7430

37979

ecology and environment, inc.

4105 EAST FLORIDA AVENUE, SUITE 350, DENVER, COLORADO 80222, TEL. 303-757-4984

International Specialists in the Environmental Sciences

June 13, 1985

Mr. E.L. Osika, Jr.
Vice President
United Park City Mines
309 Kearns Building
136 S. Main Street
Salt Lake City, UT 84101

Dear Mr. Osika:

This letter briefly describes the proposed sampling and drilling program to be carried out by Ecology and Environment, Inc. (E&E), the Field Investigation Team (FIT) for the Environmental Protection Agency (EPA) at Richardson Flat. This investigation is tentatively scheduled for June 20 through June 28, 1985.

The sampling objectives are as follows:

- Sample the tailings. Send to lab to be analyzed for Task 1 & 2 Metals and cyanides.

- Sample soils on and around the site. Send to lab to be analyzed for Task 1 & 2 Metals and cyanides.

- Sample Silver Creek and intermittent streams. Send to lab to be analyzed for Task 1 & 2 Metals and cyanides.

- Install at least two ground water monitoring wells. Sample the wells and send the samples into the lab to be analyzed for Task 1 & 2 Metals, cyanides and sulfates. Also, collect split spoon soil samples while drilling.

recycled paper

Please refer to the attached figures for sampling and drilling locations. Also attached is a list of the parameters the Region VIII EPA Laboratory will by analyzing for.

I will be in Salt Lake City Monday June 17, 1985. I will call you in the morning of June 18 to set up a time for us to meet. We can then discuss the sampling and drilling program in detail.

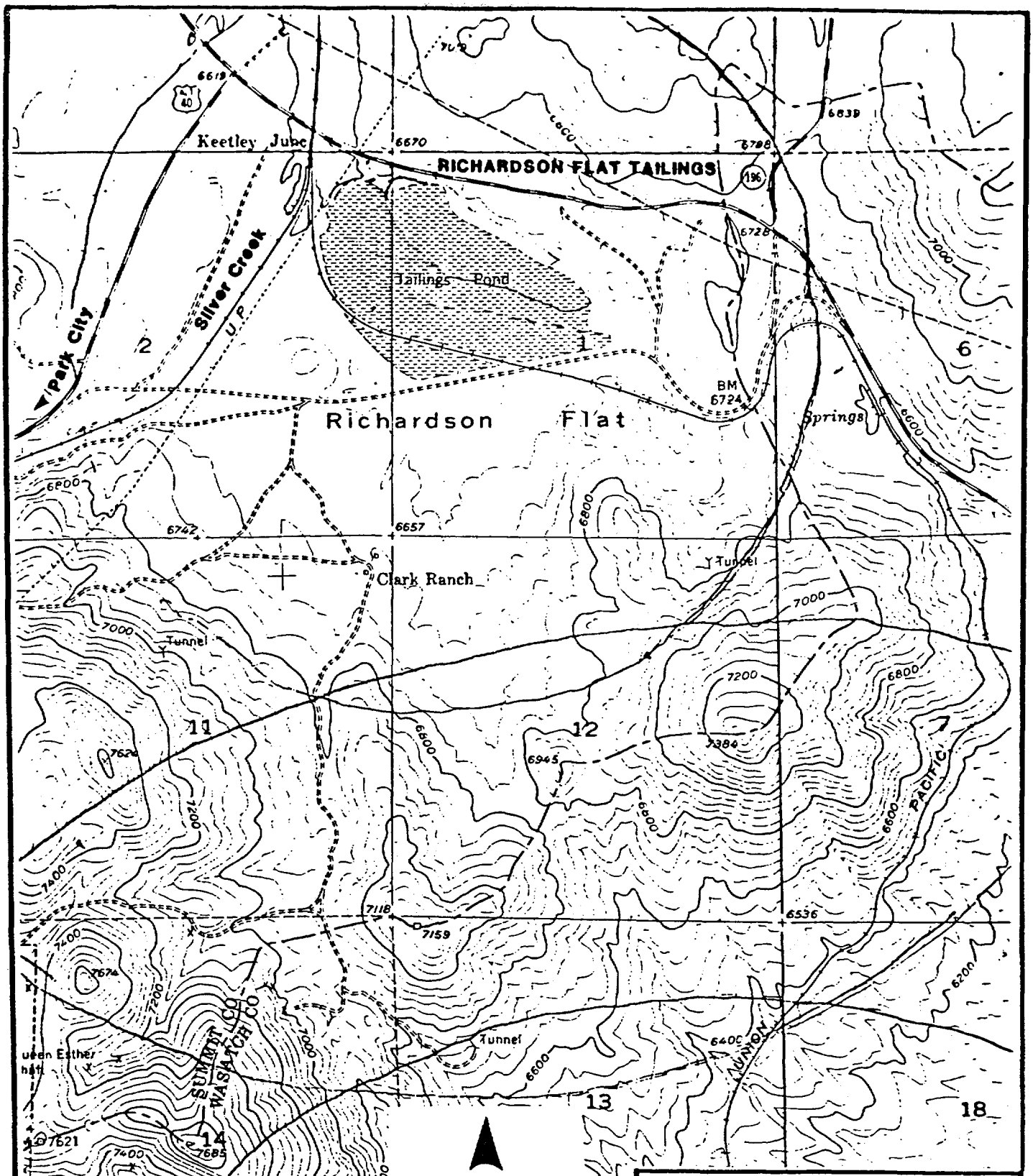
I am looking forward to meeting you.

Sincerely,

Jeffrey A. Holcomb

JH/pt

cc: Eric Johnson, EPA Utah Project Officer



FIELD INVESTIGATIONS OF UNCONTROLLED HAZARDOUS WASTE SITES

TASK REPORT TO THE E.P.A.

TITLE: GENERAL SITE LOCATION

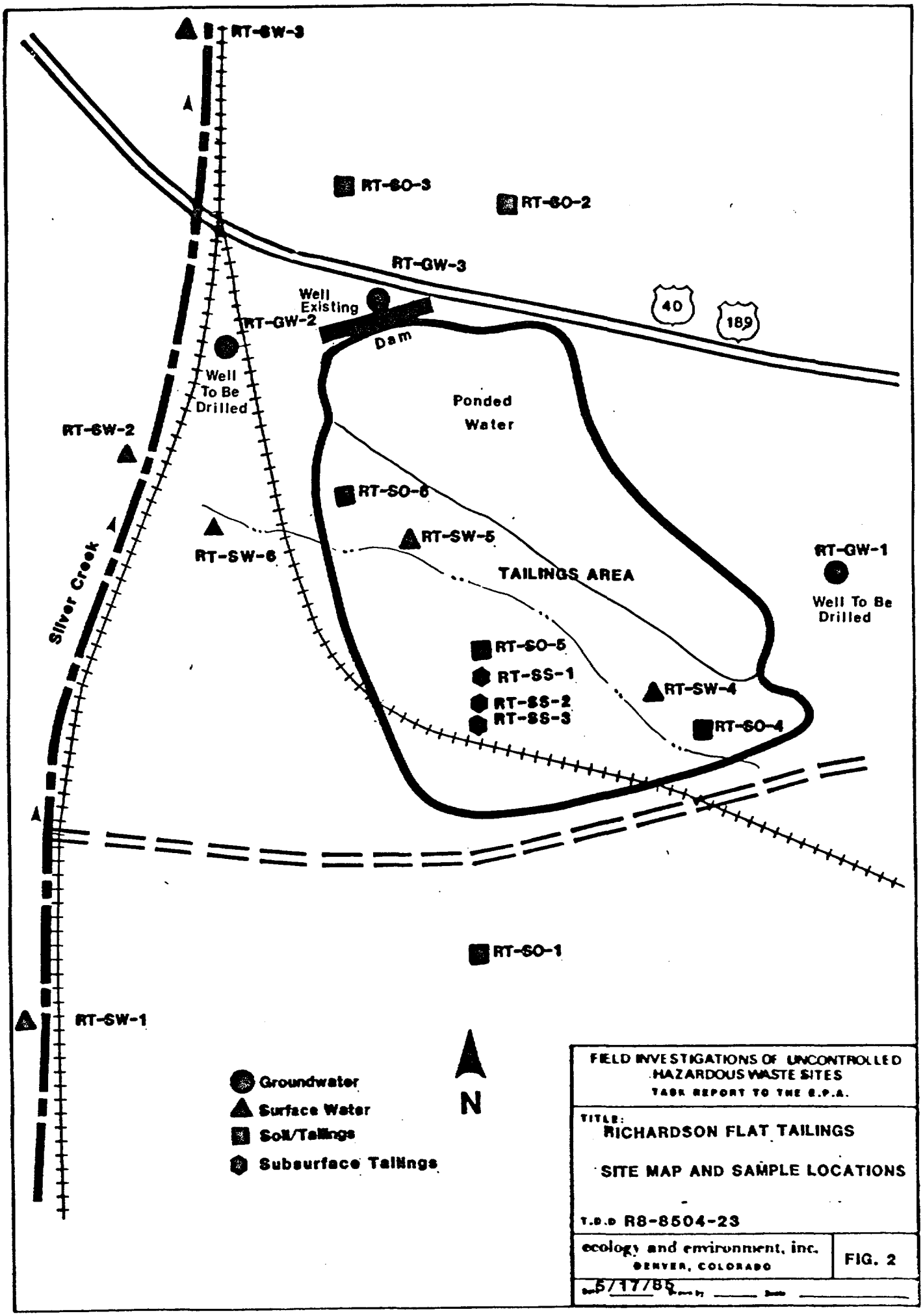
RICHARDSON FLAT TAILINGS, UTAH

T.D.D. R8-8504-23

ecology and environment, inc.
DENVER, COLORADO

FIG. 1

Date 5/17/85 Drawn by ____ Scale ____



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

TITLE: RICHARDSON FLAT TAILINGS

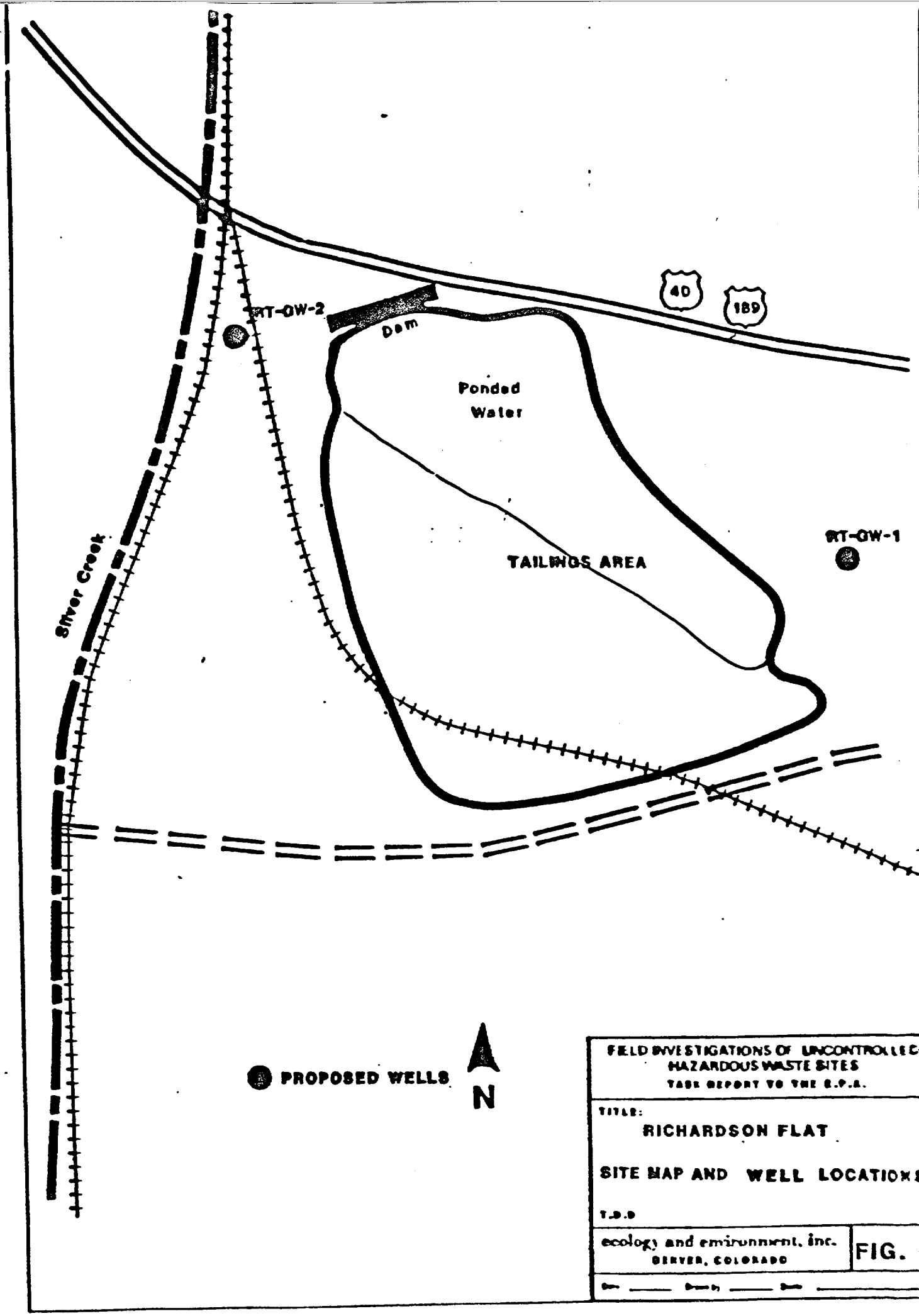
SITE MAP AND SAMPLE LOCATIONS

T.D.D R8-8504-23

ecology and environment, inc.
DENVER, COLORADO

FIG. 2

Date 5/17/85 Drawn by _____ Date _____


40
189
RT-GW-2
Dam
Ponded
Water
TAILINGS AREA
RT-GW-1
Silver Creek
PROPOSED WELLS
N
FIELD INVESTIGATIONS OF UNCONTROLLED
HAZARDOUS WASTE SITES
TASK REPORT TO THE E.P.A.
TITLE:
RICHARDSON FLAT
SITE MAP AND WELL LOCATION
T.D.D
ecology and environment, inc.
DENVER, COLORADO
FIG.

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, DENVER, COLORADO

LABORATORY SERVICES REQUEST

PROJECT NAME RICHARDSON FLAT, PARK CITY, UT PROJECT CODE _____ SAMPLES COLL. BY _____ DATE _____

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

ANALYST INITIALS																	
	STATION CODE																
	SAMPLE COLL. TIME																
	STATION DESCRIPTION AND REMARKS																
	CODE	PARAMETER															
		TASK 1&2 METALS															
		Aluminum															
		Antimony															
		Arsenic															
		Barium															
		Beryllium															
		Cadmium															
		Calcium															
		Chromium															
		Cobalt															
		Copper															
		Iron															
		Lead															
		Magnesium															
		Manganese															
		Mercury															

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

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII, DENVER, COLORADO

LABORATORY SERVICES REQUEST

PROJECT NAME Richardson Flat, Park City UT PROJECT CODE _____ SAMPLES COLL. BY _____ DATE _____

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

ANALYST INITIALS																
	STATION CODE															
	SAMPLE COLL. TIME															
	STATION DESCRIPTION AND REMARKS															
	CODE	PARAMETER														
		Nickel														
		Potassium														
		Selenium														
		Silver														
		Sodium														
		Thallium														
		Tin														
		Vanadium														
		Zinc														
		TASK 3 METAL														
		Cyanide														
		SPECIAL ANION														
		Sulfate														

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

ecology and environment, inc.

4105 EAST FLORIDA AVENUE, SUITE 350, DENVER, COLORADO 80222, TEL. 303-757-4984

International Specialists in the Environmental Sciences

DATE : June 12, 1985

TO : Keith Schwab, FIT-DPO

FROM : Jeff Holcomb, E&E FIT JH

SUBJECT: Sampling Plans for Bauer Tailings, Richardson Flat, Tooele Smelter and Valley Materials Slag. TDD's R8-8505-25 through R8-8505-28.

Attached please find responses to your concerns regarding the above mentioned sampling plans. These will be added to the original sampling plans and will be incorporated into the FIT investigations.

If you have more questions, please call me.

cc: William Geise
Eric Johnson

recycled paper

VALLEY MATERIALS SLAG, R8-8505-12

1. As stated in the Sampling Plan Section II, Objectives, the purpose of the Site Inspection follow-up is to add to the existing data base and to strengthen the HRS package. To accomplish this the FIT is resampling the Jordan River. Prior samples collected by Radian Corp. of Salt Lake City do not clearly indicate a release to the Jordan River. Also, the State of Utah did not collect samples from the Jordan River but rather from intermittent ditches. Please see Table 1 for data.

2. The sampling plan call for the collection of surface water and sediment samples from the east and west banks of the Jordan River. However, this will be modified; only samples from the east bank of the Jordan River will be collected. The reason for this change is the FIT is only interested in detecting a release to the Jordan River not characterizing the river. Please refer to Table 2, Sample Plan Check List.

TABLE 1

SURFACE WATER DATA COLLECTED BY THE

STATE OF UTAH AND RADIAN CORP.

ppm

AGENCY	DATE SAMPLES COLLECTED	ELEMENT	UPGRADIENT SW-1 (#7)	MIDDLE SW-2 (#8)	DOWNGRADIENT SW-3 (#9)
Radian	11-21-84*	Ag	<.002	<.002	<.002
		As	0.015	0.016	0.017
		Cd	<.002	<.002	<.002
		Cr	<.001	<.001	<.001
		Cu	<.001	<.001	<.001
		Pb	0.008	0.012	.014
		Zn	0.023	0.023	0.028
			#153	-	#156
State of Utah	6-5-84	Ag	<.01	N/A	0.013
		As	0.009	N/A	0.091
		Ba	<.05	N/A	0.77
		Be	<.01	N/A	-
		Cd	<.01	N/A	0.01
		Cr	<.02	N/A	<0.1
		Co	<.1	N/A	-
		Cu	.02	N/A	-
		Pb	0.024	N/A	0.24
		Hg	<.01	N/A	0.0002
		Ni	0.1	N/A	-
		Se	<.0005	N/A	<.01
		Zn	0.07	N/A	-

N/A = non-applicable - no middle sample collected

NOTE: The sample I.D. numbers refer to Radian's and the State of Utah's Designations. Original data sheets are attached.

* = The samples collected by Radian were not acidified in the field. They were sent to the lab, filtered and acidified.

SAMPLE PLAN CHECK LIST

REGION VIII

Site Name: VALLEY MATERIALS SLAG

Address:

City: MIDVALE, UT County: SALT LAKE

TDD Number: 8505-12

Project Team Leader: JEFF HOLCOMB

Sampling Date: JUNE, 1995

TABLE 2

Sample Location	Sample Type	Field Parameters					Laboratory Parameters														Comments
		Temp	pH	Cond	DO	Special	Task 1&2 Metals	Task 3 Cyanide	Task3 Sulfide	Task3 Ammonia	Special Anions	Special NO3&NO2	Special Inorganic	VOA	B/N/A Extract	Pesticide	Special Organic	Split	Dup	Trip	
VMS-SW-1	Surface water	X	X	X			X	X			$SO_4^{=}$										Triplicate S for lab A
VMS-SW-2	"	X	X	X			X	X			X										
VMS-SW-3	"	X	X	X			X	X			X										
VMS-SW-4	"	X	X	X			X	X			X								X		Duplicate of SW-3
VMS-BL-1	"	X	X	X			X	X			X										Blank Water Sample
VMS-SE-1	sediment						X	X													
VMS-SE-2	"						X	X													
VMS-SE-3	"						X	X													

SAMPLE PLAN CHECK LIST

REGION VIII

Site Name: VALLEY MATERIALS SLAG

TDD Number: 8505-12

Address:

Project Team Leader: JEFF HOLCOMB

City: MIDVALE, UT County: SALT LAKE

Sampling Date: JUNE, 1985

TABLE 2

Sample Location	Sample Type	Field Parameters					Laboratory Parameters														
		Temp	pH	Cond	DO	Special	Task 1&2 Metals	Task 3 Cyanide	Task3 Sulfide	Task3 Ammonia	Special Anions	Special NO3&NO2	Special Inorganic	VOA	B/N/A Extract	Pesticide	Special Organic	Split	Dup	Trip	COMMENTS
VMS-SW-1	Surface water	X	X	X			X	X			$SO_4^=$										Triplicate for lab
VMS-SW-2	"	X	X	X			X	X			X										
VMS-SW-3	"	X	X	X			X	X			X										
VMS-SW-4	"	X	X	X			X	X			X								X		Duplicate of SW-3
VMS-BL-1	"	X	X	X			X	X			X										Blank water sample
VMS-SE-1	sediment						X	X													
VMS-SE-2	"						X	X													
VMS-SE-3	"						X	X													

RADIAN RAW DATA

Analytical Serv REPORT LAB # 84-11-168

RECEIVED: 11/28/84

RESULTS BY TEST

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)	Sample 04 (entered units)	Sample 05 (entered units)
AG_E ug/ml	no data	no data	no data	no data	no data
AS_GA (AA ug/ml	no data	no data	no data	no data	no data
CD_E ug/ml	no data	no data	no data	no data	no data
CR_E ug/ml	no data	no data	no data	no data	no data
CU_E ug/ml	no data	no data	no data	no data	no data
PB_GA ug/ml	no data	no data	no data	no data	no data
PREP_X date complete	no data	no data	no data	no data	no data
ZN_E ug/ml	no data	no data	no data	no data	no data

TEST CODE default units	Sample 06 (entered units)	Sample 07 (entered units) SW-1 upgradient	Sample 08 (entered units) SW-2 middle	Sample 09 (entered units) SW-3 downgradient	Sample 10 (entered units)
AG_E ug/ml	no data	<.002	<.002	<.002	<.002
AS_GA ug/ml	no data	0.015	0.016	0.017	0.032
CD_E ug/ml	no data	<.002	<.002	<.002	<.002
CR_E ug/ml	no data	<.001	<.001	<.001	<.001

RADIAN

Analytical Serv REPORT

LAB # 84-11-168

RECEIVED: 11/28/84

RESULTS BY TEST

CONTINUED FROM ABOVE

		#7 SW-1	#8 SW-2	#9 SW-3	
CU_E ug/ml	no data	<.001	<.001	<.001	<.001
PB_GA ug/ml	no data	0.008	0.012	0.014	<.002
PREP_X date complete	no data				
ZN_E ug/ml	no data	0.019	0.023	0.028	0.021

TEST CODE default units	Sample 11 (entered units)	Sample 12 (entered units)	Sample 13 (entered units)	Sample 14 (entered units)
AG_E ug/ml	<.002	<.002	<.002	<.002
AS_GA ug/ml	1.49	4.9	3.2	0.51
CD_E ug/ml	<.002	<.002	<.002	<.002
CR_E ug/ml	<.001	<.001	<.001	<.001
CU_E ug/ml	<.001	<.01	<.001	<.001
PB_GA ug/ml	<.002	<.002	0.005	<.002
ZN_E ug/ml	0.026	0.021	0.016	0.027

HW84-153 RAW DATA Backstream Surface Water #153

Rev. 3/82

Field No. _____

1 [X] TC [X] TM [ ] Nut
[ ] PC [ ] PM [ ] BOD

[ ] Pest. [ ] Rad. [ ] Bact. [ ] Spec.

Date Recd.: _____

Received By: _____

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES JUN 7 84 42058

Sample No. 701

Storet No. _____ 703

Water Syst. No. Source No. _____ 703 704

Date Collected 840605 (yr. mo. dy.) 704 Time Collected 1410 (24-hour clock) 705 Water Rights No. _____ 707

Exact Description of sampling Point: Surface stream at south main entrance Valley Materials 725 646

Supply Owned by _____ 712 Sample Type _____ 710

Sample Collected by: Jim Salmon 713

SEND REPORT TO: Phone 533-4145
Jim Salmon-Bur Sol Hdq
150 W North Temple 648
SLC Utah 717
zip code

Sample Source 736: 01 Spring, 02 Well, 03 Stream, 04 Lake, 06 List. source, 07 Effluent, 08 Storm sewer, 14 Other, 15 Tunnel, 18 Artesian well, 19 Swimming

County 731: 18 — 01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Current use: 4 708
Proposed use: 709
1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 365 770

RECEIVED JUL 23 1984 Utah State Div. of Environmental Health

1 FIELD TESTS

Temperature (°C)	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µmhos	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	659

2 WASTEWATER ANALYSIS

Temperature (°C) 650 pH 782 BACT. LAB. No. _____

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N.	0.5 778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered / Unfiltered

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N	0.1		722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
2.64	Calcium	53		728
	Chromium			729
	Chromium, Hex. as Cr		<.5	730
	Copper			732
	Iron, dissolved			733
	Lead			734
2.44	Magnesium	30		737
	Manganese			738
	Nickel			740
.25	Potassium	10		742
	Selenium			743
	Silver			744
3.00	Sodium	69		745
	Zinc			749
8.37	TOTAL CATIONS			

Sp. Cond. µmhos/cm.	835 762
TDS @ 180°C	476 786

4 CHEMICAL ANALYSIS

pH, units 7.9

me/l	ANIONS	mg/l	
	Bicarbonate	178	758
	Carbon Dioxide	4	759
	Carbonate	0	760
2.88	Chloride	102	763
2.92	CO_3 Solids	88	
	Fluoride	.29	765
	Hydroxide	0000	767
	Nitrate as N	1.80	605
	Nitrite as N	<.01	606
	Phosphorus, Ortho as P	.05	607
	Silica, dissolved as SiO_2	13	750
2.19	Sulfate	105	772
8.00	TOTAL ANIONS		
	GRAND TOTAL		

Tot. Phosphorus		785
Total Alk. as $CaCO_3$	146	752
T. Hdns. as $CaCO_3$	256	754
Surfactant as MBAS		773
Turbidity, as NTU	10	757
Sp. Gravity		608

5 TOTAL METALS ANALYSIS

CATIONS	mg/l	~~ug/l (ppb)~~ ppm	
Aluminum		.35	800
Arsenic		.009	660
Barium	<.05		661
Beryllium	<	.01	801
Cadmium	<	.01	662
Chromium	<.02	.00	663
Cobalt	<	.1	806
Copper		.02	664
Gold			700
Iron	4.1		755
Lead		.024	665
Manganese	<	.01	666
Mercury	<.0001		739
Molybdenum	<	.1	802
Nickel		.1	667
Selenium	<.0005		668
Silver	<	.01	669
Uranium			601
Vanadium	<	.3	803
Zinc		.010	670

6 RADIOLOGICS

	pc/l-g		pc/l-g	
Alpha, gross		621	^{89}Sr	633
Beta, gross		623	^{131}I	635
Tritium, ^3H		625	^{134}Cs	637
^{226}Radium		627	^{137}Cs	639
^{228}Radium		629		
^{90}Sr		631		

INTERPRETATION OF ANALYSES:
Remarks:

Based on State Standards, this sample was:

	Satisfactory	Questionable	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

Analyses Approved By: RSB Date: 840703

By _____ ENVIRONMENTAL HEALTH

J. Oman 17-July-84

RAW DATA

Downgradient Surface Water #156

Rev. 3/82 HW84156
Field No.

1 [X] TC [X] TM [X] Nut
[ ] PC [ ] PM [ ] BOD

[ ] Pest. [ ] Rad. [ ] Bact. [X] Spec.

Date Recd.: _____
Received By: _____

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES

JUN 78842061
Sample No. 701

Storet No. 702 | Water Syst. No. 703 | Source No. 704

Date Collected: 840603 (yr. mo. dy.) | Time Collected: 1430 (24-hour clock) | Water Rights No. 707

Exact Description of sampling Point: 4200 South Storm drain surface H2O 40' from Sign Road 646

Supply Owned by: BSHWM 712 | Sample Type 710

Sample Collected by: J SHMOW J HEDDON 713

SEND REPORT TO: Phone 523 4145
J SHMON BSHWM 715
150 WEST NORTH TEMPLE 648
SLC UTAH 84110 717
zip code

Sample Source 714: 14 — 01 Spring, 02 Well, 03 Stream, 04 Lake, 06 Dist. syst., 07 Effluent, 08 Storm sewer, 14 Other, 15 Tunnel, 18 Artesian well, 19 Swimming pool

County 631: 18 — 01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Current use: 708
Proposed use: 4 709
1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 365 770

1 FIELD TESTS

Temperature (°C)	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µmhos	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	659

2 WASTEWATER ANALYSIS

Temperature (°C) 650 | pH 782 | BACT. LAB. No.

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N. 5.8	778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered / Unfiltered

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N	<0.1		722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
2.48	Calcium	50		728
	Chromium			729
	Chromium, Hex. as Cr		5	730
	Copper			732
	Iron, dissolved			733
	Lead			734
1.82	Magnesium			737
	Manganese			738
	Nickel			740
.10	Potassium	4		742
	Selenium			743
	Silver			744
2.43	Sodium	56		745
	Zinc			749
6.85	TOTAL CATIONS			

me/l	ANIONS	mg/l	
	Bicarbonate	200	758
	Carbon Dioxide	6	759
	Carbonate	0	760
1.66	Chloride	59	763
3.28	CO_3 Solids	98	
	Fluoride	0.37	765
	Hydroxide	0.00	767
	Nitrate as N	0.77	605
	Nitrite as N	<0.01	606
	Phosphorus, Ortho as P	.02	607
	Silica, dissolved as SiO_2	17	750
1.79	Sulfate	86	772
6.73	TOTAL ANIONS		
	GRAND TOTAL		

	Tot. Phosphorus		785
	Total Alk. as $CaCO_3$	164	752
	T. Hdns. as $CaCO_3$	246	754
	Surfactant as MBAS		773
	Turbidity, as NTU	200	757
	Sp. Gravity		608

4 CHEMICAL ANALYSIS

pH, units 7.7

TOTAL METALS ANALYSIS ppm

5 CATIONS	mg/l	ug/l (ppb)	
Aluminum			800
Arsenic	.091		660
Barium	.17		681
Beryllium			801
Cadmium	.01		662
Chromium	<.1		663
Cobalt			804
Copper			664
Gold			700
Iron	.18		755
Lead	.24		665
Manganese			666
Mercury	.0002		739
Molybdenum			803
Nickel			667
Selenium	<.01		668
Silver	.013		669
Uranium			601
Vanadium			803
Zinc			670

Sp. Cond. µmhos/cm.	675	762
TDS @ 180°C	390	786

6 RADIOLOGICS

	pc/l-g		pc/l-g	
Alpha, gross		621	^{89}Sr	633
Beta, gross		623	^{131}I	635
Tritium, ^3H		625	^{134}Cs	637
^{226}Radium		627	^{137}Cs	639
^{228}Radium		629		
^{90}Sr		631		

Analyses Approved By: RCS Date: 840703

INTERPRETATION OF ANALYSES:
Remarks:

Based on State Standards, this sample was:

	Satisfactory	Conditional	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

By _____
ENVIRONMENTAL HEALTH

RECEIVED JUL 31 1984 Utah State Div. of Environmental Health

L. Oman 25-July-84

RICHARDSON FLAT, R8-8504-23

1. Prior sampling at Richardson Flat by the State of Utah was not sufficient to characterize the site for HRS scoring. Hence, the FIT will resample the site including the installation of at least two monitoring wells. Existing data is shown in Table 3.

2. Tailings samples will be collected from the oxidized zone, the enrichment zone beneath the oxidized zone and at the base of the tailings. These zones should be discernible by color and will be identified by a trained geochemist who has experience in this area. If the zones are not discernible by color then samples will be collected two feet below the surface and at the base of the tailings.

   If the tailings are too saturated to support a drill rig, a hand auger will be used. Hand augering will be conducted until physically impossible.

TABLE 3

DATA COLLECTED BY THE STATE OF UTAH AT

RICHARDSON FLAT

ppm

DATE SAMPLES COLLECTED	ELEMENT	136	140	135	144	137	935
6-4-84	Ag	<.01	0.4	<0.01	0.012	1.3	63.5
	As	0.001	0.077	0.001	0.048	14.0	<16.7
	Ba	0.14	<.05	<.05	<.05	217.0	<33
	Be	<.01	<.01	<.01	<.01	1.2	<0.4
	Cd	<.01	0.01	<0.1	<.031	0.9	447.0
	Cr	0.02	<0.1	<.02	<.1	24.0	12.7
	Co	<0.1	<0.1	<.1	<.1	8.8	16.7
	Cu	<.01	-	<.01	-	-	-
	Pb	<.10	<0.1	<0.1	<.1	52.9	3770.0
	Hg	<.0001	<0.0002	<.0001	<.0001	0.19	1.24
	Ni	0.1	<0.1	<0.1	<.1	23.6	13.3
	Se	<.0005	0.0005	<.0005	.0015	<2.0	<1.9
	Zn	.010	1.7	0.005	7.7	132	16,700

136 - upgradient surface water

140 - downgradient surface water

135 - upgradient ground water

144 - downgradient ground water

137 - background soil

935 - downgradient soil

Rev. 3-84 PC 138

Fmic No.

☒ TC ☐ FCM ☐ Nut
☐ FC ☐ PM ☐ BOD

☐ Test. ☐ Rad. ☐ Bact. ☒ Spec.

Date Recd.: Upgradient 5-H2O #136

Received By:

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES

J 84841928
Sample No.

Stort No. 702

Water Syst. No. Source No. 703 704

Date Collected 840706 714 (yr. mo. dy.)

Time Collected 0545 715 (24-hour clock)

Water Rights No. 707

Exact Description of sampling Point: Richmond Plant upgradient water about 5 miles range in to center of valley 646

Supply Owned by 712

Sample Type 710

Sample Collected by: Richardson & Verbout 713

SEND REPORT TO: Phone 533-4145
Jim Shannon 715
150 West North Temple 648
SLC UTAH 84110 717
zip code

Sample Source 716: 01 Spring, 02 Well, 03 Stream, 04 Lake, 06 Dist. syst., 07 Effluent, 08 Storm sewer, 14 Other, 15 Tunnel, 18 Artesian well, 19 Swimming pool

County 611: 01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Current use 708

Proposed use 4 705

1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 365 770

RECEIVED JUL 25 1984 Utah State Div. of Health

1 FIELD TESTS

Temperature	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µmhos	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	659

2 WASTEWATER ANALYSIS

Temperature (°C) 650 | pH 782 | BACT. LAB. No.

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N.	778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered ☐ Unfiltered ☐

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N			722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
1.88	Calcium	38.		728
	Chromium			729
	Chromium, Hex. as Cr		<5	730
	Copper			732
	Iron, dissolved			733
	Lead			734
.60	Magnesium	7.		737
	Manganese			738
	Nickel			740
.05	Potassium	2.		742
	Selenium			743
	Silver			744
.69	Sodium	16.		745
	Zinc			749
3.22	TOTAL CATIONS			

Sp. Cond. µmhos/cm.	295	762
TDS @ 180°C	262	786

4 CHEMICAL ANALYSIS

pH, units 7.4

me/l	ANIONS	mg/l	
	Bicarbonate	178.	758
	Carbon Dioxide	11.	759
	Carbonate	0	760
.20	Chloride	7.	763
2.92	CO_3 Solids	88	
	Fluoride	.14	765
	Hydroxide	0000	767
	Nitrate as N	.14	605
	Nitrite as N	<.01	606
	Phosphorus, Ortho as P	.12	607
	Silica, dissolved as SiO_2	29.	750
.17	Sulfate	8.	772
3.29	TOTAL ANIONS		
	GRAND TOTAL		

Tot. Phosphorus		785
Total Alk. as $CaCO_3$	146.	752
T. Hdns. as $CaCO_3$	154.	754
Surfactant as MBAS		773
Turbidity, as NTU	53	757
Sp. Gravity		608

5 TOTAL METALS ANALYSIS

CATIONS	mg/l	~~ug/l (ppb)~~	
Aluminum		.02	800
Arsenic		.001.0	660
Barium	.14		661
Beryllium		<.01	801
Cadmium		<.01	662
Chromium		<.02	663
Cobalt		<.1	806
Copper		<.01	664
Gold			700
Iron	.20		755
Lead		<.10	665
Manganese		<.01	666
Mercury		<.0001	739
Molybdenum		<.1	802
Nickel		.1	667
Selenium		<.0005	668
Silver		<.01	669
Uranium			601
Vanadium		<.3	803
Zinc		.010	670

6 RADIOLOGICS

	pc/l-g			pc/l-g	
Alpha, gross		621	^{89}Sr		633
Beta, gross		623	^{131}I		635
Tritium, ^3H		625	^{134}Cs		637
^{226}Radium		627	^{137}Cs		639
^{228}Radium		629			
^{90}Sr		631			

Analyses Approved By: RSJ Date: 840629

INTERPRETATION OF ANALYSES:
Remarks:

Based on State Standards, this sample was:

	Satisfactory	Conditional	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

By
ENVIRONMENTAL HEALTH

J. Oman 17-July-84

Surface H_2O - down gradient #140

Rev. 3/82 HW84140

Field No.

- [x] TC
- [x] TM
- [ ] Nut
- [ ] PC
- [ ] PM
- [ ] BOD

- [ ] Pest.
- [ ] Rad.
- [ ] Bact.
- [x] Spec.

S. H_2O down

Date Recd.: 8/20/84

Received By:

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES

Lab. No. 484841932 701

Storet No. 703

Water Syst. No. Source No. 704

Date Collected 840809 (yr. mo. dy.) 710

Time Collected 1040 (24-hour clock) 810

Water Rights No. 707

Exact Description of sampling Point 646
Downgradient - Near site 4 Mouth of R & R Drive Richmond Utah

Supply Owned by 712

Sample Type 710

Sample Collected by 713
D. Heldon D. Wilkins

SEND REPORT TO: Phone 533-4145
Jim Salmon 715
150 West North Tempe 648
SLC Utah 84110 717
zip code

114 Sample Source 714
01 Spring 14 Other
02 Well 15 Tunnel
03 Stream 18 Artesian well
04 Lake
06 Dist. syst. 19 Swimming pool
07 Effluent
08 Storm sewer

23 County
Beaver 1 Box Elder 2 Cache 3 Carbon 4 Daggett 5 Davis 6 Duchesne 7 Emery 8 Garfield 9 Grand 10 Iron 11 Juab 12 Kane 13 Millard 14 Morgan 15 Piute 16 Rich 17 Salt Lake 18 San Juan 19 Sanpete 20 Sevier 21 Summit 22 Tooele 23 Uintah 24 Utah 25 Wasatch 26 Washington 27 Wayne 28 Weber 29 Uinta

Current use 708
Proposed use 709
1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 365 770

1 FIELD TESTS

Temperature (°C)	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µmhos	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	659

2 WASTEWATER ANALYSIS

Temperature (°C) 650 | pH 782 | BACT. LAB. No.

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N.	778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered / Unfiltered

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N			722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
11.4	Calcium	228		728
	Chromium			729
	Chromium, Hex. as Cr		<5	730
	Copper			732
	Iron, dissolved			733
	Lead			734
4.60	Magnesium	56		737
	Manganese			738
	Nickel			740
.05	Potassium	2		742
	Selenium			743
	Silver			744
15.6	Sodium	36		745
	Zinc			749
17.6	TOTAL CATIONS			

Sp. Cond. µmhos/cm.	1400 762
TDS @ 180°C	1246 786

4 CHEMICAL ANALYSIS

pH, units 7.7

me/l	ANIONS	mg/l	
	Bicarbonate	286	758
	Carbon Dioxide	9	759
	Carbonate	0	760
.90	Chloride	32	763
4.69	CO_3 Solids	141	
	Fluoride	.34	765
	Hydroxide	0000	767
	Nitrate as N	.006	605
	Nitrite as N	<.001	606
	Phosphorus, Ortho as P	.01	607
	Silica, dissolved as SiO_2	33	750
12.16	Sulfate	584	772
17.7	TOTAL ANIONS		
	GRAND TOTAL		

Tot. Phosphorus		785
Total Alk. as $CaCO_3$	235	752
T. Hdns. as $CaCO_3$	800	754
Surfactant as MBAS		773
Turbidity, as NTU	25	757
Sp. Gravity		608

TOTAL METALS ANALYSIS

5 CATIONS	mg/l	~~ug/l (ppb)~~	
Aluminum			800
Arsenic		.0022	660
Barium	<.05		661
Beryllium	<.01		801
Cadmium	<.01		662
Chromium	<.1		663
Cobalt	<.1		804
Copper			664
Gold			700
Iron			755
Lead	<.1		665
Manganese			666
Mercury	<.0002		739
Molybdenum	<.2		802
Nickel	<.1		667
Selenium	.005		668
Silver	.010		669
Uranium			601
Vanadium			803
Zinc	.17		670

6 RADIOLOGICS

	pC/l-g		pC/l-g	
Alpha, gross		621	^{89}Sr	633
Beta, gross		623	^{131}I	635
Tritium, ^3H		625	^{134}Cs	637
^{226}Radium		627	^{137}Cs	639
^{228}Radium		629		
^{90}Sr		631		

Analyses Approved By: REJ Date: 840629

INTERPRETATION OF ANALYSES:
Remarks:

Based on State Standards, this sample was:

	Satisfactory	Conditional	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

By ENVIRONMENTAL HEALTH

07-Aug-84 J. Oman

Field No. 135

☒ Rec. ☒ Rad. ☐ Nut ☐ BOD ☐ Rad. ☐ Bact. ☒ Spec.

Date Recd.: 6.H2O

Received By:

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES #135

Sample No. 43841927

Source No. 702

Water Syst. No. Source No. 703 704

Date Collected 705: 04 06 84 (yr. mo. dy.)

Time Collected 706: 0913 (24-hour clock)

Water Rights No. 707

Exact Description of sampling Point 646: UP-gradient H2O at Spring South of Clark Ranch along road

Supply Owned by 712

Sample Type 710

Sample Collected by 713: J Hansen D Nordick

SEND REPORT TO: Phone 530 4145

715: Jim Salmen
648: 150 West North Temple
717: SLC Utah 84110
zip code

Sample Source 719: 14 — 01 Spring, 02 Well, 03 Stream, 04 Lake, 06 Dist. syst., 07 Effluent, 08 Storm sewer, 14 Other, 18 Tunnel, 19 Swimming pool

County 611: 22 — 01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Current use 708: ☐

Proposed use 709: 4

1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 770: 365

JUL 25 1984 Utah State Div. Of Environmental Health

FIELD TESTS

Temperature (°C)	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µ mhos.	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	650

2 WASTEWATER ANALYSIS

Temperature (°C) 650 | pH 782 | BACT. LAB. No.

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N.	778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered | Unfiltered

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N			722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
2.40	Calcium	48		728
	Chromium			729
	Chromium, Hex. as Cr		< 5	730
	Copper			732
	Iron, dissolved			733
	Lead			734
.80	Magnesium	10		737
	Manganese			738
	Nickel			740
.03	Potassium	1		742
	Selenium			743
	Silver			744
1.13	Sodium	26		745
	Zinc			749
4.36	TOTAL CATIONS			

Sp. Cond. µmhos/cm.	410 762
TDS @ 180°C	280 786

4 CHEMICAL ANALYSIS

pH, units 7.5

me/l	ANIONS	mg/l	
	Bicarbonate	196	758
	Carbon Dioxide	15	759
	Carbonate	0	760
.54	Chloride	21	763
3.13	CO_3 Solids	93	
	Fluoride	0.16	765
	Hydroxide	0.00	767
.21	Nitrate as N	2.93	605
	Nitrite as N	< 0.01	606
	Phosphorus, Ortho as P	.04	607
	Silica, dissolved as SiO_2	33	750
0.35	Sulfate	17	772
4.27	TOTAL ANIONS		
	GRAND TOTAL		

Tot. Phosphorus		785
Total Alk. as $CaCO_3$	156	752
T. Hdns. as $CaCO_3$	160	754
Surfactant as MBAS		773
Turbidity, as NTU	0.3	757
Sp. Gravity		608

5 TOTAL METALS ANALYSIS ppm

CATIONS	mg/l	ug/l (ppb)	
Aluminum	<	.1	800
Arsenic		.001	660
Barium	< .05		661
Beryllium	<	.01	801
Cadmium	<	.01	662
Chromium	<	.02	663
Cobalt	<	.1	804
Copper	<	.01	664
Gold			700
Iron	< .03		755
Lead	<	.01	665
Manganese	<	.01	666
Mercury	<	.0001	739
Molybdenum	<	.1	802
Nickel	<	.1	667
Selenium	<	.005	668
Silver	<	.01	669
Uranium			601
Vanadium	<	.3	803
Zinc		.005	670

6 RADIOLOGICS

	pc/l-g		pc/l-g	
Alpha, gross		621	^{89}Sr	633
Beta, gross		623	^{131}I	635
Tritium, ^3H		625	^{134}Cs	637
^{226}Radium		627	^{137}Cs	639
^{228}Radium		629		
^{90}Sr		631		

Analyses Approved By: RSB Date: 840626

INTERPRETATION OF ANALYSES:
Remarks:

Based on State Standards, this sample was:

	Satisfactory	Conditional	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

By ENVIRONMENTAL HEALTH

J. Oman 17-July-84

HW84144

Original #144 GW Dam

Rev. 3/82

Field No. _____

[X] TC [X] TM [ ] Nut
[ ] PC [ ] PM [ ] BOD

[ ] Pest. [ ] Rad. [ ] Bact. [ ] Spec.

Date Recd.: 6-4-84

Received By: _____

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES

Sample No. 484841936 701

Storet No. _____ 703

Water Syst. No. Source No. _____ 704 705

Date Collected: 84 04 04 (yr. mo. dy.) 706

Time Collected: 1130 (24-hour clock) 706

Water Rights No. _____ 707

Exact Description of sampling Point: Toe of Richardson Flat Tailings dam-ground water seep

Supply Owned by _____ 712

Sample Type _____ 710

Sample Collected by: T Heddon 713

SEND REPORT TO: Phone 533 4145

Tim Salmon-Bur Soil Hazz
150 W North Temple 648
SLC Utah 717
zip code

Sample Source 710: 14
01 Spring, 02 Well, 03 Stream, 04 Lake, 06 Dist. syst., 07 Effluent, 08 Storm sewer, 14 Other, 15 Tunnel, 18 Artesian well, 19 Swimming pool

County: 22 Salt Lake
01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Cargo use [X] 708
Proposed use [ ] 709
1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 365 770

1 FIELD TESTS

Temperature (°C)	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µmhos	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	659

2 WASTEWATER ANALYSIS

Temperature (°C) _____ 650 pH _____ 782 BACT. LAB. No. _____

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N.	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N.	778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered [ ] Unfiltered [ ]

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N			722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
30.6	Calcium	612		728
	Chromium			729
	Chromium, Hex. as Cr		<5	730
	Copper			732
	Iron, dissolved			733
	Lead			734
9.40	Magnesium	114		737
	Manganese			738
	Nickel			740
.33	Potassium	13		742
	Selenium			743
	Silver			744
2.08	Sodium	48		745
	Zinc			749
43.	TOTAL CATIONS			

Sp. Cond. µmhos/cm. 2890 762
TDS @ 180°C 3098 786

4 CHEMICAL ANALYSIS

pH, units 7.7

me/l	ANIONS	mg/l	
	Bicarbonate	322	758
	Carbon Dioxide	10	759
	Carbonate	0	760
.90	Chloride	32	763
5.38	CO_3 Solids	158	
	Fluoride	.48	765
	Hydroxide	0.00	767
	Nitrate as N	0.03	605
	Nitrite as N	<0.01	606
	Phosphorus, Ortho as P	.01	607
	Silica, dissolved as SiO_2	19	750
38.80	Sulfate	1863	772
45.	TOTAL ANIONS		
	GRAND TOTAL		

Tot. Phosphorus	.2	785
Total Alk. as $CaCO_3$	264	752
T. Hdns. as $CaCO_3$	2070	754
Surfactant as MBAS		773
Turbidity, as NTU	10	757
Sp. Gravity		608

5 TOTAL METALS ANALYSIS DOM

CATIONS	mg/l	~~ug/l (ppb)~~	
Aluminum			800
Arsenic	.0486		660
Barium	<.05		661
Beryllium	<.01		801
Cadmium	.031		662
Chromium	<.1		663
Cobalt	<.1		804
Copper			664
Gold			700
Iron			755
Lead	<.1		665
Manganese			666
Mercury	<.0001		739
Molybdenum	<.2		803
Nickel	<.1		667
Selenium	.0015		668
Silver	.012		669
Uranium			601
Vanadium			803
Zinc	.77		670

6 RADIOLOGICS

	pc/l		pc/l	
Alpha, gross		621	^{89}Sr	633
Beta, gross		623	^{131}I	635
Tritium, ^3H		625	^{134}Cs	637
^{226}Radium		627	^{137}Cs	639
^{228}Radium		629		
^{90}Sr		631		

Analyses Approved By: RSH Date: 840629

INTERPRETATION OF ANALYSES:
Remarks:

Based on State Standards, this sample was:

	Satisfactory	Conditional	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

By _____ ENVIRONMENTAL HEALTH

7-6-84 L. Oman

Rev. 3/82 137

Field No.

☐ TC ☒ TM ☐ Nut
☐ PC ☐ PM ☐ BOD

☐ Pest. ☐ Rad. ☐ Bact. ☐ Spec.

BKS soil #137

Date Recd.:

Received By:

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES

Sample No. 4804192S

Storet No. 702

Water Syst. No. Source No. 703 704

Date Collected 705 (yr. mo. dy.) Time Collected 706 (24-hour clock)

Water Rights No. 707

Exact Description of sampling Point 646
Backill to South West of Clark Ranch - upgradient soil

Supply Owned by 712

Sample Type 710

Sample Collected by 713
D Herbica

SEND REPORT TO: Phone
Jim Salmon - Bur Sol Haz 715
150 W North Temple 648
SLC Utah 717
zip code

Sample Source 719: 14
01 Spring, 02 Well, 03 Stream, 04 Lake, 06 Dist. syst., 07 Effluent, 08 Storm sewer, 14 Other, 15 Tunnel, 18 Artesian well, 19 Swimming pool

County 611: 22
01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Current use ☐ 708
Proposed use ☐ 709
1. Culinary
2. Agriculture
3. Industrial
4. Other

Cost Code 365 770

1 FIELD TESTS

Temperature (°C)	792	CO_2, mg/l	572
D.O., mg/l	793	Depth, m	609
Sp. Cond. µ mhos	653	Cl Resid., mg/l	753
pH	651	Flow, MGD	652
Sp. Gravity	608	Flow, GPM	604
Transparency, m	649	Flow, cfs	650

2 WASTEWATER ANALYSIS

Temperature (°C) 650 | pH 782 | BACT. LAB. No.

	mg/l		mg/l		
B.O.D.$_5$	794	T.O.C.	671	M.P.N. Total Coliforms/100ml	658
Tot. Sus. Solids	787	C.O.D.	777	M.P.N. Fecal Coliforms/100ml	657
NO_2+NO_3,N	602	Cyanide	775	Fecal Strep C/100ml.	656
T.K.N.	778	Phenolics	783	M.F. Total Coliforms/100ml.	654
Oil & Grease	780	Sulfide	672	M.F. Fecal Coliforms/100ml.	655
				Plate Count-Org./ml.	599

3 Filtered | Unfiltered

me/l	CATIONS	mg/l	ug/l (ppb)	
	Ammonia as N			722
	Arsenic			723
	Barium			724
	Boron			725
	Cadmium			727
	Calcium			728
	Chromium			729
	Chromium, Hex. as Cr			730
	Copper			732
	Iron, dissolved			733
	Lead			734
	Magnesium			737
	Manganese			738
	Nickel			740
	Potassium			742
	Selenium			743
	Silver			744
	Sodium			745
	Zinc			749
	TOTAL CATIONS			

4 CHEMICAL ANALYSIS

pH, units

me/l	ANIONS	mg/l	
	Bicarbonate		758
	Carbon Dioxide		759
	Carbonate		760
	Chloride		763
	CO_3 Solids		
	Fluoride		765
	Hydroxide		767
	Nitrate as N		605
	Nitrite as N		606
	Phosphorus, Ortho as P		607
	Silica, dissolved as SiO_2		750
	Sulfate		772
	pH 1:1	6.6	
	% Solids	80.0	
	TOTAL ANIONS		
	GRAND TOTAL		
	Tot. Phosphorus		785
	Total Alk. as $CaCO_3$		752
	T. Hdns. as $CaCO_3$		754
	Surfactant as MBAS		773
	Turbidity, as NTU		757
	Sp. Gravity		608

Sp. Cond. µmhos/cm. 762
TDS @ 180°C 786

TOTAL METALS ANALYSIS ppm

5

CATIONS	mg/l	ug/l (ppb)	
Aluminum			800
Arsenic		14.	660
Barium		27.	661
Beryllium		1.2	801
Cadmium		.9	662
Chromium		24	663
Cobalt		8.8	804
Copper			664
Gold			700
Iron			755
Lead		529	665
Manganese			666
Mercury		.19	739
Molybdenum		2.4	802
Nickel		236	667
Selenium		2.0	668
Silver		1.3	669
Uranium			601
Vanadium			803
Zinc		130	670

dry wt basis

6 RADIOLOGICS

	pC/l		pC/l	
Alpha, gross		621	^{89}Sr	633
Beta, gross		623	^{131}I	635
Tritium, ^3H		625	^{134}Cs	637
^{226}Radium		627	^{137}Cs	639
^{228}Radium		629		
^{90}Sr		631		

Analyses Approved By: Date:

INTERPRETATION OF ANALYSES:
Remarks:

RECEIVED
SEP 6 1984
Utah State Div. O
Environmental Hea

By ENVIRONMENTAL HEALTH

Based on State Standards, this sample was:

	Satisfactory	Conditional	Unsatisfactory
B.O.D.$_5$			
Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

30-Aug-84 A. Oman

Rev. 3-82

Field No.

☐ T.C. ☐ TM ☐ Nut
☐ FC ☐ PM ☐ BOD

☐ Pest. ☐ Rad. ☐ Bact. ☐ Spec.

Date Recd.: Offers Soil

Received By:

UTAH STATE DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH
WATER ANALYSES #935

Sample No. 701 84 1935

Store: No.

Water Syst. No. Source No. 703 704

Date Collected 702 6 27 84

Time Collected 706 1120 (24-hour clock)

Water Rights No. 707

Exact Description of sampling Point 646
Richardson Flat N Side
of Fran's-off Site (air release)
runways 1/8 mile West Highway

Supply Owned by 712

Sample Type 710

Sample Collected by 713
J. Meribica

SEND REPORT TO: Phone 533 4145 715
Jim Solomon - Bur Solid Haz 648
150 W North Temple 717
SLC Utah
zip code

Sample Source 716: 01 Spring, 02 Well, 03 Stream, 04 Lake, 06 Dist. syst., 07 Effluent, 08 Storm sewer, 14 Other, 15 Tunnel, 18 Artesian well, 19 Swimming pool

County 631: 01 Beaver, 02 Box Elder, 03 Cache, 04 Carbon, 05 Daggett, 06 Davis, 07 Duchesne, 08 Emery, 09 Garfield, 10 Grand, 11 Iron, 12 Juab, 13 Kane, 14 Millard, 15 Morgan, 16 Piute, 17 Rich, 18 Salt Lake, 19 San Juan, 20 Sanpete, 21 Sevier, 22 Summit, 23 Tooele, 24 Uintah, 25 Utah, 26 Wasatch, 27 Washington, 28 Wayne, 29 Weber

Current use — 4 708

Proposed use — 1 709

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2. Agriculture
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Cost Code 8 6 5 770

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Transparency, m	649	Flow, cfs	659

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	Lead			734
	Magnesium			737
	Manganese			738
	Nickel			740
	Potassium			742
	Selenium			743
	Silver			744
	Sodium			745
	Zinc			749
	TOTAL CATIONS			

Sp. Cond. µmhos/cm.		762
TDS @ 180°C		786

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pH, units

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	GRAND TOTAL		
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	T. Hdns. as $CaCO_3$		764
	Surfactant as MBAS		773
	Turbidity, as NTU		757
	Sp. Gravity		608

TOTAL METALS ANALYSIS ppm

5 CATIONS

	mg/l	ug/l (ppb)	
Aluminum			800
Arsenic		< 16.7	660
Barium	3.3		661
Beryllium		< .4	801
Cadmium		4.47	662
Chromium		12.7	663
Cobalt		16.7	804
Copper			664
Gold			700
Iron			755
Lead		37.0	665
Manganese			666
Mercury		1.24	739
Molybdenum		1.7	802
Nickel		13.5	667
Selenium		< 1.9	668
Silver		63.5	669
Uranium			601
Vanadium			803
Zinc		16.7	670

6 RADIOLOGICS

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Alpha, gross		621	^{89}Sr	633
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Tot. Sus. Solids			
M.P.N. Total Coliform.			
M.P.N. Fecal Coliform.			

30-Aug-84 J. Oman

BAUER TAILINGS, R8-8504-25

1. The Black Hawk Resin Pit owned by Hercules, Inc. is located near the north east corner of the tailings. Two children were burned after walking through this pit in May, 1985. It is not an objective of the FIT to characterize and determine what actually burned the children. The pit area was mentioned to let it be known that it existed and the potential danger of this area.

2. Tailings samples will be collected from the oxidized zone, the enrichment zone beneath the oxidized zone and at the base of the tailings. These zones should be discernible by color and will be identified by a trained geochemist who has experience in this area. If the zones are not discernible by color then samples will be collected two feet below the surface and at the base of the tailings.

   If the tailings are too saturated to support a drill rig, a hand auger will be used. Hand augering will be conducted until physically impossible.

REGION VIII LABORATORY SAFETY CONCERNS REGARDING HIGH AND MEDIUM CONCENTRATED HAZARDOUS WASTE SAMPLES

With the FIT shipment of potentially hazardous samples to the Region VIII laboratory, a legitimate concern has been raised with regard to the safety of the personnel and equipment. This concern is shared by both the FIT and Region VIII personnel. The hazardous nature of a sample is either suspected before hand, and is designated in the sample plan, or is designated in the field based on field measurements. In either case, if a sample is designated to be medium or high the Region VIII laboratory has the right of refusal and can redirect the shipment to a designated CLP high hazards lab. The working relationship and ultimate discussion as what to do with a sample of this nature is the topic of this discussion.

Designation of a Medium or High Hazard Sample

The designation of a sample as either medium or high hazard is a field decision based on the: site knowledge, sample location, substance (known or suspected), visual appearance and any field monitoring conducted with available field instrumentation. A common misunderstanding is that as the site safety levels increase to B and A, the hazardous nature of the substance increases correspondingly. This hazardous waste designation is only remotely connected to the levels of site safety being utilized and is not an absolute discriminator as to the potential hazardous nature of the substance. For instance, Level B for organic contaminated sites may indicate the presence of medium to high organic concentrations. Whereas, only Level C would be used to operate on an inorganic site while collecting flue dust (high hazard).

Sample Control

It is proposed that in all future sampling plans a hazardous waste section be added to discuss the potential collection of medium and high hazard samples. This hazardous waste section will include the toxicity, reactivity and other potential dangers associated with the suspected hazardous material. Within this section a small field analytical procedure will be developed for organics or other compounds which can be qualitatively tested for in the field (OVA, HNU, headspace, explosimeter, draeger, pH, etc.). These field tests would be conducted by the FIT during sample collecting and the result phoned to the Region VIII laboratory. The Region VIII laboratory would then decide whether to accept or reject the sample(s).

The field analytical procedures would be described in the sampling plan and concurrence of all parties would be secured prior to the sampling. By implementing this program, the Region VIII Laboratory staff will have a more complete picture of the hazardous materials they are expected to analyze. This program will also assure a greater safety factor for personnel handling the materials during sample preparation and analysis.

TOOELE SMELTER, R8-8504-26

1. Tailings samples will be collected form the oxidized zones, the enrichment zone beneath the oxidized zone and at the base of the tailings. These zones should be discernible by color and will be identified by a trained geochemist who has experience in this area. If the zones are not discernible by color then samples will be collected two feet below the surface and of the base of the tailings.

   If the tailings are too saturated to support a drill rig, a hand auger will be used. Hand augering will be conducted until physically impossible.

2. Surface water, soil and tailings samples will be collected prior to drilling and prior to the disposal of drill cuttings on the tailings area. This will be done to avoid cross-contamination between samples.