ 1020	✓	✓ 3470	✓ 2960
		Thallium	✓	<100	✓ <100	✓ <16	✓	✓ <19	✓ <14
		Tin	✓		✓	✓	✓	✓	✓
		Vanadium	✓	<10	✓ <10	✓ 37	✓	✓ 9.1	✓ 3.5
		Zinc	✓	1410	✓ 812	✓ 1570	✓	✓ 6360	✓ 5400
		% Solids				97.4		95.8	96.9
		TASK 3 METAL							
		Cyanide	✗	✗	✓	✓	✓	✓	✓
		SPECIAL ANION							
		Sulfate	✓	222	✓ 909				
		Chloride		40	33				

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µ mhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012 (Rev. 11-82)

pH:	7.40	7.40
Temp:	21	21
Cond:	1200	1400

EP[illegible]ONM[illegible]AL P[illegible]IC[illegible]GEI[illegible]
REGION VIII, DENV[illegible] COLORADO

LABORATORY SERVICES REQUEST

PROJECT NAME Richardson Flat Tailings PROJECT CODE R8-8505-27 SAMPLES COLL. BY S Kennedy DATE 6/19/85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE			RT-SO-6		RT-SO-7											
SAMPLE COLL. TIME			1555		1630											
STATION DESCRIPTION AND REMARKS			SO-6 NW Tailings 6-19-85		SO-7 mid-upper tailings 6-19-85											
CODE	PARAMETER															
8-oz jar	TASK 1&2 METALS	✓		✓												
	Aluminum	✓	794	✓	1340											
	Antimony	✓	<400	✓	<300											
	Arsenic	✓	900	✓	600											
	Barium	✓	6.2	✓	27											
	Beryllium	✓	<1.8	✓	<1.5											
	Cadmium	✓	80	✓	58											
	Calcium	✓	16900	✓	75200											
	Chromium	✓	7.8	✓	19											
	Cobalt	✓	<0.9	✓	1.5											
	Copper	✓	371	✓	961											
	Iron	✓	154000	✓	106000											
	Lead	✓	7010	✓	8530											
	Magnesium	✓	3960	✓	13100											
	Manganese	✓	510	✓	5150											
	Mercury	✓	0.14	✓	0.50											

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µmhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012
(Rev. 11-83)

EN[illegible]NM[illegible]L P[illegible]IC[illegible]GEN[illegible]
REGION VIII, DENV[illegible] COLORADO

RT-1

LABORATORY SERVICES REQUEST

PROJECT NAME Richardson Flat Tailings PROJECT CODE R8-8505-27 SAMPLES COLL. BY S. Kennedy DATE 6/19/85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE			RT-SO-6		RT-SO-7										
SAMPLE COLL. TIME			1555		1630										
STATION DESCRIPTION AND REMARKS			SO-6 NW Tailings 6-19-85		SO-7 mid-upper Tailings 6-19-85										
CODE	PARAMETER														
8-oz jar	Nickel	✓	9.6	✓	16										
	Potassium	✓		✓											
	Selenium	✓	L400	✓	L300										
	Silver	✓	24	✓	22										
	Sodium	✓	3280	✓	2280										
	Thallium	✓	L18	✓	L15										
	Tin	✓		✓											
	Vanadium	✓	4.8	✓	6.5										
	Zinc	✓	5870	✓	3780										
	% solids		90.6		93.7										
	TASK 3 METAL														
	Cyanide	✓		✓											
	SPECIAL ANION														
	Sulfate														

results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in μ mhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012
(Rev. 11-82)

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, DENVER, COLORADO

Rec'd 10/6/85

LABORATORY SERVICES REQUEST

PROJECT NAME RF PROJECT CODE 850527 SAMPLES COLL. BY D. Tu[illegible] DATE 8-2-85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE		RF GW-1	RF GW-3	RF GW-4	RF GW-1	RF GW-2	RF GW-3	RF GW-4
SAMPLE COLL. TIME		1700	1915	2000	1700	1630	1915	2000
STATION DESCRIPTION AND REMARKS		RT-1	MW #1	Mon well #4	RT-1	Mon. well #2	Mon well #1	Mon well #4
CODE	PARAMETER	Totals	Totals	Totals	Dissolved	Dissolved	Dissolved	Dissolved
	TASK 1&2 METALS							
	Aluminum	1040	80700	83400	<30	<30	<30	<30
	Antimony	<5	<5	<5	<5	<5	<5	<5
	Arsenic	<5	78	70	<5	9	<5	9
	Barium	83	1534	1354	78	99	104	104
	Beryllium	<10	<10	<10	<10	<10	<10	<10
	Cadmium	<5	42	48	<5	<5	<5	<5
	Calcium mg/L	45	352	332	47	307	254	254
	Chromium	<5	98	104	<5	<5	<5	<5
	Cobalt	<5	46	48	<5	67	10	10
	Copper	<5	1583	1350	<5	<5	<5	<5
	Iron	958	126000	130000	<10	14800	376	300
	Lead	<30	588	527	<30	<30	<30	<30
	Magnesium mg/L	9.9	88	85	9.8	70	56	56
	Manganese	20	2230	2070	11	9990	924	903
	Mercury	<0.1	0.70	0.60	<0.1	<0.1	<0.1	<0.1

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in μmhos/cm, as per STORET.

☆ GPO: 1979-680-570

RSEPA-012
(Rev. 11-82)

pH
Temp.

E ONI AL ECTI AGE
REGION VIII, DENVER, OLORADO

Rec'd 10/6/85

LABORATORY SERVICES REQUEST

PROJECT NAME RF * PROJECT CODE 8505-27 SAMPLES COLL. BY D. Tinsley DATE 8-2-85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE	RF GW-1	RF GW-3	RF GW-4	RF GW-1	RF GW-2	RF GW-3	RF GW-4
SAMPLE COLL. TIME	1700	1915	2000	1700	1630	1915	2000
STATION DESCRIPTION AND REMARKS	RT-1	mon. well #1	mon well #4	RT-1	mon well #2	mon well #1	mon. well #4

CODE	PARAMETER	✓	Totals	✓	Totals	✓	Totals	✓	Dissolved	✓	Dissolved	✓	Dissolved	✓	Dissolved
	Nickel		<30		88		82		<30		<30		<30		<30
	~~Potassium~~														
	Selenium		<5		<5		<5		<5		<5		<5		<5
	Silver		<5		<5		<5		<5		<5		<5		<5
	Sodium mg/L		16		44		44		16		52		42		44
	Thallium		<100		<100		<100		<100		<100		<100		<100
	~~Tin~~														
	Vanadium		<10		262		266		<10		<10		<10		<10
	Zinc		<5		650		569		6		144		<5		<5
	TASK 3 METAL														
	Cyanide	✓	<10	✓	<10	✓	<10	✓		✓		✓		✓	
	Tag #		8-27144		8-27147		8-27583								
	SPECIAL ANION														
	Sulfate	✓	35	✓	625	✓	1025	✓		✓	775	✓		✓	

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µ mhos/cm, as per STORET.

pH
Temp

★ GPO: 1979-680-570

RSEPA-012
(Rev. 11-82)

EI[illegible]ONM[illegible]AL P[illegible]CTIC[illegible]GEI[illegible]
REGION VIII, DENVE[illegible]OLORADO

Rec'd 10/[illegible]/85

LABORATORY SERVICES REQUEST

PROJECT NAME RF PROJECT CODE 8505-27 SAMPLES COLL. BY D Tuesday DATE 8-1 85 8-2-85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE	RF SS-1	RF SS-2	RF SS-3	RF SS 4	RF SS-5	RF SS-6	RF GW-2
SAMPLE COLL. TIME	8-1 1711	8-2 1300	8-2 1400	8-2 1450	8-2 1600	8-2 1600	1630
STATION DESCRIPTION	Split spoon hole RT-1	Split spoon Hole RT-1	Split spoon Hole RT 2	Split spoon Hole RT 2	Split spoon Hole RT-2	Split spoon Hole RT-2	Mon. Well #2
AND REMARKS metals H_2O preserved w/ HNO_3 CN^- " " " NaOH							

CODE	PARAMETER		Totals		Totals		Totals		Totals		Totals		Totals		Totals
1 l poly (H_2O)	TASK 1&2 METALS	✓		✓		✓		✓		✓		✓		✓	
8 oz jar (soil)	Aluminum		16900		16700		844		484		1410		12400		4920
	Antimony		<1		<1		31		49		171		14		~~[illegible]~~ 63 SC
	Arsenic		6.5		6.3		311		328		218		34		~~<10~~ 349 SC
	Barium		125		147		31		86		64		235		~~16~~ 2665 SC
	Beryllium		<2		<2		<2		<2		<2		<2		<10
	Cadmium		6.8		7.4		53		169		61		15		16
	Calcium mg/L Cor Aq.		6190		5020		81600		117000		54200		9200		314
	Chromium		19		19		6.3		16		14		15		42
	Cobalt		8.7		9.5		<1		<1		4.5		16		80
	Copper		14		17		225		225		335		105		190
	Iron		18500		19700		80800		68000		22600		15100		26300
	Lead		37		37		2770		4720		4920		1090		1080
	Magnesium mg/L Cor Aq		6240		7620		11100		12900		13300		4530		72
	Manganese		471		625		5990		5880		1630		1220		10400
	Mercury		<.05		<.05		0.94		1.97		2.26		0.40		0.1

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in μmhos/cm, as per STORET.

★ GPO: 1979-680-570

RSEPA-012 (Rev. 11-82)

pH
Temp.

Soils are ug/gm

E[illegible]ONA[illegible]AL P[illegible]CTI[illegible]AGE[illegible]
REGION VIII, DENVE[illegible]OLORADO

LABORATORY SERVICES REQUEST

PROJECT NAME RF PROJECT CODE 8505-27 SAMPLES COLL. BY D Tuesday DATE 8-2-85

SAMPLES RECEIVED AT LABORATORY BY _____ DATE _____ DATA REVIEWED BY _____

ANALYST INITIALS

STATION CODE	RF SS-1	RF SS-2	RF SS-3	RF SS-4	RF SS-5	RF SS-6	RF GW-2
SAMPLE COLL. TIME	8-1 1211	8-1 1300	1400	1430	1600	1600	1630
STATION DESCRIPTION	split spoon RT-1	split spoon RT-1	split spoon RT-2	split spoon RT-2	split spoon RT-2	split spoon RT-2	mon. well #2
AND REMARKS metals H_2O preserved w/ HNO_3 CN⁻ H_2O preserved w/ NaOH							

CODE	PARAMETER	✓ Total	✓ Total	✓ Total	✓ Total	✓ Total	✓ Total	✓ Total
1 l poly (H_2O) 8 oz jar (Soil)	Nickel	21	22	7	<6	<6	16	30
	Potassium							
	Selenium	<1	<1	1.0	<1	9.4	1.3	<5
	Silver	<1	<1	7.9	13	26	6.9	17
	Sodium mg/L for Aq.	308	279	2230	11300	6100	1010	54
	Thallium	<20	<20	<20	<20	<20	<20	<100
	Tin							
	Vanadium	31	28	3.1	<2	5.4	30	17
	Zinc	70	44	3980	23200	12700	1510	2790
	% Solids	79.2	77.4	86.4	88.3	88.9	79.1	
	TASK 3 METAL							
*	Cyanide							✓ 200 (*) [illegible]
	SPECIAL ANION							
	Sulfate							✓ 775

All results in mg/l unless otherwise indicated, heavy metals in ug/l, pH in units, turbidity in JTU, specific conductance in µmhos/cm, as per STORET.

☆ GPO: 1979-680-570

RSEPA-012 (Rev. 11-82)

mg/L

pH

Temp

[illegible]

Subsurface [illegible] Cyanide

Richardson Flat Tailings

Versar INC.

Project/Batch 751249-3

CASE/Batch ID 1801H

Date 8/13/85

VERSAR, INC.
GENERAL INORGANIC CHEMISTRY SECTION
DATA REPORT

SAMPLE NO.	LAB NO.	Cn mg/kg	TS %	
1801H 18	6489	<0.4	87.6	SS-1
1801H 19	6490	<0.4	75.3	-2
1801H 20	6491	<0.4	84.8	RFSS-3
1801H 21	6492	5.2	93.7	-4
1801H 22	6493	<0.3	88.0	RFSS-5

R 1

Tails

WJN for
Laboratory Manager

6550 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000 • TELEX: 901125