7173

REPORT OF DRILLING ACTIVITIES
RICHARDSON FLATS TAILINGS SITE
SUMMIT COUNTY, UTAH
TDD #T08-9204-015
PAN EUT0039SBA

PREPARED FOR:

U.S. Environmental Protection Agency
Region VIII
Waste Management Division
Mike Zimmerman, On-Scene Coordinator

PREPARED BY:

Troy C. Sanders
Ecology and Environment, Inc.
Technical Assistance Team

DATE SUBMITTED: July 13, 1992

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REPORT OF DRILLING ACTIVITIES
RICHARDSON FLATS TAILINGS SITE
SUMMIT COUNTY, UTAH
TDD #T08-9204-015

1.0 INTRODUCTION

Under Technical Direction Document (TDD) #T08-9204-015, the Region VIII U.S. Environmental Protection Agency/Emergency Response Branch (EPA/ERB) tasked the Ecology and Environment, Inc. (E & E), Technical Assistance Team (TAT) to provide oversight and documentation of the installation of groundwater monitoring wells at the Richardson Flats Tailing site near Park City, Utah. The purpose of the work was to prepare for an upcoming investigation focusing on the potential existence of contamination related to a sanitary/municipal landfill located within the site boundary. The TAT members involved in this project and their respective roles are as follows:

Troy Sanders - Project Manager/Field Geologist
Cordel Schmidt - Health and Safety Officer/Field Geologist

Under special project TDD #T08-9204-016, TAT provided a drilling subcontractor, Boyles Brothers Drilling Company, to drill and develop groundwater monitoring wells. Boyles Brothers personnel mobilized on June 23, 1992 and drilling commenced that same day. A total of three wells were drilled, installed and developed from June 23 through June 27, 1992. TAT provided oversight and technical assistance during the drilling and development activities. All field activities were performed in personal protection Level D in accordance with the results of on-site health and safety monitoring.

Field activities were photographed and documented in a bound logbook. Logbook notes are located in Appendix A. Photographs taken during drilling and well development activities are located in Appendix B of this report.

2.0 SITE DESCRIPTION AND BACKGROUND

The Richardson Flats Tailings site is located approximately three and one-half miles northeast of Park City in Summit County, Utah. The site consists primarily of metallic ore mill slurries and waste rock materials in a tailings pile which covers approximately 160 acres of the site. A sanitary/municipal landfill, numerous debris piles, and open areas occupy the other portions of the site. The site is situated in a topographic depression and is bounded by Silver Creek to the west, U.S. Highway 40 to the north, and county roads to the east and south (Figure 1). A newly constructed section of Highway 40 bisects the landfilled area of the site. The legal description of the area of interest currently under investigation is the southwest quarter of the northeast quarter of Section 2, Township 2 South, Range 4 East.

The E & E Field Investigation Team (FIT) has previously conducted a drilling and multimedia sampling investigation which focused on the tailings material present on-site. Analytical results indicated that all tailings samples collected contained high concentrations of inorganic contaminants. The previous sampling efforts have not addressed the potential leakage and resulting groundwater contamination from the landfill area on-site.

The objectives of this field effort was to install three monitoring wells and retrieve subsurface soil samples at the Richardson Flats Tailings site. The subsequent sampling of these wells will detect the presence and horizontal extent of organic and/or inorganic contaminants in the uppermost aquifer beneath the site near the landfilled area.

3.0 INVESTIGATION PROCEDURES

3.1 Drilling and Well Installation

Three drill locations were selected by TAT member Troy Sanders at the Richardson Flats Tailings site (Figure 2). Access agreements for all well locations and field activities were secured from the property owner by Mike Zimmerman, EPA On-Scene Coordinator.

In preparation for drilling activities, the TAT met with representatives of U.S. West, Mountain Fuel, and Utah Power and Light on June 23, 1992 for field utility line location determination. According to the field representatives, the proposed drilling area was clear of any underground utilities.

Drilling activities commenced on June 23,1992 using a B-53 air rotary/casing drive rig equipped with 4-inch internal diameter steel casing. Split-spoon samples were collected at five foot intervals during the drilling of each monitoring well in order to gain knowledge of geologic conditions such as depth to water table, lithology, and stratigraphy. Drilling was conducted in personal protection Level D. TAT provided continuous air monitoring with an HNu photoionization detector equipped with a 10.2 and 11.7 eV probe, and an MSA combination hydrogen sulfide, combustible gas and oxygen meter. Drilling and well installation activities were conducted in accordance with guidelines proposed in the "RCRA Ground Water Monitoring Technical Enforcement Guidance Document". All backfilling was completed as the casing was removed from the hole to prevent caving of the annulus.

The wells were constructed of 2-inch internal diameter Schedule 80 flush threaded PVC pipe and screen having a slot size of .01-inch. In general, 10-20 mesh silica sand was placed to a level at least two feet above the top of the screen followed by a two-foot seal of bentonite pellets placed above the sand pack. A well-mixed Portland cement natural bentonite grout slurry was placed from the bentonite seal to within a few feet of the ground surface. A concrete plug was placed in the upper few feet of each borehole. All wells were provided with vented PCV slip caps and locking 4-inch nominal diameter steel casing five feet in length was placed around each well and set into concrete to

a two foot depth. A summary of well completion details for the wells are presented in Table 1. Specific information on well completion details is provided in the well construction diagrams located in Appendix C.

3.2 Well Development

Following well installation, each well was developed with a stainless steel bailer that was decontaminated between wells. Fairly turbid water was produced from the wells because each borehole intercepted a thick clay layer. TAT monitored water temperature, specific conductivity, pH and percent sediment during well development. When these parameters stabilized and the water contained less than five percent fines, the well development was considered complete. Organic vapor levels of development water (container headspace) was measured but were at background levels for all wells.

4.0 FIELD OBSERVATIONS

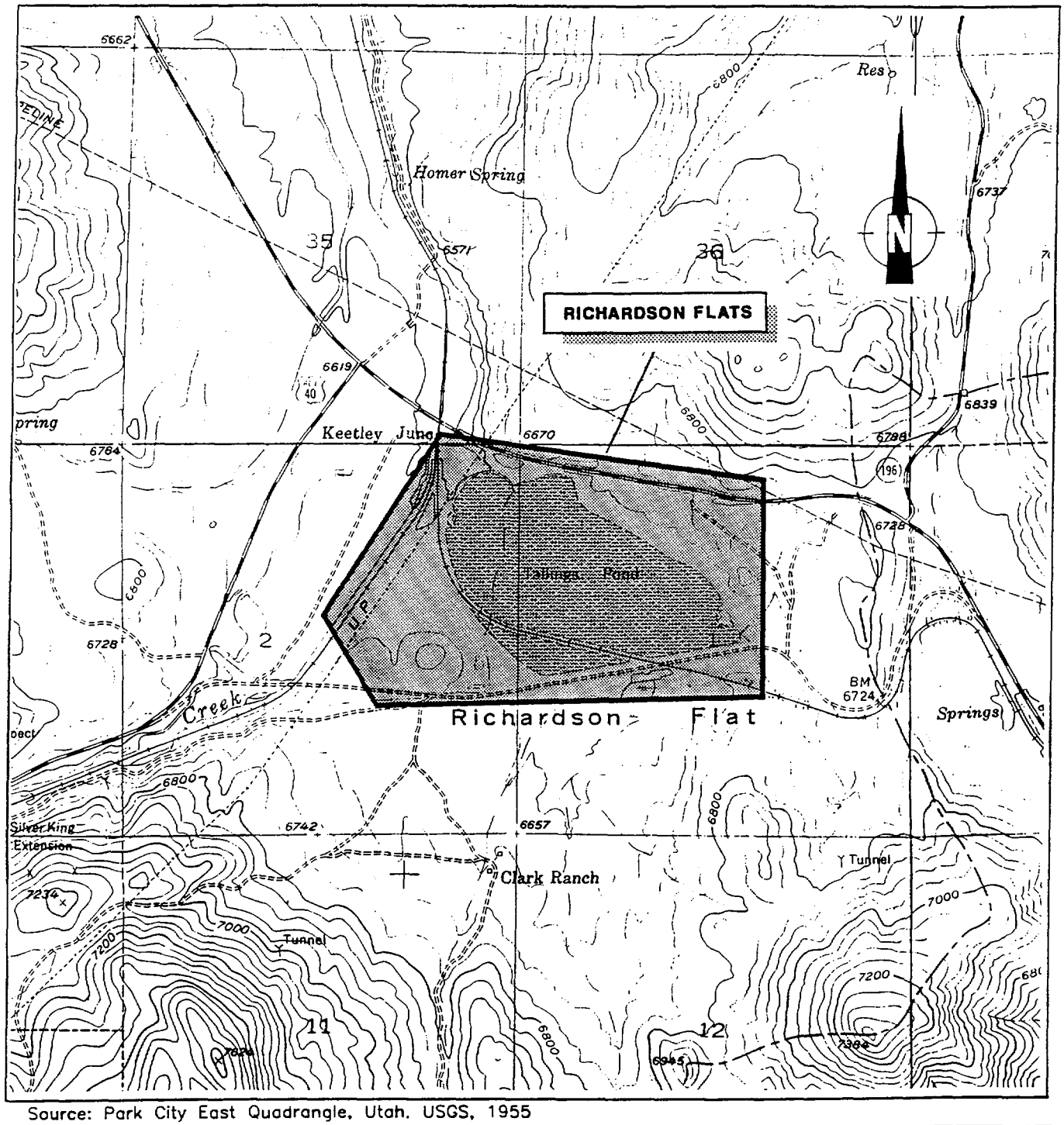
4.1 Geology and Hydrogeology

Drilling encountered seven to eight feet of unconsolidated deposits of gravely silt which graded into an underlying clayey silt to gravely clay layer. Abundant refuse was intercepted when drilling borehole RF-MW-02 and to a lesser extent in borehole RF-MW-03. Organic vapor levels of split-spoon samples and at the well casing headspace detected a single low level reading of 0.5 parts per million (ppm) above background when drilling through the landfill material. A reading of 2.5 ppm above background was detected in the well casing headspace at the 35 foot level of borehole RF-MW-02. This reading could be attributed to water vapor interference from condensation lining the well casing.

The measured depth to water varied from well to well, due to the rolling topography near the landfilled area. An alluvial aquifer was encountered in each well and appeared to be relatively homogenous in the saturated zone. Field water quality measurements of the groundwater in the study area showed that the downgradient wells (RF-MW-02 and RF-MW-03) had a pH about one unit lower and higher specific conductivity and temperature values than the background well (RF-MW-01).

5.0 SUMMARY

Three monitoring wells were successfully installed at the Richardson Flats Tailings site in Summit County, Utah from June 23 through June 26, 1992. The wells were developed on June 27, 1992 and are scheduled to be sampled for organic and inorganic parameters in August 1992.

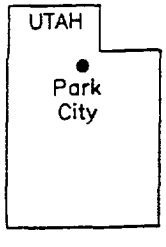


Source: Park City East Quadrangle, Utah. USGS, 1955

0 1/2 1 MILE

1000 0 1000 2000 3000 4000 5000

LOCATION MAP



LEGEND

Site location

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE, REMOVAL AND PREVENTION
EPA CONTRACT 68-WO-0037

TITLE:

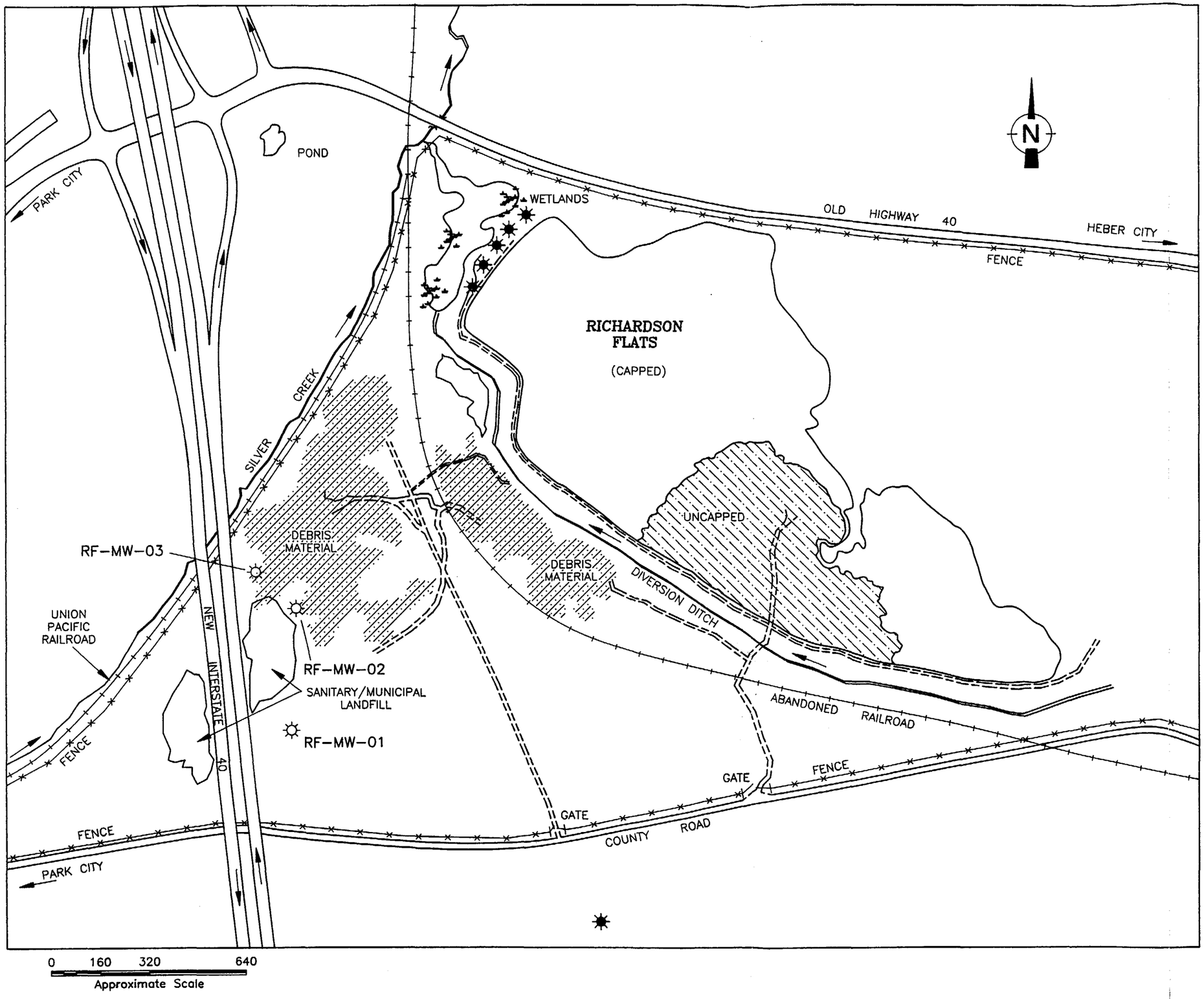
RICHARDSON FLATS
Park City, Utah
SITE LOCATION MAP

T.D.D. T08-9204-015

ecology & environment, inc.
DENVER, COLORADO

FIG. 1

Date: 05/92 Drawn by: RSM Scale:



LEGEND

✸ Approximate location of existing monitoring wells previously installed

☼ Location of existing monitoring wells installed 06/23/92 to 06/26/92

TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE, REMOVAL AND PREVENTION
EPA CONTRACT 68-WO-0037

TITLE:
RICHARDSON FLATS
Park City, Utah
MONITORING WELL LOCATION MAP

T.D.D. T08-9204-015

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DENVER, COLORADO

FIG. 2

Date: 07/92 Drawn by: RSM Scale:

TABLE 1
WELL COMPLETION DETAILS
RICHARDSON FLATS TAILINGS SITE
SUMMIT COUNTY, UTAH
TDD #T08-9204-015

WELL NUMBER	TOTAL DEPTH (FT.)*	SCREENED INTERVAL (FT.)*	DEPTH TO WATER (FT.)*, **
RF-MW-01	25.0	10.0-25.0	7.8
RF-MW-02	38.0	28.0-38.0	26.3
RF-MW-03	34.0	19.0-34.0	21.3

* - Measured from ground surface.
** - Measured 24 hours after well installation.

APPENDIX A
LOGBOOK NOTES

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Job Number

Richardson Flats Tailings Site
Well Installation Project
Park City, UTAH

08-9204 15

E & E Job Number _____

Telephone Code Number _____

Site Name Richardson Flats Tailings Site

City/State Park City, Summit County, Utah

TDD T08-9204-15

PAN EUT0039SBA

SSID 94

Start / Finish Date 06/22/92 , 06/27/92

Book 1 of 1

E & E Emergency Response Center: (716) 684-8940
E & E Corporate Center: (716) 684-8060
MEDTOX Hotline: (501) 370-8263
E & E Safety Director (Home): (716) 655-1260

08-9204 15

Date Log Open: 06/22/92
TDD #: T08-9204-015
PAN: EUT0039 SBA
Site Name: Richardson Flats Tailings Site
Site Location: Park City, Summit County, Utah
TAT Project Officer: Troy C. Sanders
EPA Point of Contact: Mike Zimmerman (303) 294-7134
General Task: Install (3) three GW monitoring wells at Richardson Flats Tailings Site, near Park City, UT.

Specific Tasks:

Team Members: Troy Sanders - Project Officer - Geologist
Coredel Schmidt - Safety Officer - Geologist

TDD Deadlines:

Mike Zimmerman: 1-800 SKY PAGE
(267-7209)
(H) 277-9939
(W) 294-7134

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34
at
City, UT.

Edwin L. Osika, Jr.
EXECUTIVE VICE PRESIDENT

UNITED PARK CITY MINES CO.
309 KEARNS BLDG.
136 SOUTH MAIN
SALT LAKE CITY, UTAH 84101

(801) 532-4031
(801) 649-8011

T. Sander
6/23/92

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State of Utah
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF ENVIRONMENTAL RESPONSE
AND REMEDIATION

1950 West North Temple
Salt Lake City, Utah 84114-4840
(801) 536-4100
FAX: (801) 359-8853

Harold Sandbeck
Environmental Health Scientist/Geophysicist

T. Sander
6/23/92

08-9204 15 08

06/23/92

0745 Depart for site

0800 Meet UPCM employees Dave Tuesday, Edwin Osika, Jr and Cerry Gee. depart for site to review well locations

0815 Arrive at site, walked around landfill area and picked out the location of the two downgraident and one upgraident wells. The upgraident well will be further to the SW direction to ~~assure try and~~ TO find background water conditions.

0905 Mountain Fuel Representative on site Woody — Heber Office 654 3600 No gas lines in vicinity, site clear

0910 Mtn Fuel rep offsite. Coridel Schmidt is currently meeting Blue Stakes utilities reps. (if present) at Interstate 40 and Old Highway 40.

0930 EPA OSC Mike Zimmerman Onsite.

0940 TATM Schmidt arrives with drillers and proceed to upgraident location. Representatives from U.S West Utah Power + Light also determined there are no problems with underground utilities in the area. Drillers offload sand and well completion materials, ~~et~~ TO

1015 Drillers Helper departs site for supply yard with extra truck. Two men will be onsite from the Boyles Brothers Drilling Co. to drill borings and install the groundwater monitoring wells. Driller Tom Giles, Helper: Charlie Sowers. Rig has been deconned, potable water from Salt Lake City water supply.

1030

1045

T. Sa

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1030 Drillers set up over RF-MW-01 upgraident monitoring well.

SITE SAFETY BRIEFING

SITE NAME: Richardson Flats

TDD: F08 - 9204 - 15

PAN NO: F08 -

BRIEFER: Cordel Schmidt

ATTENDEES	DATE TIME 6/23/92 1100 AM			INITIALS
Corky Schmidt	[illegible]			
Troy Sanders	[illegible]			
Mike ~~Holmes~~ Zimmerman	CMZ			
Dave Tuesday	[illegible]			
Edwin Osika	[illegible]			
Kerry Gee	[illegible]			
Tom Giles	[illegible]			
Charlie Sowers	CFS			

SITE SAFETY TEAM LEADER

1045: Calibrate O_2 + HNu meters by Coredel Schmidt HNu 100 ppm Isobutylene span gas at 58 ppm, Span 9.540. Background reading 1.5 ppm.

T. Sanders

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1240

1050 Driller steam cleans drill rods
1115 Health + Safety Officer Cordel Schmidt conducts Site Safety Meeting all persons present on-site attend meeting see page 5 for signatures. 2-10

1130 ~~Drilling~~ Sampling proceeds on Hole RF-MW-01. Driving 2 ft split spoon sampler into surface soils. 1255
Weather conditions: Sunny, Winds 0-5 mph from North
partly cldy. / Clear skys. Temp: expected high 90° + Farenheit.

4" ODEX System Used Rig: Mobile Drill "B-53" 1320

Drill Blow Counts 4/13/19/30 1300
Sample Recovery 50% = 12 inches 1330
Description: Dark brown, Roots first 4" 1335
Silty to clayey, Brittle, dry soil.
(TOP-SOIL)

NNU Readings: 0 ppm above background. 1340
(0'-5' depth)

1145 Drilling begins on Hole RF-MW-01 Drilling proceeds in Level D Hardhat, Tyvek, Steel Toed boots, Safety Glasses, Surgics gloves when handling samples, and hearing protection
1205 Bit and rods removed from hole Odex system is being plugged up with "hardpan" material near surface.
1215 Harold Sandbeck (RPM State of Utah) on-site 1355
1232 0-5 ft interval has been drilled. Rock chip consisting of a mixture of subangular to rounded Quartzitic, volcanic clastic material 1445
from approx 3-5 ft depth

T. Sand T. Sa

08-9204 15. 6/23/92

1240 Split spoon sample taken from 5-7 ft depth
Blow counts: 6 / 8 / 13 / 14
Sample Recovery: 50 %
Description: Med brown silty clay, with sub angular 2-10mm clasts of geothite/hematite red and black inclusions (brecia volcanic material)
0-20" dry 20-24" bgs moist. Slightly mottled. Pyrite oxidized or mica clasts.
HNU Readings: 0 ppm above background.

1255 Drilling from 5-10 ft. proceeds. Clayey material median brown w/ chips of volcanic rock continue to come from hole at 8.5 ft level. HNU reading 0 ppm above background.

...on North

"B-53" 1320 Split spoons deconed in TSP + water wash w/ plastic brush and Tap H_2O rinse.

1300 OSC + RPM offsite for lunch

1330 5-10 ft. interval complete. HNU readings at hole 0 ppm above bg.

1335 OSC + RPM onsite. Clay has been plugging the holes in the drill bit which is slowing down progress on the hole.

1340 2 ft. split spoon sample collected from 10-12 ft.
Blow counts 16 / 33 / 21 / 28 /
Sample Recovery: 65 %
Description: Dk reddish brown clay with angular clasts 3-10 mm in diameter, moist, mica platlets also present. Material in spoon is not saturated, slightly plastic. Limonitic staining locally. Some clasts appear to be silicic breccia
HNU Readings 0 ppm above background.

...tection

1355 Drilling of 10-15 ft. depth begins
Sand layer suspected at approx 9-11 ft. Then began drilling through hard consolidated material.

1445 10-15 ft. depth completed. Small amount 2-3 oz. of Western Family 100% Natural Vegtable Oil placed in hole to

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08-9204 15 6/23/92 0

lubricate drill string for removal. 1710
1450 Splitspoon sample taken from 15-17 ft. 1715
TAT anticipates that we are drilling (have been) 1720
through bedrock "highly silicic volcanic
rock medium purple/red in color. 173

Blow Counts: 8/10/18/42
Sample Recovery: 65%
Description: Brown to reddish brown clayey soil
micaceous with 02 to 15 mm clasts of consolidate
material (high alty content) moist at top of core wet at bottom 1-2".
HNU 0.0 ppm above background
1455 Mike Zimmerman reports Silver Creek
is flowing ≈ 2 ft per second, 4" deep,
and 4 ft. wide.
1505 Drilling initiated on 15-20 ft. depth
1515 Mike Zimmerman offsite. Cuttings from hole are
poorly sorted moist material with less clay and more
silica present.
1531 15-20 ft. section drilling complete.
1540 Split Spoon sample taken from 20-22 ft.
HNU 0.0 ppm above b.g.
Blow counts: 17/20/45/50
Sample Recovery: 50%
Sample Description: Entire length of split 1850
spoon is saturated and the 1 ft length of 1907
sample is saturated: 30% angular clasts
in dk red/brown, gravely coarse ground,
~~silty~~ clayey material.
4" of Water in hole (cased)
1555 Drilling of length 20-25 ft. initiated 1920
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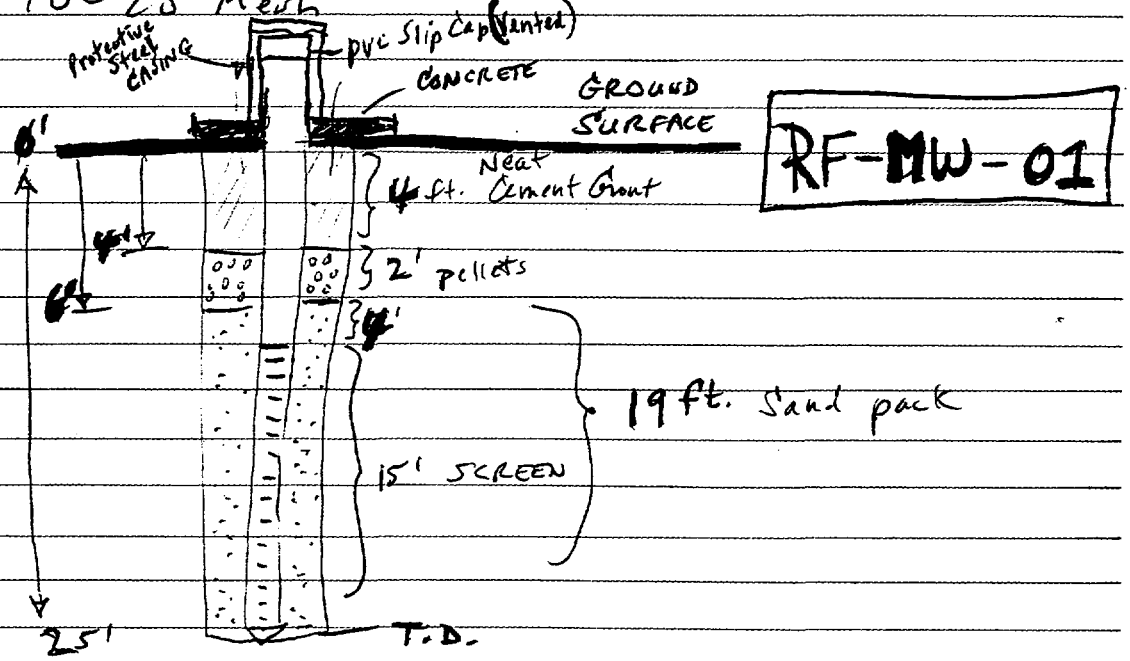
1710 drilling to 25 ft Total Depth of Well complete
1715 Drillers begin to trip out drill string + bit.
1720 String is out. Water is visible in bottom of hole and is filling in from bottom of hole.
1730 Well installation begins 15 ft of screen is selected Manufacturer TriLoc ~~2" x 10 ft~~ Schedule 80 slot size .01 inch. 10 ft of Solid casing. Sand to Six feet Colorado Silica Sand, Inc. Environmental Media 10-20 Mesh



1850 Rosemary Fields onsite Attorney for UPCM, Inc.
1907 Sand pack completed used ≈ 2 bags 100 lbs C55I sand to 6 ft depth bgs
Bentonite Pellets to be placed in hole to the 4 foot bgs level. No manufacturer information available on pellets
1920 Bentonite Seal complete to the 4 ft level, ≈ 1/2 of 5 gal pail wet. Hydrated with two gal. Mt. Olympus Distilled H2O

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1925 Concrete mix to be used is "Sakrete Concrete Mix" Western Dry Mix and Packaging Corp 490 West 33RD South SLC UT 84115, each bag = 90 lb Net Wt (2/3 Cu ft.)

1930 Decon of Drill string + Casing begins It was determined that the well will be cemented ~~[illegible]~~ (TZ) 6/23/92 tommorow. TAT places a lock on the well cap

1950 TAT + Drillers off site.

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06/23/92

08-92

0800

0815

0820

0920

0935

8 inches

0950

and

1025

1040

T. Sar

08-9204 15. 06/24/92

0800 TAT onsite, Drillers, Ed Osika, and Dave Tuesday already on site. The last piece of 5 ft. casing was pulled from hole some bentonite was removed from the hole with the section of casing.

0815 Cement mixed, Cement used Mountain Cement Co. Type I-II L.A. (Low Alkali) portland Cement Cement poured to approx 2 ft. Will let this mix set up and finish off the well w/ the mix listed yesterday 6/23/92 1925 entry "Sakrete". Approx 1/4 bag (Net wt 94 lbs) used

0820 Drillers prepare to move equipment to hole RF-MW-02

0920 TAT picks out well location for RF-MW-02 Drillers set up decon pad, to wash off rig and hot pressure wash, and Acetone wash casing and drill rods.

0935 TAT returns to RF-MW-01 to obtain a water level measurement for this well water depth 7 ft. 8 inches from ground surface. Well cap locked before leaving site.

0950 Kerry Gee on site. Ed was only at the gate and did not visit drilling activities on-site.
TAT calibrates O_2, H_2S, LEL meter and HNu Isobutylene span gas 100ppm at 58 ppm span = 9.80, Background = 1.0ppm

1025 Drillers positioned over location of RF-MW-02 Weather conditions: Sky partly cloudy, breezy 5-10mph to the North, Temp expected in the low 90's. Site safety briefing held, same concerns identified yesterday will apply today.

1040 RF-MW-02 Split spoon sample from 0-2 ft. attempted
Sample Recovery: 25%
Blow Counts: 19 50/REFUSAL Sampling stopped due to obstruction possibly a rock at 8".

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Sample description: Unconsolidated silt and cobble material
HNU - background.

1045 Drilling of RF-MW-02 initiated for 0-5 ft. interval.

1052 Ed Osika on-site. HNU at hole = background. Dark soil and quartzite rock chips from hole from 0-4 ft. Asphalt type material at 4 1/2 ft level.

1105 0-5 ft. interval completed Split spoon sample from 5-7 ft. taken
Sample Recovery: 5%. Rock in split spoon.
Blow Counts: 13/20/27/9
Sample Description: Small pieces of wood dark brown soil with clasts from 2-6 mm in diameter. White waxy substance at tip of split spoon. Large Quartzite clast inside spoon. 10-25 mm
HNU Readings: 0.0 ppm

1120 Drilling of 5-10 ft interval begins - Trash like material; wood, paper pulp product exiting as cuttings. Material is aromatic, like garbage.

1135 5-10 ft. interval complete HNU reading at hole 0.0 ppm. Split spoon sample taken at 10-12 ft. level.
Blow Counts = 7/6/9/10
Sample Recovery: 65%
Sample Description: Clay intermixed w/ quartzite pebbles and garbbage: plastic, glass fragments, diaper, slightly moist.
HNU Readings: 0.0 ppm

1145 Drilling of 10-15 ft. interval begins cuttings consist of wood, glass fragments, dark quartzitic fragments

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2:10 Drilling of 10-15 ft interval complete. HNU reading at casing opening 0.0 ppm.

2:15 Split spoon sample taken for 15-17 ft. level logs.
Blow Counts: 13/23/21/11
Sample Recovery: 20% Rock in opening - Quartzite Clast
HNU Readings: .5 ppm above background
Sample Description Black fiberous material with pieces of plastic and paper - Paper has been burned. charcoal present. sample dry and odorofous.

2:25 Drilling of 15-20 ft interval initiated. Gary Hill Bayles Brothers, Inc. onsite to check Progress.

2:35 Gary Hill departs site.

2:57 Plastic, wood chips, glass and occasional rock chips are the cuttings being derived from the hole.

1315 Drilling of 15-20 ft. interval complete. HNU readings were at background levels.

3:20 Split Spoon sample taken from 20-22 ft.
Blow Counts: 19/22/7/7
Sample Recovery: 5%
HNU readings: 0.0 ppm above background
Sample Description: 2" plug of wood, burnt black partially and large rock fragment.

1335 Drilling of 20-25 ft. interval initiated.

1345 Ed + Kerry offsite.

1350 TAT Sanders offsite to call OSC and inform him of drilling progress.

1435 TAT Sanders back onsite. Drilling to 25 ft. complete. Split Spoon sample Taken from 25-27 ft.
Blow Count 5/6/5/8
Sample Recovery: 60%
HNU Reading: 0.0 above background
Sample Description: Top 6 inches black silty clay, moist contains trash debris, plastic, wood, pebbles Bottom 12 inches consists of

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reddish brown clay w/ small pebble inclusions 2-6 mm in diameter. plastic and moist

1450 Drilling of 25-30 ft interval started.

1515 Drilling placed on hold due to nearby lighting storm. will wait for storm to pass over before initiating further drilling.

1620 Drilling begins after storm moves further NE, moist dark brown/red clay, wood chips and plastic comming out of drill bit as cuttings.

1750 Drilling stopped at approx 28 ft depth for hole RF-MW-02 due to it getting late in the day. Drilling on this hole will continue tommorow morning. Meet time is set for 8:00AM

1815 TAT offsite.

T. Sanders

6/24/92

08-920

0800 TAT

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0800 TAT onsite

0815 Drillers, Ed Osika, Dave Tuesday onsite. Drillers had to stop off at their yard to get a rock bit which may speed up drilling progress. The clay material they are currently in has been plugging up the odex bit being used.

0825 Cordel Schmidt calibrates O_2, H_2S, LEL Meter and HNU. Calibration Gas: 100 ppm Isobutylene, at 58 ppm Span reads 8.94, background reading .5 ppm. Weather conditions: Skys partly cloudy, expected thunderstorms this afternoon, Temp will reach mid 80's, wind 0-5 mph.

0840 Rock bit is deconned w/ hot pressure wash and acetone wash. HNU fan appears to be defective.

0845 Site safety briefing held with all persons onsite. the same safety concerns were reiterated, in addition to requesting that No personnel linger about rig for unnecessary reasons.

0850 Drilling of RF-MW-02 25-30 ft. interval continues. Water is flowing from the upper casing with the cuttings. This H_2O must have flowed into the hole last night.

1855 TAT Cordel Schmidt offsite to phone office to inform TATL of progress. Will bring back 11.7 probe for HNU if opperational ~~and~~ (T2) or request OVA be sent out.

0905 Rod pulled from hole, bit is plugged again, will switch to tri-cone "rock bit" to increase drilling speed

0915 Drilling continues w/ new bit.

0930 Drilling of 25-30 ft. interval complete. Cordel Schmidt back onsite with 11.7 ev probe for HNU. HNU calibrated by C. Schmidt Calibration Gas 100 ppm Isobutylene at 66 ppm Span reads 5.89, Background 1.0 ppm

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08-9204 15. 06/25/92

0935 Split Spoon Sample taken from 30-32 ft. depth
Blow counts: 3/3/8/26
HNu readings: 0.0 ppm above backgnd
Sample Recovery: 85%
Sample Description: reddish brown clay, highly plastic small pebble clasts 2-17 mm quartzitic material, water at top of split spoon, clay is very moist.

0950 Drilling of 30-35 depth interval initiated well is producing water clay mix.

1035 30-35 ft interval completed. HNU detected 2.5 ppm above background in the hole 0 ppm above background in breathing zone at 34 ft.

1050 Split spoon sample taken from 35-37 ft. depth
Blow Counts: 25/18/19/44
Sample Recovery: 65%
HNU Readings: 0.0 ppm above background
Sample Description: Wet very moist at top of spoon red/brown clay material clasts of rock 10-20 mm in diameter. Bottom 9" consist of moist clay (dk. reddish brown) w/ zones of white to gray quartzite layers intermixed in the clay that is slightly plastic.

1105 Drilling of 35-39 ft interval initiated

1200 Drilling of 35-39 ft depth completed. Water is being allowed to fill hole so driller can blow out accumulated muck inside the casing.

1210 Center rods and bit being tripped out of RF-MW-02

1220 Well completion activities begin on RF-MW-02
10 ft. of well screen Schedule 80 2" I.D. PVC used. slot size .01 inch
30 ft. of well casing " " " " " "
12 ft. of sand pack installed ≈ 1 1/4 bags of CSSI 10-20 mesh silica sand
3.5 ft. of Bentonite pellets ≈ 1/2 bucket (5 gal) pellets used.

08-

VENTE PV S

GROUND SURFACE

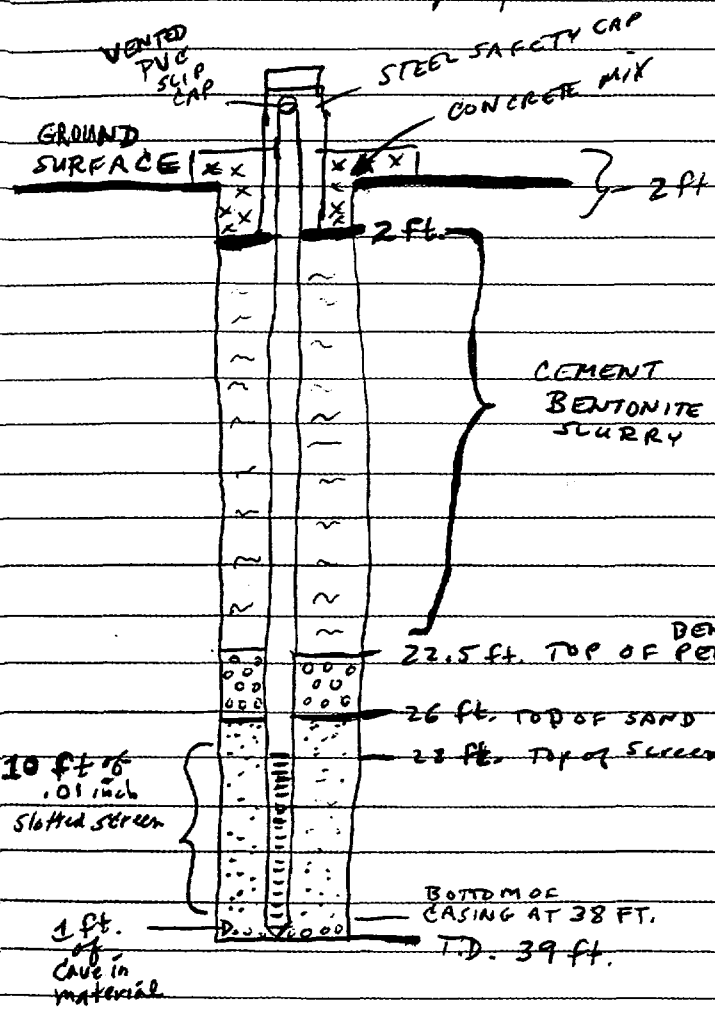
10 ft of .01 inch slotted screen

1 ft. of cave in material

1400 Ben
410 TAT
425 Ben Co.
435 Slu to
451 TA in 2
500 Dr de
Sand

08-9204 15.06/25/92

RF-MW-02



1400 Bentonite pellets hydrated w/ 2 gal. Mt. Olympus Distilled H_2O.

410 TAT Schmidt off site to call office [Tom Smith (TATL)].

425 Bentonite + Cement slurry mixed: pellets and Mtn. Cement Co. Type I-II .C.A. (2 sacks + 5-10 % bentonite).

435 Slurry added to hole (casing) Approx. 20 gallons of slurry was added to the casing.

451 TAT Schmidt back on site. 20 gal of additional slurry mixed 5 addl. gallons added. Slurry came up to the 2 ft. Level

500 Drillers Break down rig and move drill equipt. to decon. station.

T. Sanden

08-9204 15 06/25/92

1515 Drillers begin decon. of drilling equiptment over pad. Hot wash, Acetone wash, tap water rinse.

1600 TATM Schmidt + Tom Giles over to RF-MW-01 to finish the well. Concrete to surface will be poured on RF-MW-01 and 02 ~~[illegible]~~ one right after the other.

1625 Preparation of 3'x3' form area surrounding RF-MW-02 begins.

CS 1650 DECONING OF RIG AND PIPE COMPLETED. DECONING CONSISTED OF CS ~~STEAM CLEANING~~ A HOT WATER WASH AND RINSE. PIPES ALSO DECONED WITH ~~HEXANE~~ ~~TO~~ ACETONE!

1725 Concrete mixture made for 2' depth to surface w/ Mountain Cement Co Type I-II LA. filled to surface. Protective pipe set in this mixture. ≈ 20 gal mixture of "Sakrete" mixed to fill 3'x3' form, (3 bags used) Two addl. bags mixed in approx 12 gal water to complete filling the form.

1740 Well # RF-MW-01 Completed. Locked prior to departing location.

1800 Drillers set up over Third Well location. TAT locks cap on well RF-MW-02.

1840 TAT, Drillers, Ed Osika, Dave Tuesday Off site.

T. Sanders
6/25/92

08-9204 15. 6/26/92

1800 TAT on-site, Dave Tuesday + Ed Osika also on-site.

1810 Drillers arrive on-site. Mixing concrete to finish well RF-MW-02. It was necessary to cut off 16" of the metal security casing to fit properly over the PVC because the hole could not be dug out to accomodate entire length. 6½ Bags of "Sakrete" were mixed with ≈ 45 gallons of water to fill the hole from 2 ft. depth to the surface and completely fill the 3'x3' form.

830 Monitoring well RF-MW-02 concrete poured, well installation complete.

845 TAT Sanders + Schmidt calibrate O_2 H_2S LEL meter and HNU Span Gas used 100 ppm Isobutylene 58 ppm, Span reads 9.79, Background .5 ppm. 10.2 EV probe being used.

900 Rig set up and ready to begin on well RF-MW-03

905 Split Spoon Sample taken from 0 - 2 ft depth
Blow Counts: 8/34/29/16
Sample Recovery: 15%
HNU Readings: 0.0 ppm above backgnd
Sample Description: Overburden lt. brown soil w/ large clasts of quartzite 20-30 mm in diameter.

0915. Drilling of 0-5 ft interval begins
Black ~~[illegible]~~ charred wood type material exiting drill as cuttings at the 4 ft level bgs.
Weather conditions: Partly cloudy, winds 0-10mph, Temp ≈ 60 expected to reach mid-80°F.

0925 0-5 ft. Depth interval complete. 5-7 ft split spoon sample taken. HNU reading at hole = 0.0 ppm above backgd.
Blow counts: 3/4/12/13
Sample Recovery: 10%
HNU Readings: 0.0 ppm above background

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1 inch of moist dk. brown mud at base.

Sample description: 6 inches of charred wood/charcoal type material. One large rock 20-30 mm quartzite.

0930 Drilling of 5-10 ft. interval begins. Charcoal and brown slightly plastic clay material from hole as cuttings at 5-6 ft level. Reddish brown clay slightly plastic cuttings from the 9 ft level HNU 0.0 ppm A.B. in Hole.

0940 Drilling of 5-10 ft. interval complete Split spoon from 10-12 taken.

Blow Counts: 3/4/4/11

Sample Recovery: 15%

HNU Reading: 0.0 ppm A.B.

Sample description: Top of spoon contains pebbly fragments 2" layer of quartzitic clasts and bottom 2" of limonitic jarositic stained very slightly plastic clay silty material at bottom. Some charcoal type material above clay below quartzite.

0950 Drilling of 10-15 ft. level initiated.

TATM Schmidt takes H_2O level measurement of well RF-MW-02 Water level 26 ft. 6 inches BGS. Quartzitic + lt brown clay fragments exiting from well at 12 ft level. Moist med brown plastic clay exiting as cuttings at 14 ft. level.

1008 Drilling of 10-15 ft. level complete. Split spoon sample

1015 → taken from 15-17 ft. on hole RF-MW-63.

Blow Counts: 27/28/11/8

Sample Recovery: 65%

HNU Readings: 0.0 ppm A.B.

Sample Description: Top of spoon 1-2" zone of dk. brown sl. plastic clay, 1" zone of quartzite fragments. Multi-(green, yellow, red, black) colored layer of clay w/ numerous pebble size clasts. 8". Bottom 9" consists of reddish brown clay highly plastic coherent clay zone.

Activity Log continued on page # 31 of Logbook

T. Sandu

08-9204 15 6/27/92

WELL PURGING RECORD

Well RF-MW-01 Date 06/27/92

Well level 7 ft. 10 inches BGS Well depth 25 ft. BGS.

Measuring point Ground Level

Water column in well 18.20 feet

One purge volume * 3.0 gallons

* (one purge vol (gal) = water column (ft) x casing vol ** (gal/ft)

** (casing volumes, gal/ft:

1½" = 0.092 2" = 0.163 4" = 0.653 6" = 1.469

	Start Time	End Time	Volume Purged (Gal)	pH	Spec. Cond.	°C Temp.	REMARKS Sediment
1st Purge	0950	1012	3.0 gal	7.84	805 µS	10	Lt. Brown Turbid 10% Sediment
2nd Purge	1014	1022	3.0 gal	7.70	700 µS	9°C	Lt. Brown Turbid. 5% Sed.
3rd Purge	1030	1050	3.0 gal	7.53	753 µS	9.5°C	Tan Cl. Turbid 5% Sed.
4th Purge	1055	1117	3.0 gal	7.66	788 µS	9.5	Lt. Tan, milky Tan, Slightly Turbid <5% Sed
5th Purge							

- Bailer Decontaminated w/ TSP Alconox and rinsed w/ TDP N_2O
- Rope used: Poly utility cord (Polypropylene) the Lehigh Group. Allentown, PA. 18106.
- Bailer used: 2 ft x 1.5" Stainless Steel Bailer.

HNu Readings: 0955 – background .5 ppm
1010 – background " "
1020 – background " "
1035 – " " "
1110 – " " "

Well is 125 ft. from SE toe of mounded landfill and approx 55 ft from T. Sanders bounding North side of site.

08-9204 15 06/27/92

WELL PURGING RECORD

Well RF-MW-02 Date 06/27/92
Well level 26ft.4 inches BGS Well depth 38 ft BGS
Measuring point Ground Surface
Water column in well 11[redacted] ft. 8" feet
One purge volume * 2.0 gallons
* one purge vol (gal) = water column (ft) x casing vol ** (gal/ft)
** casing volumes, gal/ft:
1½" = 0.092 2" = 0.163 4" = 0.653 6" = 1.469

	Start Time	End Time	Volume Purged (gal)	pH	Spec Cond	°C Temp.	REMARKS Sediment	
1st Purge	1140	1146	2.0	6.92	1825 µM	12	Reddish Brown, 10	Murky % Sed.
2nd Purge	1151	1206	2.0	6.83	2.19 mS	13	Reddish brown,	cloudy 5 % Sed.
3rd Purge	1206	1216	2.0	6.84	2.40 mS	12.5	Reddish Brown,	cloudy 5 % Sed.
4th Purge	1220	1230	2.0	6.82	2.34 mS	12.5	Reddish Brown, cloudy	sl. 5% Sed.
5th Purge	1232	1238	2.0	6.74	2.35 mS	13	Med. Brown,	turbid, 5 % Sed
6th Purge	1244	1252	2.0	6.84	2.30 mS	13	Med Brown,	turbid < 5% Sed.

HNU Readings: 1140 – Background - .5 ppm.
1157 – " " " "
1215 – " " " "
1225 – " " " "

2nd & 3rd + 4th, 5th + 6th purge volume had a very slight layer of floating material on its surface, Non-oily, platty material.

HNU Readings: 1235 – Background: 1.0 ppm. Background Readings 1.0 ppm
1250 – Background: " "

Well is ≈ 50 ft. East of toe of mounded area from the SW

08-9204 15 06/27/92

WELL PURGING RECORD

Well RF-MW-03 Date 06/27/92

Well level 21 ft 4" BGS Well depth 34 ft BGS

Measuring point Ground Level

Water column in well 12 ft 8 inches foot

One purge volume * 2.10 gallons

* one purge vol (gal) = water column (ft) x casing vol ** (gal/ft)

** casing volumes, gal/ft:

1½" = 0.092 2" = 0.163 4" = 0.653 6" = 1.469

	Start Time	End Time	Volume Purged (gal)	pH	Spec. Cond.	°C Temp	REMARKS % Sediment
1st Purge	1306	1315	2.10	6.94	1.95 mS	12.5	Med Brown, turbid, 8 % Sed.
2nd Purge	1320	1330	2.10	6.95	1957 µS	12.5	Med Brown, turbid, 5 % Sed.
3rd Purge	1333	1340	2.10	6.98	1982 µS	12.0	Med Brown, turbid 5 % Sed.
4th Purge	1344	1353	2.10	6.95	1973 µS	12.25	Lt. Brown, turbid <5 % Sed.
5th Purge	1356	1404	2.10	6.98		12.0	Lt. Brown, turbid <5 % Sed.

HNU Readings: 1320 — Background 1.0 ppm.
1333 — " " " .
1345 — " " " .
1356 — " " " .

Well is located ≈ 100 ft. from large power poles NW of toe of manaded portion of landfill on NE corner

T. Sarden

6/23/92

08-9204 15.

CAMERA INFORMATION

Nikon N5005 AF CAMERA 35mm
Nikkor 50mm 1:1.8 AF LENS
EPA I.D. # 724652

Roll 1:
Film Type ~~Koda color~~ TJS Metaphoto Super Color 200
Color print Film
ASA 200 ISO 200/24°
24 exposure

TJS 6/23/92

Roll 2:
Film Type Kodak Gold Plus 35mm Color Print Film
ASA 200 ISO 200/24°
24 exposure

TJS 6/24/92

Roll 3

Film Type: KODAK Gold Plus 35mm for Color Prints
ASA 200 ISO 200/24°
24 exposures

T. Stolen 6/26/92

08-9204 15.

PHOTO LOG

PHOTO#	DATE	TIME	PHOTOGRAPHER	DESCRIPTION
1	REJECT			
2	6/23/92	1105	CS	Drill rig positioned over monitoring well location RF-MW-01
4 ~~3~~ CS	6/23/92	1140	TCS	Sample Recovery 0-12" depth
~~4~~ CS 3)	6-23-92	1107	CS	RF-MW-01, LOOKING NORTH AT COMPRESSOR WHICH WAS USED FOR DRILLING OPER.
5	6-23-92	1150	CS	RF-MW-01, LOOKING NW AT DRILL RIG.
6			CS	
7			CS	
8	6/23/92	1245	TCS	Soil Recovery 5-7ft. Depth
9	6/23/92	1345	TCS	Sample Recovery 10-12 ft. Depth
10	6/23/92	1445	CS	MW-01 13' BGS, VERY HARD FM. CS/PROB. VOLCANIC (RHYOLITIC?) ~~BRECCIATED DEBRIS~~
11	6/23/92	1503	TCS	Sample Recovery 15-17 ft Depth
12				
13	6/23/92	1545	TCS	Sample Recovery 20-22 Ft Depth
14	6/23/92	1609	TCS	Drilling 20-25 ft. section RF-MW-01 note wet material flowing on outside of casing
15 - ~~19~~	6/23/92	1624	TCS	Panorama of drilling operations RF-DW-01

T. Smith

08-921

PHOTO #

20

21

22

23

24 6

Roll 2

1-3 6/2

4 6/2

5 6/2

6+7 6/2

8 6/2

9 6/2

10 6/2

11 6/25

12 6/25

T. Smith

08-9204 15: PHOTO LOG (CONT)

PHOTO #	DATE	TIME	Photographer	Description
20	6/23/92	1936	TRS	Decontamination of drill string and casing.
21	6/24/92	0930	TRS	Decon of Drill Rig prior to drilling RF-MW-02.
22	6/24/92	0956	TRS	Acetone decon of Casing and center bit and rods.
23	6/24/92	1040	TRS	TAT member decontaminating 2 ft. split spoon sampler.
24	6/24/92	1141	TRS	Sample obtained from RF-DW-02 10-12 ft level.
Roll 2				
1-3	6/24/92	1155	TRS	Panorama of RF-MW-02 Drilling operations
4	6/24/92	1220	TRS	Sample obtained from RF-DW-02 15-17 ft level.
5	6/24/92	1445	TRS	Sample obtained from RF-DW-02 20-22 ft level.
6+7	6/25/92	0900	TRS	Water and clay slurry derived from hole RF-MW-02 29.5 ft. level.
8	6/25/92	0905	TRS	Tri-cone "rock bit" - new bit to be installed to increase drilling speed.
9	6/25/92	0940	TRS	Sample obtained from RF-DW-02 30-32 ft. level
10	6/25/92	1100	TRS	Sample obtained from RF-MW-02 35-37 ft. level
11	6/25/92	1200	TRS	Driller blowing out water clay mixture from casing prior to well installation.
12	6/25/92	1223	TRS	Well completion activities, installation of well casing and screen.

[illegible] 6/25/92

08-9204 15 PHOTO LOG (CONT.)

08-

Photo #	DATE	TIME	PHOTOGRAPHER	DESCRIPTION	Photo
13	6/25/92	1615	CS	3'x3' Form set around well RF-MW-01.	7
14	6/25/92	1640	TCS	Decon. activities of drill rig between hole MW-02 and 03.	8
15	6/25/92	1740	TCS	Background Monitoring Well: RF-MW-01	9
16	6/26/92	0825	TCS	Drillers mixing concrete mix for monitoring well RF-MW-02.	10
17	6/26/92	0835	TCS	Completed monitoring well RF-MW-02.	11
18-20	6/26/92	0955	TCS	Panoroma of Well Location RF-MW-03	
21	6/26/92	1025	TCS	Split spoon sample from 15-17 ft. level well RF-MW-03.	
22	6/26/92	1128	TCS	Split spoon sample recovered from 20-22 ft. level in well MW-03.	
23	VOID				
24	6/26/92	1305	TCS	Split Spoon sample from 25-27 ft. depth. well RF-MW-03	
ROLL #3					
1	6/26/92	1405	TCS	Split spoon sample taken from 30-32 ft. depth well RF-MW-03	
2	6/26/92	1630	TCS	Well completion activities RF-MW-03, placing tremie pipe down hole for silica sand placement.	
3	6/26/92	1950	TCS	Monitoring well RF-MW-03.	
4-5	VOID				
6	6/27/92	0830	TCS	Drillers decontaminating drill equipt. used for RF-MW-03.	

T. Sandene

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08-9204 15. Photo Log (Continued)

Photo #	DATE	TIME	PHOTOGRAPHER	DESCRIPTION
7	06/27/92	1035	TRS	Bailing well # RF-MW-03 well development activities.
8	6/27/92	1120	TRS	Markings on monitoring well RF-MW-01.
9	6/27/92	1147	TRS	Taking pH measurements on development water from RF-MW-02.
10	6/27/92	1300	TRS	Markings on monitoring well RF-MW-02.
11	6/27/92	1410	TRS	Markings on monitoring well RF-MW-03.

T. Sardeson
6/27/92

08-9204 15 6/26/92 Activity Log (Continued)

1030 Drilling of 15-20 ft interval begins
Moist plastic dk brown/reddish clay from hole at 18.5 ft. level as cuttings.

1105 15-20 ft. level complete. HNU Readings at hole 0.0 ppm A.B.
all other measurements H_2S LEL = 0.0 and O_2 = 20.8 %

1125 Split spoon sample taken from 20-22 ft. depth.
Blow Counts: 7 / 5 / 5 / 7
Sample Recovery: 90%
HNU Readings: 0.0 ppm A.B.
Sample Description: brown/reddish brown clay layer plastic, slightly mottled. very small clasts of qtz and mica platlets 0-2 mm present in core. Bottom of split spoon (bottom 6") wet.

1140 Drilling of 20-25 ft. interval initiated.

1145 Bit is clogged w/ clay driller will switch to the tri-cone rock bit.

1300 SPLIT SPOON ~~FROM~~ 25'-27' BGS
8-16-42-19 = BLOW COUNT, HNU = BKGD IN HOLE.
Sample ~~Description~~ Recovery 25%
Sample Description: TOP 4" dk. brown/reddish brown clay moist, plastic bottom 7" wet, slightly plastic clay reddish/brown w/ angular clasts of quartzite and mica platlets, rock in bottom of split spoon limited sample recovery.

1310 ~~Samp~~ TEI Drilling of 25-30 ft. level initiated.
TATC-Schmidt says drilling was difficult bit + rod was pushed through the clay layer from ≈ 20-28 ft. Wet clay was in rod. at this level.

1330 NOTE THAT DAVE TUESDAY (PRP REPRESENTATIVE) HAS, THROUGHOUT THIS DRILLING PROJECT, HANDLED ALL CUTTINGS, DRILL CORE, ETC WITHOUT ANY GLOVED PROTECTION ON HIS HANDS.

08-9204 15 6/26/92

1354 Drilling of 25-30 ft. depth interval completed.
1400 Split spoon sample taken from 30-32 ft.
Blow Counts: 2/5/12/13
Sample Recovery: 85%
HNU: 0.0 ppm ABOVE Background
Sample description: Top of Spoon (sample) is extremely moist/wet plastic clay into a reddish/brown coherent plastic clay ≈ 1 ft. thick, bottom 6" is similiar clay but contains more pebbles.

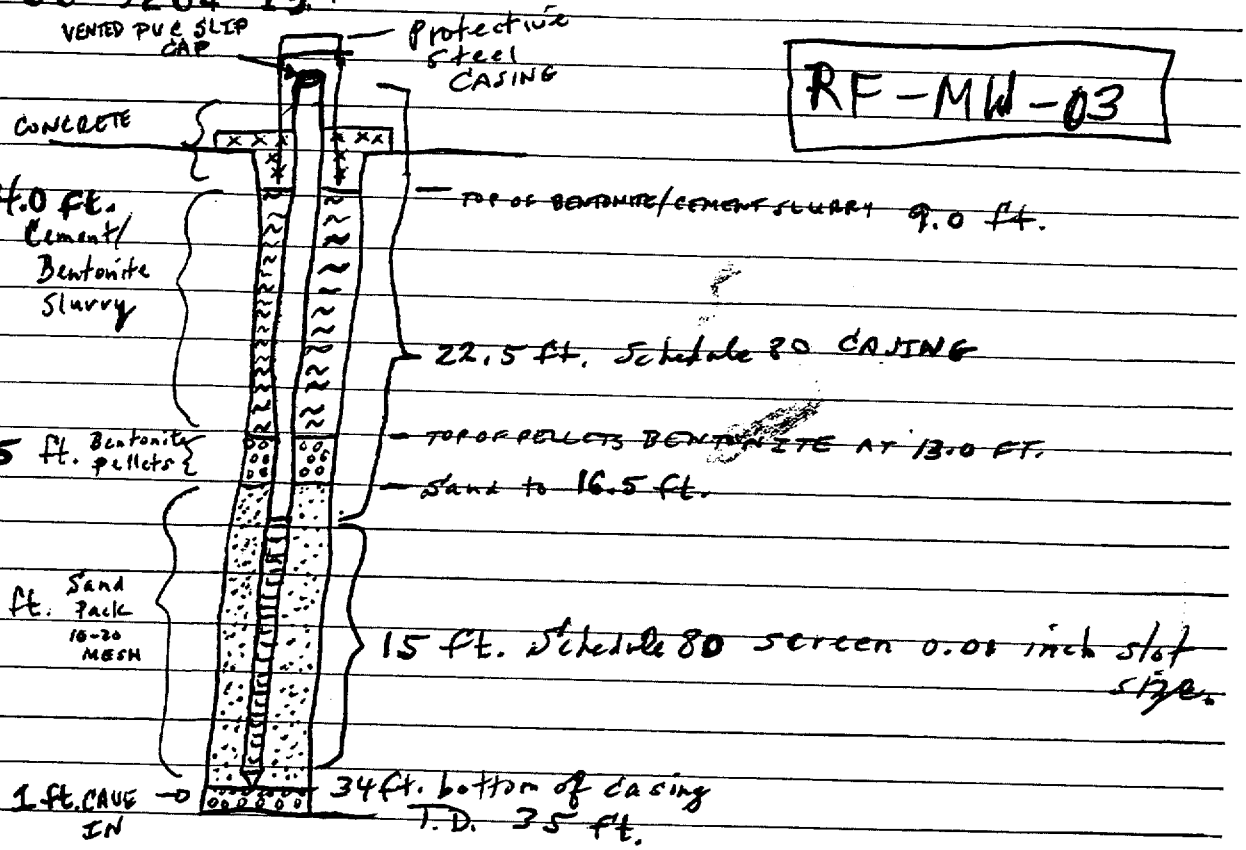
1415 Drilling of 30-35 ft interval initiated. TD for well will be 35 ft if possible.
1435 Drilling of 30-35 ft interval complete. Red/brown clay covering bit + center rod clay is very moist/wet.
1450 Drillers blow out muck accumulated in bore hole.
1455 TAT Schmidt H + Safety officer shuts down operations due to lightning storm.
1530 Drillers back at work, lightning storm appears to has passed, rain continues, Drillers will proceed to purge water and clay muck from borehole.
1605 Center rods and drill bit tripped out of borehole RF-MW-03.
1620 All equipt pulled from hole, well completion activities begin.
- 15 ft. factory slotted PVC schedule 80 ASTM .01 incl slot size. O-rings in place. Screen placed in well
- 22½ ft. Schedule 80 PVC ASTM casing placed in hole.
- 17.5 ft. of sand pack installed ≈ 1½ bags of CSSI 10-20 mesh used.
- 3.5 ft. of Bentonite pellets added to well ≈ ½ bucket (5 gal.) used.
1800 Bentonite pellets hydrated w/ 2 gal. of Mt. Olympus Distilled H_2O.
1810 Cement/Bentonite slurry mixed 2 Bags Mtn Cement Type I-II L.A. used w/ 20 gallons of water approx 5% bentonite added (hydrated pellets)
1909 Cement poured into hole from 9 ft. to above surface to fill 3'x3' form. Steel casing set in concrete. 10 bags of cement mixed with approx. 40 gal of water for mixture.

T. Sand.

08
V
CONC
4.0 f
Cem
Ber
Sl
3.5 ft.
17.5 ft.
1 ft
1948
1955
T. Sand

08-9204 15 06/26/92

RF-MW-03



1948 Well complete RF-MW-03. Steel protective casing locked.

1955 TAT offsite

T. Sandu

6/26/92

0805 TAT onsite, drillers + Dave Tuesday already onsite. 1410
Drillers are de mobing around well RF-MW-03.
0820 Drillers begin deconning casing and center rods and 1435
drill rig over pad w/ hot pressure wash.
0840 TAT Sanders offsite to Gas up rental car, buy Distilled H_2O
for PH, COND. meter.

0910 TAT Sanders back onsite. Decon complete,
0940 TAT + Drillers proceed to Monitoring well RF-MW-01
and set up for Well completion activities
HNu calibrated by TATM Sanders 100 ppm Isobutylene
span gas used, 10.2 ev probe, at 58 ppm span reads
9.63, Background = .5 ppm.
Weather conditions: clear to pty. cloudy skys, Temp
≈ 70 F, wind 0-5 mph from south.
HNU reading at well head .5 ppm = Background
TAT schmidt calibrates pH + Specific Cond. meter
per manufacturers specifications
Well purging information for this well is located on
page 21 of this Logbook.
1020 Ed osika onsite.
1120 Well completion activities for RF-MW-02 complete.
Final water level measurement 20' 10" from ground surface
1135 Proceeded to well # RF-MW-02. Begin well completion
activities. Well purging information for this well
is located on page 22 of this logbook. All equipt.
used at last well deconned in TSP wash and Tap H_2O
rinse. HNU at well head = Background. New poly-
propylene rope attached to bailer.
1258 Well completion activities at well RF-MW-02 complete.
Final water level measurement 27' 6" from ground surface.
1304 TAT moves to Well RF-MW-03. HNU at hole Background
100 ppm New Rope attached to bailer, bailer and other eqpt. deconned.

08-9204 15. 6/27/92

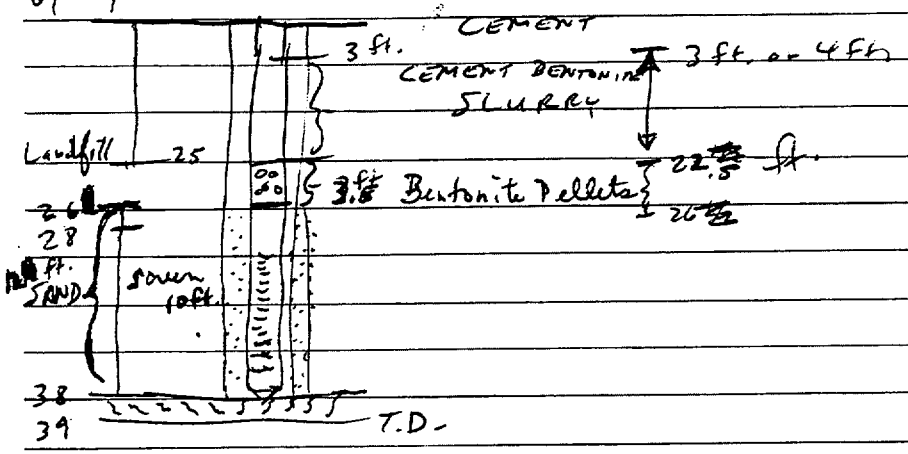
1410 Well development activities on monitoring well RF-MW-03 complete.

1435 TAT + Drillers off site, for SLC airport + Fed X.

T. Sanders
6/27/92

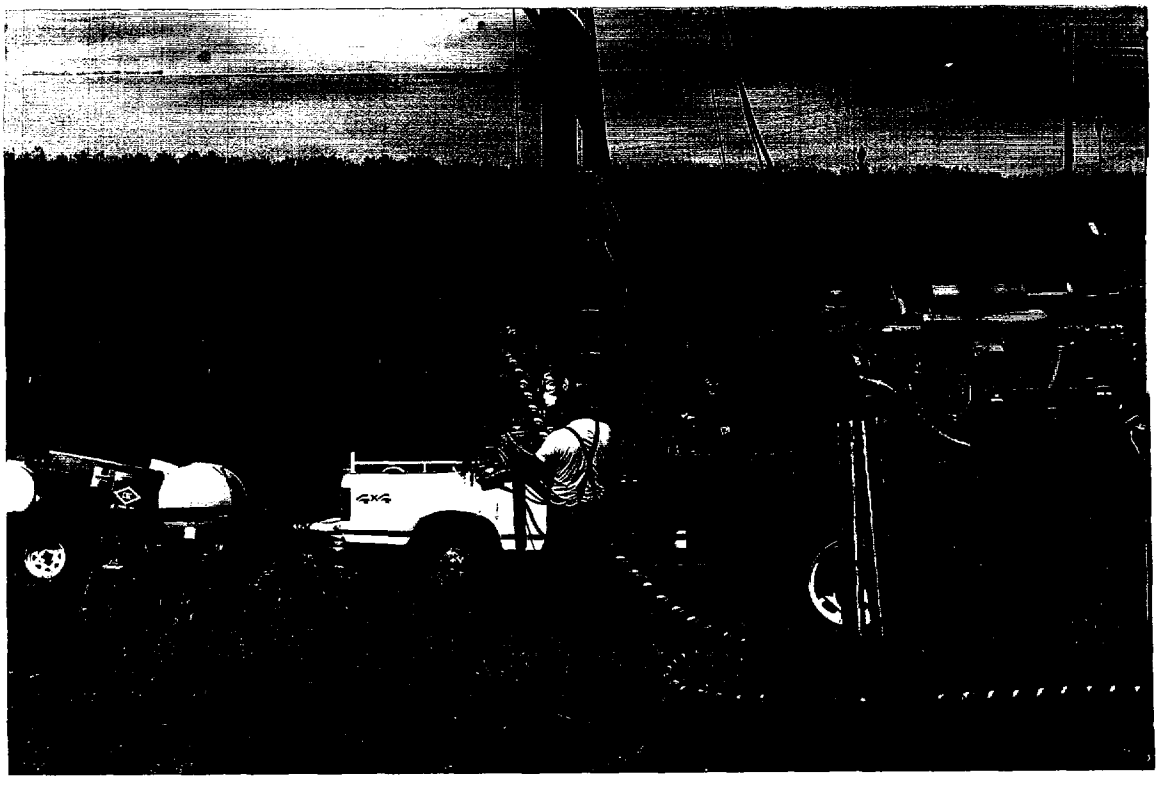
CALCULATIONS

6/25/92 RF-MW-02



T.C. Sanders
6/25/92

APPENDIX B
PHOTODOCUMENTATION



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Drill rig (B-53) positioned over drill location RF-MW-01

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1105 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Air compressor used in conjunction with air rotary/casing drive drill rig
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1107 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-01; 0-2 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1140 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Drilling operations at location RF-MW-01

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1150 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-01; 5-7 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1245 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-01; 10-12 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1345 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Drilling borehole of RF-MW-01, approximately 13 feet below ground surface
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1445 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-01; 15-17 foot depth

Location: Richardson Flats Tailings Site

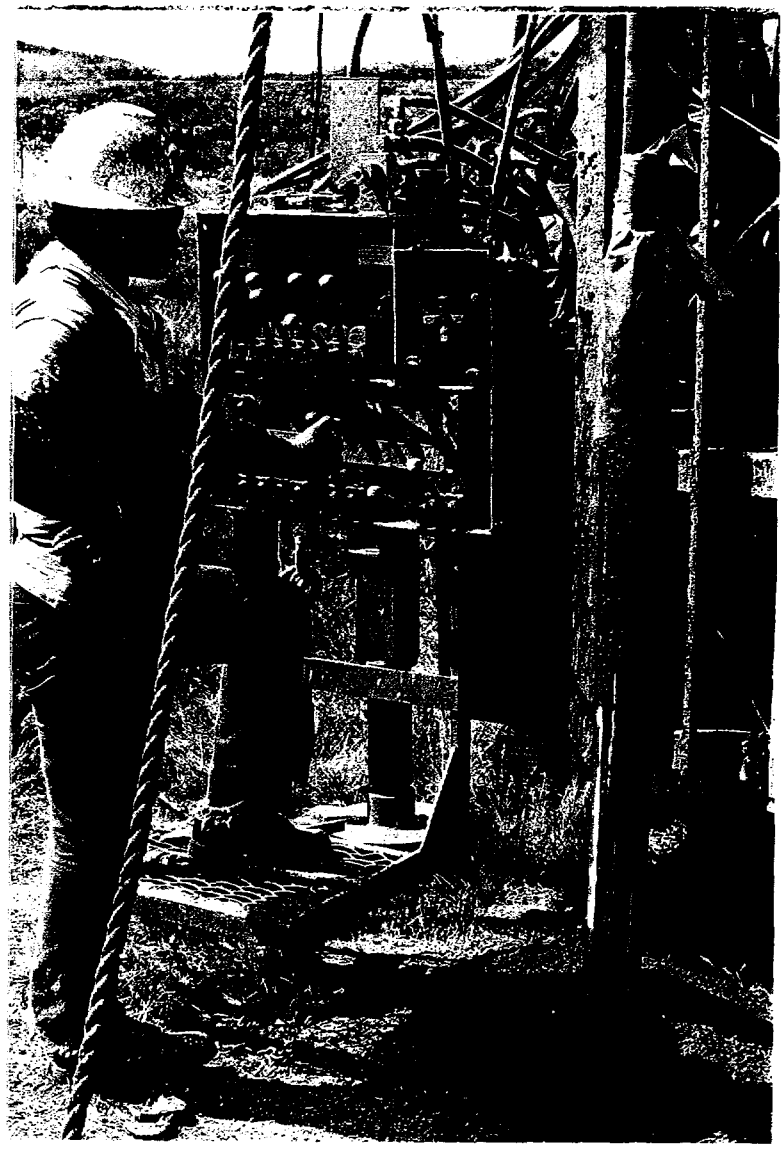
City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1503 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-01; 20-22 foot depth

Location: Richardson Flats Tailings Site

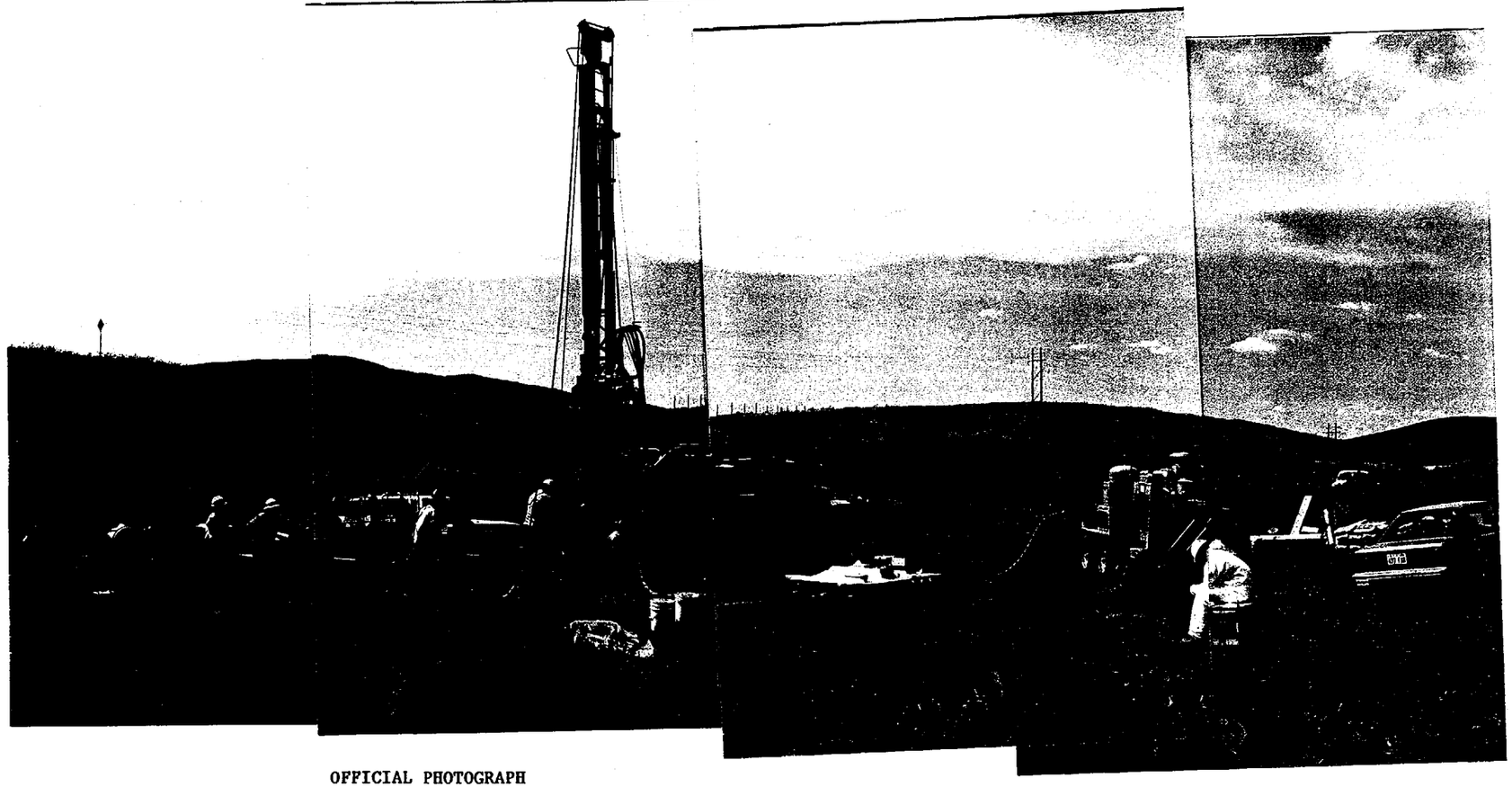
City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1545 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Drilling the 20-25 foot section of RF-MW-01; note the wet material flowing on the outside of the casing
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1609 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Panorama of drilling operations at RF-MW-01

Location: Richardson Flats Tailings Site

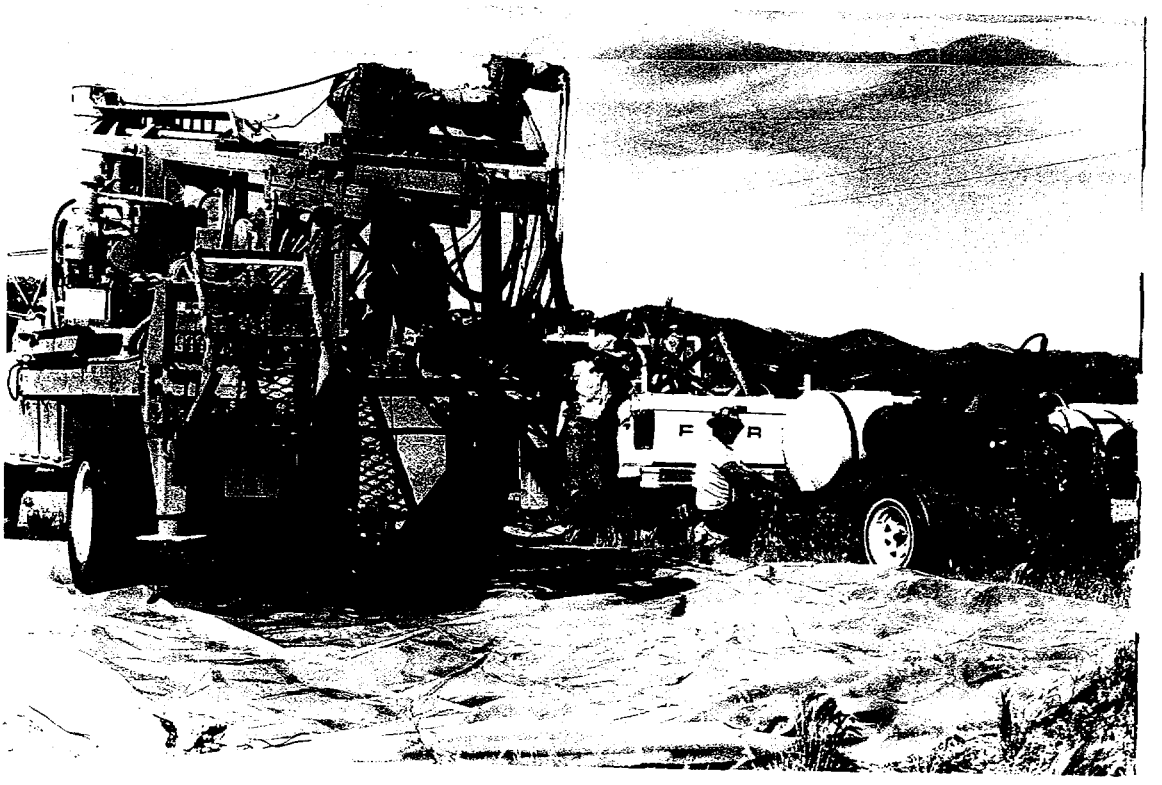
City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1624 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Decontamination of drill string and casing

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1936 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Decontamination of drill rig prior to drilling second monitoring well, RF-MW-02
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 24, 1992 Time: 0930 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Acetone decontamination of casing, rods and drill bit

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 24, 1992 Time: 0956 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: TAT member decontaminating 2 foot split-spoon sampler

Location: Richardson Flats Tailings Site

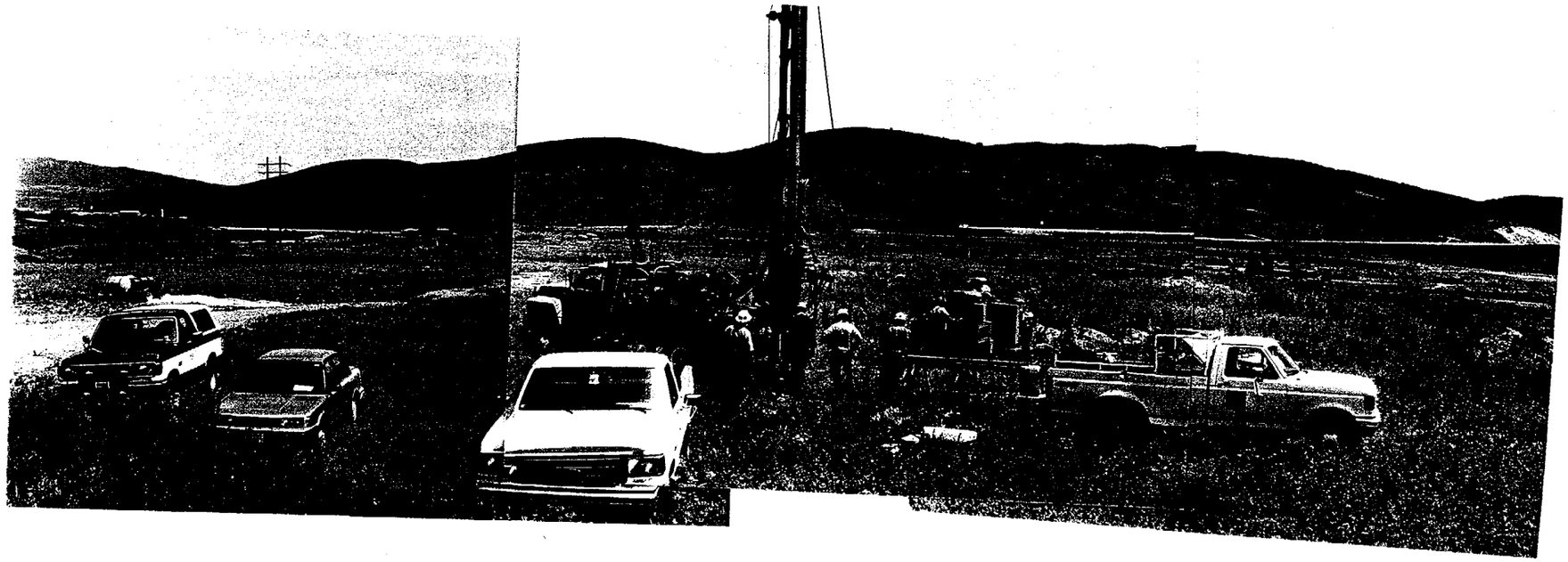
City: Park City County: Summit State: UT
Date: June 24, 1992 Time: 1040 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-02; 10-12 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 24, 1992 Time: 1141 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

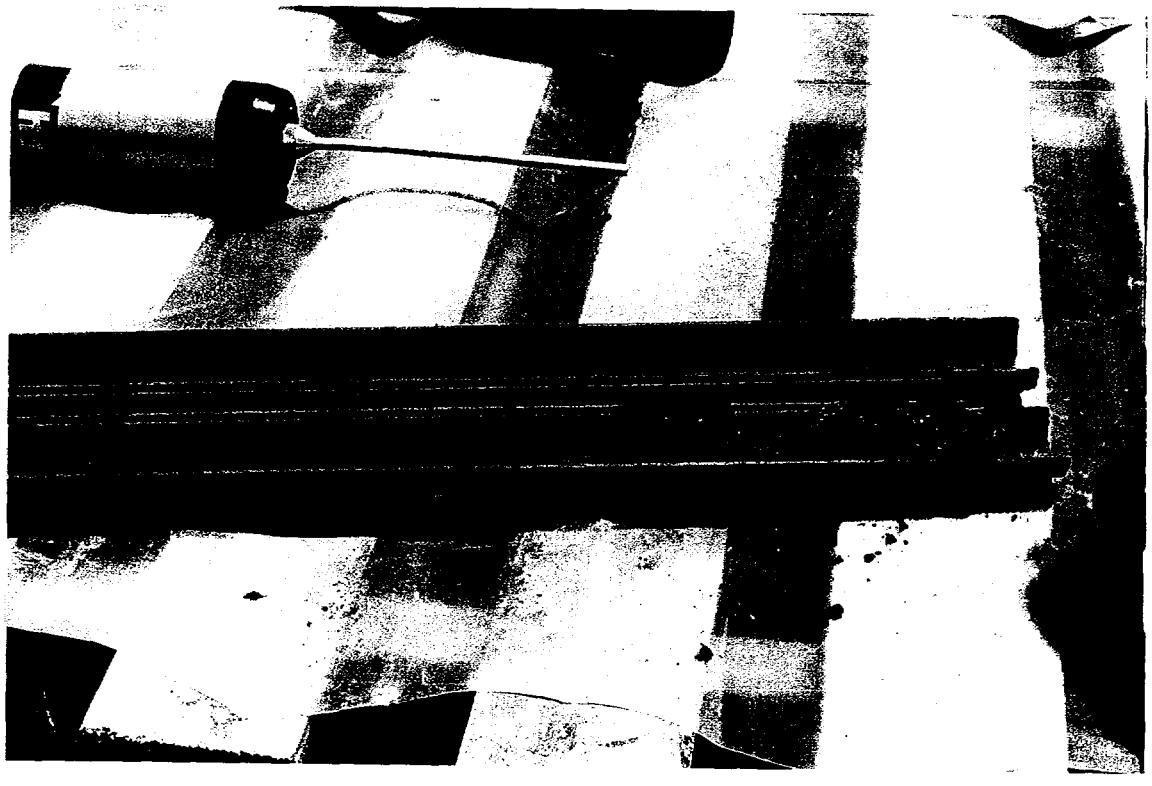


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Panorama of drilling operations at RF-MW-02

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 24 1992 Time: 1155 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

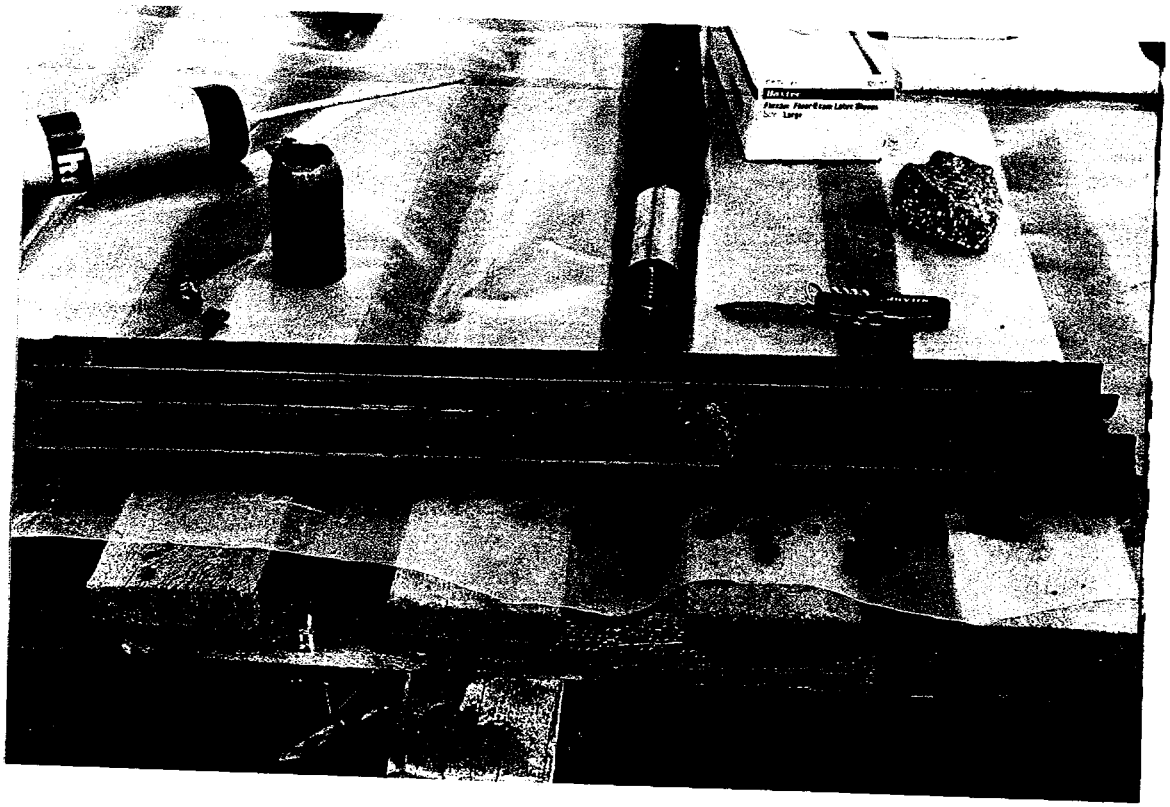


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-02; 15-17 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 24, 1992 Time: 1220 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-02; 20-22 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 24, 1992 Time: 1445 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Water and clay slurry derived from boring RF-MW-02, at approximately 29.5 foot depth
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 0900 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Tri-cone "rock bit" new bit installed to increase drilling speed

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 0905 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-02; 30-32 foot depth

Location: Richardson Flats Tailings Site

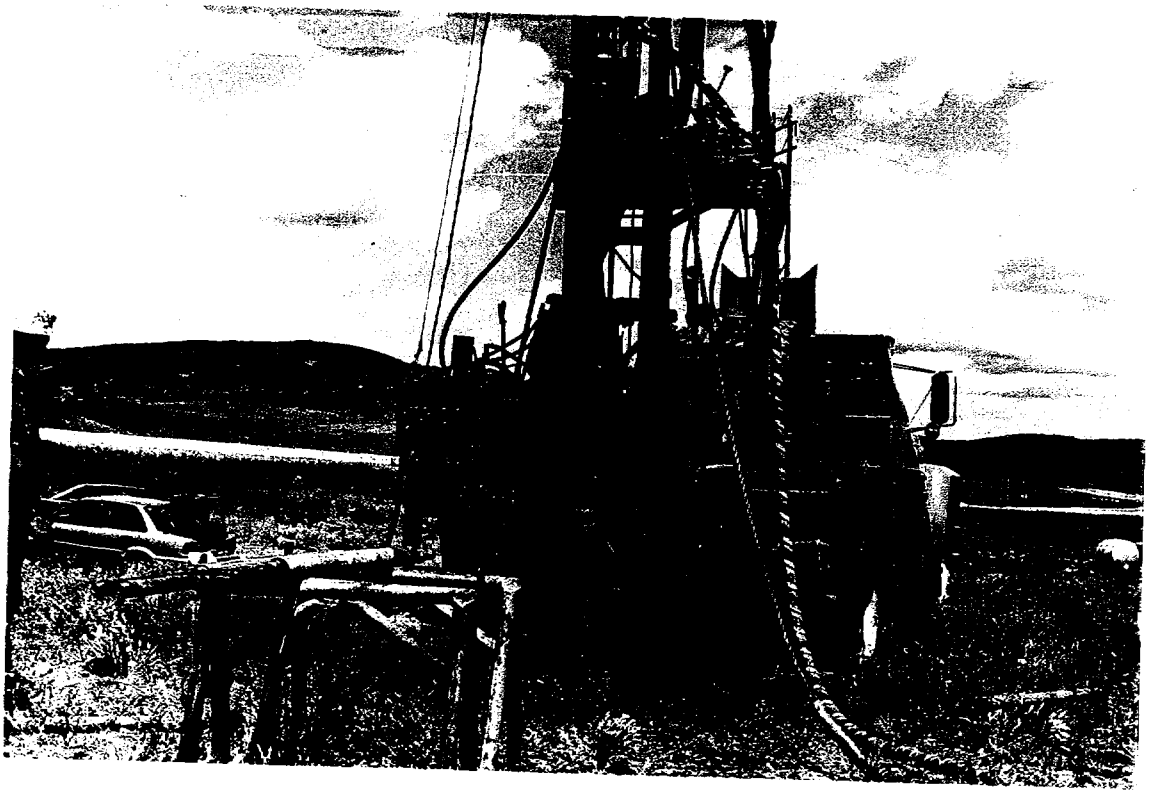
City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 0940 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-02; 35-37 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 1100 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

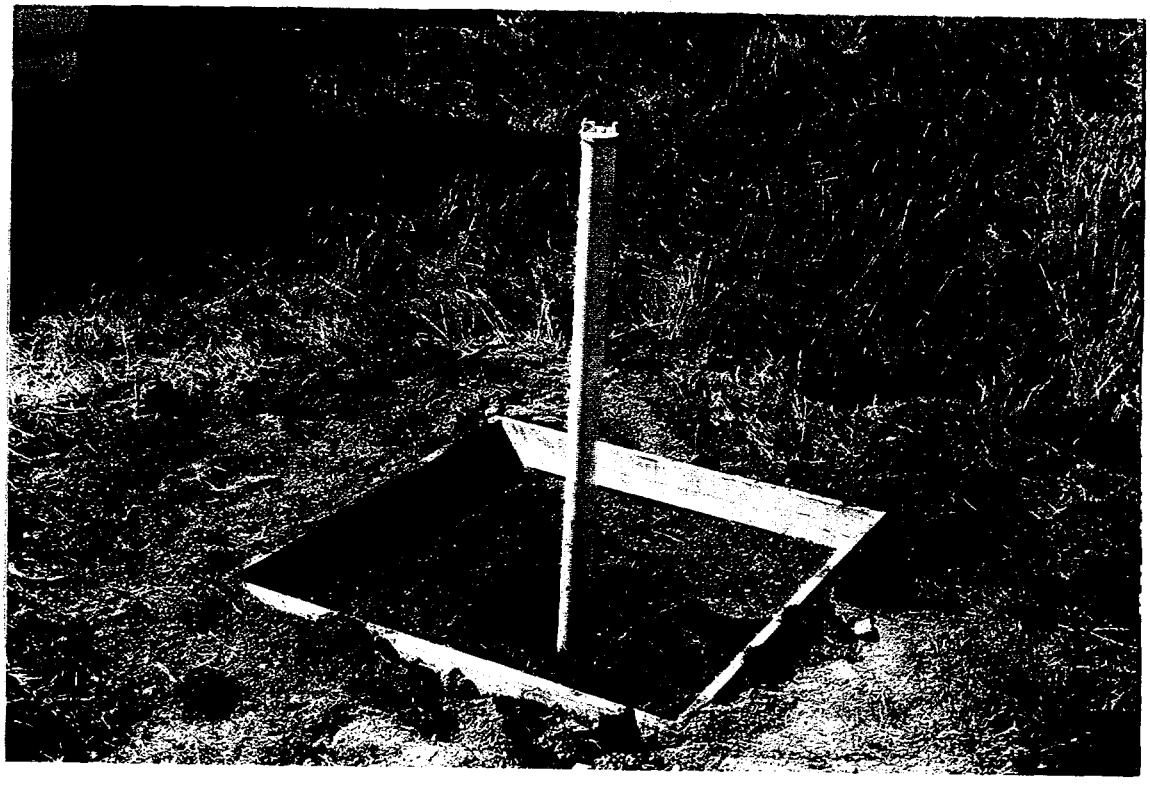
Subject: Driller blowing out water-clay mixture from casing prior to installation of the monitoring well
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 1200 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Well completion activities, installation of well screen and casing
Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 1223 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Concrete form set around well RF-MW-01

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 1615 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Decontamination activities of drill rig between hole RF-MW-02 and RF-MW-03
Location: Richardson Flats Tailings Site

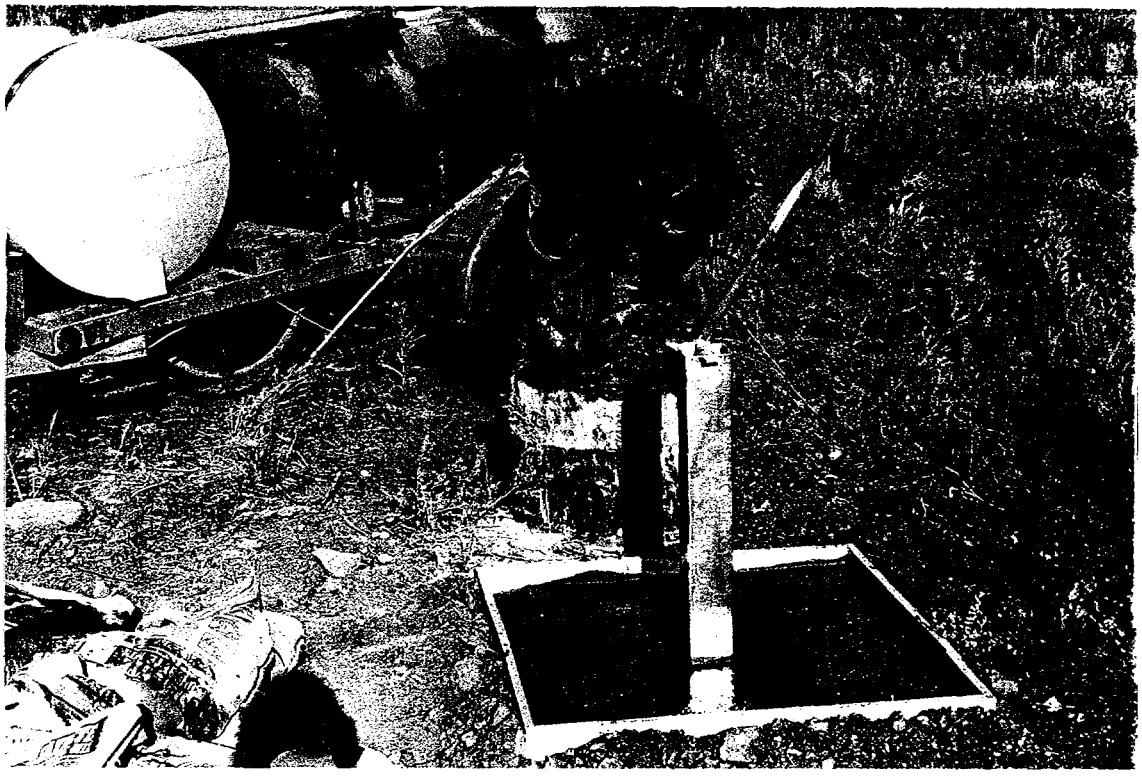
City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 1640 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Background monitoring well RF-MW-01

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 25, 1992 Time: 1740 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

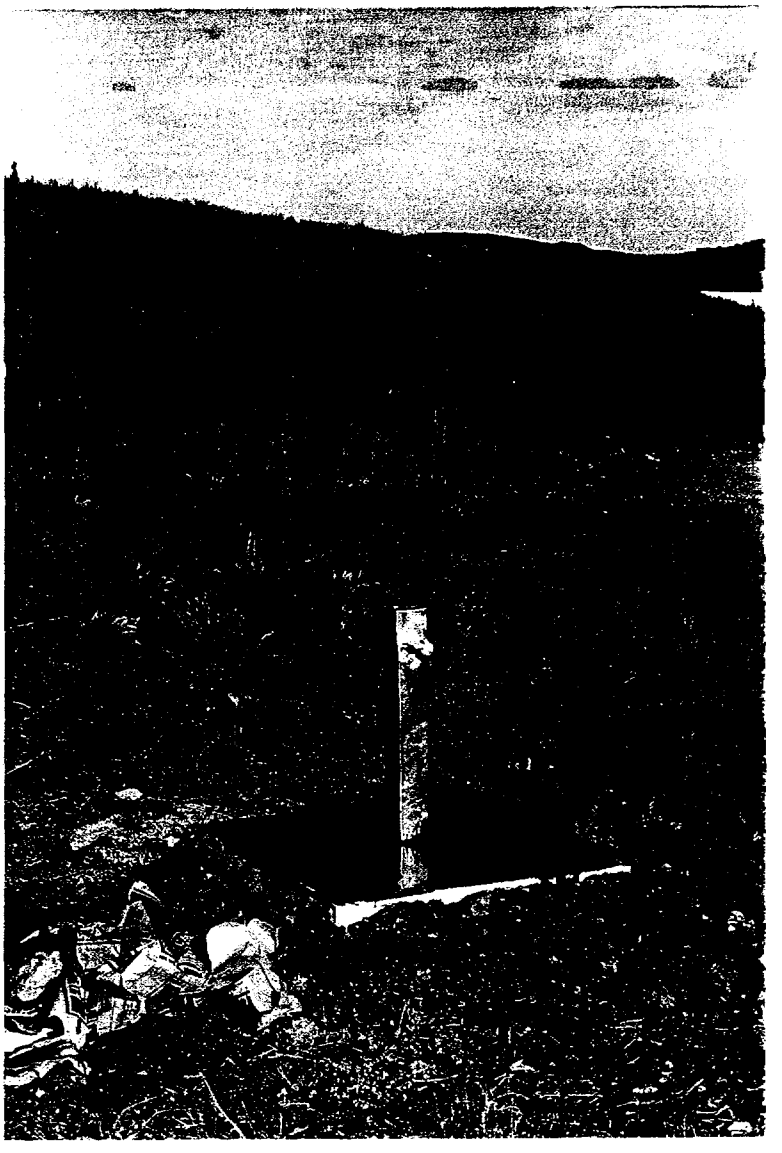


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Drillers mixing concrete for monitoring well RF-MW-02

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 0825 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

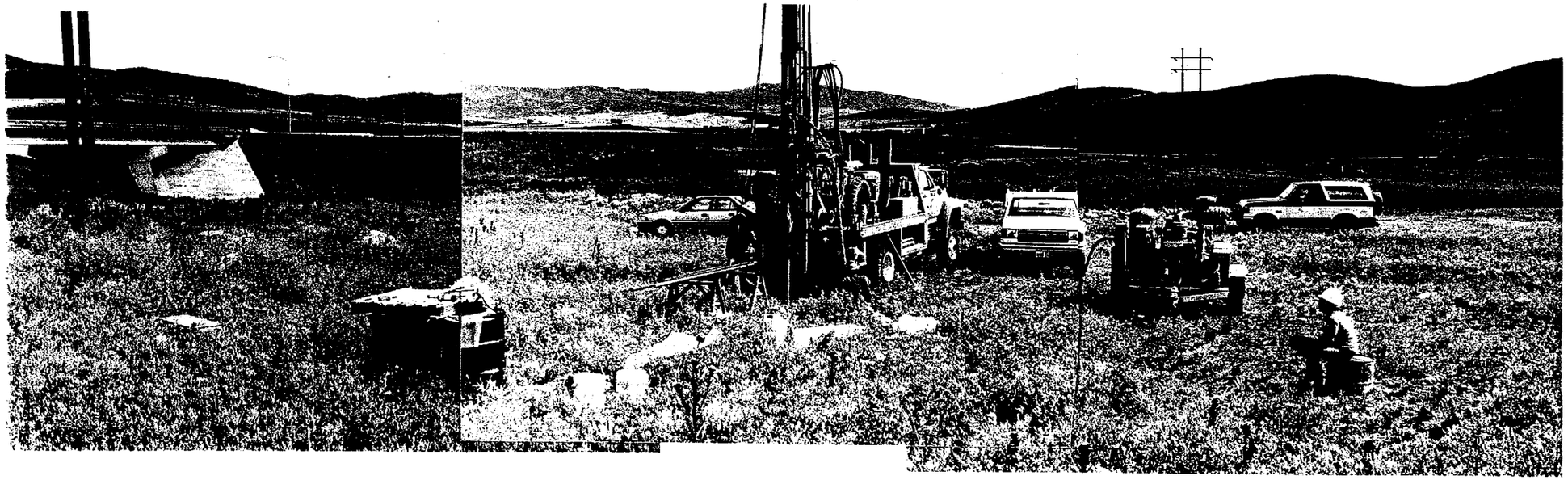


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Downgradient monitoring well RF-MW-02

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 0835 Hours
Photographer: Cordel Schmidt
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Troy Sanders
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Panorama of drilling operations at RF-MW-03

Location: Richardson Flats Tailings Site

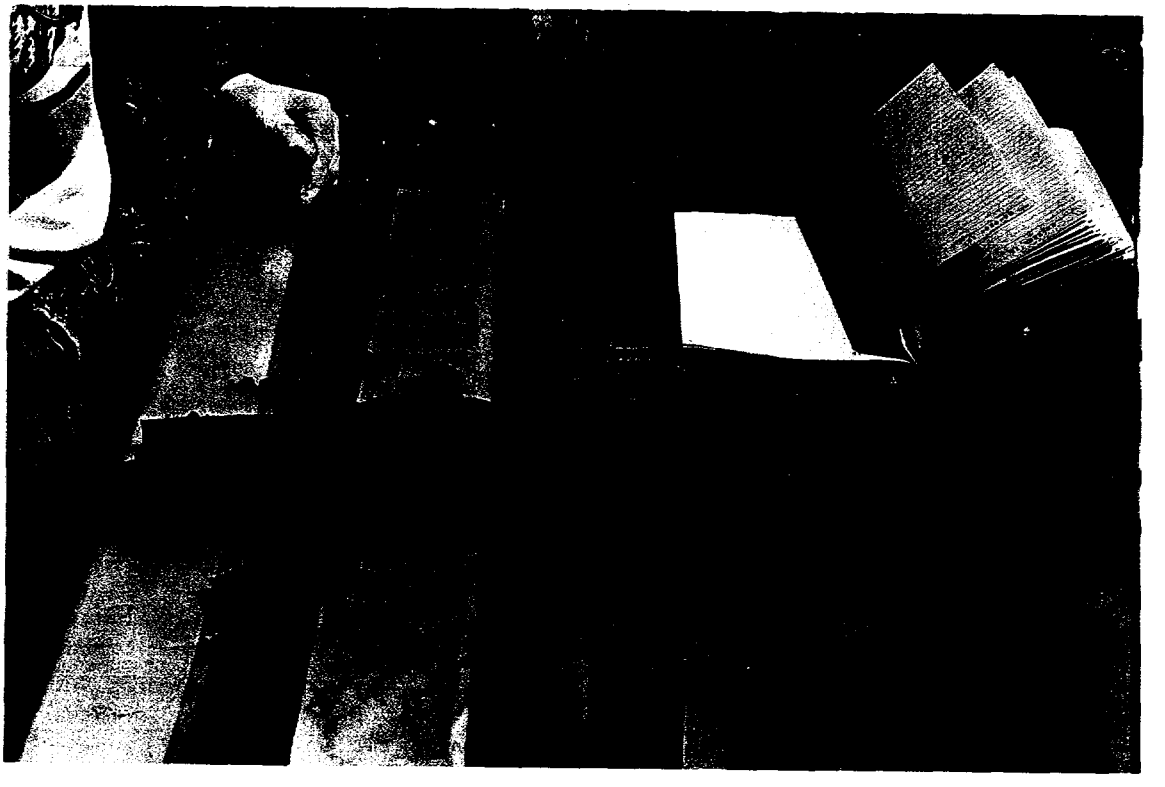
City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 0955 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-03; 15-17 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 1025 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

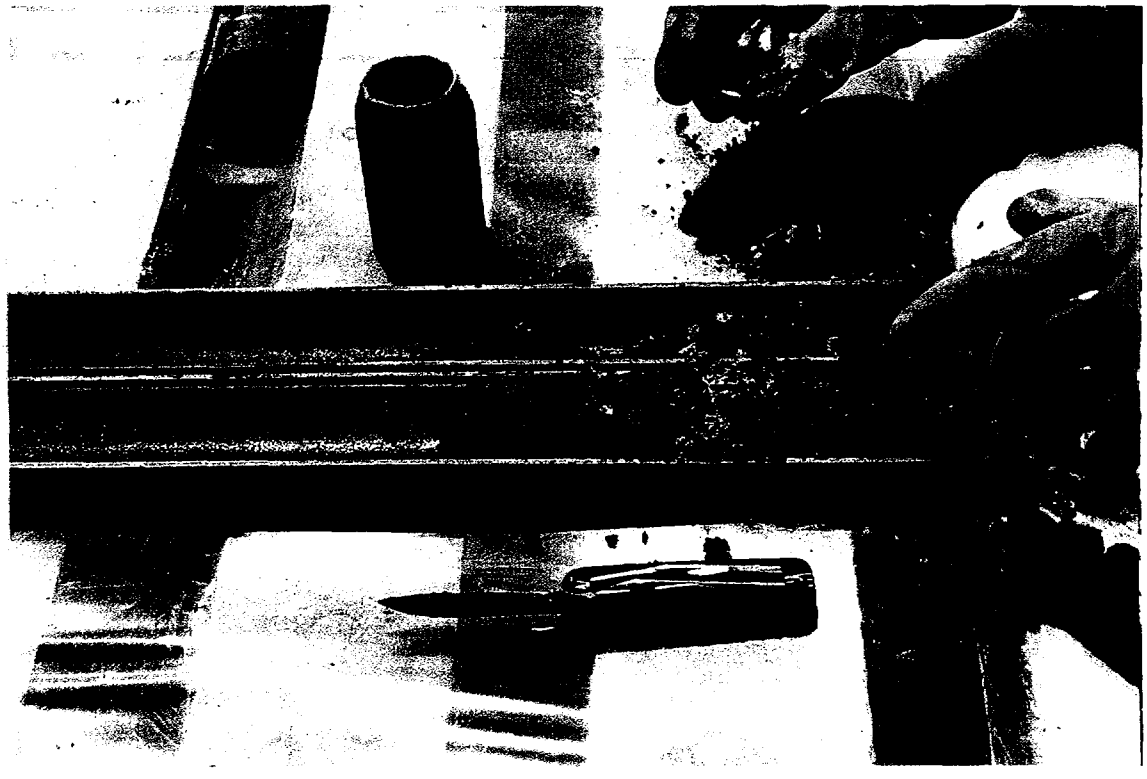


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-03; 20-22 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 1128 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-03; 25-27 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 1305 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Split-spoon sample obtained from RF-MW-03; 30-32 foot depth

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 1405 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Well completion activities at RF-MW-03; drillers placing tremie pipe down hole for silica sand placement
Location: Richardson Flats Tailings Site

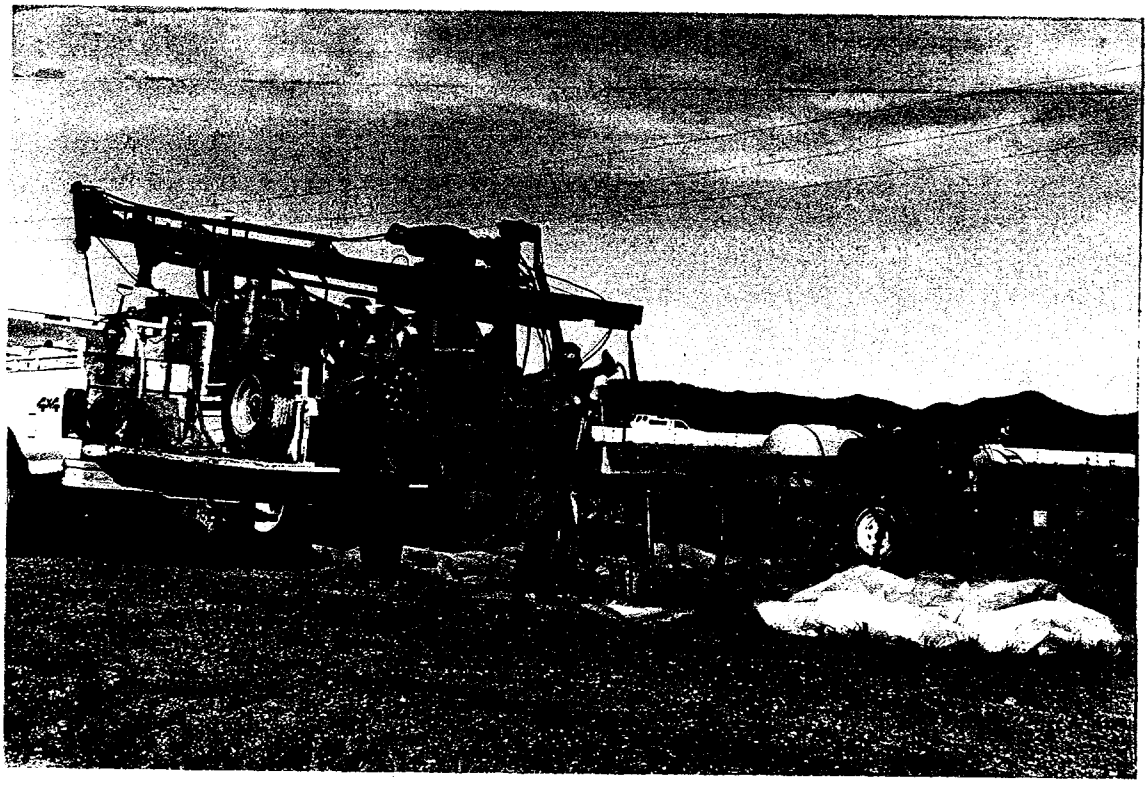
City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1630 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Downgradient monitoring well RF-MW-03

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 26, 1992 Time: 1950 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

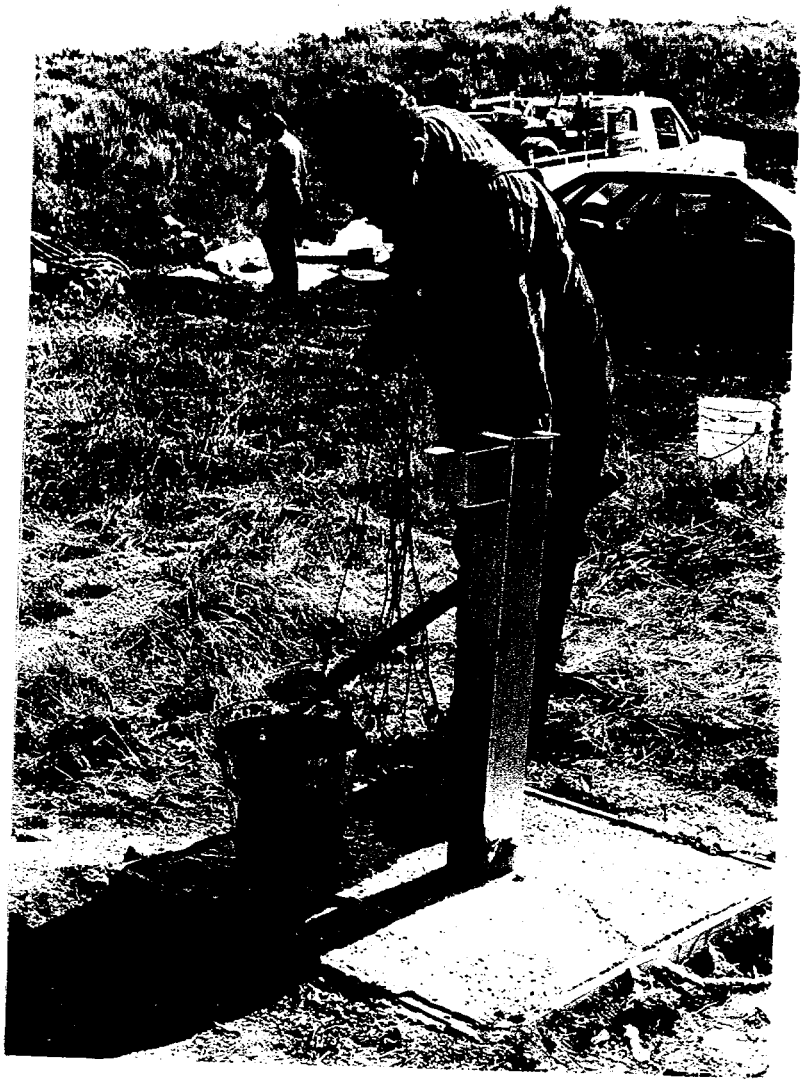


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Decontamination of drilling equipment used for RF-MW-03

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 27, 1992 Time: 0830 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

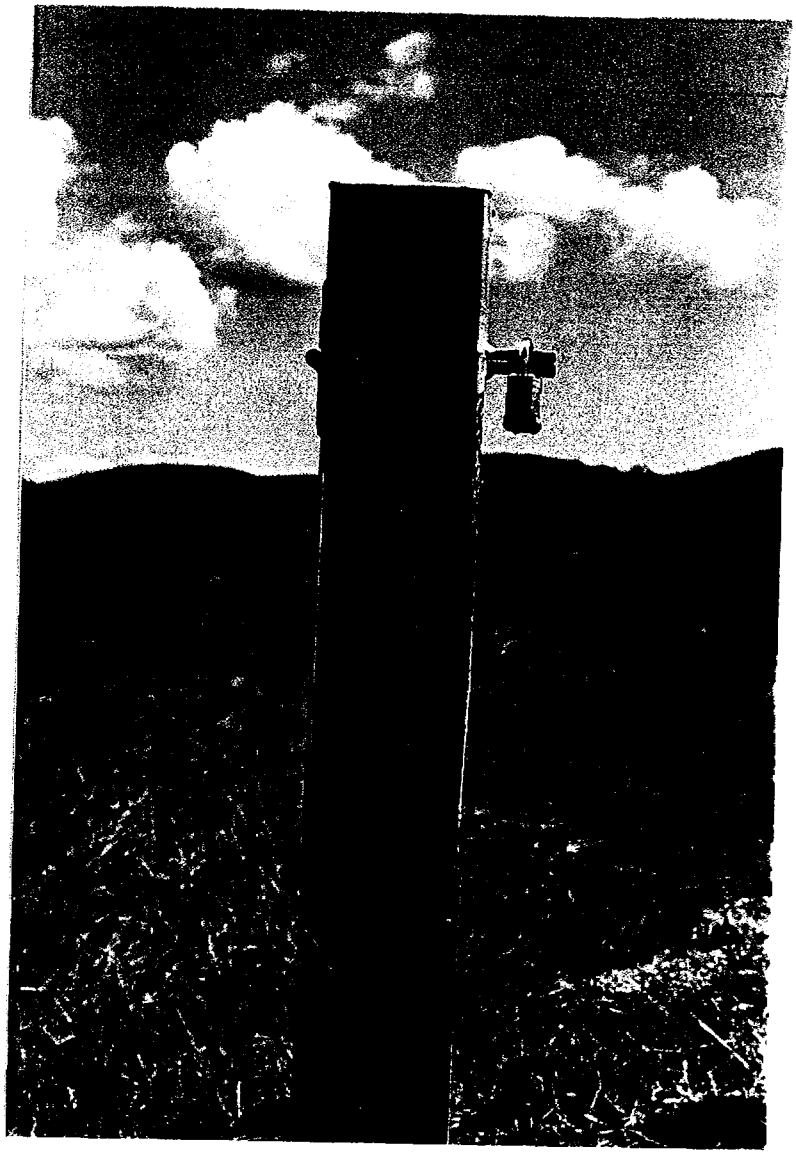


OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Well development activities, bailing well RF-MW-03

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 27, 1992 Time: 1035 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Markings on monitoring well RF-MW-01

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 27, 1992 Time: 1120 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: TAT member taking pH measurements on water developed from well RF-MW-02
Location: Richardson Flats Tailings Site

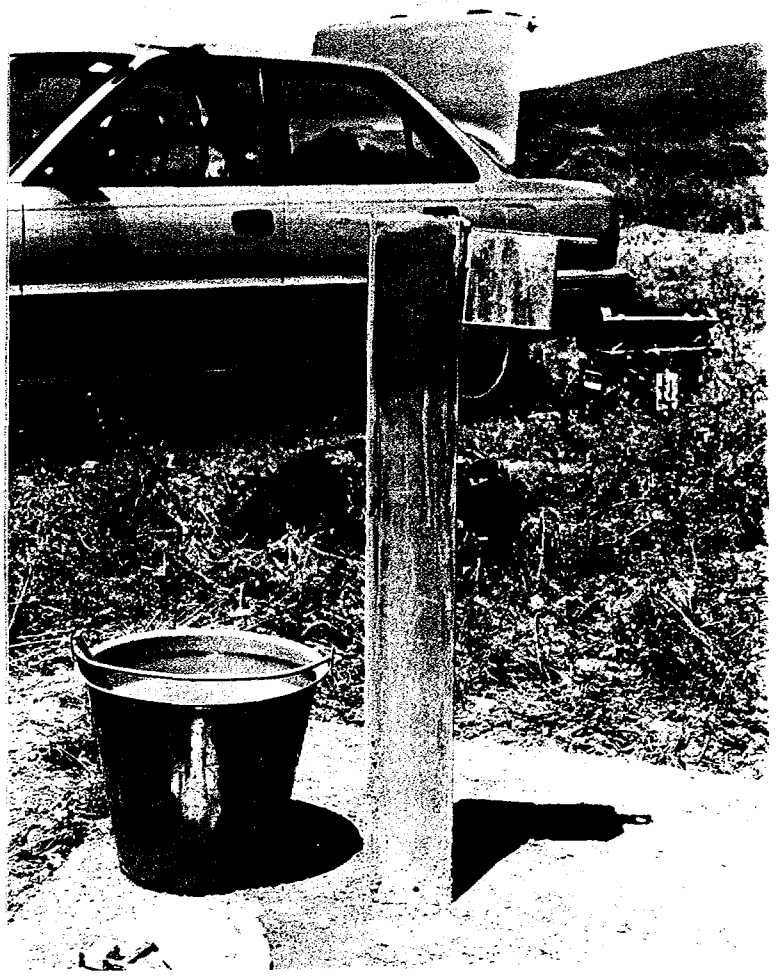
City: Park City County: Summit State: UT
Date: June 27, 1992 Time: 1147 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Markings on monitoring well RF-MW-02

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1300 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA



OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Markings on monitoring well RF-MW-03

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1410 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

OFFICIAL PHOTOGRAPH
ENVIRONMENTAL PROTECTION AGENCY

Subject: Markings on monitoring well RF-MW-02

Location: Richardson Flats Tailings Site

City: Park City County: Summit State: UT
Date: June 23, 1992 Time: 1300 Hours
Photographer: Troy Sanders
Film: Kodak ASA: 200 Location of Negative: EPA-ERB
File: T08-9204-015
Witness: Cordel Schmidt
Process: C-41
Paper: AGFA

APPENDIX C
WELL CONSTRUCTION DIAGRAMS

DRILL LOG

PROJECT RICHARDSON FLATS TAILINGS SITE JOB NO. T08-9204-15 DATE 6/23-25/92

WELL/BORING RF-MW-01 LOCATION PARK CITY, SUMMIT LOGGER T. SANDERS

DRILL METHOD AIR ROTARY/CASING DRIVE COUNTY, UTAH PAGE 1 OF 1

WATER LEVEL FIRST ENCOUNTERED N/A FINAL 7.8 FT. ELEV. N/A

DEPTH IN FEET	LITH COL	SAMPLE TYPE IDENT.	MOISTURE CONTENT WATER LEVEL	LITHOLOGIC DESCRIPTION	NOTES
			DRY	Top Soil - Silty to clayey, dark brown, plant roots Cuttings 3-5 ft. depth: quartzitic and volcanic fragments	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 4/13/19/30 SAMPLE RECOVERY: 50%
5			DRY MOIST	Silty-Clay - med. brown, 2-10mm sub-angular quartzitic and volcanic fragments, micaceous, pyrite (oxidized), sl. mottled Cuttings 8.5 ft. depth: clay med brown Cuttings 9-11 ft.depth: sand	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 6/8/13/14 SAMPLE RECOVERY: 50% Water @ 7.8 ft.
10			MOIST	Clay - dark reddish/brown with 3-10mm silicic breccia fragments, micaceous, limonitic staining	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 16/33/21/28 SAMPLE RECOVERY: 65%
15			MOIST WET	Clay - brown to reddish /brown, micaceous, 2-15mm silicic fragments	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 8/10/18/42 SAMPLE RECOVERY: 65%
20			WET	Clay - dark red/brown, approx. 30% coarse grained to gravel sized sub-angular rock fragments, no bedding evident	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 17/20/45/50 SAMPLE RECOVERY: 50% TOTAL DEPTH 25.0 ft.

WELL/PIEZOMETER COMPLETION DIAGRAM

Project RICHARDSON FLATS TAILINGS SITE

TDD No. T08-9204-15

Location PARK CITY, SUMMIT COUNTY, UTAH

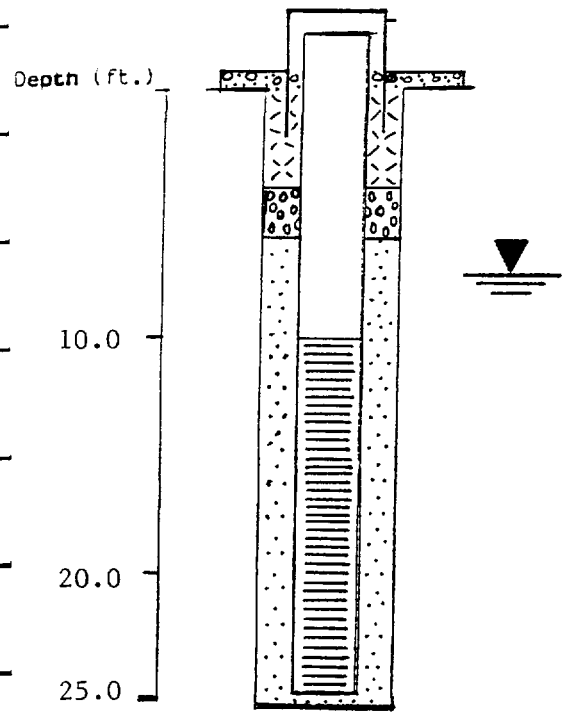
Well Number RF-MW-01

Geologist T. SANDERS

Date(s) of Installation 6/23-24/92

Depth to Water 7.8 feet (G.L.)

Elevation from Measuring Point GROUND SAUFACE



DRILLING SUMMARY:

Driller BOYLES BROTHERS DRILLING CO.

Rig Type B-53
Drilling Method AIR ROTARY/CASING DRIVE
Bit(s) HAMMER (ODEX)/TRI-CONE BITS
Drilling Fluid ---

Surface Casing ---
Hollow Stem/Drive Casing I.D. (in.) 4"
Total Depth of Boring (ft.) 25
Borehole Diameter (in.) 4

WELL DESIGN:

Completion Basis: Above Grade X Below Grade
Geological Log X Geophysical Log
Type

Total Depth of Well (ft.) 25
Casing String(s): C=casing S=screen

+2.5	-	10.0	C	-
10.0	-	25.0	S	-

Casing: SCHEDULE 80 PVC, 2" I.D. THREADED WITH FLUSH THREADS
Screen: SCHEDULE 80 PVC, 2" I.D., 0.010" SLOT SIZE WITH BOTTOM CAP
Centralizers ---
Gravel/Sand Pack 6.0 to 25.0 feet
10-20 MESH COLORADO SILICA SAND
Bentonite Seal(s) 4.0 to 6.0 feet
to feet
Bentonite (type) PELLETS ¼"
Backfill (cuttings) --- to feet
Cement Seal(s) 0.0 to 4.0 feet
to feet
Cement Composition 90% PORTLAND TYPE I-II LOW ALKALI CEMENT 10% BENTONITE
Protective Casing 2.25 to +2.75 feet
Protective Casing Type 5" NOMINAL DIAMETER STEEL CASING
Other ---

WELL DEVELOPMENT:

Method BAILING - 2½ FT. STAINLESS STEEL BAILER

Duration 1.0 hrs Estimated production L.T. 1 gpm
Water Appearance LIGHT TAN, SL. TURBID

Remarks: TOTAL DISCHARGE = 12.0 GALLONS

DRILL LOG

PROJECT RICHARDSON FLATS TAILINGS SITE JOB NO. T08-9204-15 DATE 6/24-26/92

WELL/BORING RF-MW-02 LOCATION PARK CITY, SUMMIT COUNTY, UTAH LOGGER T. SANDERS

DRILL METHOD AIR ROTARY/CASING DRIVE PAGE 1 OF 2

WATER LEVEL FIRST ENCOUNTERED N/A FINAL 26.3 FT. ELEV. N/A

DEPTH IN FEET	LITH COL	SAMPLE TYPE IDENT.	MOISTURE CONTENT WATER LEVEL	LITHOLOGIC DESCRIPTION	NOTES
			DRY	Overburden - silt and gravels, dark brown soil, silicic rock fragments	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 19/50/Refusal SAMPLE RECOVERY: 25%
5			DRY	Top Soil/Refuse - dark brown silty soil, wood chips and rock fragments 2-6mm, aromatic Cuttings 5-10 ft. depth: wood, paper pulp, etc.	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 13/20/27/9 SAMPLE RECOVERY: 5%
10			SL. MOIST	Clay/Refuse - dark brown clay, silicic pebbles, plastic,glass, wood chips	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 7/6/9/10 SAMPLE RECOVERY: 65%
15			DRY	Refuse - black fiberous material, plastic, paper, charcoal	HNU: 0.5 ppm above bkgd. BLOW COUNTS: 13/23/21/11 SAMPLE RECOVERY: 20%
20			---	Refuse - wood plug blackened by fire, large silicic rock clast	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 19/22/7/7 SAMPLE RECOVERY: 5%

DRILL LOG CONTINUED

DRILL LOG

PROJECT RICHARDSON FLATS TAILINGS SITE JOB NO. T08-9204-15 DATE 6/24-26/92

WELL/BORING RF-MW-02 (continued) LOCATION PARK CITY, SUMMIT LOGGER T. SANDERS

DRILL METHOD AIR ROTARY/CASING DRIVE COUNTY, UTAH PAGE 2 OF 2

WATER LEVEL FIRST ENCOUNTERED N/A FINAL 26.3 FT. ELEV. N/A

DEPTH IN FEET	LITH COL	SAMPLE TYPE IDENT.	MOISTURE CONTENT WATER LEVEL	LITHOLOGIC DESCRIPTION	NOTES
25			MOIST	Silty-Clay - black, pebbles, wood plastic, paper, grading into a reddish/brown clay, 2-6mm pebbles	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 5/6/5/8 SAMPLE RECOVERY: 60% Water @ 26.3 ft.
30			VERY MOIST	Clay - reddish/brown, highly plastic, 2-17mm silicic fragments	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 3/3/8/26 SAMPLE RECOVERY: 85%
35			WET	Clay - red/brown, 10-20mm fragments, grading to dark reddish/brown clay containing lenses of gray quartzite	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 25/18/19/44 SAMPLE RECOVERY: 65%
					TOTAL DEPTH 39.0 ft.

WELL/PIEZOMETER COMPLETION DIAGRAM

Project RICHARDSON FLATS TAILINGS SITE

TDD No. T08-9204-15

Location PARK CITY, SUMMIT COUNTY, UTAH

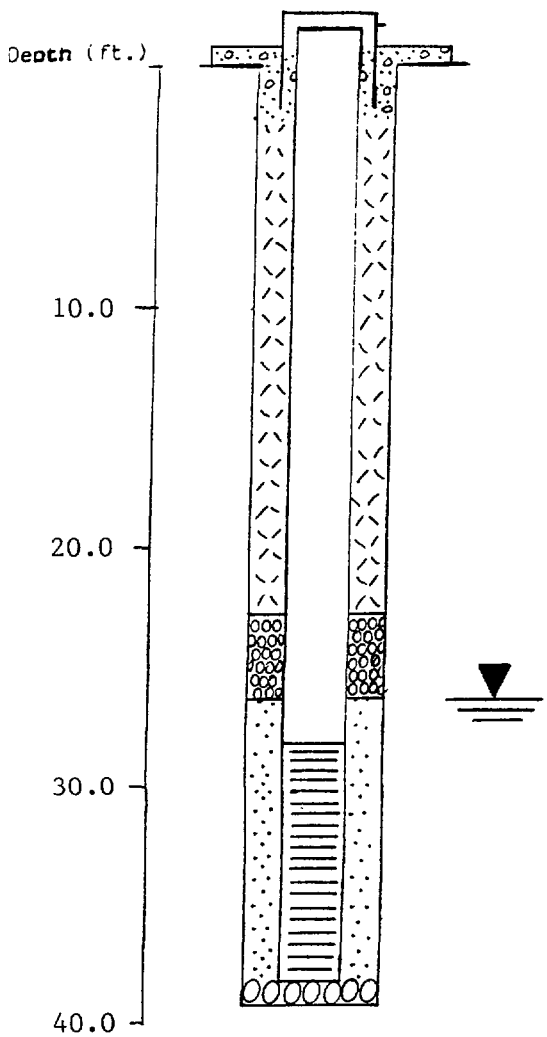
Well Number RF-MW-02

Geologist T. SANDERS

Date(s) of Installation 6/24-26/92

Depth to Water 26.3 feet (G.L.)

Elevation from Measuring Point GROUND SURFACE



DRILLING SUMMARY:

Driller BOYLES BROTHERS DRILLING CO.

Rig Type B-53
Drilling Method AIR ROTARY/CASING DRIVE
Bit(s) HAMMER (ODEX)/TRI-CONE BITS
Drilling Fluid ---

Surface Casing ---
Hollow Stem/Drive Casing I.D. (in.) 4
Total Depth of Boring (ft.) 39
Borehole Diameter (in.) 4

WELL DESIGN:

Completion Basis: Above Grade X Below Grade
Geological Log X Geophysical Log Type

Total Depth of Well (ft.) 38
Casing String(s): C=casing S=screen
+1.5 - 28.0 C -
28.0 - 38.0 S -

Casing: SCHEDULE 80 PVC, 2" I.D. THREADED WITH FLUSH THREADS
Screen: SCHEDULE 80 PVC, 2" I.D., 0.010 SLOT SIZE WITH BOTTOM CAP
Centralizers ---
Gravel/Sand Pack 26.0 to 38.0 feet
10-20 MESH COLORADO SILICA SAND
Bentonite Seal(s) 22.5 to 26.0 feet
to feet
Bentonite (type) PELLETS ¼"
Backfill (cuttings) --- to feet
Cement Seal(s) 2.0 to 22.5 feet
0.0 to 2.0 feet
Cement Composition 90% PORTLAND TYPE I-II LOW ALKALI CEMENT 10% BENTONITE, "SAKRETE" CONCRETE MIX TO SURFACE
Protective Casing 2.0 to +1.75 feet
Protective Casing Type 5" NOMINAL DIAMETER STEEL CASING
Other ---

WELL DEVELOPMENT:

Method BAILING - 2½ FT. STAINLESS STEEL BAILER

Duration 1 hrs Estimated production L.T. 1 gpm
Water Appearance MEDIUM BROWN, TURBID

Remarks: TOTAL DISCHARGE = 12.0 GALLONS

DRILL LOG

PROJECT RICHARDSON FLATS TAILINGS SITE JOB NO. T08-9204-15 DATE 6/26/92

WELL/BORING RF-MW-03 LOCATION PARK CITY, SUMMIT LOGGER T. SANDERS

DRILL METHOD AIR ROTARY/CASING DRIVE COUNTY, UTAH PAGE 1 OF 2

WATER LEVEL FIRST ENCOUNTERED N/A FINAL 21.3 FT. ELEV. N/A

DEPTH IN FEET	LITH COL	SAMPLE TYPE IDENT.	MOISTURE CONTENT WATER LEVEL	LITHOLOGIC DESCRIPTION	NOTES
			DRY	Top Soil - silty, lt. brown soil, 20-30mm silicic fragments Cuttings 4 ft. depth: black charred wood chips	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 8/34/29/16 SAMPLE RECOVERY: 15%
5			DRY	Refuse - charred wood/charcoal, 20-30mm quartzite clast Cuttings 5-6 ft. depth: black/brown sl. plastic clay Cuttings 9 ft. depth: reddish/brown sl. plastic clay	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 3/4/12/13 SAMPLE RECOVERY: 10%
10			---	Clay - pebbles and 2 inch layer silicic fragments, limonitic stained silty clay v. sl. plastic charcoal in core Cuttings 12 ft. depth: lt. brown clay, silicic clasts	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 3/4/4/11 SAMPLE RECOVERY: 15%
			MOIST	Cuttings 14 ft. depth: med. brown clay	
15			MOIST	Clay - dark brown sl. plastic clay silicic fragments, grading to multi-colored clay with pebbles, to reddish/brown clay highly plastic	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 27/28/11/8 SAMPLE RECOVERY: 65%
20			MOIST ▼ WET	Clay - brown/reddish brown, plastic, sl. mottled, 1-2 mm clasts silicic material and micaceous	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 7/5/5/7 SAMPLE RECOVERY: 90% Water @ 21.3 ft.

DRILL LOG CONTINUED

DRILL LOG

PROJECT RICHARDSON FLATS TAILINGS SITE JOB NO. T08-9204-15 DATE 6/26/92

WELL/BORING RF-MW-03 (continued) LOCATION PARK CITY, SUMMIT LOGGER T. SANDERS

DRILL METHOD AIR ROTARY/CASING DRIVE COUNTY, UTAH PAGE 2 OF 2

WATER LEVEL FIRST ENCOUNTERED N/A FINAL 26.3 FT. ELEV. N/A

DEPTH IN FEET	LITH COL	SAMPLE TYPE IDENT.	MOISTURE CONTENT WATER LEVEL	LITHOLOGIC DESCRIPTION	NOTES
25			WET	Clay - dark brown to reddish/ brown, plastic, grading to reddish/ brown sl. palstic clay, subangular silicic clasts, micaceous	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 8/16/42/19 SAMPLE RECOVERY: 25%
30			WET	Clay - reddish/brown, plastic, grading to 1 ft. thick coherent clay interval, into red/brown clay containing pebbles	HNU: 0.0 ppm above bkgd. BLOW COUNTS: 2/5/12/13 SAMPLE RECOVERY: 85%
					TOTAL DEPTH 35.0 ft.

WELL/PIEZOMETER COMPLETION DIAGRAM

Project RICHARDSON FLATS TAILINGS SITE

TDD No. T08-9204-15

Location PARK CITY, SUMMIT COUNTY, UTAH

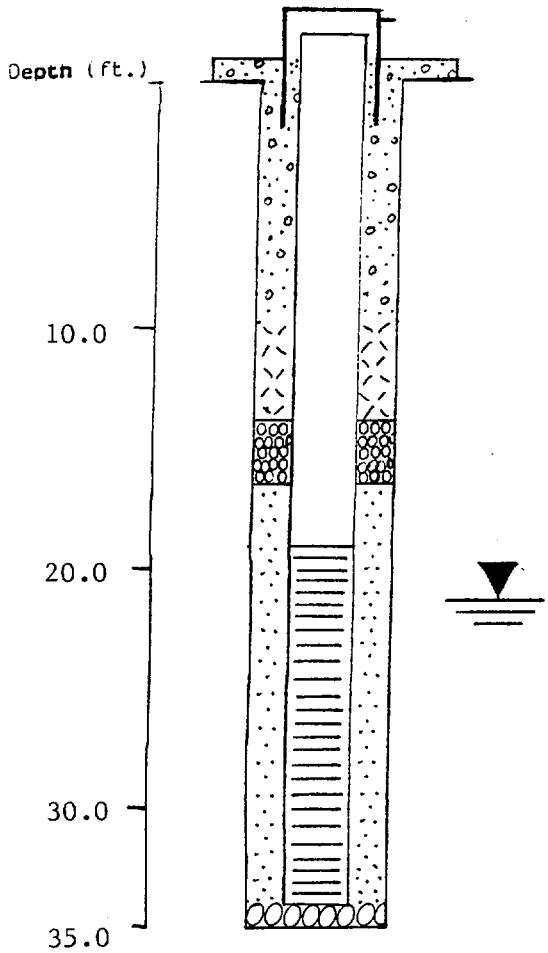
Well Number RF-MW-03

Geologist T. SANDERS

Date(s) of Installation 6/26/92

Depth to Water 21.3 feet (G.L.)

Elevation from Measuring Point GROUND SURFACE



DRILLING SUMMARY:

Driller BOYLES BROTHERS DRILLING CO.

Rig Type B-53

Drilling Method AIR ROTARY/CASING DRIVE

Bit(s) HAMMER (ODEX)/ TRI-CONE BITS

Drilling Fluid ---

Surface Casing ---

Hollow Stem/Drive Casing I.D. (in.) 4

Total Depth of Boring (ft.) 35

Borehole Diameter (in.) 4

WELL DESIGN:

Completion Basis: Above Grade X Below Grade ____

Geological Log X Geophysical Log ____ Type ____

Total Depth of Well (ft.) 35

Casing String(s): C=casing S=screen

+ 2.5	- 19.0	C		-
19.0	- 34.0	S		-

Casing: SCHEDULE 80 PVC, 2" I.D. THREADED WITH FLUSH THREADS

Screen: SCHEDULE 80 PVC, 2" I.D., SLOT SIZE 0.010 WITH BOTTOM CAP

Centralizers ---

Gravel/Sand Pack 16.5 to 34.0 feet
10-20 MESH COLORADO SILICA SAND

Bentonite Seal(s) 13.5 to 16.0 feet
to ____ feet

Bentonite (type) PELLETS ¼"

Backfill (cuttings) --- to ____ feet

Cement Seal(s) 9.0 to 13.0 feet

Concrete 0.0 to 9.0 feet

Cement Composition 95% PORTLAND TYPE I-II LOW ALKALI 5% BENTONITE, "SAKRETE" CONCRETE MIX TO SURFACE

Protective Casing 2.25 to + 2.75 feet

Protective Casing Type 5" NOMINAL DIAMETER STEEL CASING

Other ---

WELL DEVELOPMENT:

Method BAILING - 2½ FT. STAINLESS STEEL BAILER

Duration 50 MIN. Estimated production L.T. 1 gpm

Water Appearance LIGHT BROWN, TURBID

Remarks: TOTAL DISCHARGE = 10.5 GALLONS

ecology and environment, inc.
1776 SOUTH JACKSON STREET, DENVER, COLORADO 80210, TEL. 303-757-4984
International Specialists in the Environment

MEMORANDUM

TO: Mike Zimmerman, OSC
EPA/ERB - Denver

FROM: Troy Sanders T. Sanders
TAT - Region VIII

DATE: July 13, 1992

SUBJECT: Richardson Flats Tailings Site Monitoring Well Installation Activities, Summit County, Utah, TDD #T08-9204-015, PAN EUT0039SBA

Attached is the report of sampling activities which documents the drilling and installation of three groundwater monitoring wells at the above mentioned site from June 23 through 27, 1992. Also provided is an extra set of photograph reprints and the negatives for the photos taken in the field.

Please contact me at (303) 757-4984 if you have any questions or comments regarding the attached report.

recycled paper

EPA REGION VIII
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID # 7173
PAGE #

IMAGERY COVER SHEET
UNSCANNABLE ITEM

Contact the Superfund Records Center to view this document.

SITE NAME Richardson Flat Tailings

OPERABLE UNIT

REPORT OR DOCUMENT TITLE Report of Drilling Activities

DATE OF DOCUMENT July 13, 1992

DESCRIPTION OF IMAGERY Color Photos

NUMBER AND TYPE OF IMAGERY ITEM(S) ~30 photos