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40-8907

January 13, 2000

John J. Surmeier, Chief
U.S. Nuclear Regulatory Commission
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop T-7J9
Washington, D.C. 20555

Subject: **Source Materials License SUA-1475**
Technical Support for Proposed License Amendments

Telephone
303.694.6660
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Dear Mr. Surmeier:

Earth Tech, Inc. on behalf of United Nuclear Corp. (United Nuclear) provides the attached tables and figures in support of an upcoming license amendment to revise the Church Rock site monitoring program. Monitoring program revisions were initiated at the request of the U.S. Environmental Protection Agency (EPA). The current monitoring program is documented in Condition 30 of Source Materials License SUA-1475.

United Nuclear originally prepared a license amendment request for the monitoring program in a letter dated February 17, 1999, and supported by the letter dated May 17, 1999. As a result of discussions at the May 11, 1999, meeting in Dallas with the EPA, Nuclear Regulatory Commission (NRC), New Mexico Environment Division (NMED), and Navajo Superfund, the monitoring well system was tested in June 1999 to determine which wells would be suitable for sampling using low-flow purge techniques. Low-flow purge is the method preferred by EPA. Table 1 presents the test results, which identified several wells with such limited saturation or low yield that they are not suitable for low-flow purging. Therefore, the monitoring system originally proposed in the February and May 1999 letters was modified to reflect the testing results.

This letter presents the revised monitoring program wells with the modifications that reflect testing results. Enclosed with this letter is United Nuclear's proposed standard operating procedure (SOP) for purging, sampling, and sample handling under the revised monitoring program. This SOP is draft form and will be finalized once the revised monitoring program is approved in a license amendment.

NMSSOI Public

Table 2 lists the wells, provides information as to their use (monitor water level or water quality and water level), and their purpose in the monitoring program. Most of the existing performance monitoring wells will be maintained as part of the ongoing monitoring program, with the exception of the wells that can no longer be sampled because of saturation loss or poor performance (lack of water level and/or water quality stabilization) during low-flow purge testing. Extraction wells that were or will be decommissioned and other monitoring wells not included in the current performance monitoring program will be used as appropriate to provide spatial and temporal continuity in the monitoring data.

Where several wells are grouped together and exhibit similar water quality and water levels, one well was selected for ongoing water quality monitoring. For example, Zone 1 Wells 142 and 143 located at the northern property boundary (Figure 3): both wells exhibit similar water chemistry; therefore, Well 142 will be sampled for water quality while Well 143 will be monitored for water level only. Please note that before July 1999 adjacent Well 141 was also going to be monitored for water level; however, this well was plugged with silt during arroyo flooding this past summer. United Nuclear attempted to pump the silt out twice but was unsuccessful. The well is plugged with more than 70 feet of sediment.

Additional testing will occur this month to select a well to replace Zone 3 Well 502B, which failed the June low-flow purge testing. United Nuclear will test Wells 708 and 711, located downgradient from 502B, to determine which one can be used for monitoring water level and quality. The selected well will be included in the forthcoming amendment request.

Figures 1 through 3 show the well locations for the current and proposed revised performance monitoring program and the remaining extraction wells. The yellow and blue squares over the well designations indicate if the wells will be used for water level monitoring only (yellow) or both water quality and water level monitoring (blue). The white squares with a diagonal line identify the wells that will be deleted from the program.

Please review the proposed revised monitoring program and SOP and send me your comments by the end of January 2000. United Nuclear plans to implement the new program during the April 2000 second quarter sampling event; however, they need

six to eight weeks to purchase, prepare, install, and test the sampling equipment before it is used for the sampling event. To meet this schedule, comments and approval must be received no later than February 21, 2000. If an approved license amendment is not in place by that time, United Nuclear plans to sample using the current monitoring wells and procedures. Please contact Larry Bush at (505) 722-6651 or me at (303) 804-2367 if you have any questions or need additional information.

Very truly yours,
Earth Tech, Inc.

Suzie du Pont
Project Manager

cc: Levon Benally (Navajo Superfund)
Roy Blickwedel (General Electric Corporation)
Larry Bush (United Nuclear)
Ken Hooks (NRC Project Manager)
Beiling Liu (NMED)
Greg Lyssy (EPA)
NRC Region VI

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TABLE 1
RESULTS OF LOW FLOW PURGE TEST (1)
CHURCH ROCK SITE

Well	Pump Rate *Lpm*	Water Level Change (2) *ft*	pH *SU*	Temp. *C°*	Conductivity *umhos*	Paremeters Stabilized? Level	Paremeters Stabilized? Quality	Comments	Use (3)
SWA									
509D	0.11	0.03	6.18 6.18	15.54 15.54	4315 4321	Yes	Yes		yes
632	0.12	0.37	6.2 6.17	15.78 14.1	5007 4826	Yes	Yes		yes
GW-1	0.10	0.13	6.38 6.38	15.34 14.74	3952 3796	Yes	Yes		yes
GW-2	0.10	0.29	6.18 6.16	16.85 15.23	4573 4433	Yes	Yes		yes
GW-3	0.11	0.59	6.39 6.38	14.59 14.47	3882 3860	Yes	Yes		yes
GW-4	na	na	na	na	na	na	na	Not enough water to operate pump	no
624	0.11	0.08	6.45 6.46	13.91 13.91	4184 4195	Yes	Yes		yes
627	0.10	0.11	6.8 6.79	15.33 15.86	4535 4524	Yes	Yes		yes
Zone 1									
515A	0.10	1.04	5.6 5.59	24.5 23.7	7250 7390	No	Yes	Only 1.5 liters removed	yes
516A	0.10	2.66	6.39 6.4	22.8 23.2	9840 9830	No	Yes	Only 1.5 liters removed	no
604	0.10	0.74	4.46 4.5	24.4 23.4	7040 7080	No	Yes	Only 1.5 liters removed	yes
614	0.1 (?)	0.25	6.35 6.34	16.5 16.8	6452 6492	Yes	Yes	Only 1.5 liters removed	yes
142	0.08	0.07	7.91 7.91	15.39 15.54	1287 1298	Yes	Yes		yes
Zone 3									
420	0.09	0.20	6.41 6.44	20.18 16.29	3352 3025	Yes	Yes		yes
502B	0.10	2.68	4.18 4.72	18.53 16.5	4300 4860	Yes	No	Water quality did not stabilize Excessive drawdown	no
504B	0.09	0.1	5.63 5.66	16.36 17.22	3929 4013	Yes	Yes		yes
517	0.10	2.63	4.31 4.31	17.56 18.25	3945 3971	No	Yes	Only 1.5 liters removed Excessive drawdown	yes
518	0.10	1.67	3.17 3.18	17.43 18.54	2327 5221	No	No	Conductivity did not stabilize	no

Notes:
1. Test conducted in June 1999 to determine if wells could be sampled using low-flow purge and sample techniques. EPA wells were not tested because they have typically produced adequate water.
2. Drop in water level during pump test to remove 2 liters unless otherwise indicated in "Comments."
3. "No" indicates the well did not produce sufficient water to allow low-flow purge and sample techniques to be used.

ft = foot
Lpm = liters per minute
SU = standard units
C° = degrees centigrade
umhos = micromhos
SWA = Southwest Alluvium

TABLE 2

PROPOSED REVISED MONITORING WELLS
CHURCH ROCK SITE

SOUTHWEST ALLUVIUM

Well	Water Level	Water Quality	NRC POC	Purpose
Continue Monitoring				
509D	X	X	Y	Seepage extent
632	X	X	Y	Seepage extent
GW 1	X	X	Y	Seepage extent
GW 2	X	X	Y	Seepage extent
EPA 23	X	X	Y	Seepage extent
EPA 28	X	X	Y	Problematic completion
624	X	X		Downgradient background, seepage extent
627	X	X		Downgradient background, seepage extent
805	X			Water level only
807	X			Water level only
EPA 25	X	X		Downgradient background, seepage extent
GW 3	X	X		Downgradient background, seepage extent
801	X			Decommisioned pumper, water level only
802	X	X		Pumper, saturation extent, seepage
803	X	X		Pumper, saturation extent, seepage
808	X			Pumper, water level only
Proposed Total	16	12		
Eliminate From Monitoring				**Reason For Elimination**
GW 4	X	X		Dry
EPA 22A			Y	Dry
29A				Dry
639				Dry
642				Dry
644				Dry
645				Dry
804				Not needed, use 632
806				Not needed, use 805
EPA 27				Dry

Note:
Shading indicates dry wells.

TABLE 2

PROPOSED REVISED MONITORING WELLS
CHURCH ROCK SITE

ZONE 3

Well	Water Level	Water Quality	NRC POC	Purpose
Continue Monitoring				
420	X	X		Postmining-pretailings background, track plume
708 or 711	X	X		Track saturation and plume, replace 502B pending results of low flow purge testing to be performed in January 2000
504 B	X	X		Track saturation and plume, extensive data set
517	X	X	Y	Track plume, extensive data set
EPA 9	X			Extent of saturation, water quality not necessary
EPA 13	X			Extent of saturation,water quality not necessary
EPA 14	X	X		Postmining-pretailings background, track plume
702	X			Water level only, track saturation
710	X			Water level only
712	X			Water level only
713	X			Water level only
714	X			Water level only
613	X	X		Extensive data set, track saturation and source
701	X			Water level only (decommissioned pumper)
706	X			Water level only (decommissioned pumper)
707	X			Water level only (decommissioned pumper)
717	X			Water level only (pumper)
719	X			Water level only (decommissioned pumper)
Additional Wells, Not Included In Performance Monitoring				
402	X			Long-term water level for migration path
424	X			Long-term water level for migration path
446	X			Long-term water level for migration path
Proposed Total	21	6		
Eliminate From Monitoring				**Reason For Elimination**
9 D				Dry
106 D				Dry
411				Oil, cannot get water level or sample
501 B			Y	Dry
EPA 1				Dry
EPA 3			Y	Dry
EPA 11				Dry
EPA 12				Dry
EPA 15				Dry
EPA 17				Dry
EPA 18				Dry
126				Dry
502 B				Failed low-flow test, use 708 or 711
518			Y	Failed low-flow test, use 517
608				Not needed (formerly water level only)
703				Not needed (formerly water level only)
715				Not needed (formerly water level only)
708 or 711				Depends on results of low flow purge testing to be performed in January 2000 - Not needed (decommissioned pumper)
709				Not needed (decommissioned pumper)
716				Not needed (pumper)
718				Not needed (pumper)
720				Not needed (decommissioned pumper)

Note:
Shading indicates dry wells.

TABLE 2

PROPOSED REVISED MONITORING WELLS
CHURCH ROCK SITE

ZONE 1

Well	Water Level	Water Quality	NRC POC	Purpose
Continue Monitoring				
515A	X	X		Track transition area
604	X	X	Y	Track center of seepage
614	X	X	Y	Track transition area
EPA 2	X	X		Postmining-pretailings background water quality
EPA 4	X	X	Y	Postmining-pretailings background water quality
EPA 5	X	X		Track transition area
EPA 7	X	X	Y	Track transition area, edge of saturation
EPA 8	X			Track edge of saturation
142	X	X		Premining Background
143	X			Water level only, use 142
Additional Wells, Not Included In Performance Monitoring				
505A	X			Long-term water level for migration path
502A	X			Long-term water level for migration path
501A	X			Long-term water level for migration path
504A	X			Long-term water level for migration path
412	X			Long-term water level for migration path
Proposed Total	17	8		
Eliminate From Monitoring				**Reason For Elimination**
141				No longer useable, plugged during arroyo flooding
516A			Y	Failed low-flow testing
619				Anomalous water quality and water level
615				Decommissioned pumper, not needed - use 515 A
616				Decommissioned pumper, not needed - use 604
617				Decommissioned pumper, not needed

Note:
No wells within the tailings reclamation cap were included.

26-060-B1057

N

REFERENCE
TOPOGRAPHIC MAP OF SEC. 7, T16N, R16W, N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, NEW MEXICO DATED 8-1-96, SCALE 1" = 400'

E 54,000 E 56,000 E 58,000 E 60,000 E 62,000 E 64,000

N 76,000 N 74,000 N 72,000

PROPERTY BOUNDARY

PIPELINE ARROYO

NORTH CELL

CENTRAL CELL

SOUTH CELL

RECLAIMED TAILINGS AREA

BORROW PIT No. 2 (RECLAIMED)

EVAPORATION PONDS

SOUTHWEST ALLUVIUM REMEDIAL ACTION TARGET AREA

LEGEND:

803▲ EXTRACTION WELL, LOCATION AND DESIGNATION

627▲ MONITORING WELL (WATER QUALITY AND WATER LEVELS), LOCATION AND DESIGNATION

804△ MONITORING WELL (WATER LEVELS ONLY), LOCATION AND DESIGNATION

INDICATES APPROXIMATE LIMITS OF TAILINGS UNDERLYING RECLAIMED AREA

WATER LEVEL MONITORING ONLY

WATER LEVEL AND WATER QUALITY MONITORING

SOUTHWEST ALLUVIUM WELLS DELETED FROM MONITTORING PROGRAM

NOTES:

1. EXTRACTION WELL 808 WAS INSTALLED AND BEGAN OPERATING IN JUNE 1991. THE WELL WAS ADDED TO THE SOUTHWEST ALLUVIUM SYSTEM AS REQUIRED BY THE NRC AND EPA IN THEIR COMMENTS TO THE 1990 ANNUAL REVIEW.

SCALE
800 0 800 FEET

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	01/13/00	ISSUED FOR 2ND REVISED MONITORING WELL LETTER	EMH		

FIGURE 1

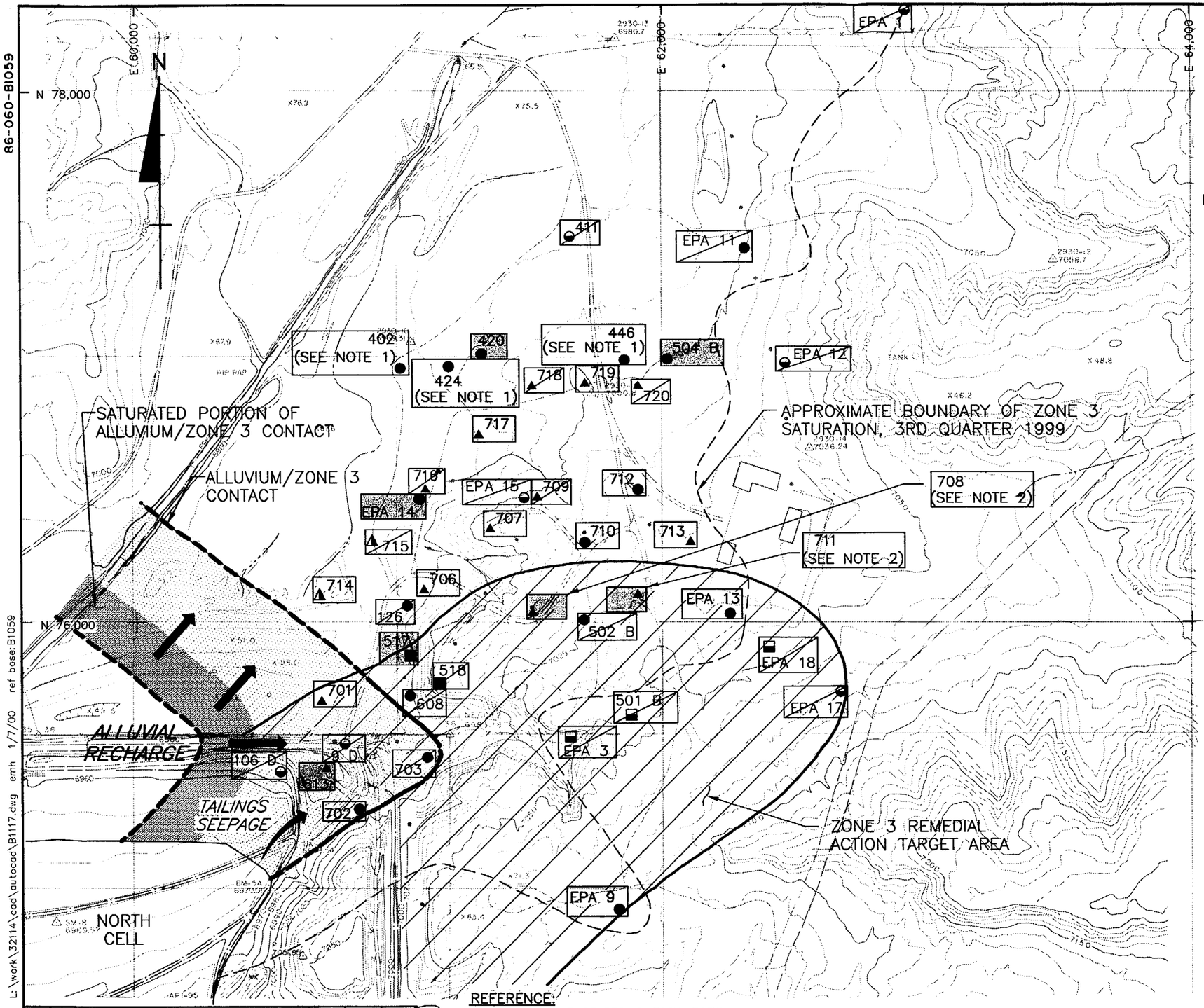
SOUTHWEST ALLUVIUM PROPOSED REVISED MONITORING WELL LOCATIONS

PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

EARTH TECH

FILE NAME L:\work\32114\cad\autocad\B11-5.dwg emh 1/7/00 ref base:B1057

1



LEGEND:

- 708 ▲ EXTRACTION WELL LOCATION AND DESIGNATION
- 714 ▲ IDLE EXTRACTION WELL LOCATION AND DESIGNATION
- 420 ● ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 17 ◒ ZONE 3 MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- 518 ■ ZONE 3 POINT OF COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION (CONTAINS WATER)
- EPA 3 ◒ ZONE 3 POINT OF COMPLIANCE MONITORING WELL LOCATION AND DESIGNATION (DRY OR CONTAINS INSUFFICIENT WATER FOR SAMPLE COLLECTION)
- WATER LEVEL MONITORING ONLY
- WATER LEVEL AND WATER QUALITY MONITORING
- ZONE 3 WELL DELETED FROM MONITORING PROGRAM

NOTES:

1. ZONE 3 WELL ADDED TO MONITORING PROGRAM.
2. WELLS 708 AND 711 WILL BE TESTED IN JANUARY 2000 TO DETERMINE WHICH WELL CAN BE USED TO REPLACE 502B.

SCALE
400 0 400 FEET

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	01/13/00	ISSUED FOR 2ND REVISED MONITORING WELL LETTER	EMH		

REFERENCE:
TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, N.M. DATED: 8-1-96. SCALE: 1" = 400'.

FIGURE 2

ZONE 3 PROPOSED REVISED MONITORING WELL LOCATIONS

PREPARED FOR:
UNC MINING AND MILLING
GALLUP, NEW MEXICO

EARTH TECH

FILE NAME L:\work\32114\cad\autocad\B1117.dwg emh 1/7/00 ref base:B1059
86-060-B1059

1

36-060-B1057

N

REFERENCE

TOPOGRAPHIC MAP OF SEC. 2, T16N, R16W, N.M.P.M. & VICINITY PROVIDED BY UNITED NUCLEAR CORPORATION, GALLUP, NEW MEXICO DATED: 8-1-95 SCALE: 1" = 400'

E 54,000 E 56,000 E 58,000 E 60,000 E 62,000 E 64,000

N 76,000 N 74,000 N 72,000

PROPERTY BOUNDARY

NOTES:

1. WELL EPA 7 SERVED AS BOTH A PUMP-BACK AND MONITORING WELL FROM SEPTEMBER, 1990 TO OCTOBER 1994 WHEN IT COULD NO LONGER BE PUMPED DUE TO PLUGGING.
2. THE ZONE 1/ALLUVIUM CONTACT IS FROM FIGURE 3-3 OF THE GHR REPORT (CANONIE, 1987b.).
3. ZONE 1 WELL ADDED TO MONITORING PROGRAM

NORTH CELL (RECLAIMED)

ZONE 1/ ALLUVIUM CONTACT

NORTH CROSS-DIKE PUMP-BACK WELLS

CENTRAL CELL (RECLAIMED)

BORROW PIT No. 2 (RECLAIMED)

SOUTH CELL (RECLAIMED)

ZONE 1 REMEDIAL ACTION TARGET AREA

EAST PUMP-BACK WELLS

PROJECTED EXTENT OF ZONE 1 SATURATION MARCH 1999

LEGEND:

- INFILTRATION FROM ALLUVIUM INTO ZONE 1
- EPA 4 — MONITORING WELL LOCATION AND DESIGNATION
- 617 — REVISED EAST PUMP-BACK SYSTEM WELL LOCATION AND NUMBER (TURNED ON SEPTEMBER, 1990)
- WATER LEVEL MONITORING ONLY
- WATER LEVEL AND WATER QUALITY MONITORING
- ZONE 1 WELL DELETED FROM MONITORING PROGRAM

SCALE

800 0 800 FEET

No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	01/23/00	ISSUED FOR 2ND REVISED MONITORING WELL LETTER	EMH		

FIGURE 3

ZONE 1 PROPOSED REVISED MONITORING WELL LOCATIONS

PREPARED FOR:

UNC MINING AND MILLING
GALLUP, NEW MEXICO

EARTH TECH

FILE NAME L:\work\32114\cad\autocad\B1116.dwg srr 1/7/00 ref base: B1057

1

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STANDARD OPERATING PROCEDURE: GROUNDWATER SAMPLING

I. Purpose: Obtain representative groundwater samples from the Church Rock site monitoring wells by using dedicated pumps and low flow purge and sampling techniques. The monitoring data are used to determine if groundwater has or is being impacted by seepage from the reclaimed tailings impoundment and to evaluate the performance of the groundwater corrective action program. This Standard Operating Procedure is based on site conditions, a U.S. Environmental Protection Agency (USEPA) procedure for low flow purge and sample (USEPA, 1994), and recommendations of Puls and Barcelona (1995).

Note that the existing extraction system wells (wells 802 and 803) are pumped continuously. These wells will continue to be sampled from existing ports using their dedicated pumps. Therefore, the following requirements and procedure items related to low flow purging and sampling are not applicable to these wells.

II. Requirements:

1. A dedicated, adjustable rate positive displacement pump, such as a bladder pump, has been installed in each well to be sampled.

2. The pump has been placed in the middle part of the screened interval. The pump intake is a minimum of two feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well.

3. The well has been allowed to equilibrate since pump placement for a minimum of one week prior to sampling.

III. Procedure

Step 1: Measure Water Level - Take water level measurements before purging the well using the precautions that follow.

1a. Minimize disturbance of any particulates attached to the sides of the well.

1b. Do not allow the measurement probe to drop to the bottom of the well where it could disturb accumulated sediment. Minimize disturbances of the stagnant water column above the screened interval.

1c. Measure and record the depth to water using the attached Field Data Sheet.

1d. Decontaminate the probe and tape before proceeding to the next well.

Step 2: Purge the Well - Purge the well at a rate of 100 to 300 milliliters per minute where obtainable, removing as little groundwater as possible and using the dedicated positive displacement pump in the well and a flow-through cell for measurement of field parameters.

2a. Calibrate the low flow cell according to the manufacturer's instructions.

2b. After calibrating the flow-through cell, place the cell on the tubing from the positive displacement pump.

2c. Operate the positive displacement pump according to the manufacture's directions.

2d. Pump each well at the pre-tested rate that supports a minimum drawdown. Table 1 contains the results of the positive displacement pump pre-tests. Make adjustments to stabilize the flow rate as soon as possible.

2e. Monitor the water level at intervals sufficient to verify that water levels are stable. The goal is that the water level drop in the well be minimized. Care should be taken not to cause pump suction to be broken or entrainment of air in the sample.

2f. Record the pumping rate adjustments and depth to water on the attached Field Data Sheet.

2g. During purging of the well, monitor the field indicator parameters (temperature, pH, and specific conductivity) on a regular basis. Parameters are to be monitored using a flow-through cell. Purge until three consecutive readings of the indicator parameters have stabilized as follows:

pH $\pm$ 0.2 standard unit
specific conductivity $\pm$ 5 percent

Record final indicator parameter readings using the attached Field Data Sheet. It is not necessary to purge three well casing volumes.

2h. Purge water will be handled in accordance with existing procedures.

2i. Disconnect the flow-through cell and decontaminate it prior to purging the next well according to existing procedures and the manufacturer's instructions.

Step 3: Collect Water Samples

3a. Use the purge flow rate for collecting water samples, or adjust slightly if necessary to minimize aeration, bubble formation, or turbulent filling of sample bottles.

3b. The required sample bottles are listed in Table 2. Filter samples in the field using an in-line filter or a 0.45-micron filter using a vacuum pump.

Note that for the first two sampling events following institution of this sampling method, both filtered and unfiltered samples will be prepared. After the analytical results of these samples are compared, Table 2 will be updated to indicate whether filtered or nonfiltered samples will be collected.

3c. Place samples in prepared bottles and add preservative, if appropriate. When used, check that the two 40-milliliter vials have been filled to capacity to prevent air pockets. All sample bottles must be labeled with well I.D., date, and preparation and preservation method.

3d. Wells to be sampled quarterly are listed on Table 3. Samples are iced down in an ice chest and shipped to a qualified analytical laboratory for analysis.

V. References:

Puls, R.W. and Barcelona, M.J., 1995. Ground Water Issue: Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. USEPA Office of Research and Development, Office of Solid Waste and Emergency Response. EPA/540/S-95/504.

USEPA, 1994. Ground Water Sampling Procedure: Low Flow Purge and Sampling Draft Final. Region I Low Flow SOP # GW 0001.

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TABLE 1
RESULTS OF POSITIVE DISPLACEMENT PUMP PRE-TEST (1)
CHURCH ROCK SITE

Well	Pump Rate *Lpm*	Water Level Change (2) *ft*	Comments	Use (3)
SWA				
509D	0.11	0.03		yes
632	0.12	0.37		yes
GW-1	0.10	0.13		yes
GW-2	0.10	0.29		yes
GW-3	0.11	0.59		yes
GW-4	na	na	not enough water to pump	no
624	0.11	0.08		yes
627	0.10	0.11		yes
Zone 1				
515A	0.10	1.04	only 1.5 liters removed	yes
516A	0.10	2.66	only 1 liter removed, water level did not stabilize	no
604	0.10	0.74	only 1.5 liters removed	yes
614	0.1 (?)	0.25	only 1.5 liters removed	yes
142	0.08	0.07		yes
Zone 3				
420	0.09	0.20		yes
502B	0.10	2.68	water quality did not stabilize	no
504B	0.09	0.1		yes
517	0.10	2.63	only 1.5 liters removed	yes
518	0.10	?	conductivity did not stabilize	no

Notes:

1. Pre-test conducted in June 1999 to determine whether wells could be sampled using low flow purge and sample techniques. EPA wells were not tested because the have typically produced adequate water.
2. Drop in water level during pump test to remove 2 liters unless otherwise indicated in "Comments".
3. "No" indicates the well did not produce sufficient water to allow low flow purge and sample techniques to be used.

ft = feet
Lpm = liters per minute
SWA = Southwest Alluvium

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TABLE 2
ANALYTICAL SAMPLE FILTERING AND PRESERVATION
UNC MINING AND MILLING

Analyte	Required Sample Volume	Preservation (note 2)
Bicarbonate pH TSS	500 ml (pint) *	Unfiltered and cool 4°C
Chloride Sulfate TDS	500 ml (pint)	Filter/unfiltered and cool 4°C
Metals (see note 1)	1,890 ml (half gallon)	Filter/unfiltered and cool 4°C 7.5 ml Nitric Acid (HNO_3) to pH 2.0
Chloroform	2 - 40 ml vials completely full - no air pockets	Filter/unfiltered and cool 4°C Vials with sodium thiosulfate ($Na_2S_20_3$)
Ammonia Nitrate	120 ml (pint)	Filter/unfiltered and cool 4°C 1 ml Sulfuric Acid (H_2SO_4) to pH 2.0

Note 1: Metals include: Calcium, Magnesium, Potassium, Sodium, Aluminum, Arsenic III, Beryllium, Cadmium, Cobalt, Lead, Manganese, Molybdenum, Nickel, Selenium IV, Uranium, Vanadium, Radium 226, Radium 228, Thorium 230, Lead 210, Gross Alpha

Note 2: For the first two sampling rounds, both filtered and unfiltered samples will be collected as indicated. Future sampling rounds will collect only filtered or unfiltered samples.

* Need to verify required sample volume.

TDS Total Dissolved Solids

TSS Total Suspended Solids

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TABLE 3
LIST OF WELLS TO BE SAMPLED
UNC MINING AND MILLING

Zone	Well	NRC POC
Southwest Alluvium	509D	Yes
Southwest Alluvium	624	No
Southwest Alluvium	627	No
Southwest Alluvium	632	Yes
Southwest Alluvium	802 (a)	No
Southwest Alluvium	803 (a)	No
Southwest Alluvium	EPA 23	Yes
Southwest Alluvium	EPA 25	No
Southwest Alluvium	EPA 28	Yes
Southwest Alluvium	GW 1	Yes
Southwest Alluvium	GW 2	Yes
Southwest Alluvium	GW 3 (b)	No
1	142	No
1	614	Yes
1	515A (c)	No
1	604 (c)	Yes
1	EPA 2	No
1	EPA 4	Yes
1	EPA 5	No
1	EPA 7	Yes
3	420	No
3	613	No
3	504 B	No
3	517 (c)	Yes
3	EPA 14	No

Notes:

a. Production well.
b. Water level change during the pumping test (Table 1) was approximately twice or more of the recommended change. Well retained because of importance of well.
c. Insufficient water pumped and excessive water level change during the pumping test (Table 1). Well retained because of importance of well.

GROUNDWATER MONITORING FIELD DATA SHEET 1
WATER DEPTH AND PURGING
_____QUARTER 20____

DRAFT

Well No.	Month/Day	Time	Starting Water Depth	Pumping Rate and Adjustments	Intermediate Water Depths	Ending Water Depth
Southwest Alluvium						
624						
627						
632						
802						
803						
509 D						
EPA 23						
EPA 25						
EPA 28						
GW1						
GW2						
GW3						
Zone 1						
142						
604						
614						
515 A						
EPA 2						
EPA 4						
EPA 5						
EPA 7						
Zone 3						
420						
517						
613						
504 B						
EPA 14						

GROUNDWATER MONITORING FIELD DATA SHEET 2
FIELD PARAMETERS
_____QUARTER 20____

DRAFT

Well No.	Month/Day	Time	pH	Specific Conductivity	Temperature
Southwest Alluvium					
624					
627					
632					
802					
803					
509 D					
EPA 23					
EPA 25					
EPA 28					
GW1					
GW2					
GW3					
Zone 1					
142					
604					
614					
515 A					
EPA 2					
EPA 4					
EPA 5					
EPA 7					
Zone 3					
420					
517					
613					
504 B					
EPA 14					