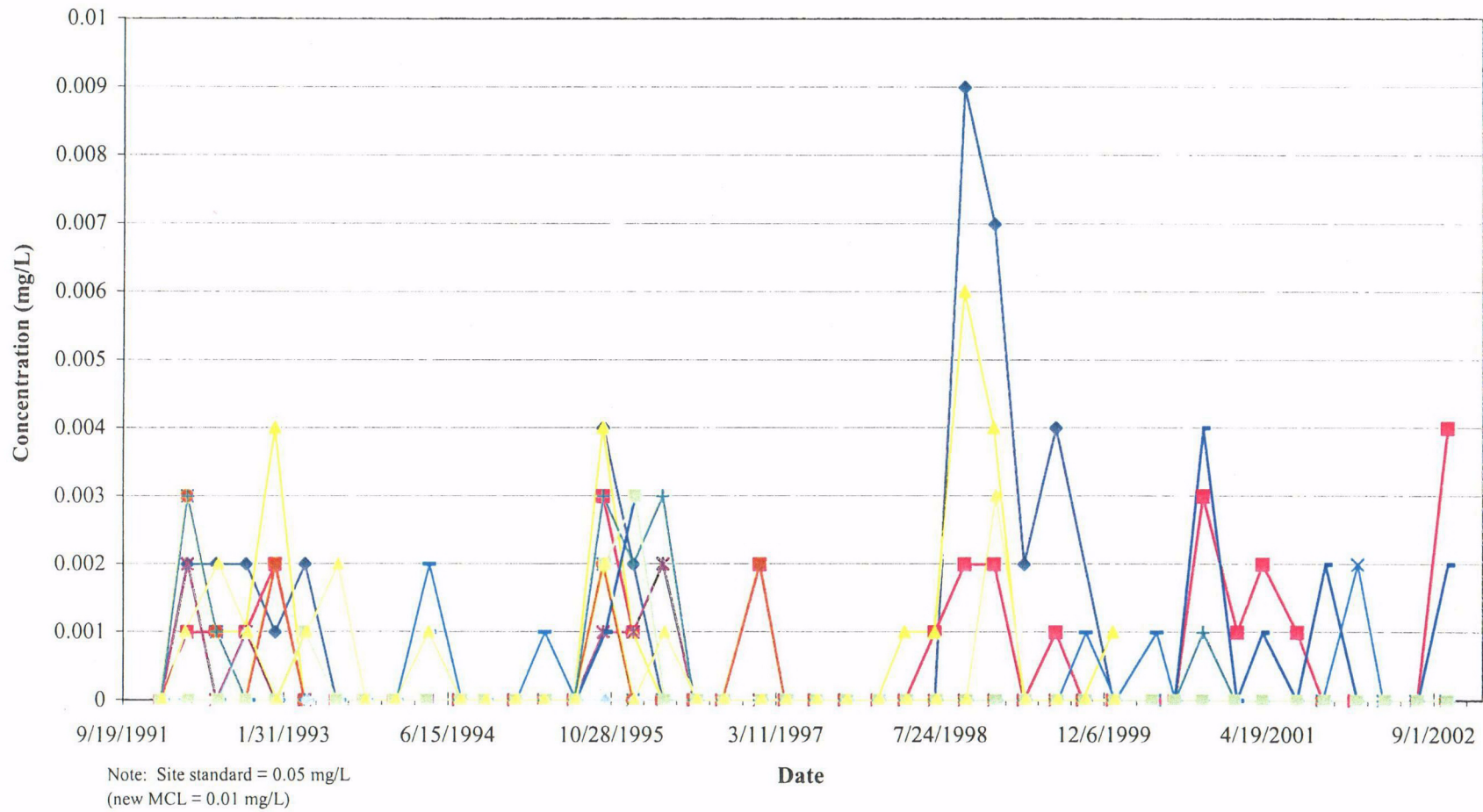
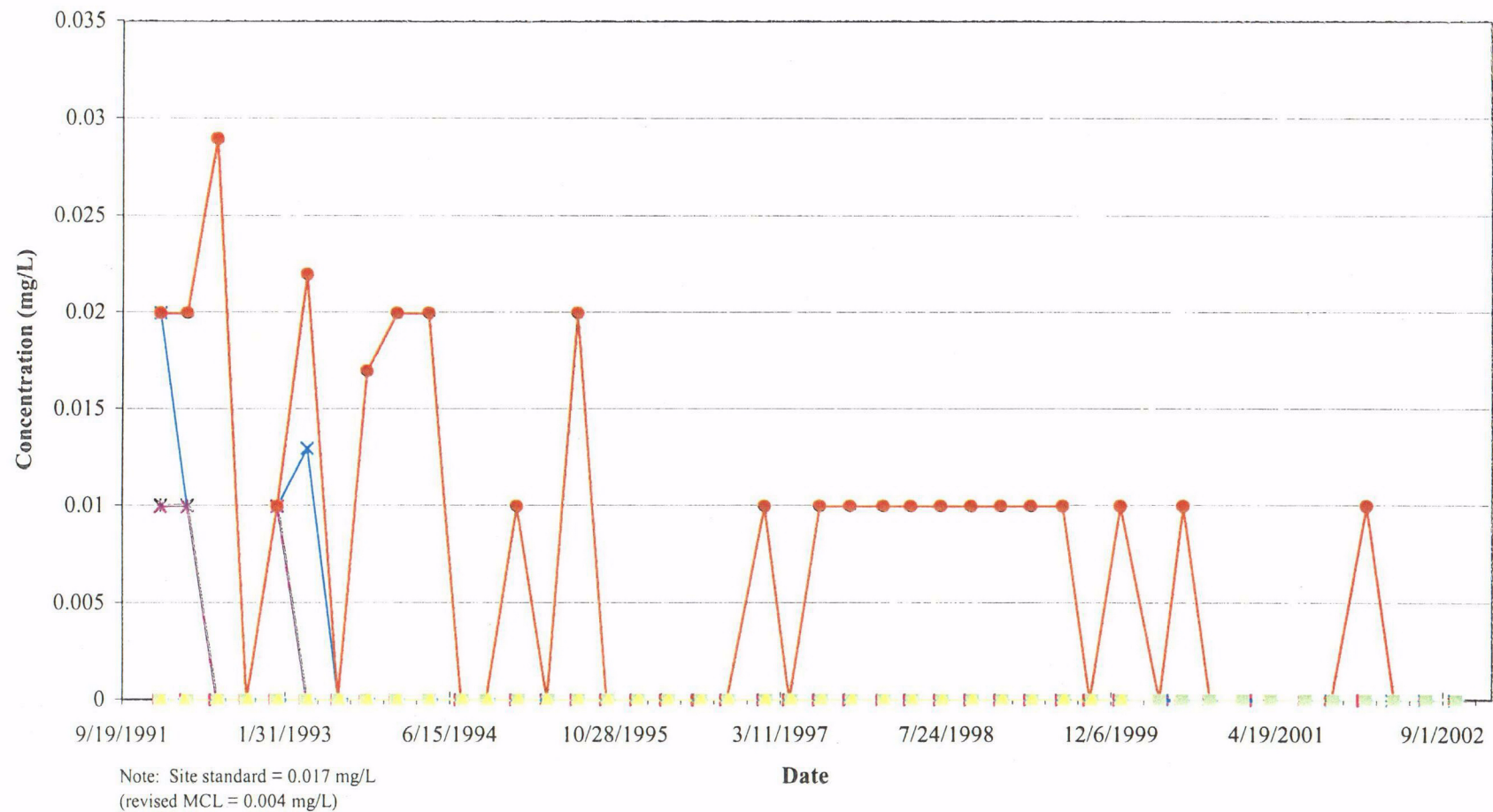


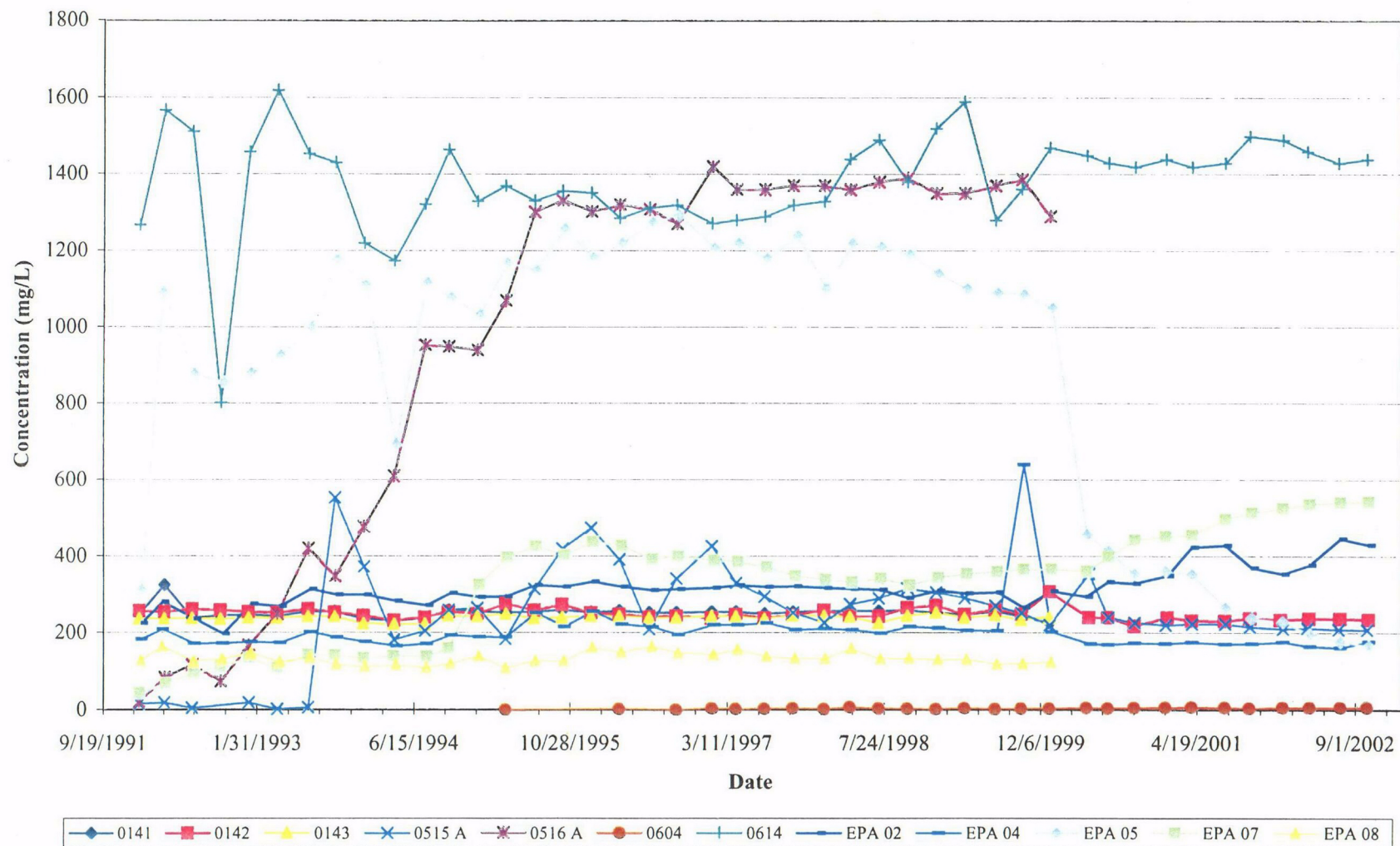
GRAPH 47
 Zone 1 Arsenic Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



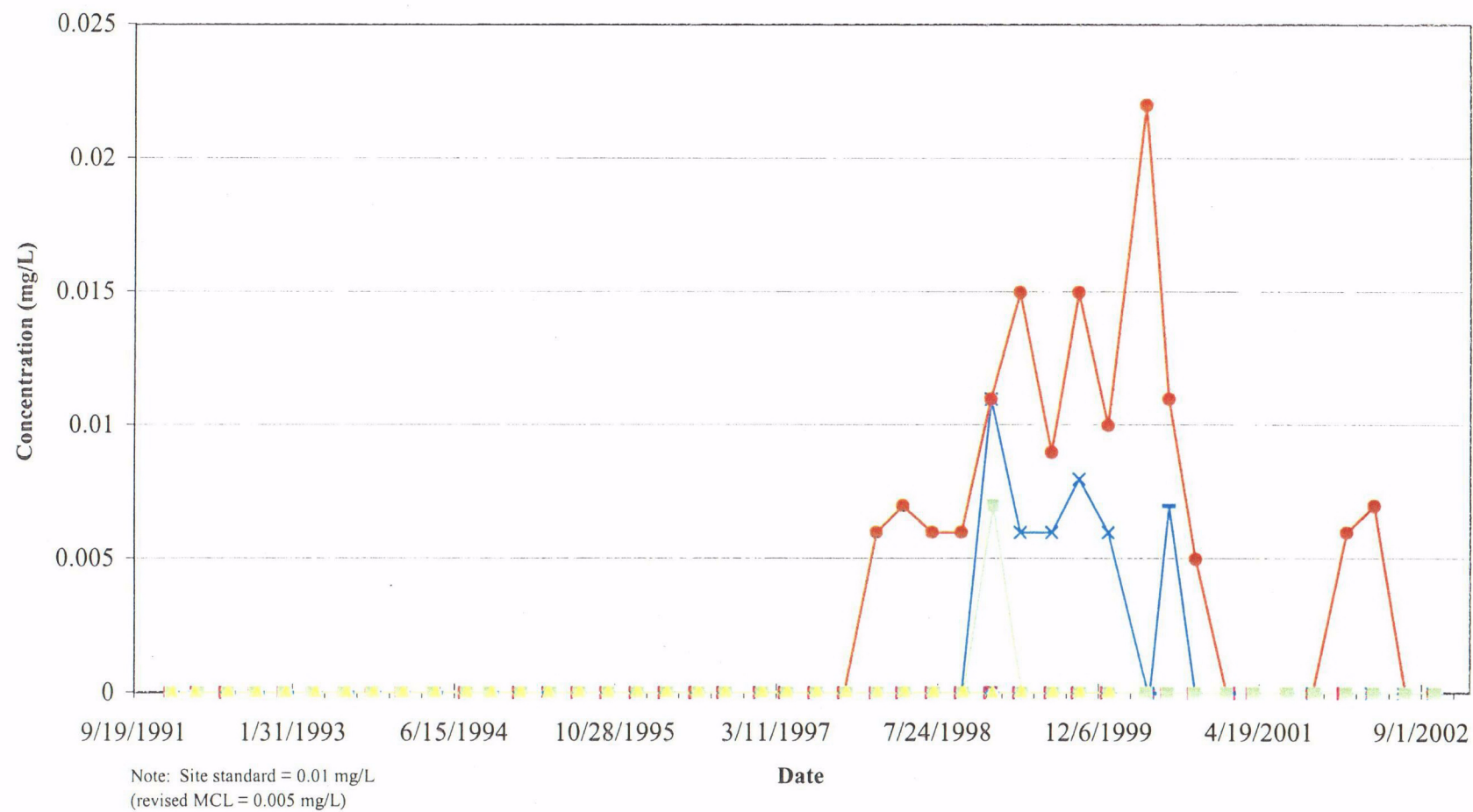
GRAPH 48
Zone 1 Beryllium Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



GRAPH 49
 Zone 1 Bicarbonate Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

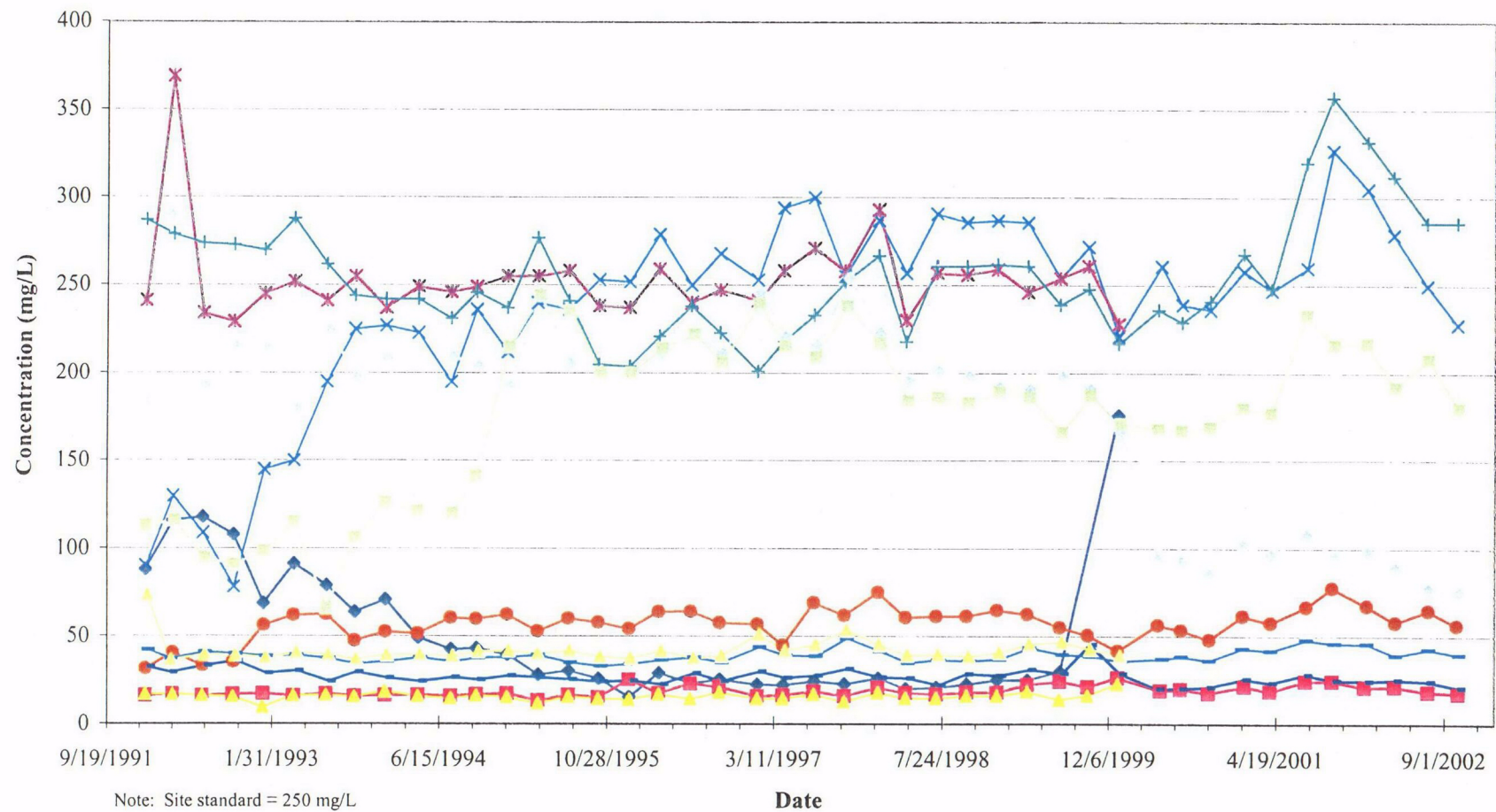


GRAPH 50
 Zone 1 Cadmium Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



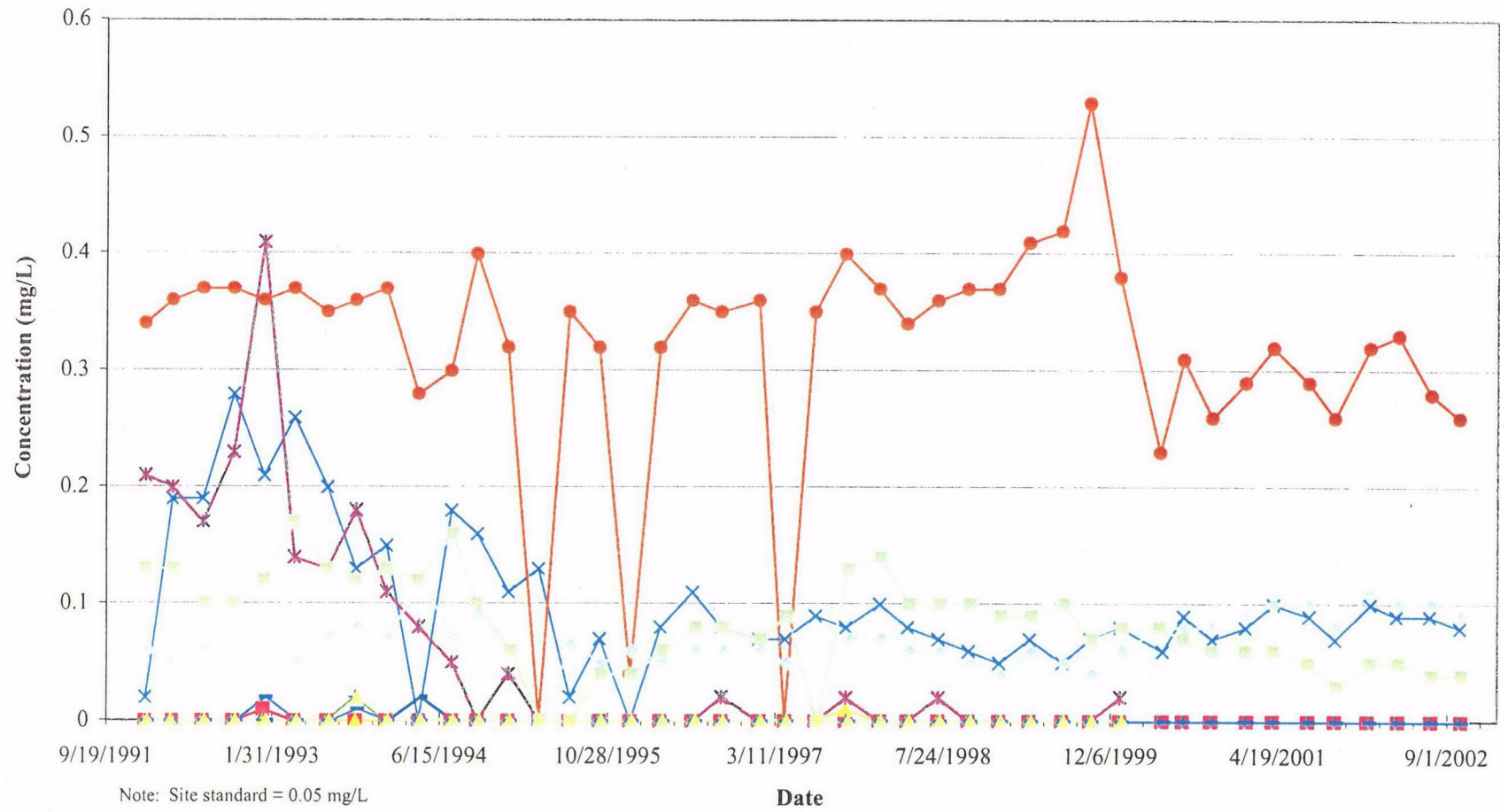
0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

GRAPH 51
 Zone 1 Chloride Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



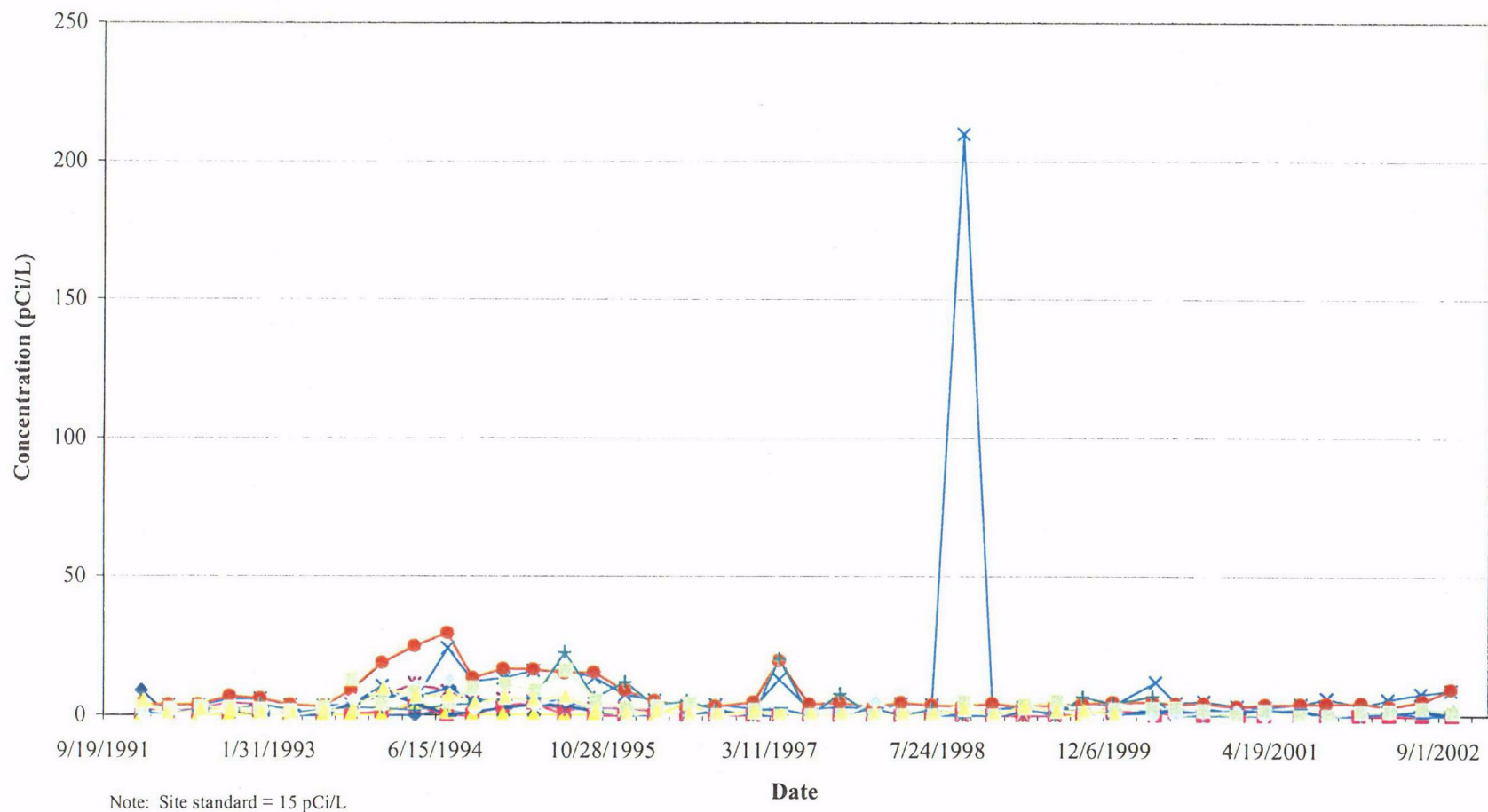
0141	0142	0143	0515 A	0516 A	0604	0614	EPA 02	EPA 04	EPA 05	EPA 07	EPA 08
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GRAPH 52
 Zone 1 Cobalt Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

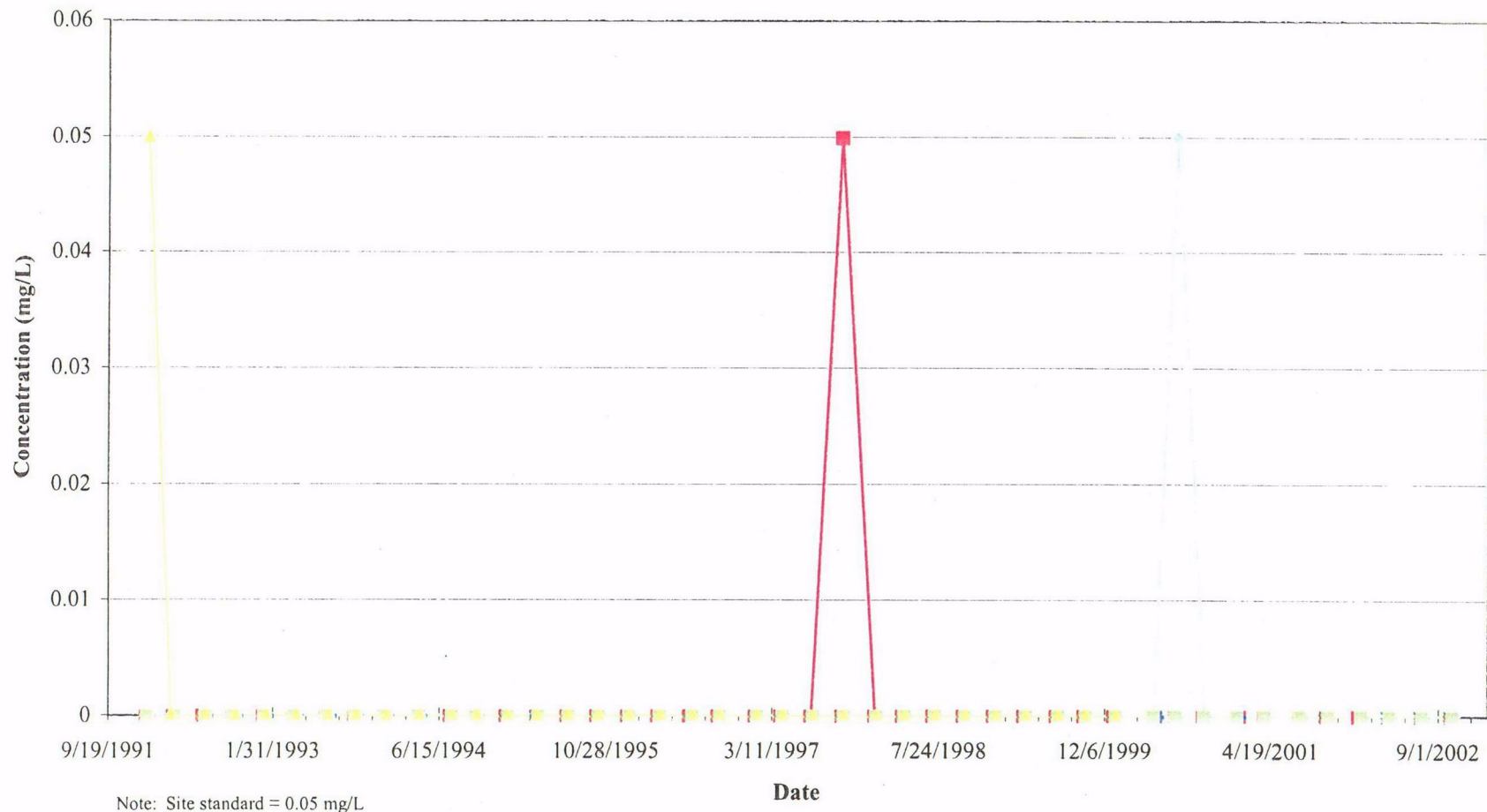


0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

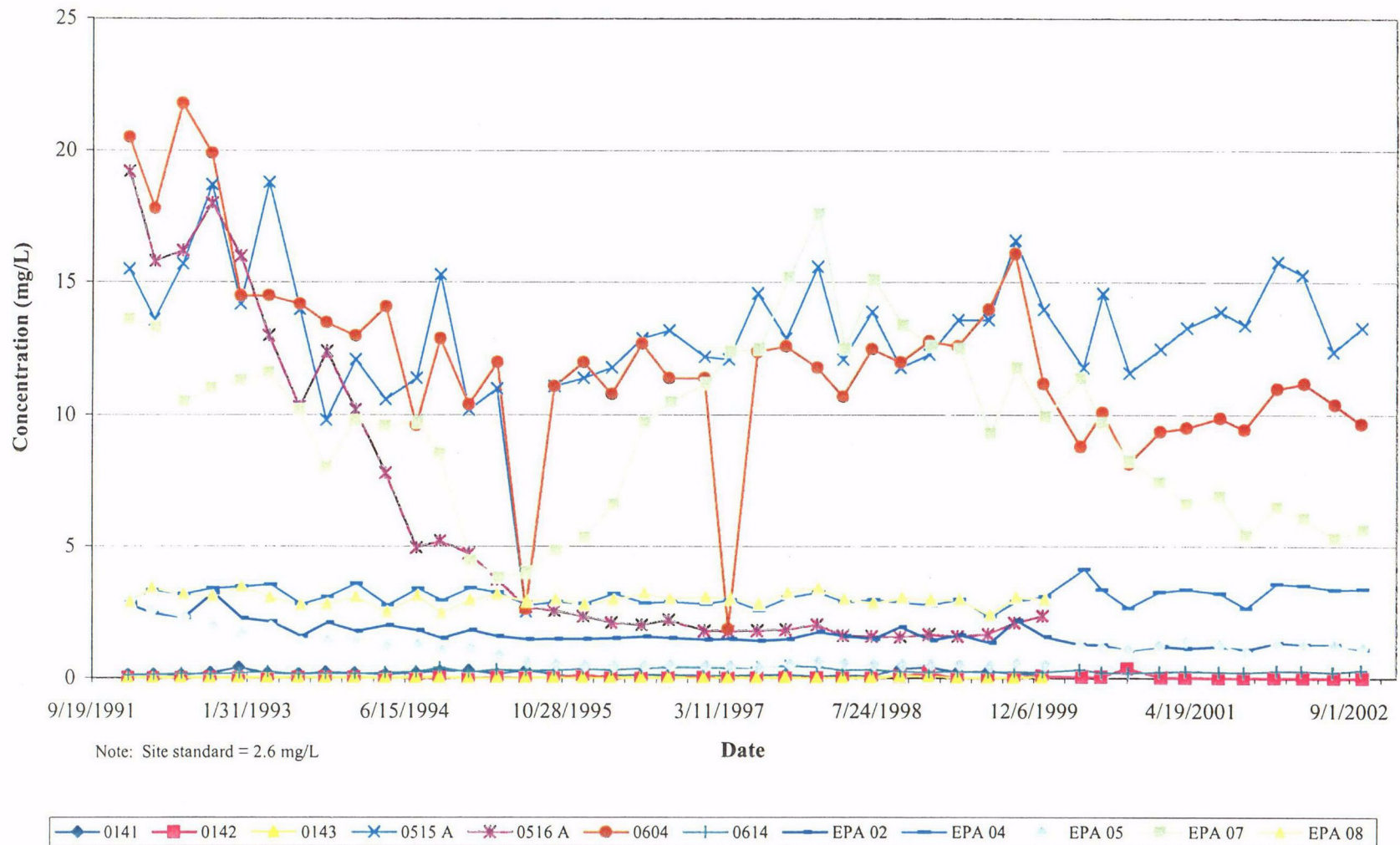
GRAPH 53
 Zone 1 Gross Alpha Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



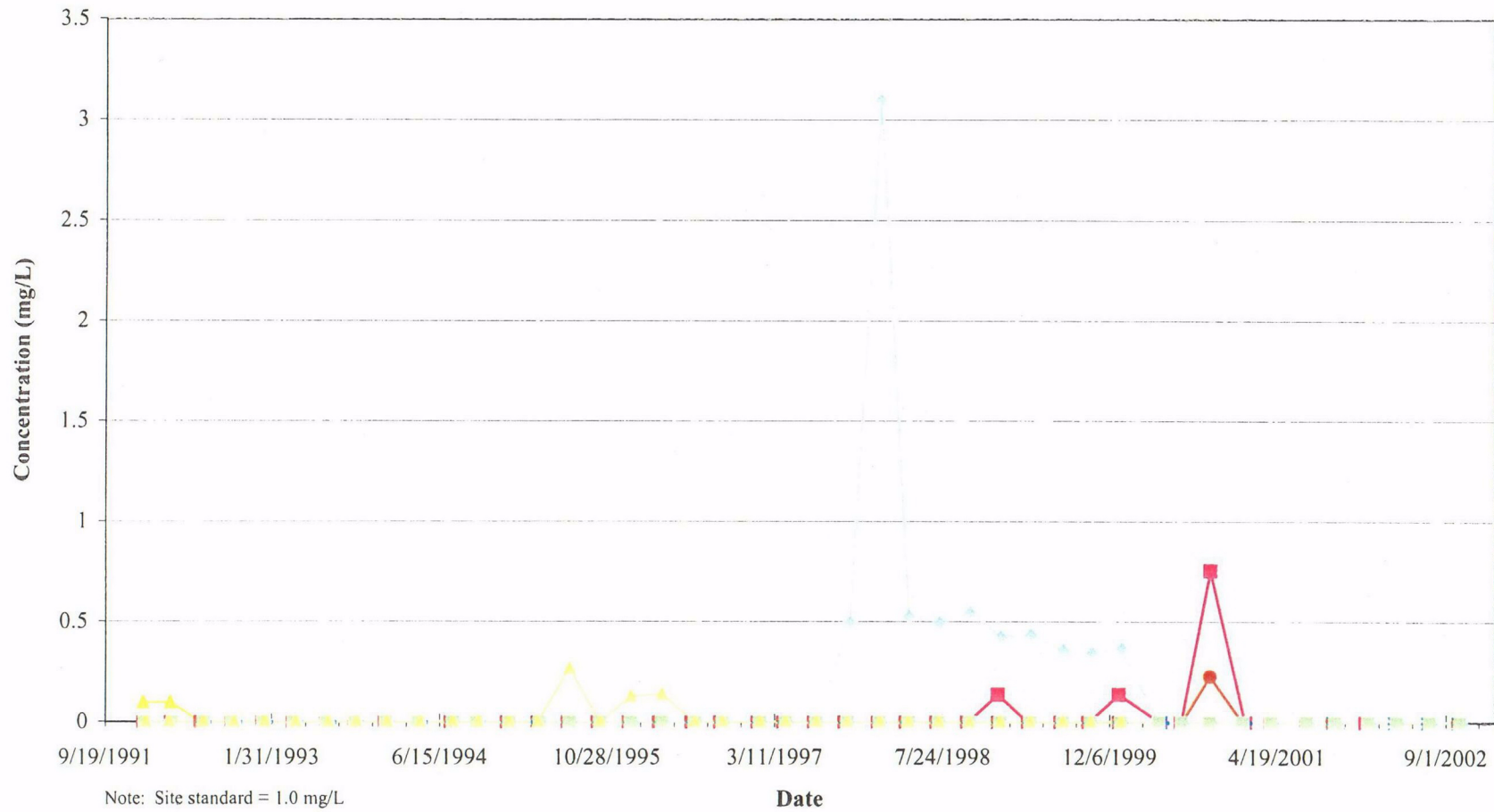
GRAPH 54
 Zone 1 Lead Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



GRAPH 55
 Zone 1 Manganese Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

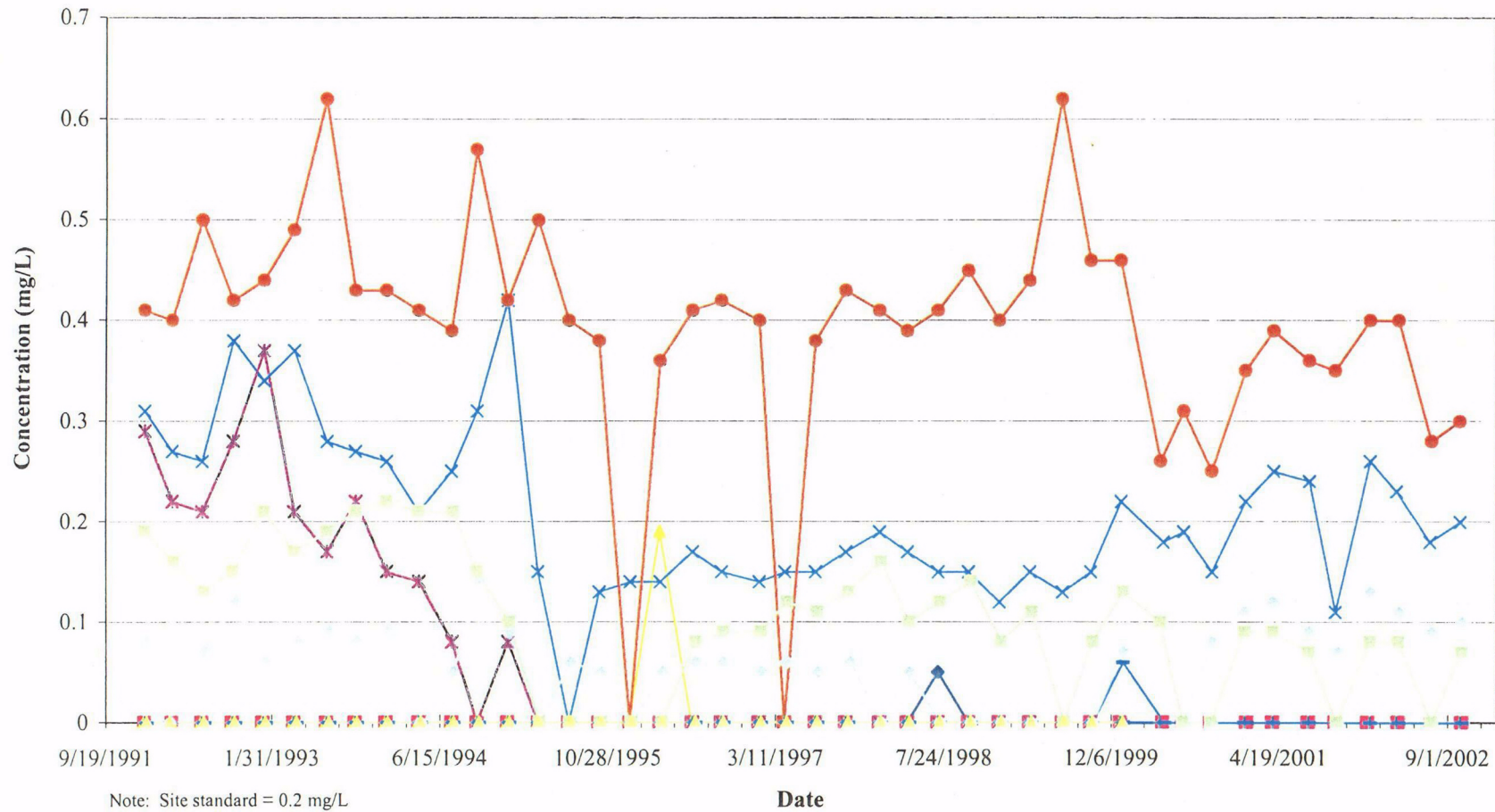


GRAPH 56
 Zone 1 Molybdenum Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

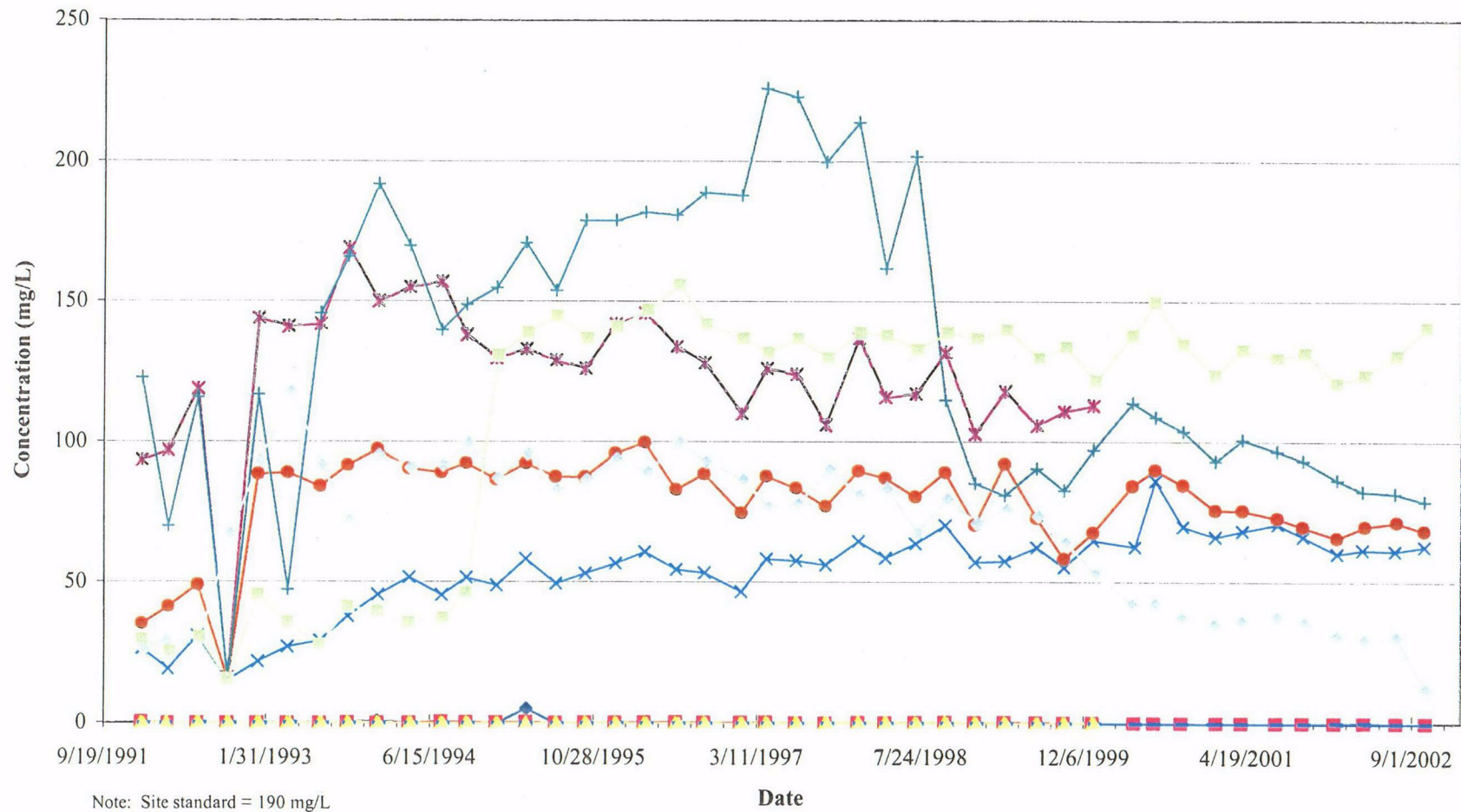
GRAPH 57
 Zone 1 Nickel Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



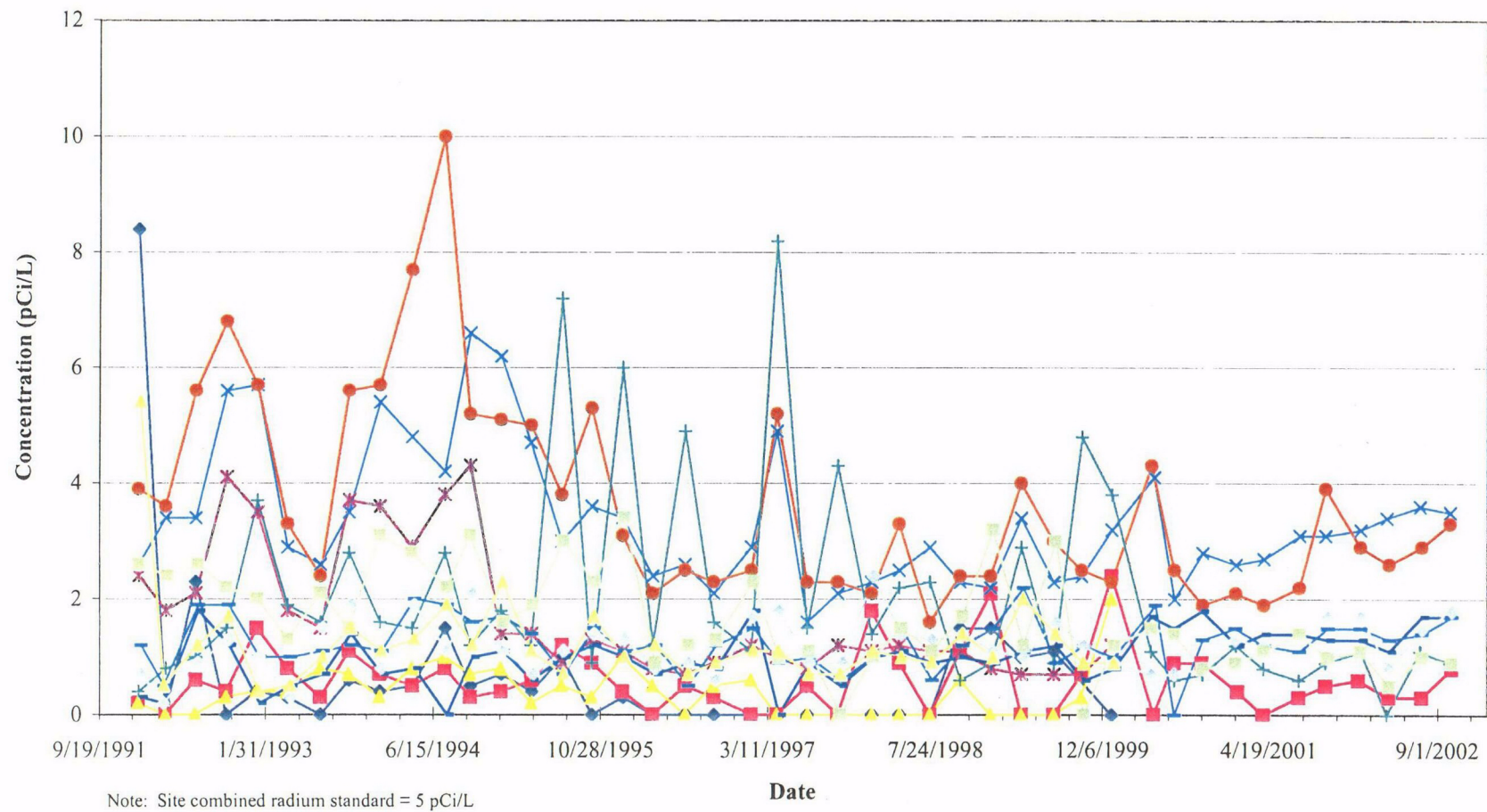
0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

C80

GRAPH 58
 Zone 1 Nitrate Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

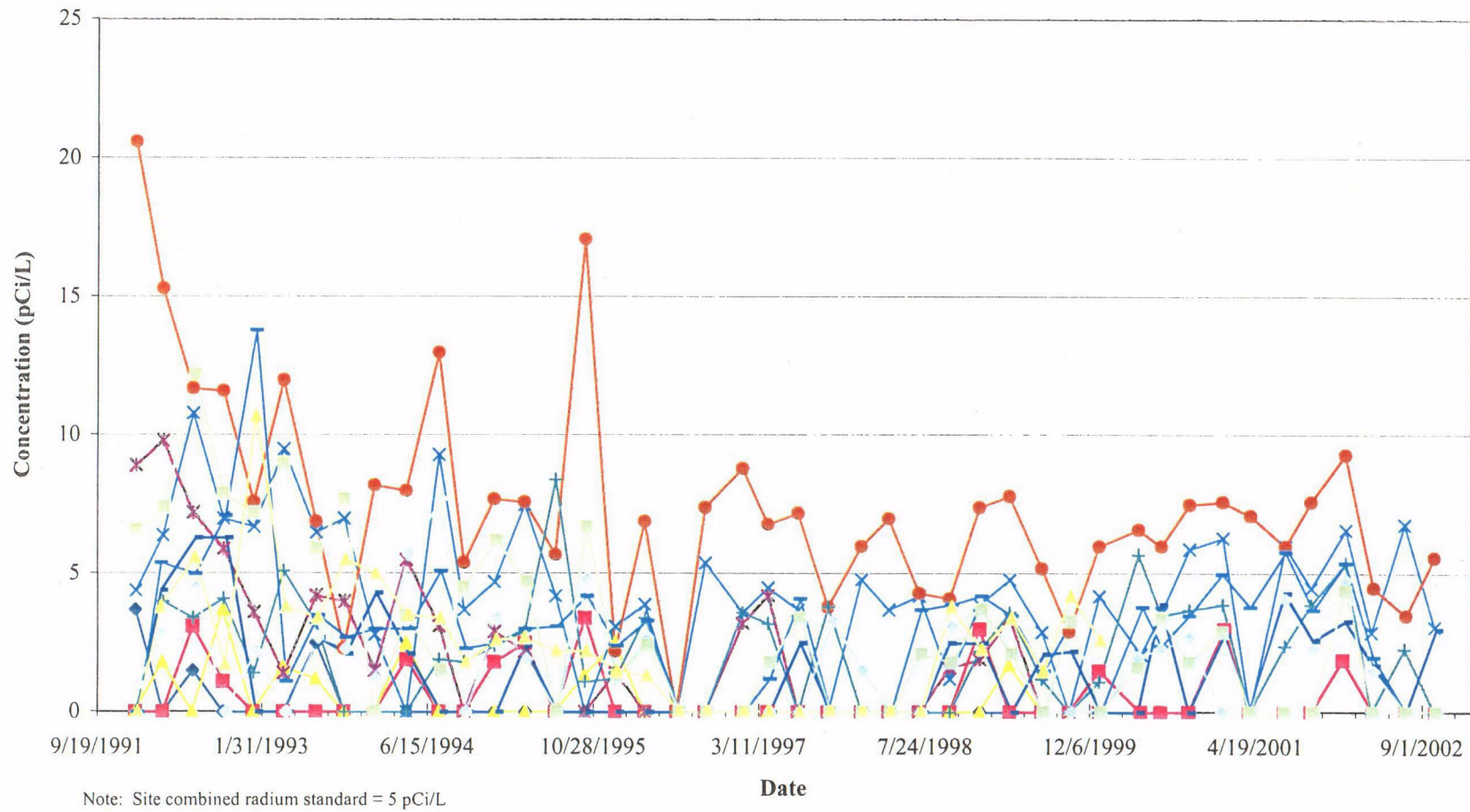


GRAPH 59
 Zone 1 Radium-226 Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

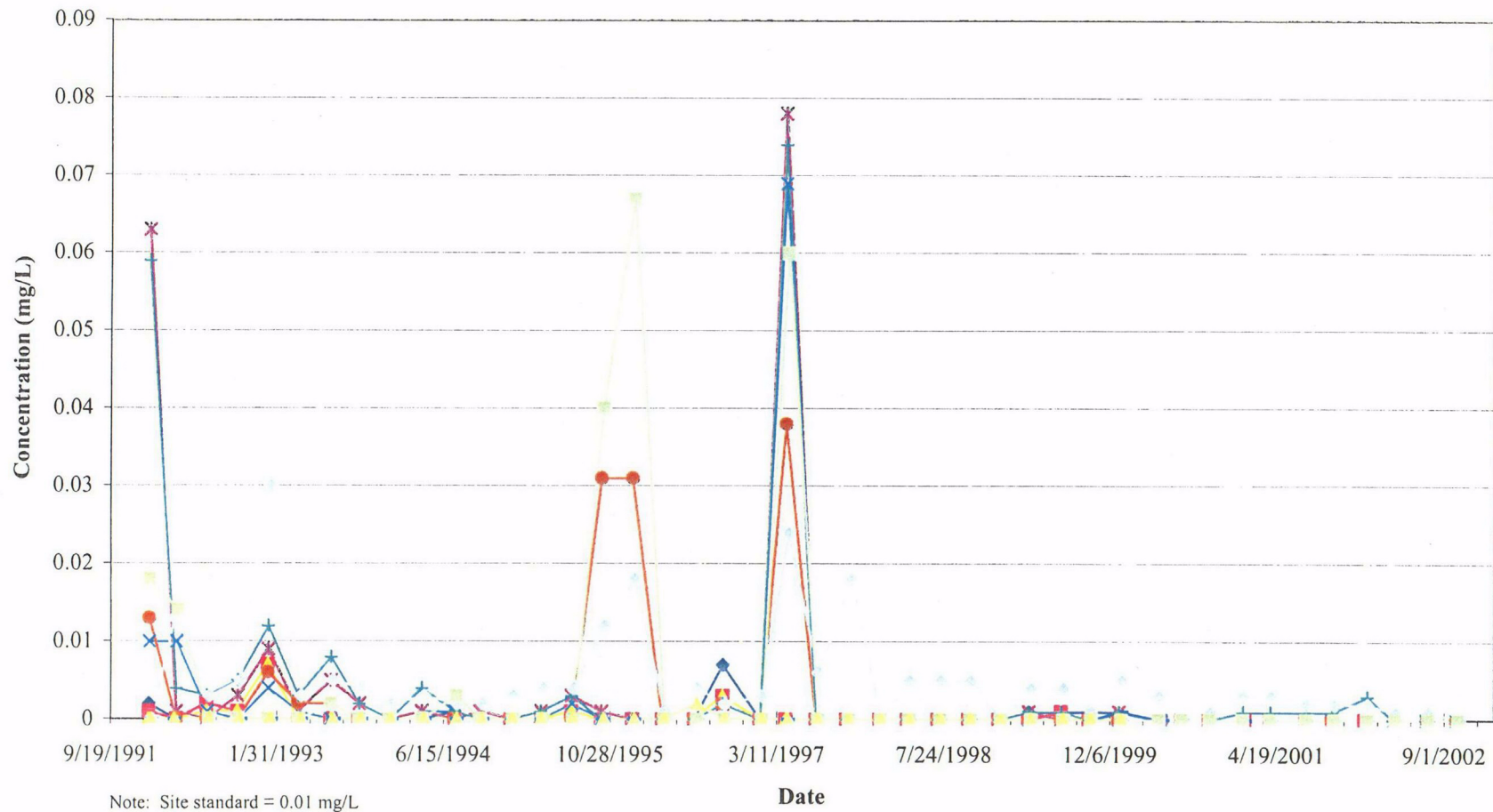


0141	0142	0143	0515 A	0516 A	0604	0614	EPA 02	EPA 04	EPA 05	EPA 07	EPA 08
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GRAPH 60
 Zone 1 Radium-228 Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

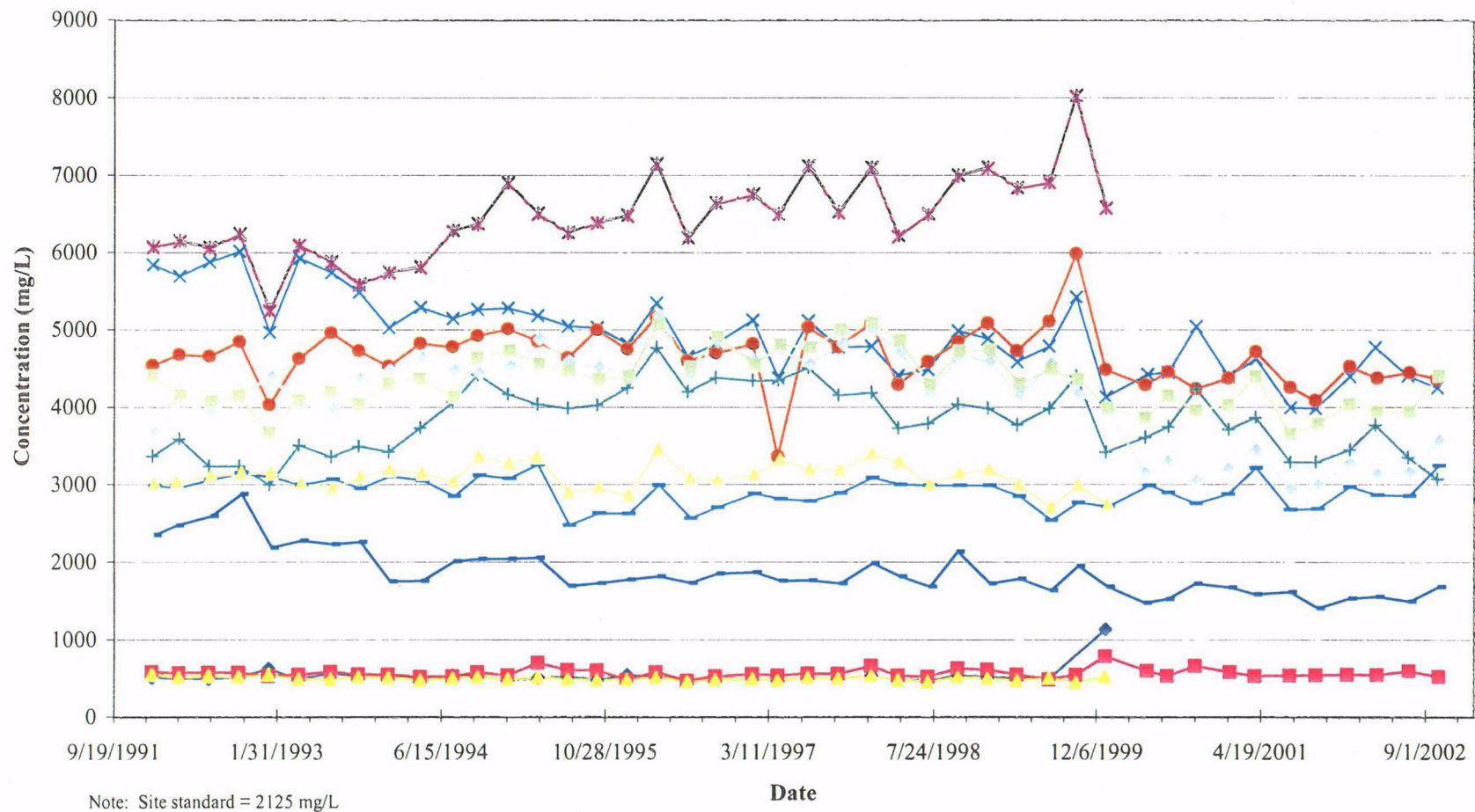


GRAPH 61
 Zone 1 Selenium Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

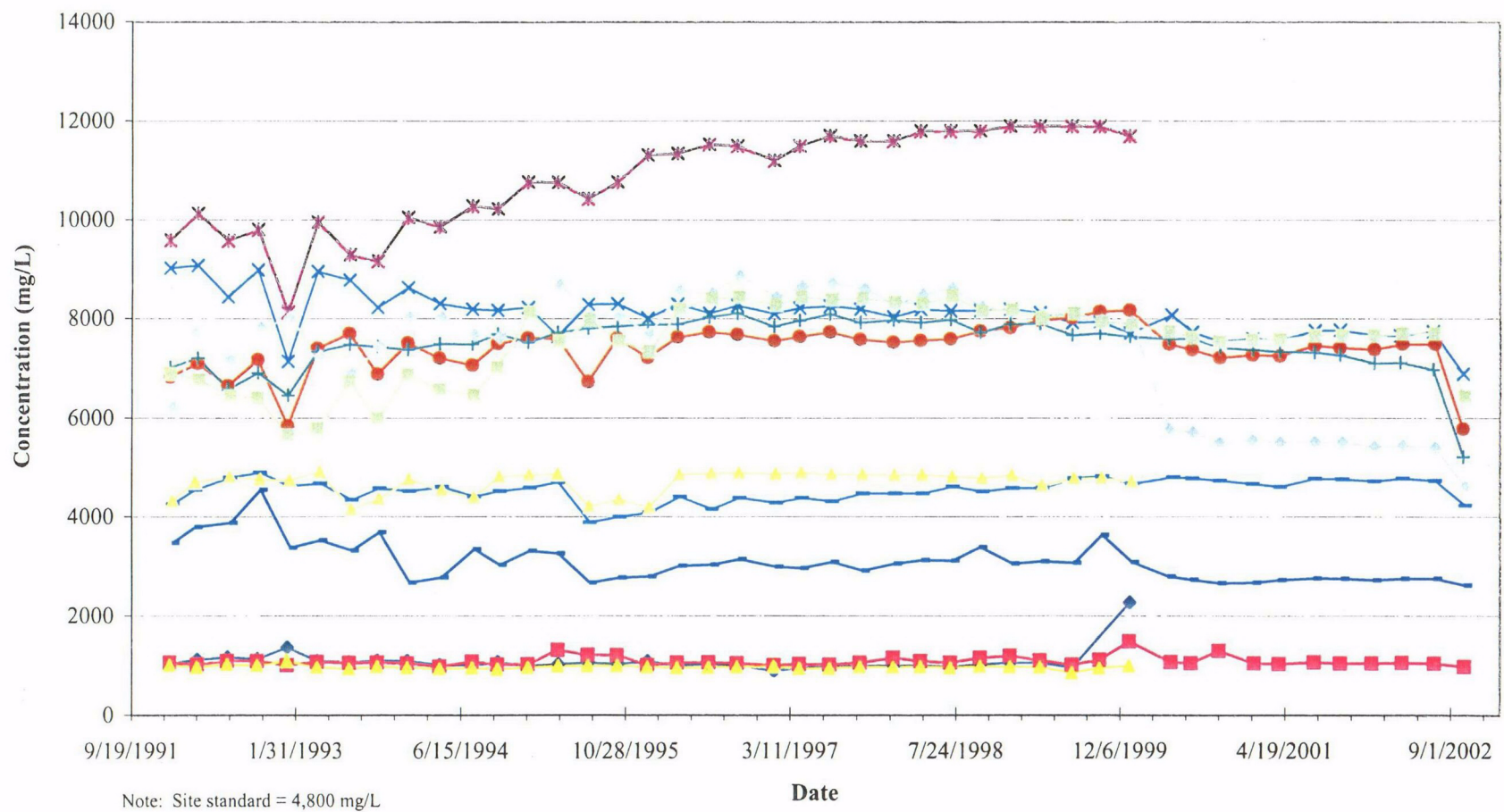


0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

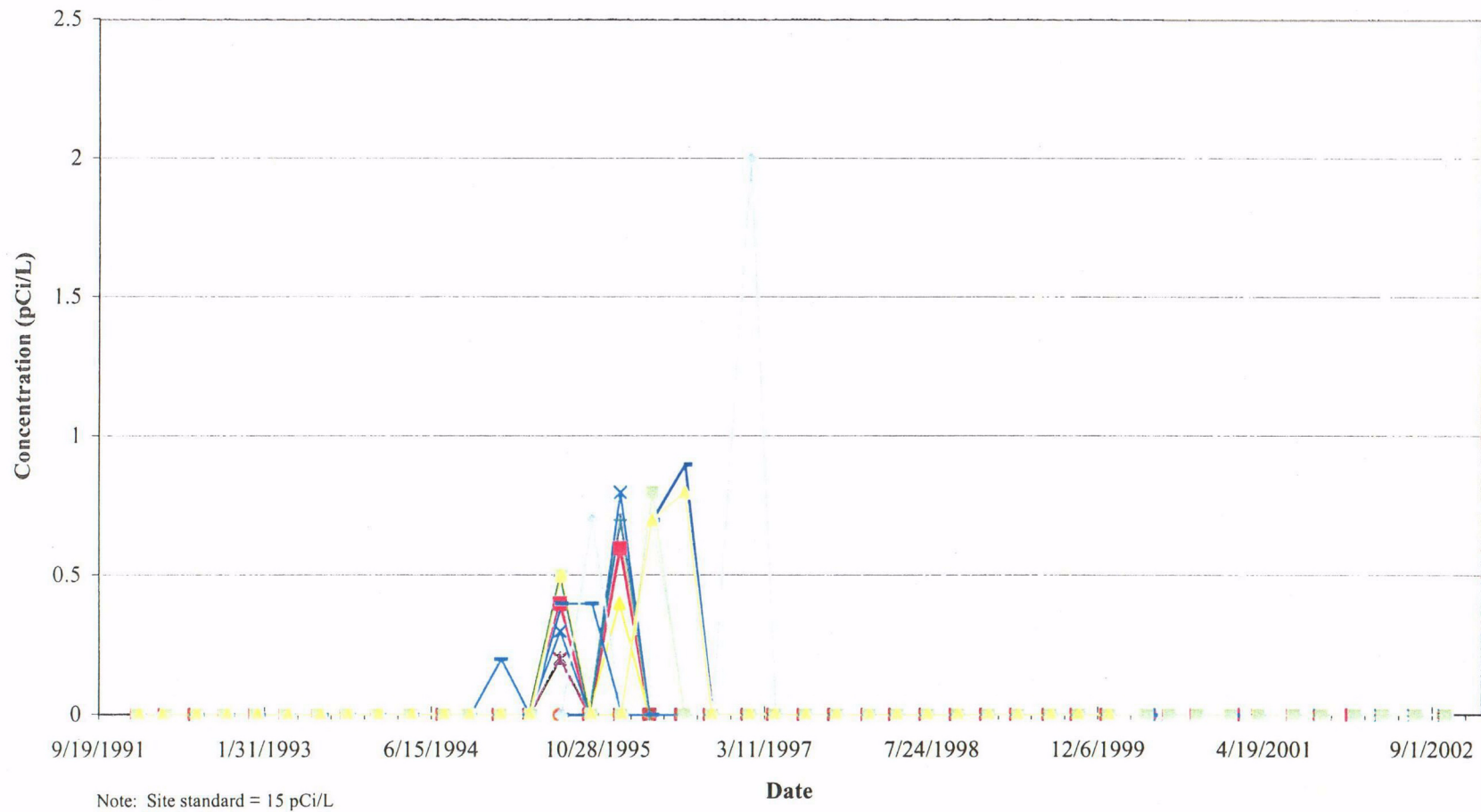
GRAPH 62
 Zone 1 Sulfate Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



GRAPH 63
 Zone 1 Total Dissolved Solids Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico

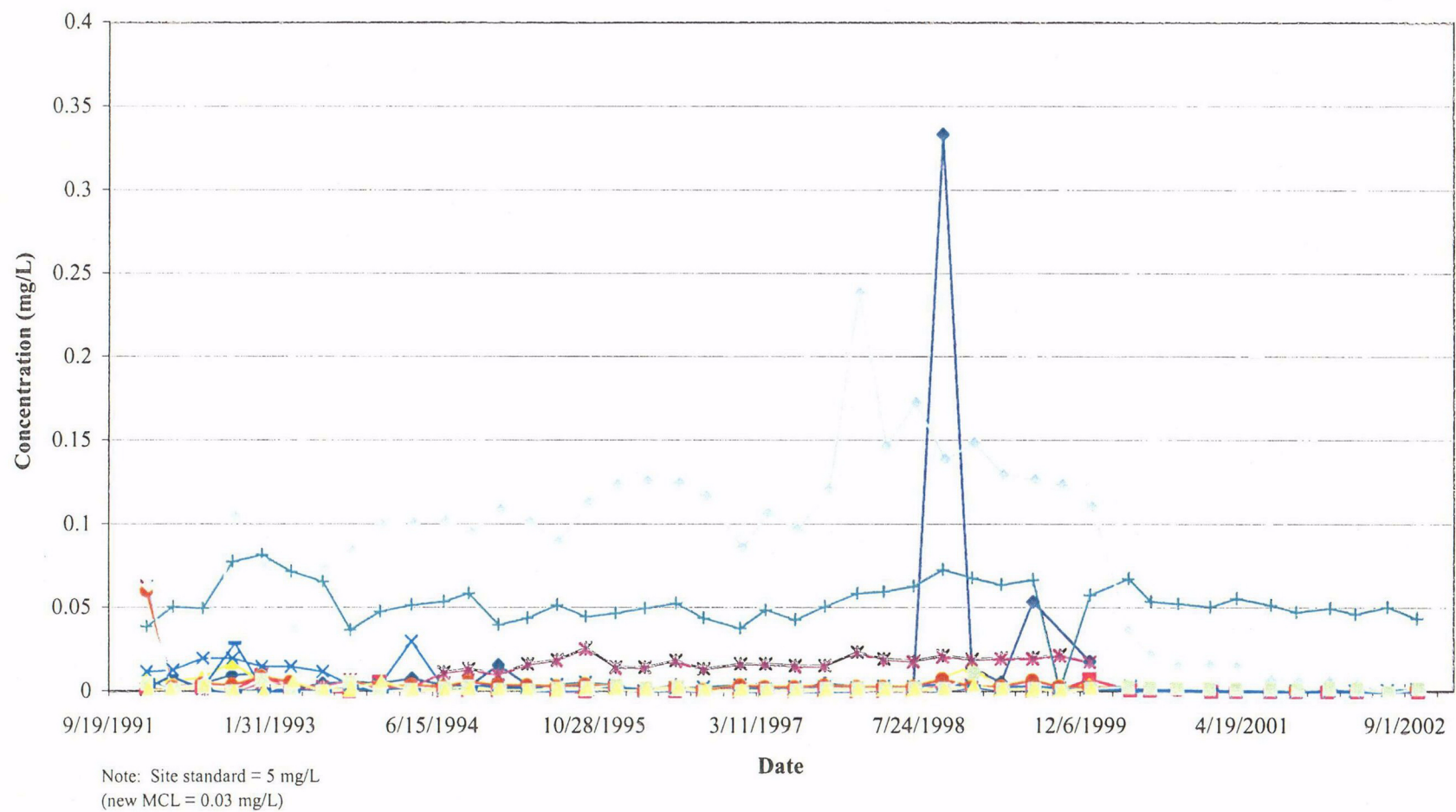


GRAPH 64
 Zone 1 Thorium-230 Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



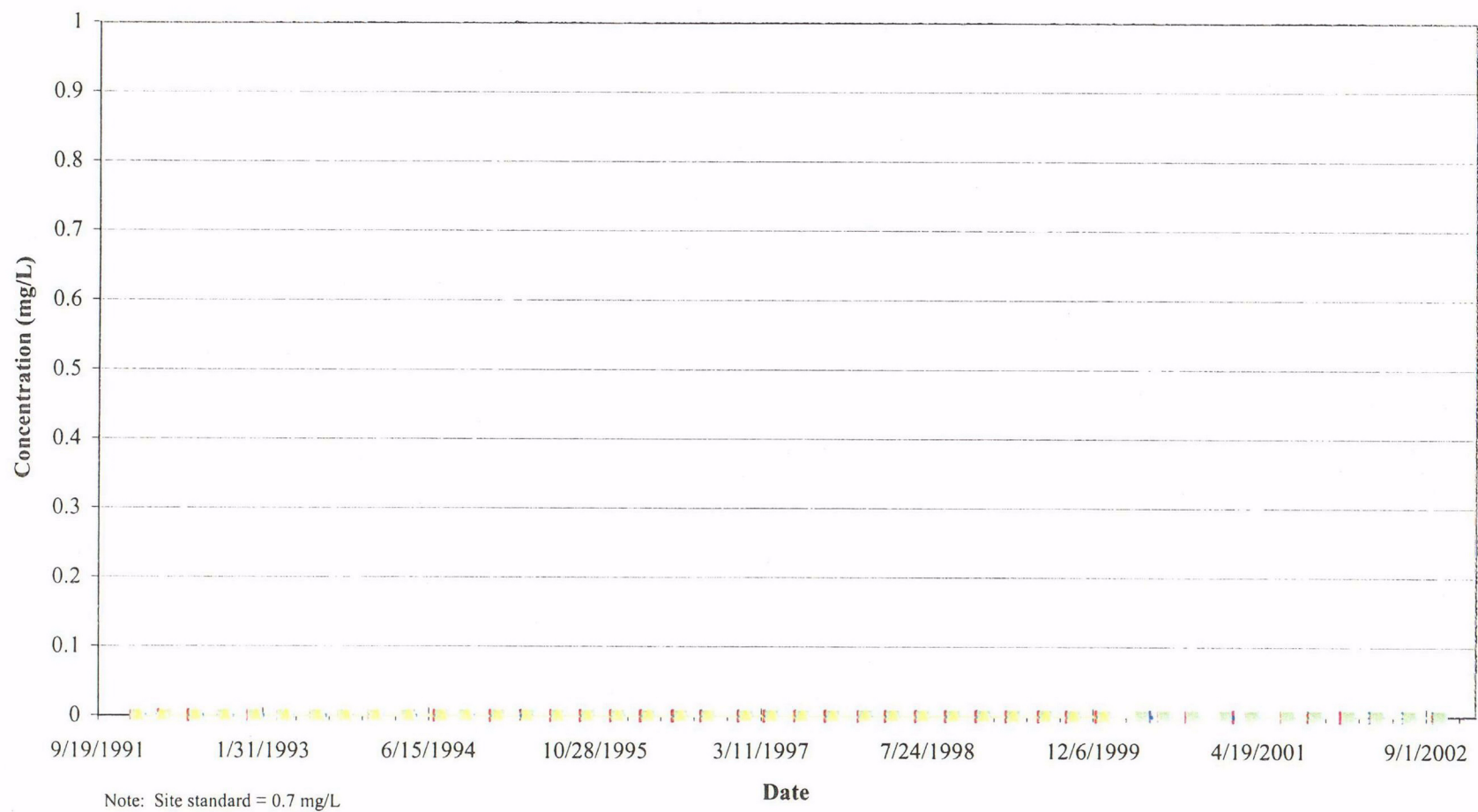
0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

GRAPH 65
 Zone 1 Uranium Concentrations
 United Nuclear Corporation, Church Rock Site
 Church Rock, New Mexico



0141 0142 0143 0515 A 0516 A 0604 0614 EPA 02 EPA 04 EPA 05 EPA 07 EPA 08

GRAPH 66
Zone 1 Vanadium Concentrations
United Nuclear Corporation, Church Rock Site
Church Rock, New Mexico



ATTACHMENT D
Site Inspection Photographs



Photograph No. 1

Photo of the North Cell, looking northwest

Note the contact between the grass and rock represents the extent of tailings

UNC Church Rock Site, New Mexico

Photograph taken on January 29, 2003

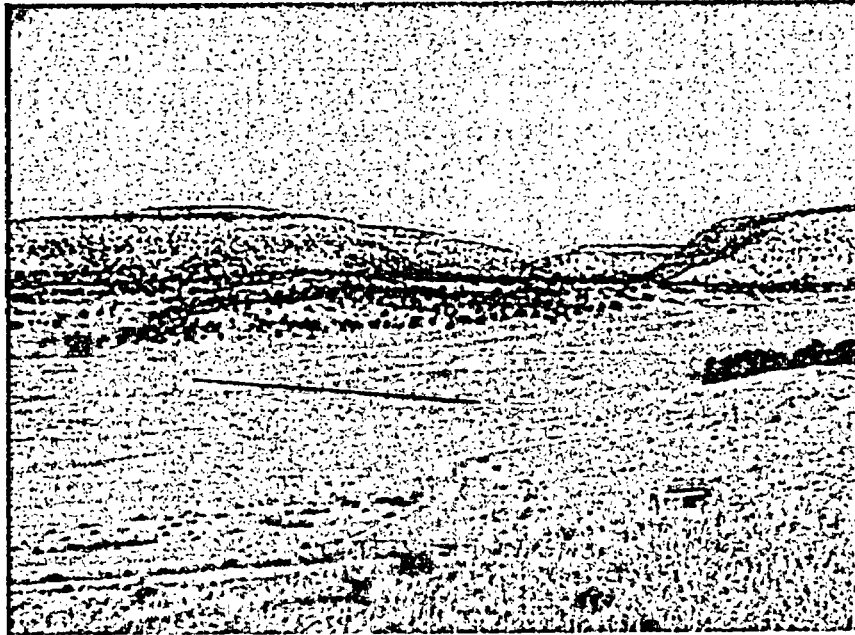


Photograph No. 2

Area overlying Zone 3 plume, looking northeast

UNC Church Rock Site, New Mexico

Photograph taken on January 29, 2003



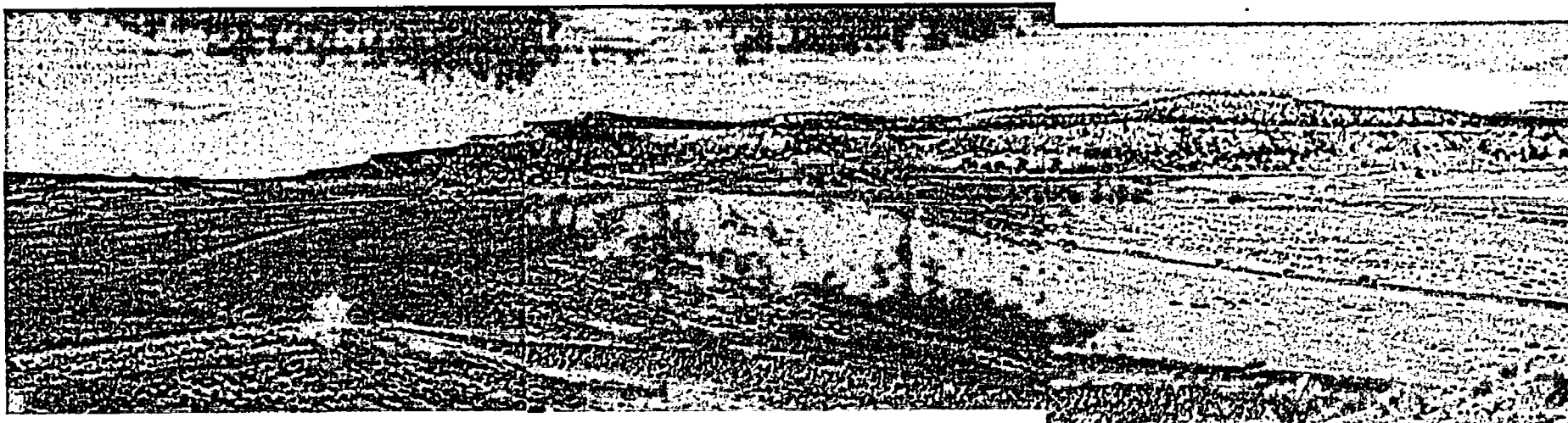
Photograph No. 3
Area overlying Zone 3 Plume, looking northeast
Plume boundary is just past telephone poles, as noted
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 4
Borrow pit that contributed to the Zone 1 plume, looking southwest
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 5
Burrow pit and area overlying Zone 1 plume, looking southwest
Note the fence is the property line
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



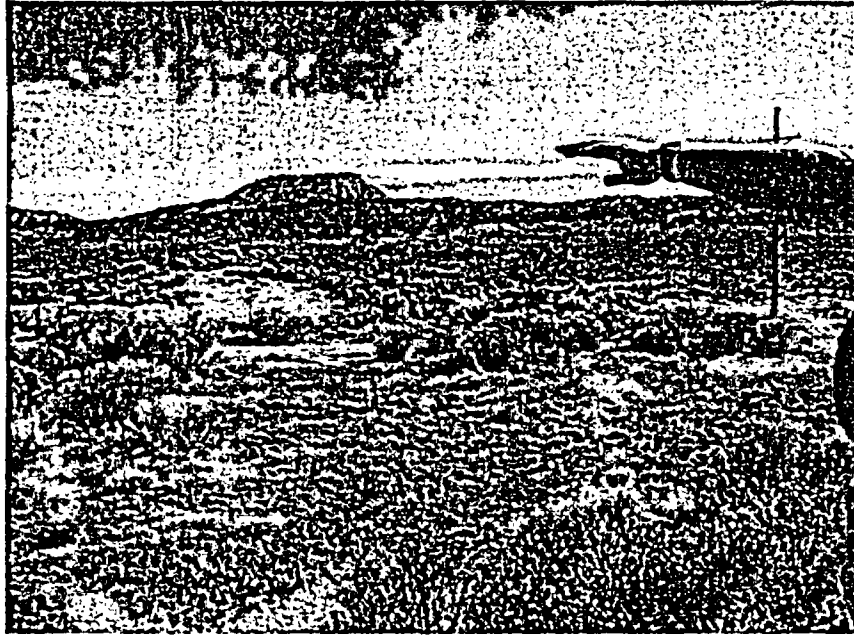
Photograph Nos. 6 - 8
Tailings ponds (photographed from the east)
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



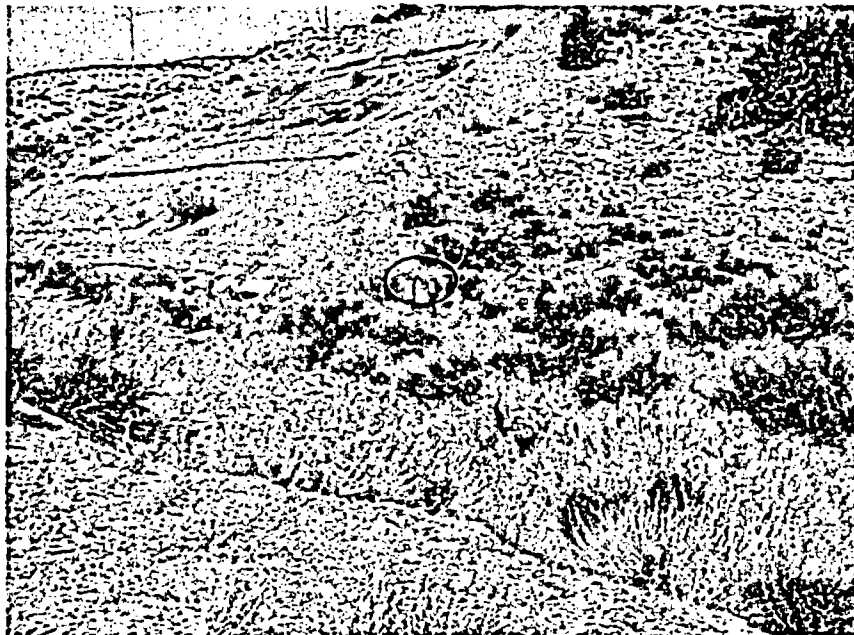
Photograph No. 9
Area overlying Zone 1 plume, arrow shows
direction of groundwater flow, looking east
 UNC Church Rock Site, New Mexico
 Photograph taken on January 29, 2003



Photograph No. 10
Area overlying Zone 1 plume, looking east
Note fence is property line
 UNC Church Rock Site, New Mexico
 Photograph taken on January 29, 2003



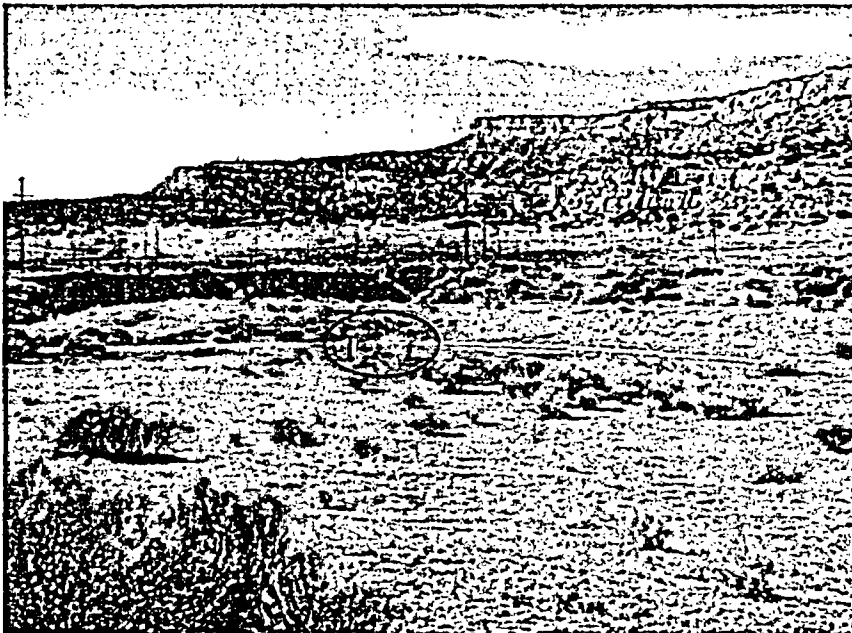
Photograph No. 11
Southern extent of area overlying Zone 1 plume, looking southeast
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 12
Zone 1 extraction well, looking east
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



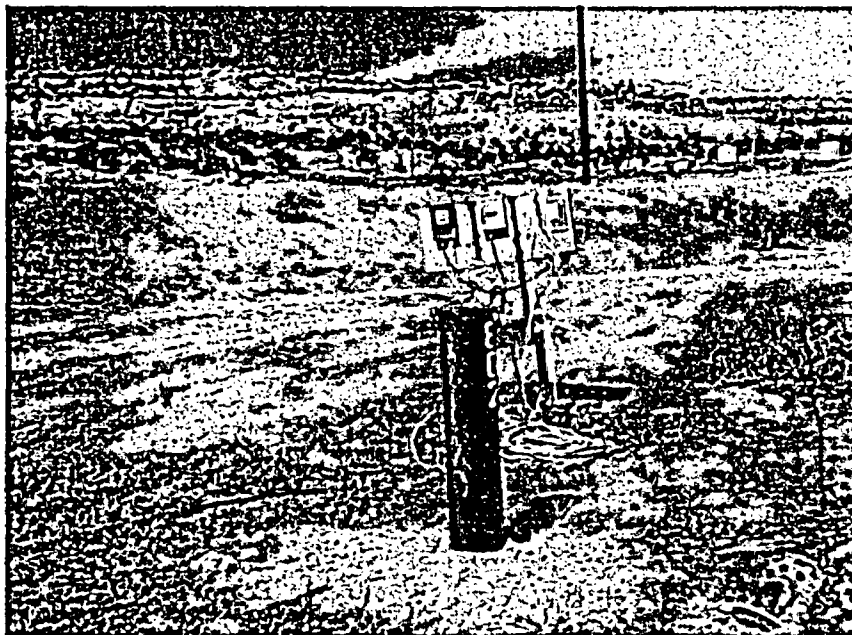
Photograph No. 13
Southwest Alluvium pump back well number 807, looking west
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 14
Southwest Alluvium pump back well number 802, looking west
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 15
Southwest Alluvium pump back well number 801, looking south
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 16
Southwest Alluvium pump back well number 802
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



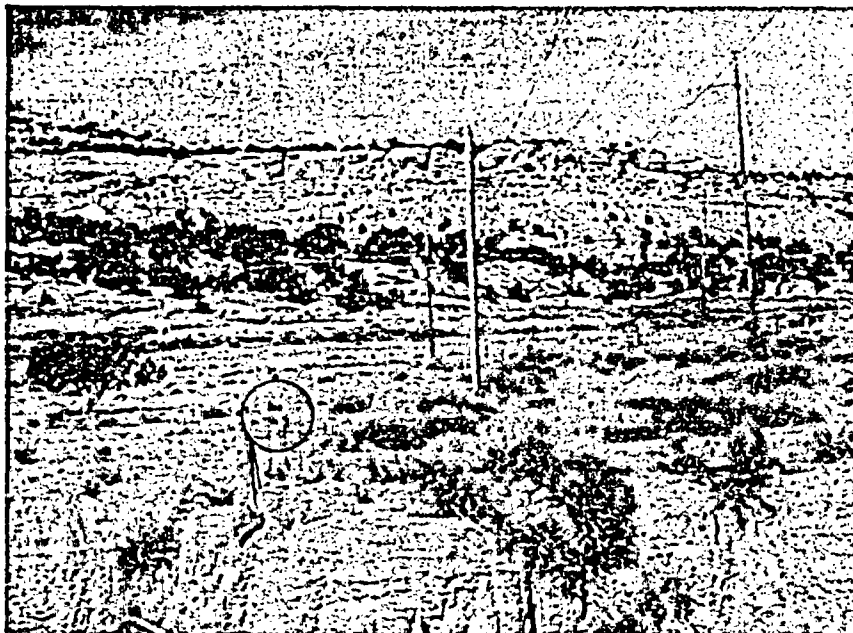
Photograph No. 17
Monitoring well 632
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 18
Monitoring well GW 2 at edge of arroyo, looking north
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



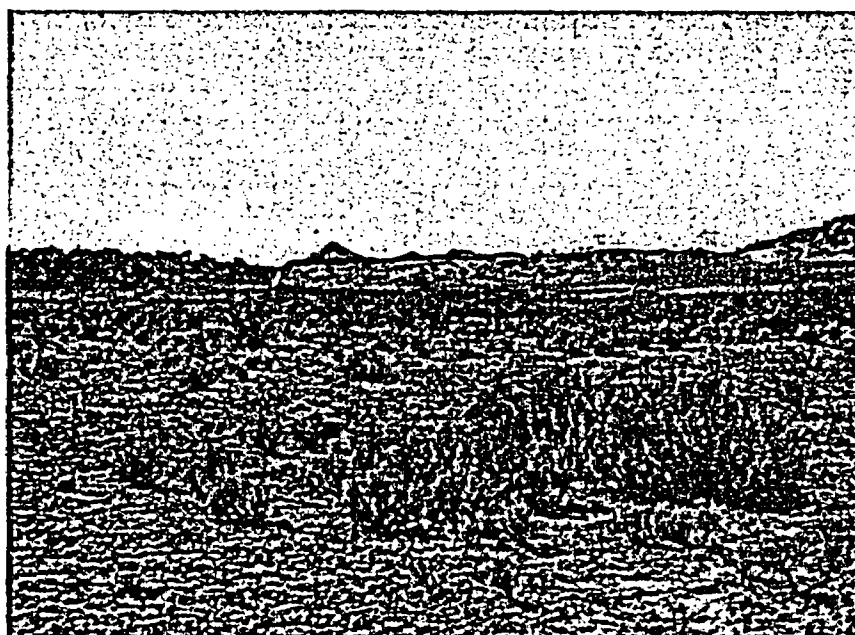
Photograph No. 19
View north in arroyo from GW 2
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 20
Monitoring well GW 3, looking west
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



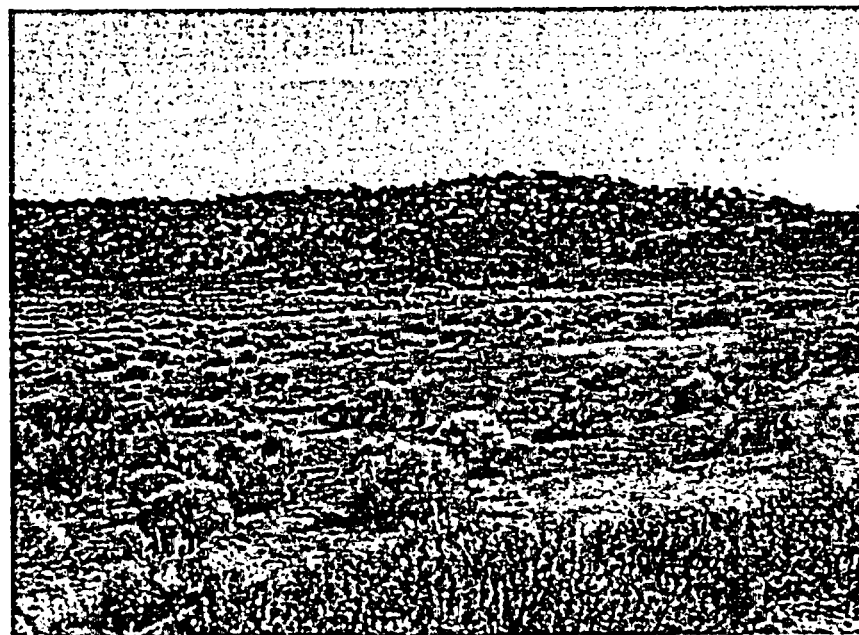
Photograph No. 21
Monitoring well GW 2, looking north
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 22
View looking south at area overlying Southwest Alluvium plume
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 23
Area underlying Southwest Alluvium plume, looking
south toward location of new monitoring well
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 24
Area overlying Zone 3 plume, looking northeast
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 25
Zone 3 plume boundary wells. Plume boundary
is approximately located under the center well
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



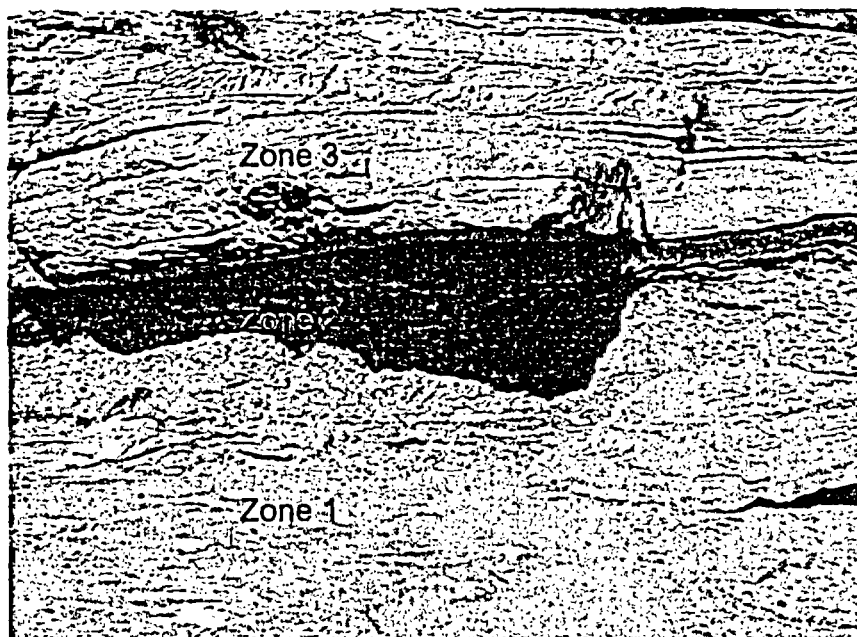
Photograph No. 26
Area overlying Zone 3 plume, looking north
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 27
Nickpoint in the Gallup Sandstone, looking north
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



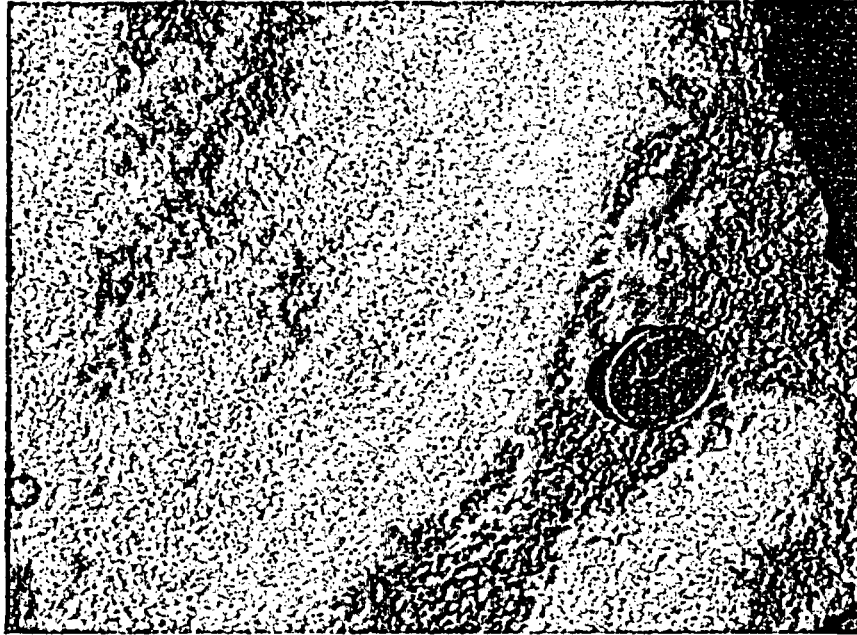
Photograph No. 28
Arroyo looking south in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



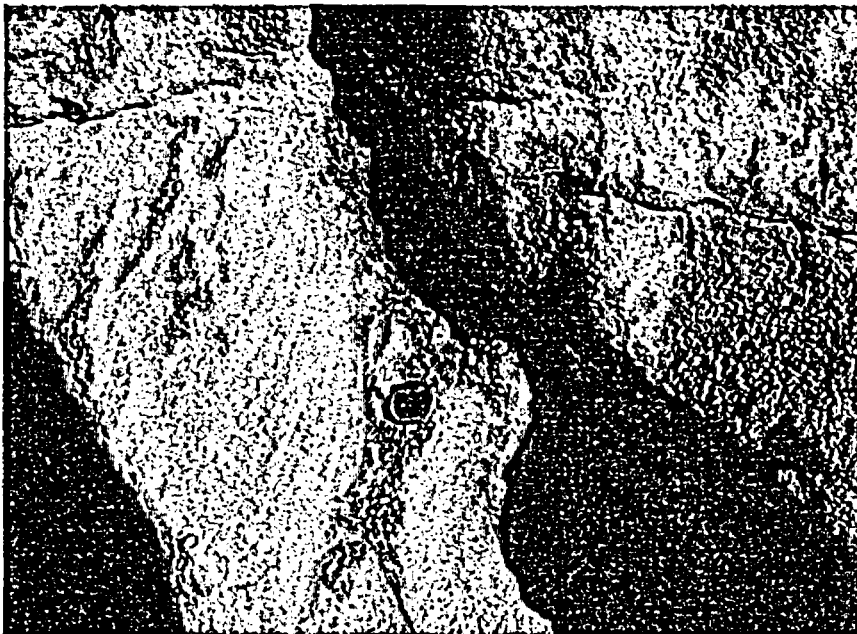
Photograph No. 29
Gallup Zones 1, 2, and 3 observed in nickpoint
 UNC Church Rock Site, New Mexico
 Photograph taken on January 29, 2003



Photograph No. 30
Gallup Sandstone, Zone 1, in nickpoint
 UNC Church Rock Site, New Mexico
 Photograph taken on January 29, 2003



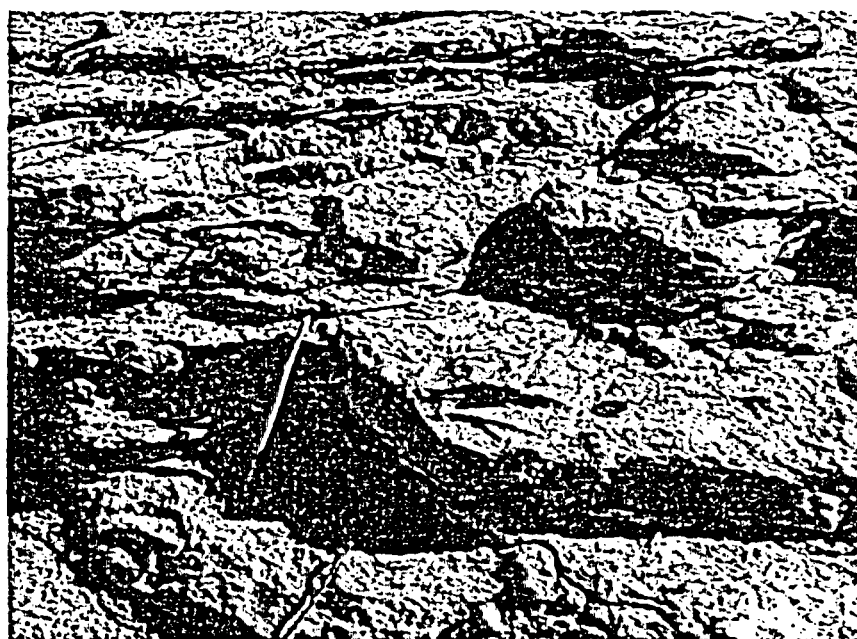
Photograph No. 31
Gallup Sandstone Zone 1, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 32
Gallup Sandstone Zone 1, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



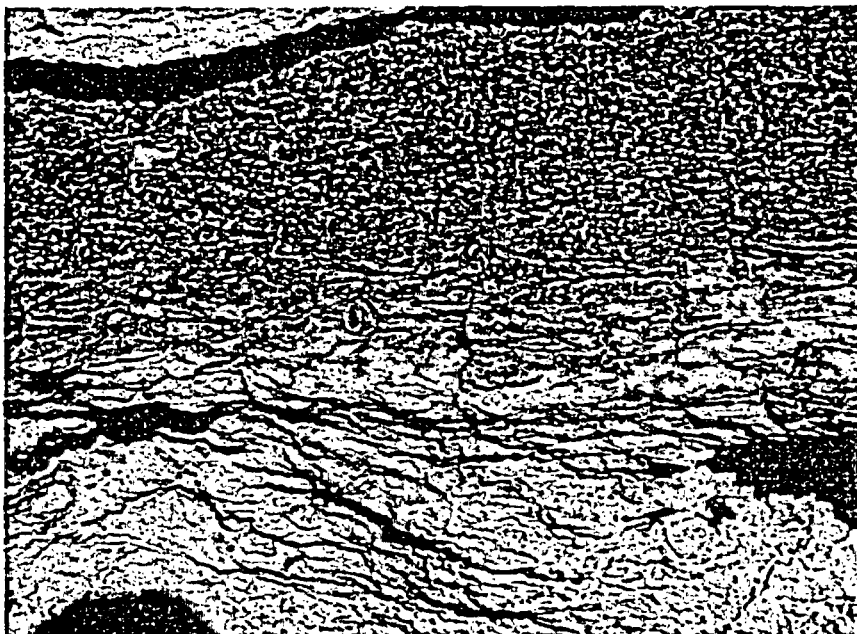
Photograph No. 33
Gallup Sandstone Zone 1, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 34
Gallup Sandstone Zone 1, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 35
Gallup Zone 2 observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



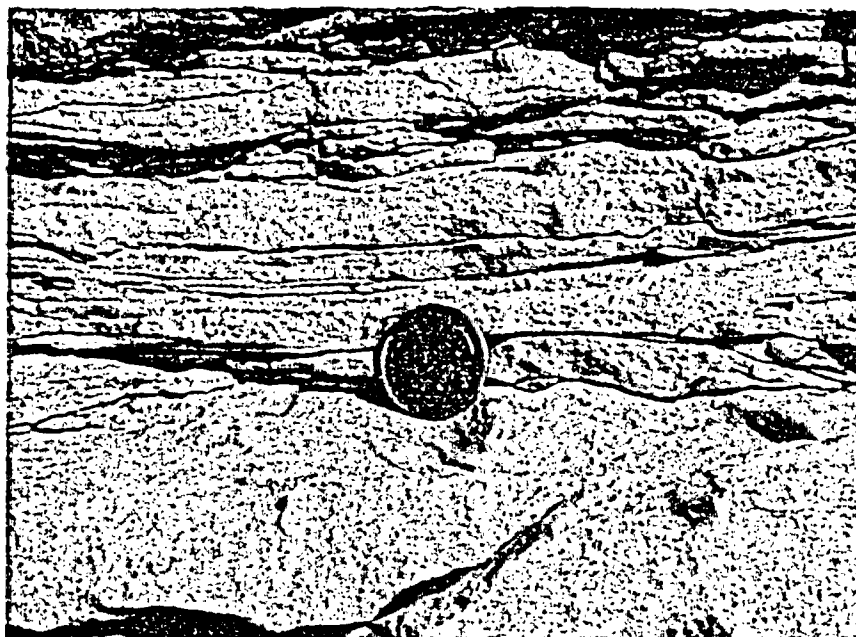
Photograph No. 36
Gallup Zone 2 observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



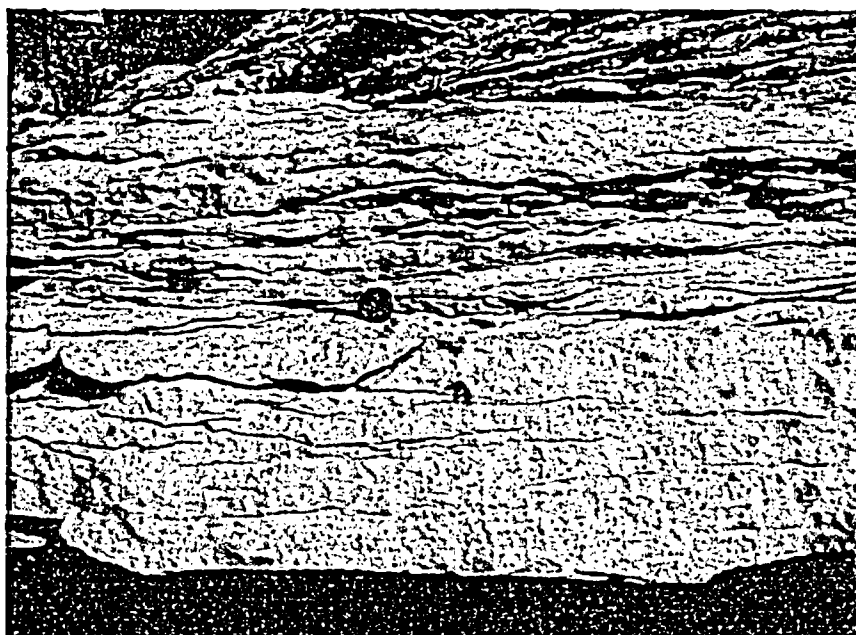
Photograph No. 37
Gallup Sandstone, Zone 3, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



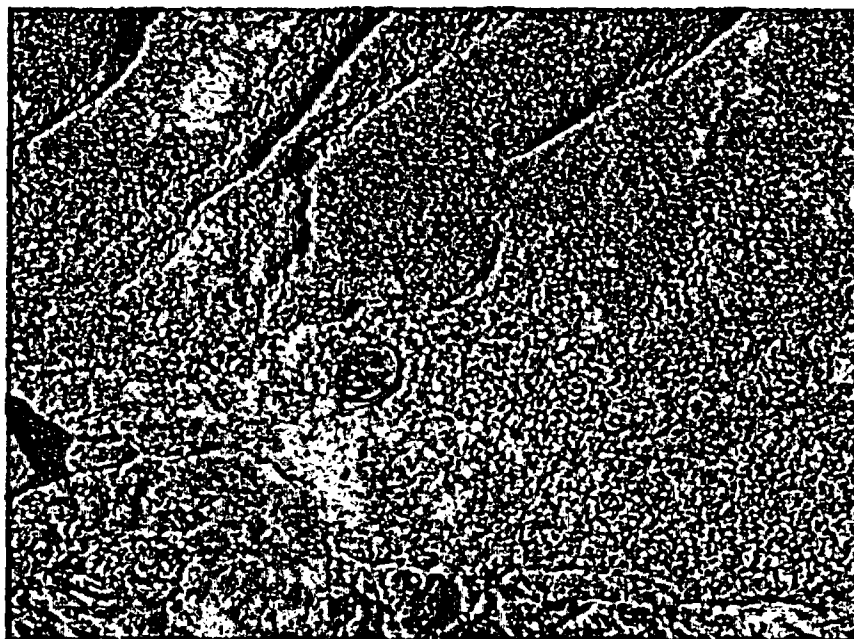
Photograph No. 38
Gallup Sandstone, Zone 3, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 39
Gallup Sandstone, Zone 3, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 40
Gallup Sandstone, Zone 3, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 41
Gallup Sandstone, Zone 3, observed in nickpoint
 UNC Church Rock Site, New Mexico
 Photograph taken on January 29, 2003



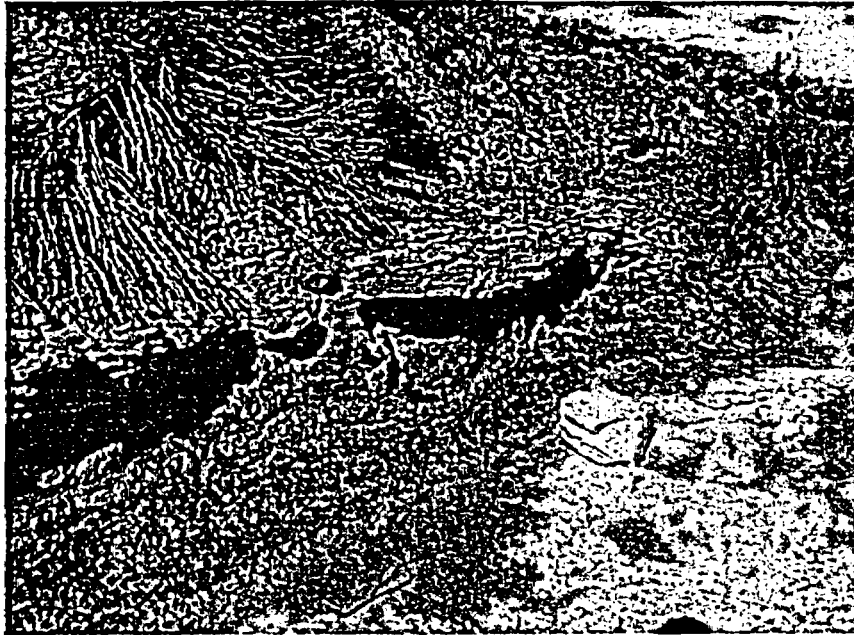
Photograph No. 42
Gallup Sandstone, Zone 3, observed in nickpoint,
arrow indicates closeup in previous photo
 UNC Church Rock Site, New Mexico
 Photograph taken on January 29, 2003



Photograph No. 43
Gallup Sandstone, Zone 3, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 44
Dilco Coal Member overlying Gallup Sandstone, observed in nickpoint
UNC Church Rock Site, New Mexico
Photograph taken on January 29, 2003



Photograph No. 45

Dilco Coal Member overlying Gallup Sandstone, observed in nickpoint

UNC Church Rock Site, New Mexico

Photograph taken on January 29, 2003

ATTACHMENT E
Interview Records

INTERVIEW RECORD

Site Name:	United Nuclear Corporation	EPA ID No:	NMD030443303
Location:	McKinley County - Church Rock, NM		
Subject:	EPA Five-Year Review Interview	Date of Interview:	04-16-03
Type:	<input checked="" type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other		
Location of Visit:			
Description of Other:			
Contact Made By:			
Name:	Mark Purcell	Title:	Project Manager
		Organization:	USEPA
Address:	USEPA Region 6, 6SF-LP, 1445 Ross Avenue, Dallas, TX 75202		
Telephone:	214-665-6707		
E-mail:	purcell.mark@epa.gov		
Individual Contacted			
Name:	Robin Brown	Title:	Project Manager
		Organization:	NMED
Address:	P.O. Box 26110, 1190 St. Francis Drive, Santa Fe, NM 87502-6110		
Telephone:	505-827-2434		
E-mail:	robin_brown@nmenv.state.nm.us		
Interview Questions			
1.	<p><i>What is your overall impression of the project (general sentiment)?</i></p> <p>All of the agencies are working together to find the appropriate remedy. However, if the site remedy is going to change, changing it may take a long time because there are a lot of entities involved in the decision and because some of the considered remedy changes (technical impracticability or alternate abatement standards) may require hearings or administrative approval from the agencies or the Water Quality Control Commission.</p> <p>Also, there has been a lack of continuity with the regulatory staff. The site managers for the U.S. Nuclear Regulatory Commission (NRC), EPA and the New Mexico Environment Department (NMED) are all relatively new (1-2 years) to the project. This makes it difficult to understand the Site history, the individual perspectives and what direction or actions should be considered.</p>		
2.	<p><i>From your perspective, what effects have site operations had on the surrounding community?</i></p> <p>Livestock does get onto the Site to graze and drink water from the evaporation pond, so they could be exposed.</p>		

3. *Are you aware of any community concerns regarding the site or its operation and administration? If so, please provide details.*

I did have the opportunity to give a presentation to the community at a meeting held at the Pinedale Chapter House on April 9, 2003. The issues raised at the meeting included the following:

- The Southwest Research Center (SRC) out of Albuquerque, NM, in working with the community on a project to assess how abandoned uranium mines (AUM) have impacted Navajo lands, is concerned that the background levels used to establish ground water cleanup standards are too high. The SRC believes that ground water concentrations after clean up will be above health-based benchmarks and wants something done about it. It also mentioned an interest in pursuing natural resource damage claims.
- Diana Malone of the Navajo EPA also stated that her agency was concerned about the background levels, the loss of a ground water resource and the need to prevent ground water contamination from leaving the Site. See also Five-Year Interview with Diana Malone, Navajo EPA.

4. *Have there been routine communications or activities (e.g., site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please describe purpose and results.*

NMED has been given the opportunity to review and comment on reports associated with the ground water remediation at the Site. NMED approved changes in the Site ground water cleanup standard for sulfate, nitrate and total dissolved solids (TDS) to better reflect background conditions. Although NMED agreed to such changes, it is noted that the level for nitrate is so high, it does not appear to reflect natural conditions.

NMED has conducted Site visits. During one of those visits, NMED commented on the sampling procedures, which resulted in the United Nuclear Corporation (UNC) changing its procedures. Those comments reflected changes in what is recorded during sample collection. NMED also has commented on the sloppy sampling procedures related to health and safety and the possible contamination of samples. UNC has not changed these procedures.

5. *Have there been any complaints, violations, or other incidents related to the site that require a response by your office? If so, please describe the events and results of the responses.*

None that I am aware of over the last five years.

6. *Is the ground-water remedy progressing in accordance with NMED's expectations for the site? Please explain.*

NMED recognizes that UNC has tried for many years to clean up the Site. However, there appears to be movement by several parties to permanently stop active remediation, at least for the Southwest Alluvium and Zone 1.

Southwest Alluvium: NMED has looked at the trend data over time and believes that pumping is still effective for some wells in some areas. NMED also believes that unless active remediation is again implemented in this ground water zone, then everything that could be done to clean up the ground water (*i.e.*, the goals for ground water remediation as defined in the EPA's Record of Decision) is not being done.

NMED has noted that contaminant concentrations from samples taken in a few monitoring wells located near to, and downgradient of, designated pumping wells are trending either upward or downward and are different from trends of wells that are not affected by the tailing leachate. This indicates that pumping is having an effect. NMED has also noted that some contaminant levels, including sulfate and uranium, are rising in some of the wells since pumping stopped (*see also* Response to Question No. 10, below). Uranium is still below the standard in these wells.

Zone 1: NMED has not looked at data trends for Zone 1, but since we cannot pump water from the Zone, there is not much else we can do to clean it up. We should continue to watch data trends in samples collected from this zone.

Zone 3: NMED supports continuing active remediation in Zone 3. NMED believes that the pumping of wells in different configurations than we have now should be considered.

Pump and Evaporation System: Water cannons are currently used to spray water onto the tailing cover for evaporation. NMED is concerned that some of the water could infiltrate downward into the tailing pile and promote leachate formation, which then could move downward into the ground water. UNC has completed calculations to evaluate this concern, but has not performed any actual field testing for verification of its calculations.

Evaporation Ponds: It is NMED's understanding that UNC has not verified that leaching is not occurring from the ponds thru the tailing pile and into the ground water.

Institutional Controls: The Superfund Oversight Section of NMED is uncertain about the mechanisms that are available to enforce institutional controls (ICs). Further, the State of New Mexico has very limited ability to enforce ICs and it cannot implement restrictions that run with the land.

6. (Continued)

Technical Impracticability: If it is determined that the existing NM cleanup standards are not achievable, either the EPA can issue a Technical Impracticability (TI) waiver or the State can approve of Alternate Abatement Standards (AASs). If AASs are selected, the EPA would not need to issue a TI waiver and, hence, our understanding is that a ROD amendment would not be required. EPA would need to check to determine if this is correct. The selected AASs would then be considered new applicable or relevant and appropriate requirements (ARARs). This applies to analytes such as sulfate that do not have EPA drinking water standards.

7. *From NMED's perspective, have any of the changes in site operations had an effect on the protectiveness or effectiveness of the ground-water remedy? Please explain.*

Site Operations - Southwest Alluvium: The temporary shutdown of pumping operations for the Southwest Alluvium seems to have had an effect on contaminant levels at some of the wells (i.e., levels are increasing). If the operational shutdown continues, it may have a detrimental effect by allowing the contaminant plume to spread. Also, some constituents which now are below cleanup standards may rise to levels which exceed those standards.

Site Operations - Zone 1: Ground water pumping was not effective because the volume of water recovered was so low.

Site Operations - Zone 3: Shutting down the pumping operations was a good decision by the EPA because pumping was contributing to the spreading of the contaminant plume; however, a revised extraction well pattern should still be considered.

8. *Are you aware of any changes in state environmental standards since the time the remedial approach was delineated which may call into question the protectiveness or effectiveness of the remedial approach?*

I am not aware of any changes. It is noted that the EPA's Maximum Contaminant Level (MCL) for uranium in drinking water is 30 micrograms per liter ($\mu\text{g/L}$) (Effective in December, 2003) or 0.03 parts per million (ppm). The current NM ground water standard for uranium is 5.0 ppm. However, NMED is currently considering revising the uranium standard to 7 $\mu\text{g/L}$ or 0.007 ppm.

9. *Do you feel well informed about the site's activities and progress?*

With regards to the ground water remediation, we receive copies of all documents. For the reclamation and closure activities being performed under the NRC's regulatory authority, NMED has not received all the documents. NRC does provide some documents and correspondence to NMED, and they are trying to keep NMED informed about the activities at the Site. However, it is noted that the NRC is not required to submit copies of all the documentation to NMED.

Sometimes UNC acts or performs tests without informing the regulatory agencies. For example, last year UNC installed several Zone 3 monitoring wells to further delineate the downgradient limit of the contaminant plume and its flow velocity. NMED was not informed about those wells until after they were installed. UNC should prepare draft work plans for the regulatory agencies to review and approve before implementing them.

10. *Do you have and comments, suggestions, or recommendations regarding the site's management or operation?*

- NMED is concerned with the uranium and sulfate levels in the Southwest Alluvium. UNC should be monitoring uranium levels closely. For example, the monitoring wells showing an upward trend in uranium levels need to be reported on more than semi-annually, while remedy remains inactive. UNC also needs to evaluate and explain why such trends are occurring. If there is a possibility that the uranium standard will be exceeded, then UNC needs to propose appropriate actions to prevent such a condition from occurring.

UNC should evaluate if rebound is occurring or if different permeability zones are affecting the plume.

NMED does not currently support a technical impracticability waiver (under EPA) for sulfate or TDS in the southwest alluvium because trends for these constituents were decreasing for many downgradient wells and changing (either up or down) for many pumping wells while remediation was active and because trends in most of the downgradient wells changed after pumping stopped. These factors indicate that more could still be done to achieve the ROD cleanup goals in this ground water zone. If UNC can show statistically that trends in wells affected by the plume during active remediation are similar to trends in wells not affected by the Site, then they may have a case to support technical impracticability because this would indicate that pumping is not having an affect.

10. (Continued)

If AASs under the State of New Mexico are pursued at this Site instead of technical impracticability under EPA, then UNC needs to show that projected levels of contaminant will not decrease more than 20% in 20 years. At this time, we believe that AASs for sulfate in the southwest alluvium is not supportable because sulfate levels in pumping wells and downgradient wells continued to decrease while the wells were pumping.

NMED would like to point out that in the "approval to stop pumping" that EPA issued on November 15, a statement was made that "If there are any statistically significant increases in constituent concentrations in the monitoring wells, the southwest alluvium extraction system will be turned back on immediately." Concentrations of several constituents (including bicarbonate, chloride, sulfate, TDS, and uranium) have increased in downgradient monitoring wells (GW-1, GW-2, GW-3, and EPA28). These data trends are shown in Table B.6 of the Final Report and Technical Impracticability Evaluation, Southwest Alluvium Natural Attenuation Test Church Rock Site, dated November 2002.

- For Zone 3, UNC should resume active remediation after analyzing the zone to determine what approach would be best and getting approval from the agencies.
- Independent samples need to be collected (split) and sent to independent laboratory for analyses.
- Pond liners should be monitored for effectiveness.
- Perform a reliable check that moisture is not moving through tailing pile cover.
- Keep track of how the weather is affecting the system, particularly since there have been several dry years since pumping operations were shut down.
- For any zone for which monitored natural attenuation (MNA) is proposed, UNC should explain why it will work. The MNA process should be explained and NMED suggests modeling be performed to show that MNA will work.
- NMED does not see any effort to keep the state natural resource trustee(s) informed on Site activities. The New Mexico Office of Natural Resources Trustees stated that they wanted to be informed if the Site was not going to be cleaned up to established cleanup standards.

INTERVIEW RECORD

Site Name: United Nuclear Corporation	EPA ID No: NMD030443303
Location: McKinley County - Church Rock, NM	

Subject: EPA Five-Year Review Interview	Date of Interview: 03-26-03
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Type: ☒ Telephone ☐ Visit ☐ Other
Location of Visit:
Description of Other:

Contact Made By:

Name: Mark Purcell	Title: Project Manager	Organization: USEPA
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Address: USEPA Region 6, 6SF-LP, 1445 Ross Avenue, Dallas, TX 75202
Telephone: 214-665-6707
E-mail: purcell.mark@epa.gov

Individual Contacted

Name: Bill von Till	Title: Project Manager	Organization: U.S. Nuclear Regulatory Commission
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Address: MS: T-8a33, Two White Flint North,
11545 Rockville Pike,
N. Rockville, MD 20852-2738
Telephone: 301-415-6251
E-mail: rwv@nrc.gov

Interview Questions

1. *What is the U.S. Nuclear Regulatory Commission's (NRC's) role on this project.*

The NRC's role is to assure that the Licensee (UNC) is in compliance with NRC regulations, policy and License conditions. In addition, the NRC's role under the Memorandum of Understanding with the EPA is to work cooperatively with the EPA, state and the Navajo EPA to assure that adequate ground water remediation is undertaken to protect human health and the environment.

2. *What is your overall impression of the ground-water remediation effort at the site?*

At this point, additional information is needed to establish the correct remedial strategy in all three zones. General Electric (GE) is pursuing this in an acceptable step-by-step manner, but there is still work to do.

3.	<p><i>From your perspective, what effects have site operations had on the surrounding community?</i></p> <p>I am not aware of any health effect on the community from groundwater remedial actions because the ground water is not used as a drinking water source and due to the remedial efforts at the site.</p>
4.	<p><i>Are you aware of any community concerns regarding the site or its operation and administration? If so, please provide details.</i></p> <p>I am aware that the local Navajo community has concerns about the project. However, the regulatory agencies are making an effort to educate the community about the Site and Site activities. The meeting with the Pinedale Chapter elders on January 29, 2003 as part of the 5-Year Review was a good step in continuing that effort.</p>
5.	<p><i>Have there been any complaints, violations, or other incidents related to the site that require a response by your office? If so, please describe the events and results of the responses.</i></p> <p>Since I've been working on the Site over the last two years, I am not aware of any complaints, violations, or other incidents that required a response from my office, other than the U.S. Department of Energy's concerns about erosion control issues related to surface reclamation. The erosion control issues did require a response. However, those issues are not related to the EPA's ground water cleanup.</p>
6.	<p><i>Have there been routine communications or activities (site visits, inspections, reporting activities, etc) conducted by your office regarding the site? If so, please describe purpose and results.</i></p> <p>There have been routine Site visits and meetings with the Licensee (United Nuclear Corporation), its consultants, the EPA, state, and Navajo EPA for coordinating remedial activities at the Site as they relate to the ground water remediation. In addition, we've had Site visits related to erosional control issues for surface reclamation and scheduled inspections from our regional officer located in Arlington, TX.</p>
7.	<p><i>Is the ground-water remedy progressing in accordance with the NRC's expectations for the site? Please explain.</i></p> <p>The NRC is satisfied that UNC is proceeding with appropriate strategy towards achieving the ground water remediation objectives established for the Site</p>

8.	<p><i>Are you aware of opportunities to optimize the operation, maintenance, or sampling efforts at the site?</i></p> <p>I am aware of nothing additional to the previous actions taken to optimize sampling efforts beyond the low flow sampling.</p>
9.	<p><i>From the NRC's perspective, have any of the changes in the site operations affected the protectiveness or effectiveness of the ground-water remedy? Please explain.</i></p> <p>Information is still being collected to characterize the effectiveness of active remediation at the Site and develop further actions for compliance of ground water standards.</p>
10.	<p><i>Have there been any changes in NRC standards since the time the remedial approach was delineated which may call into question the protectiveness or effectiveness of the ground-water remedy?</i></p> <p>There have been no changes in the last five years to the NRC's ground water standards established in 10 CFR Part 40, Appendix A.</p>
11.	<p><i>What is the status of the NRC license for the site?</i></p> <p>The License is active under NRC oversight at this time.</p>
12.	<p><i>Do you feel well informed about the site's ground-water cleanup activities and progress?</i></p> <p>Yes.</p>
13.	<p><i>Do you have any comments, suggestions, or recommendations regarding the site's management or operation?</i></p> <p>I have no suggestions at this time.</p>

INTERVIEW RECORD

Site Name:	United Nuclear Corporation	EPA ID No:	NMD030443303
Location:	McKinley County - Church Rock, NM		
Subject:	EPA Five-Year Review Interview	Date of Interview:	April 7, 2003
Type:	<input checked="" type="checkbox"/> Telephone	<input type="checkbox"/> Visit	<input type="checkbox"/> Other
Location of Visit:			
Description of Other:			
Contact Made By:			
Name:	Mark Purcell	Title:	Project Manager
		Organization:	USEPA
Address:	USEPA Region 6, 6SF-LP, 1445 Ross Avenue, Dallas, TX 75202		
Telephone:	214-665-6707		
E-mail:	purcell.mark@epa.gov		
Individual Contacted			
Name:	Diana Malone	Title:	
		Organization:	Navajo Environmental Protection Administration (Navajo EPA)
Address:	P.O. Box 2946, Window Rock, AZ 86515		
Telephone:	928-871-7820		
E-mail:	diana_malone54@hotmail.com		
Interview Questions			
1.	<p><i>What is your overall impression of the project? (general sentiment)</i></p> <p>When the cleanup began in 1992 there was little or no coordination and communication between the EPA, the Responsible Party and the Navajo EPA, which resulted in very little community input. The Navajo EPA was given no opportunity for providing comments on Site-related activities and documents. However, since 1998 the effort by the EPA and the Responsible Party to involve the community and coordinate information has improved.</p>		

2. *What is the Navajo EPA's role in this project?*

The Navajo EPA oversees Site-related activities being conducted and acts as a liaison between the Responsible Party, the EPA and the community. The Navajo EPA ensures that documents are received for review and comment. It also conducts community outreach meetings to hear about citizen's concerns, although there has been no meeting as yet for the Site. Concerned citizens have filed a lawsuit against the United Nuclear Corporation (UNC) and the U.S. Nuclear Regulatory Commission (NRC) under the Uranium Mine Impacts to Uranium Miners Compensation Act. Since there are a lot of miners that have died from cancer, some surviving miners might be eligible for compensation.

3. *From the Navajo EPA's perspective, what effects have Site operations had on the surrounding community?*

The presence of the Site has resulted in a high profile for several uranium issues. The Navajo EPA believe that the sources of contamination being addressed should have included the abandoned uranium mines and the area of the 1979 spill, which occurred when the dam of the south cell failed resulting in a release of approximately 93 million gallons of tailings and pond water to the Rio Puerco. Additionally, there is a concern with the EPA's approach used for establishing background levels in ground water. Rather than using the background conditions after mine dewatering and discharge, maybe an analogous area not impacted by mining could have been used to establish background levels. The Navajo EPA believe that the current cleanup levels for ground water, which were established based on background levels, are too high. Finally, the Navajo EPA are still interested in seeking restoration of natural resource damages to ground water. UNC has complained that the statute of limitations for natural resource damage assessment and restoration has expired.

4. *Are you aware of any community concerns regarding the Site or its operation and administration? If so, please provide details.*

Yes. There is a concern about livestock getting though the fence and going into the Site to graze and drink water from the evaporation pond. The Navajo EPA has recommended that UNC put up a chain-link fence, rather than barb wire. However, UNC indicated that the fence would probably be cut or stolen. There was another issue about seven years ago when a resident north of the Site wanted water service, which would have required that a water line be extended northward along the highway from south of the Site. UNC did not want the line through the Site because of the potential liability for digging of the line. The resident now receives water service from the Standing Rock Chapter.

5.	<p><i>Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.</i></p> <p>As stated above, I am aware of the issue with livestock on the Site. I am also aware of vandalism related to the livestock issue. Apparently, ranchers are cutting the barb wire fence on the east side to drive their cattle onto the Site for grazing.</p>
6.	<p><i>Have there been any complaints, violations, or other incidents related to the Site that required a response by your office? If so, please describe the events and results of the response.</i></p> <p>Yes. The livestock issue required a response by our office. The Navajo EPA brought out the Navajo Nation Ranger to the Site when this occurred. The Ranger informed the rancher of the trespassing violation and wrote up a notice with pending fines for continued violations.</p>
7.	<p><i>Have there been routine communications or activities (Site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please describe purpose and results.</i></p> <p>Yes. We have conducted site inspections, including the EPA's inspection as part of the Five-Year Review. We have also visited the site to observe the Responsible Party's ground water sampling activities. We have received copies of site-related correspondence from the EPA, the NRC, and the Responsible Party and we have reviewed and commented on draft technical reports related to ground water remediation. Finally, we plan to conduct community outreach meetings at the local Navajo chapter houses, including the Pinedale Chapter House.</p>
8.	<p><i>Is the ground-water remedy progressing in accordance with the Navajo EPA's expectations for the Site? Please explain.</i></p> <p>We disagree with EPA's decision to use post-mining background levels for ground water to establish cleanup levels. Therefore, the remedy will never meet the Navajo EPA's expectations for the level of cleanup.</p>
9.	<p><i>From the Navajo EPA's perspective, have any of the changes in the Site operations affected the protectiveness or effectiveness of the ground-water remedy? Please explain.</i></p> <p>We believe that this question is not applicable, since the Navajo EPA never believed that the remedy would be protective.</p>

10. *Do you feel well informed about the Site's ground-water cleanup activities and progress?*

Over the last five (5) years, yes.

11. *Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?*

There still needs to be some improvement on community outreach. It is difficult for the Navajo EPA to explain or defend the EPA's remedy to the local community, especially when the chapter houses bring in their own consultants. The EPA, NRC and the Responsible Party need to address those concerns directly.

INTERVIEW RECORD

Site Name: United Nuclear Corporation Location: McKinley County - Church Rock, NM	EPA ID No: NMD030443303
Subject: EPA Five-Year Review Interview	Date of Interview:
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other	
Location of Visit: Pinedale Chapter House Description of Other: Meeting with Community Elders	
Contact Made By:	
Name: Mark Purcell	Title: Project Manager Organization: USEPA
Address: USEPA Region 6, 6SF-LP, 1445 Ross Avenue, Dallas, TX 75202 Telephone: 214-665-6707 E-mail: purcell.mark@epa.gov	
Individual Contacted	
Name: Jess Kirwin	Title: President Organization: Pinedale Chapter House
Address: Pinedale Chapter House Telephone: 505-786-2208 E-mail:	
<p>EPA met with Jess Kirwin, President of the Pinedale Chapter House on January 28, 2003, the day before the Site inspection, and requested an interview. However, Mr. Kirwin suggested that a meeting with the community elders would be more appropriate. Mr. Kirwin notified the elders and a meeting was held the next day, after the Site inspection was conducted. Approximately 25 people were in attendance. Representatives of the Navajo EPA, NRC and UNC supported EPA at the meeting.</p> <p>The following are issues and concerns that were raised at the meeting, along with the responses made by EPA and the NRC:</p> <ul style="list-style-type: none"> • <i>Cattle are getting onto the UNC property and drinking the water from the evaporation pond. The fence is not good enough to prevent this from happening.</i> <p><u>Response:</u> UNC has informed EPA that its fences are being cut intentionally by local livestock owners to allow livestock onto the property to graze and drink the water. UNC contacts the owners when their cattle are found on the Site. Unfortunately, the owners do not come to pick the cattle up right away. There are fences in place around the perimeter of the Site and they are maintained. The EPA/NRC are working with UNC to keep the fences up and restrict access by the livestock. <u>See also</u> interview responses by Larry Bush, UNC.</p>	

- *People are getting sick with cancer. One elder stated that there have been four people that have died of cancer recently and another woman is very sick. Another citizen attending the meeting stated that all of his relatives that past away since the 70s, died of cancer. He is concerned about the dust from the evaporation ponds when they dry up. He is also concerned about running water in the Pipeline Arroyo. It was stated that many Navajo will not come to the community meetings and will not talk about their health concerns.*

Response: The agencies are not aware of any health issues attributable to the Site and there is no evidence of exposure to Site contamination. There are no known users of the contaminated ground water. Also, the Site is set up to prevent exposure. The tailings are encapsulated and there are good engineering controls in place to ensure they remain encapsulated. Further, there are periodic inspections, and there is a monitoring program in place to ensure that the engineering controls, such as the covers, remain effective in preventing exposure.

- *Have there been any studies done on cancer clusters for this area?*

Response: It is not known if any such studies have been completed, but the federal health agency, the Agency for Toxic Substances and Disease Registry (ATSDR) conducted a public health assessment for the Site. A copy of that assessment report should be available for review in the local Site repositories.

**FIVE-YEAR REVIEW INTERVIEW QUESTIONS
FOR LARRY BUSH, UNC**

1. What is your overall impression of the project? (general sentiment)

The project has accomplished its anticipated results.

2. What is the current status of the ground-water remediation?

All recovery wells have been shut off with NRC approval as continued operation no longer offers any advantage over natural attenuation processes.

3. Is ground-water monitoring being performed? If so, please describe what activities are performed. How often are samples collected for analysis and what laboratory(ies) perform the analyses?

Yes. The wells indicated in SUA-1475 are sampled once per quarter, using low flow criteria and corresponding SOP's. The samples are shipped to Energy Laboratories Casper, Wyoming for analysis.

4. Have any problems or difficulties been encountered which have impacted implementability of the ground-water remedy or monitoring programs (e.g., access issues for well installation)? If so, please describe in detail.

None, which have affected the remedy or monitoring plan.

5. Is there a continuous on-Site O&M presence? If so, please describe staff and activities. If there is not a continuous on-Site presence, describe staff and frequency of Site inspections and activities.

Yes the Site RSO and Administrative Assistant are generally present at the site during regular work hours for much of the week. The Site Manager lives on the site and is generally available for operations and security 24 hours a day, 7 days per week.

In addition, the NRC conducts periodic inspections for radiation and health compliance. For over 15 years there have been no concerns raised as the result these inspections nor have there ever been any concerns that resulted in fines for radiation or health noncompliance.

6. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since the last five-year review? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

The EPA required the site to totally change their SOP for well sampling procedures and sample preparation in 1999. The entire site converted to low flow sampling pumps and procedures. A great deal of work was performed to first determine, if all the wells at that time would meet the low flow criteria and, if not, find suitable replacement wells. The new system was installed and proved to be very reliable, and also affirmed the data obtained by the previous EPA directed SOP. The new system was then submitted and approved as a license amendment to meet the intent of Part 30.

The practice of filtering samples prior to the various stabilization processes needed as a condition of sample preservation was also discontinued due to a general policy change by Region 6 of the EPA. A parallel set of samples was conducted during the initial onset of this policy to see the effect it might have on the older data sets and was found to yield virtually the same results, once again confirming the previous sampling and testing SOP's. Neither of these required changes have materially affected the protectiveness or effectiveness of the remedy.

7. Have there been unexpected O&M difficulties or costs at the Site in the last five years. If so, please give details.

Yes. The cost of converting all well to low flow sampling was expensive and required a great deal of time. This was an unexpected expense, since the original SOP being followed was the mandated EPA procedures.

However, sampling has become more efficient due to the new system and in the long term may eventually prove more cost effective.

8. Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

Some procedures and methods have improved, but mainly as time saving changes. The change to the low flow system has been detailed in previous questions. The constant improvement in instrumentation and better reliability from improved electronic meters may prove a continued optimizing area. As new pumps or other items are developed and accepted they will be considered for the site to address issues at that time.

UNC has petitioned for a reduction in ground water sampling frequency in the past. Because we have a long history of monitoring that shows very slow changes in water quality through time, we believe that the sampling frequency should be reduced. We are also sampling more wells than are needed to characterize the seepage-impacts.

9. What effects have Site operations had on the surrounding community?

Site operations have had little or no effects on the area in general. Because there was no natural shallow ground water system in the area prior to the site activities, there was no ground water use by the community to be impacted. The daily presence of site personnel for O&M activities have had some beneficial impact to the community, since we try to assist the surrounding community by clearing roads in harsh weather, proving some

services, and being a source of information about utilities and repairs. Examples are snow and mud removal during storm events, grave digging services to assist the Chapter, and helping the utility service representatives find and access problem areas.

10. Are you aware of any community concerns regarding the Site or its operation and administration? If so, please give details.

No.

11. Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

The area around the site is mainly used for grazing and rural home sites. Due to the poor range management practices and extreme drought over the last several years, the site has become very attractive to free ranging livestock from miles around. Some of the non-permitted local livestock owners have intentionally cut fences to allow their livestock into the ungrazed parts of Section 2 and have at times encouraged the herding of sheep and goats to the ponds for watering.

Operations spends 50-60% of their field time repairing fences, herding animals off of the site, and managing animals around the site. The true grazing allottees have worked to help us identify owners, indicate sources of animal infiltration, and deny access to their allotments from the non-permitted livestock owners.

The task of keeping the animals off the site is made more difficult due to lack of livestock quota control from both Tribal and State Agencies.

Vandalism and theft of materials such as fencing, posts, wood, and resalable items is another on going issue. In general these problems occur away from the restricted areas and are on the fringes of the Section 2 and are mainly conducted in Section 36.

12. If any events, incidents, or activities have occurred at the Site, did they require a response from you or your staff? Please explain.

As stated above the animal incursions require frequent responses by staff.

13. Do you have any comments, suggestions, or recommendations regarding the project?

The projects main intent, to protect the public from exposure to hazardous constituents in tailings-impacted ground water, has been accomplished. Because the ground water is not naturally occurring and will eventually dissipate, because water quality is not acceptable for use due to subsurface chemistry regardless of the presence of the tailings, and because the ground water system does not produce acceptable well yields, future exposure is also

highly unlikely. Future project activities should focus on developing a process to wind up site activities and turn the site over to DOE.

**FIVE-YEAR REVIEW INTERVIEW QUESTIONS
FOR ROY BLICKWEDEL, GE**

1. What is your overall impression of the project? (general sentiment)

Remediation has generally been effective and it has been protective of human health and the environment.

2. What is the current status of ground-water remediation at the Site?

The Nuclear Regulator Commission (NRC) has authorized discontinuance of the active groundwater pumping systems in each of the three water-saturated strata impacted by tailings seepage migration. Zone 1 was discontinued in July 1999 because the decommissioning criteria were achieved.

Zone 3 pumping was discontinued in December 2000 following EPA's recognition during the Five-Year Review of 1998 that Zone 3 pumping was not effective and perhaps detrimental to the containment of seepage-impacted water in Zone 3. Approval to cease pumping was granted in December 2000, pending the installation of a sentinel monitoring well and the evaluation of other remedial alternatives. The well was installed (it is not impacted by tailings seepage) and the evaluation of additional alternatives is continuing.

In the Southwest Alluvial system, active pumping was discontinued when the NRC approved an 18-month natural attenuation test. The attenuation test report, submitted in November 2002, recommended the replacement of the current remedy with a natural attenuation remedy for metals and radionuclides, and a Technical Impracticability Waiver for sulfate and TDS.

3. Did the ground-water remedy function as expected? How well did the ground-water remedy perform?

The groundwater pumping remedy has achieved significant desaturation of the impacted ground water in each area. As anticipated in the ROD and as substantiated in the various technical reports referred to above, the groundwater pumping remedy has reached the limit of its effectiveness. In all three areas of the site the

current remedy will have no additional, appreciable, beneficial effect on achieving cleanup goals beyond the natural processes that are occurring. As a practical matter, EPA expected that it would be necessary to re-evaluate the performance goals that were established in the ROD, and in achieving significant desaturation of tailings impacted groundwater and contaminant removal, the remedy has functioned as well as was expected when EPA chose it in the June 1988 Record of Decision (ROD).

In fact, because the impacted media have a high natural capacity to neutralize the effects of tailings seepage, in some respects remedy performance has exceeded expectations. At this stage of the process, further improvements in the groundwater quality in Zone 1 and the Southwest Alluvium will only be realized through natural geochemical processes. For Zone 3, it is not as clear that the contaminant plumes are stable or receding, and so, other approaches to address the impacted groundwater are under consideration.

4. What does the monitoring data show? During the operation of the remedial systems, were there any trends that showed contaminant levels were decreasing?

Descriptions of contaminant trends depend on the compound considered and whether one is discussing Zone 1, Zone 3, or the Southwest Alluvium, and so the various technical reports should be consulted for detailed answers to this question. In general, the trends for hazardous constituents, such as some metals and radionuclides have diminished both with distance from the tailings disposal area and through time.

Some other constituents, such as sulfate, are controlled solely by equilibration with naturally occurring minerals in the formation through which water moves. As a consequence, the monitoring data for sulfate are remarkably stable through time.

5. From the General Electric Corporation's perspective, have any of the remedial systems for ground water reached their limit of effectiveness? If so, please explain.

First, let me explain the General Electric Company's (GE's) role on this project. United Nuclear Corporation (UNC), is the owner and operator of this site and is performing the remedial activities under its license with the NRC. Since September 1997, UNC has been a

wholly-owned, indirect subsidiary of GE. UNC has retained GE Corporate Environmental Programs through a separate administrative services agreement to assist UNC both technically and administratively with environmental issues at Church Rock. Consequently, all statements or views contained herein or elsewhere are those of UNC.

As to UNC's perspective, the current remedy has reached the limit of its effectiveness and monitored natural attenuation in Zone 1 and the Southwest Alluvium will continue to be effective for certain constituents. Water quality has remained stable or improved since the cessation of pumping operations in all three units.

6. What did the Natural Attenuation Test for the Southwest Alluvium show? Are there any trends that show contaminant levels are increasing since shut down? Please explain.

The natural attenuation test showed that the pumping remedy is no longer of benefit toward achieving remediation goals, and that the only way to achieve completion is via monitored natural attenuation for metals and radionuclides, and a Technical Impracticability Waiver for sulfate and Total Dissolved Solids. There are no concentration trends that have increased since shutdown with the exception of bicarbonate, which is a harmless common anion that dissolves from the formation as tailings acidity is neutralized. The observation that bicarbonate increases while no hazardous or nonhazardous, regulated constituent is increasing above historical levels, attests to the immobility of the regulated constituents.

7. From the General Electric Corporation's perspective, have any of the changes in the Site operations affected the protectiveness or effectiveness of the ground-water remedy? Please explain.

It is UNC's perspective that the cessation of pumping in Zone 3 has slowed the rate at which seepage-impacted water can migrate. This is beneficial because it allows natural restorative processes to be more effective. Cessation of pumping in the other zones and the corresponding stability or reductions in concentrations of regulated constituents supports the conclusion that natural geochemical processes are as or more effective than the former pumping remedy.

8. What is the status of GE's evaluation of remedial alternatives for Zone 3?

GE is not evaluating remedial options for Zone 3. UNC is exploring the feasibility of additional measures to contain or remove contaminated groundwater from Zone 3. The main reason for doing this is that the seepage-impacted tailings have not yet reached equilibrium in Zone 3 as they have in Zone 1 and the Southwest Alluvium.

The supplemental measures being considered by UNC for Zone 3 are hydraulic in nature. Essentially UNC is evaluating methods to better collect groundwater than the wells which have been used previously. Technologies that have been retained for further consideration include enhancing the formation hydraulic conductivity via fracturing or simply containing the plume via a line of cut-off wells. A pilot test of the fracturing technique is currently in the planning stage.

9. Do you have and comments, suggestions, or recommendations regarding the project?

The USEPA maintains that institutional controls would be a useful part of any natural attenuation remedy or Technical Impracticability Waivers for the Church Rock site. Even though the formations became saturated artificially via mine dewatering, and the water is unusable for any domestic or irrigation purpose, UNC has been working with the Navajo Nation to develop an institutional control plan to prevent any groundwater use. To UNC's knowledge, neither the Tribal Resolution or environmental right-of-way have been formally accepted or adopted by the authorities since they were first proposed over two years ago in March 2001.

UNC is also awaiting the USEPA's review of the Southwest Alluvium Natural Attenuation Test.

ATTACHMENT F
EPA Information Bulletin – January 2003



UNITED NUCLEAR CORPORATION SUPERFUND SITE

Informational Bulletin
January 2003

Status of Ground Water Cleanup at the United Nuclear Corporation Superfund Site

EPA STARTS SECOND FIVE-YEAR REVIEW

The United States Environmental Protection Agency (EPA) has started the second five-year review of the ground-water cleanup activities at the United Nuclear Corporation (United Nuclear) Superfund site (Site). The purpose of the five-year review is to evaluate the performance of the remedy in order to determine if the remedy is or will be protective of human health and the environment. The first five-year review was completed in 1998. The second five-year review is scheduled to be completed in the Summer of 2003. The results of the review will be summarized in an informational bulletin and will be presented to the community in an Open House Meeting to be held later this year.

SITE DESCRIPTION

The Site is located approximately 17 miles northeast of Gallup, New Mexico. United Nuclear operated the Site as a uranium mill facility from 1968 to 1982. It included an ore processing mill and a Tailings Disposal Area, which cover about 25 and 100 acres, respectively. The Tailings Disposal Area was

THIS BULLETIN WILL TELL YOU ABOUT:

- ◆ Purpose of Five-Year Review
- ◆ Site Description and History
- ◆ Status of the Ground-water Cleanup
- ◆ Upcoming Five-Year Review Activities

subdivided by cross-dikes into three cells identified as the South cell, Central cell, and North cell. In addition, two soil borrow pits (Pits No. 1 and No. 2) were present in the Central Cell area. Borrow Pit No. 1 was used to dispose of tailings and Borrow Pit No. 2 was used to retain tailings liquids. See Site Map (Figure 1).

SITE HISTORY

The uranium mill was operated by United Nuclear from 1977 to 1982. The ore processed at the mill primarily came from two of United Nuclear's nearby mines: Northeast

Churchrock and Old Churchrock. Ore was also obtained from the nearby Kerr-McGee (Quivira) mine. The mill processes produced an acidic waste of ground ore and fluids, commonly referred to as tailings. The tailings were placed in the Tailings Disposal Area.

In 1979, the dam on the South Cell breached, releasing tailings and pond water to the Rio Puerco. The dam was repaired and the resultant spill cleaned up under the direction of state and federal regulatory agencies, including EPA.

EPA placed the Site onto the National Priorities List (NPL) of Superfund sites in 1983 because of tailings seepage that had contaminated the underlying ground water.

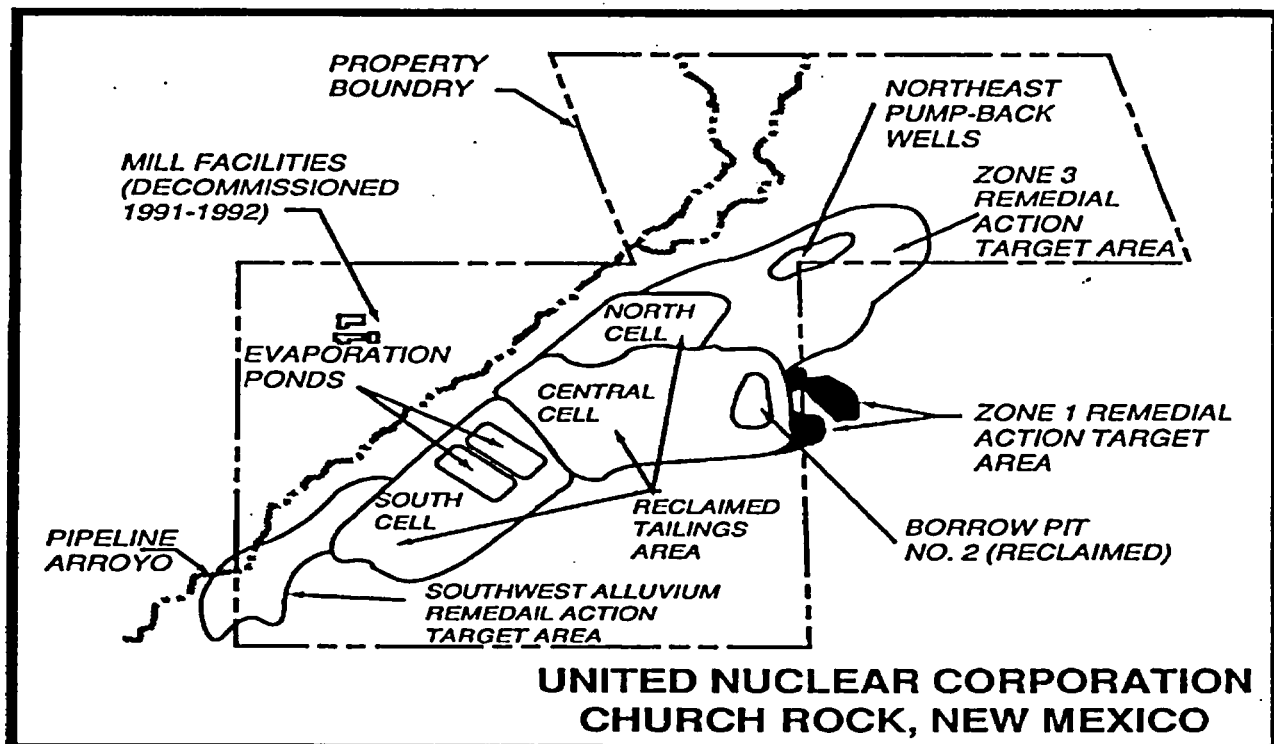
In 1986, the U.S. Nuclear Regulatory Commission (NRC) assumed responsibility

for the licensing and regulating of uranium mills within the State of New Mexico (State) at the request of the Governor.

In 1988, NRC approved a closure plan for reclamation of the Site. On August 26, 1988, the EPA and NRC signed a Memorandum of Understanding (MOU) for the coordination of EPA's ground water cleanup effort and NRC's reclamation work. Under the MOU, EPA was given the responsibility for cleaning up the ground water contamination outside of the tailings disposal site.

In a Record of Decision (ROD), dated September 30, 1988, the EPA selected extraction of contaminated water and evaporation of the extracted water as the ground-water remedy.

Figure 1



SITE HYDROGEOLOGY

The ground-water aquifers that are addressed by EPA's remedy consist of the Southwest Alluvium and Zones 1 and 3 of the Upper Gallup Sandstone. The majority of the water present in these aquifers in the vicinity of the Site originated from the mine water that was discharged into Pipeline Arroyo beginning in 1969 and infiltrated into the Southwest Alluvium and then into Zone 3 and Zone 1. This mine discharge water, which is the primary source of recharge to the aquifers in the Site vicinity, is referred to as the post-mining, pre-tailings water in the ROD and is considered the background water for the Site. Seepage from the tailings, which were deposited into the Tailings Disposal Area beginning in 1977, then impacted this background water with elevated concentrations of radioactive and non-radioactive constituents.

Water in the Southwest Alluvium flows to the southwest along Pipeline Arroyo and recharges Zone 1 and Zone 3. Water in Zones 1 and 3 flows to the northeast. The water levels in all three aquifers reached their highest levels between 1977 and 1986 and have been steadily declining since the mine water discharge ceased in 1986. This declining trend should continue as the mine discharge water continues to drain out from the Site vicinity.

STATUS OF GROUND-WATER CLEANUP

Currently, the ground-water extraction and evaporation systems (hereinafter the remedial action systems) have been decommissioned or temporarily shut off for all three aquifers to allow the EPA and other regulatory agencies the opportunity to evaluate the effectiveness of those systems in attaining the Site cleanup standards. The Zone 1 and Zone 3 systems were

decommissioned in 1999 and 2001, respectively. The Southwest Alluvium system was temporarily shut off in January 2001 to conduct an 18-month natural attenuation test.

The remedial action systems were shut off or decommissioned when they appeared to reach their limits of effectiveness for reducing the concentrations of contaminants. Their operation resulted in the removal of significant contaminant mass, dewatering of the target areas, and natural dissipation of the saturation created by mine water discharge. However, the established cleanup standards for the contaminants have not been achieved.

Southwest Alluvium: The ground-water extraction system was operated from 1989 to 2001. The system provided an adequate barrier to preventing ground water in the target treatment areas from moving downgradient. However, performance data did not indicate that continued operation of the system would result in the attainment of all cleanup standards within the target area in a reasonable time frame. The system was temporarily shut off while an 18-month natural attenuation test was conducted by United Nuclear to determine whether turning off the system would have an adverse impact on water quality. The constituents currently exceeding the cleanup standards are sulfate, chloride, total dissolved solids (TDS), and manganese.

Zone 3: The extraction system was operated from 1984 (initially under the direction of the State) to 2000. Its operation successfully dewatered the target area. However, the loss of saturated thickness over time, resulted in a decrease in efficiency of the system to the point where only three of the total 24 wells in Zone 3 were still capable of recovering sufficient water. The continued operation of the system did not provide significant benefit in terms of further dewatering of the target area. The only wells

in the system with sufficient saturation to continue operating were located downgradient of the target area. As a result, the seepage-impacted water was pulled downgradient by continued ground-water pumping. Since the benefit realized from continued dewatering of the target area no longer outweighed the negative impact of downgradient migration of the seepage-impacted water, the EPA directed United Nuclear to shut off the system for reevaluation. The constituents currently exceeding cleanup standards in Zone 3 include uranium, radium (226/228), thorium, vanadium, several heavy metals, sulfate and TDS.

Zone 1: A major component of the contamination in Zone 1 was due to seepage from Borrow Pit No. 2. The source of contamination was eliminated by the dewatering and closure of Borrow Pit No. 2. The extraction system was operated from 1984 to 1999 in the target area. The water productivity declined steadily over time until it was determined that the low pumping rates were ineffective in providing a hydraulic barrier for the prevention of contaminant migration. The system was then shut off and decommissioned. The constituents currently exceeding cleanup standards in Zone 2 are manganese, cobalt, nickel, radium (226/228), sulfate, nitrate, and TDS.

FIVE-YEAR REVIEW ACTIVITIES

The EPA will reassess the performance of the ground-water remedy during the second five-year review and determine whether to continue operating the existing remedial action system and/or implement other response actions, as appropriate. As part of this review, the EPA, in working with the NRC, the New Mexico Environment Department (NMED) and the Navajo EPA, will evaluate the results of the natural attenuation test for the Southwest Alluvium and the technical impracticability evaluation

for sulfate and TDS. The EPA will also evaluate the performance monitoring data generated since the first five-year review in 1998 on those systems. Those data are contained in United Nuclear's Annual Review Reports for ground-water remedial action.

The EPA's second five-year review is scheduled to be completed in the Summer of 2003. During the review, the EPA plans to conduct a Site inspection. The EPA also plans to conduct interviews with key individuals or groups associated with the Site cleanup, including the Site manager for United Nuclear, representatives of regulatory agencies, the Navajo Pinedale Chapter, Site neighbors, and other stakeholders. A Five-Year Review Report will be prepared documenting the results of the EPA's review.

As part of its community outreach effort, the EPA will notify the community when the Five-Year Review Report is complete, prepare and distribute a brief summary of the results in an informational bulletin, and place a copy of the Five-Year Review Report in the Site information repositories. The EPA also plans to hold an Open House meeting to present a summary of the five-year review results to the community.

FOR MORE INFORMATION

The following resources are available to to make sure that you can locate the information you need to become involved in the Superfund Process at the United Nuclear Corporation Superfund Site.

If you have any questions about activities at the Site, please contact:

Mark Purcell, Project Manager
USEPA Region 6
1445 Ross Avenue (6SF-LP)
Dallas, TX 75202
(214) 665-6707 or 1-800-533-3508

For more information about the public involvement process, please contact:

Beverly Negri
Community Outreach Team
USEPA, Region 6
1445 Ross Avenue (6SF-PO)
214-665-8157

INFORMATION REPOSITORIES

If you would like more information about this Site, you may consult the Administrative Record File and other documents contained in the information repositories listed below.

Gallup Public Library
115 West Hill Avenue
Gallup, NM 87301

USEPA - Region 6
7TH Floor Library
1445 Ross Avenue, Suite 12D13
Dallas, TX 75202
(214) 665-6707

New Mexico Environment Department
Harold Runnels Bldg.
1190 St. Francis Dr.
Santa Fe, NM 87505
(505) 827-2855 or
toll free 1-800-879-3421

On the Web:

USEPA Headquarters: www.epa.gov

USEPA Region 6:
www.epa.gov/region6

USEPA Region 6 Superfund Program:
www.epa.gov/region6/superfund

Specific information about the United Nuclear Corporation Superfund Site is available on the Internet at www.epa.gov/earth1r6/6sf/6sf-decisiondocs.htm