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Memorandum

To: **LaDonna Turner, Site Assessment Manager**
Response and Prevention Branch
U.S. Environmental Protection Agency, Region 6

From: **Phyllis Bustamante, Acting Manager**
Superfund Oversight Section, Ground Water Quality Bureau,
New Mexico Environment Department

Date: **May 23, 2012**

Subject: **Pre-CERCLIS Screening Assessment of the Section 27 Mine, New Mexico: No Further Action Under CERLCA Recommended**

Site name	Section 27	**Alias**		**Street Address**	NA
City	NA	**State**	New Mexico	**Zip code**	NA
County	McKinley County				
Latitude	35°24'39.14" N	**Longitude**	107°46'41.02" W		

Site physical description:
The Section 27 mine is located in Section 27, T14N, R9W, in the Ambrosia Lake Mining Sub-District of the Grants Mining District in McKinley County, approximately 4.2 miles northeast of the junction of State highways 509 and 605 (Figure 1). The Section 27 mine is an inactive underground mine that was operated by the United Nuclear Corporation (UNC) and produced uranium from 1970 to 1977. Limited closure activities at the site occurred in the late 1980's and included the plugging of the main shaft and vent holes, the removal of equipment and buildings, and the removal of most stockpiled ore. Approximately 15 acres of disturbed surface area remain unreclaimed at the mine site. In 2002, the New Mexico Court of Appeals adjudicated the Section 27 mine to be an existing mine subject to the New Mexico Mining Act (Ref. 1).

Site identification:
The Section 27 mine is one of 97 legacy uranium mine sites identified within the Ambrosia Lake Mining Sub-District and one of the 151 total within the Grants Mining District. The Section 27 Mine is one of four underground uranium mines solely operated by UNC in the Ambrosia Lake Mining Sub-District (Ref. 2).

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Site summary:
The Section 27 Mine was an underground uranium mine operated by UNC from 1967 through 1980. Shaft construction for the underground workings began in 1967. The Section 27 Mine produced 838,789 tons of ore and 3,718,550 pounds of uranium oxide (Ref. 2). UNC operated the Section 27 Mine pursuant to a mineral lease. UNC fully suspended all mining related activities in 1980 and the mineral lease was surrendered by a Release of Mineral Rights in 1988 (Ref. 1). The disturbed surface area at the mine site includes underground workings consisting of two shafts, and three vent shafts that are sealed at the surface, two piles of non-economical mine materials containing overburden rock, sands and gravels, one small ore stockpile, two topsoil stockpiles, and several small piles of ball mill reject materials (Ref. 3).

The Section 27 Mine was considered a wet mine with the ore zone below the water table. The uranium ore zone was approximately 400 to 500 feet below ground surface (bgs) in the Westwater Canyon Member of the Morrison Formation. During mining operations at the Section 27 Mine, approximately 227 gallons per minute of ground water as measured at a weir in Track Drift #8, drained to the UNC Sandstone Mine. All mine water from the UNC Sandstone Mine operations was pumped and discharged to a pond near the ion exchange facility located by the old Phillips mill site (Ref. 1). This water was then run through the ion exchange for uranium recovery. Most of this water was then recirculated back to the mines to further leach uranium. In 1977, a discharge was observed to an arroyo near the ion exchange facility (Ref 4). In 1975, the ion exchange effluent was sampled. Analysis showed the effluent averaged 31 picocuries per liter (piC/L) radium 226, 0.08 milligrams per liter (mg/L) selenium and 7.8 mg/L uranium which are all above New Mexico Water Quality Control Commission (NMWQCC) ground water standards (Ref 5). It is also believed that some backfilling of the underground workings with tailings may have occurred during its operation (Ref 4).

Following passage of the New Mexico Mining Act (NMMA) in 1993 the New Mexico Energy Minerals and Natural Resources Department (NMEMNRD) in 1995 issued a Notice of Violation to UNC based on UNC's failure to timely submit a Site Assessment and Permit Application as an existing mine operation under the New Mexico Mining Act [19.10.5.500NMAC] which would require UNC to reclaim the mine site. In 2000, UNC successfully argued in District Court that uranium mines were not covered under the NNMA and the Notice of Violation was dismissed. In 2002, NMEMNRD petitioned the Court of Appeals of New Mexico which reversed the District Court decision (Ref 6). In July 2003, UNC submitted a Site Assessment and Permit Application to NMEMNRD (Ref 1). In January 2004, UNC submitted a Closeout Plan to NMEMNRD for the cleanup and reclamation of the Section 27 Mine (Ref 7).

Pursuant to the New Mexico Mining Act [19.10.5.506 NMAC], NMED reviews Closeout Plans to insure the plan as written is protective of applicable standards for air, surface water, and ground water protection enforced by the NMED. Once the Closeout Plan is developed in a manner that is protective of ground and surface water quality, and air quality, NMED issues a written determination to NMEMNRD. Pursuant to the NMMA a reclamation plan for an existing mine cannot be approved without a written determination from NMED stating that the Permit/Closeout Plan has demonstrated that the activities to be permitted or authorized will be expected to achieve compliance with all applicable environmental standards if carried out as described in the closeout plan.

In addition to the determination requirement for Closeout Plan approval, NMED notified UNC in

August 2004 that as the "responsible person" UNC was required to submit an abatement plan pursuant to the NMWQCC regulations [20.6.2.4000NMAC] (Ref. 8). Ground water quality sampling results from the Section 27 mine in 1977, 1978, 1979 and 2004 indicate that ground water standards set forth in NMWQCC Regulations [20.6.2.3103NMAC] had been exceeded for uranium, selenium, molybdenum, radium 226, sulfate and total dissolved solids (Ref 9). The purpose of the Stage 1 Abatement plan is to define site conditions and provide the data necessary to select and design an effective abatement alternative (Ref. 8). NMED provided an Environmental Determination for the UNC Section 27 Mine Mining Act Existing Mine Permit and Closeout Plan in September 2006. NMED believed that environmental standards would be achieved if the abatement plan was carried out as described (Ref 10). In October 2006, NMED approved UNCs Stage 1 Abatement Plan for the Section 27 Mine (Ref. 11). Upon completion of reclamation activities under the Closeout Plan, a verification survey identified previously unknown impacted areas of the site that require abatement.

Targets:
Ground water wells that are registered with the New Mexico Office of the State Engineer (OSE) and located within a 5-mile radius of the Section 27 mine are shown in Table 1. The Section 27 mine is approximately 4.2 miles from the junction of State highway 509 and 605 which includes approximately twelve residences that rely on private domestic wells. Table 2, identifies domestic wells that were sampled by NMED in 2009. Results show ground water concentrations exceeding the Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCL) and the New Mexico Water Quality Control Commissions (NMWQCC) ground water standards (Ref 12).

Airborne Spectral Photometric Environmental Collection Technology (ASPECT) operated by EPA has developed exposure rate contour maps of the Ambrosia Lake Mining Sub-District that includes the Section 27 (NM0026) Mine (Figure 2). The EPA ASPECT exposure rate measurements were performed in part to evaluate if surface reclamation has been effective in the long-term elimination of such threats to human health and the environment. The map estimates radiation exposure rates on the ground and can be used to identify hazardous levels of radiation. Typical exposure rates in New Mexico range from 5 – 20 micro Roentgens per hour (µR/hr.). The ground surface exposure rates in and around the Section 27 Mine are up to four times higher than the typical range, that is, ground surface radiological hazards were identified at most Ambrosia Lake uranium mine sites including the Section 27 Mine (Ref. 13).

Site ownership and Potential Responsible Parties:
United Nuclear Corporation operated the Section 27 Mine under a mineral lease from 1967 until 1980 when mining operations ceased. Effective as of March 31, 1988, United Nuclear released the mineral lease under which it conducted its activities. Surface ownership of the Section 27 Mine is currently held by Kent Schmitt. Hecla Mining Company is the owner of the mineral estate (Ref. 1). In 1997, UNC became a wholly-owned, indirect subsidiary of the General Electric Company (Ref. 14).

File review:
Files that were reviewed for this assessment are listed below.

Site reconnaissance:
NMED has not conducted a site reconnaissance for this Pre-CERCLIS Screen.

Recommendation:
Data collected from the Section 27 Mine has shown a release of CERCLA hazardous substances to the ground water and the surface. On-going remedial activities at the Section 27 Mine are being conducted by UNC under state oversight in accordance with NMWQCC regulations under an Abatement Plan and their NMMA Closeout Plan. UNC is required to investigate and abate radiological and metal contamination for the impacts to the ground water system and surface resulting from activities at the Section 27 Mine.

NMED provided a written determination to NMEMNRD stating that the Mining Act Permit/Closeout Plan activities authorized in the plan were expected to achieve compliance with all applicable environmental standards if carried out as described in the closeout plan. Following the NMED determination, the Aerial Radiological Survey conducted by EPA Region 6 of the Ambrosia Lake Mining Sub-District measured radiological exposure rates well above background in and around the Section 27 Mine site. Based on this new information, NMED recommends further cleanup measures should be taken for closeout pursuant to the NMMA [19.10.5.506 NMAC] and NMWQCC Regulations [NMWQCC 20.6.2.4000 NMAC].

NMED recommends that no further action under CERCLA is required at the Section 27 Mine at this time. SOS may revisit this recommendation should additional information become available that indicates that an imminent threat to human health or the environment exists such that further action under CERCLA is warranted. NMED SOS also proposes to periodically review new data as it becomes available and incorporate it into the ground water conceptual model for the Grants Mining District. A generalized investigation of potential ground water impacts from former uranium mines within the Grants Mining District is recommended as part of regional ground water quality characterization.

References:

1. United Nuclear Corporation, 2003, Section 27 Mine Permit Application and Site Assessment, Prepared by MWH for UNC Existing Mine Permit Application.
2. New Mexico Energy Minerals and Natural Resources Department, 2007, Abandoned and inactive uranium mines in New Mexico database, Mining and Minerals Division.
3. United Nuclear Corporation, 2006, Section 27 Mines Stage One Abatement Plan Proposal, Prepared by MWH for UNC.
4. Goad, Maxine S. et al, July 1980, Water Quality Data for Discharges from Uranium Mines and Mills in New Mexico, New Mexico Health and Environment Department, Environmental Improvement Division, Water Pollution Control Bureau.
5. Environmental Protection Agency, September 1975, Impacts of Uranium Mining and Milling on Surface and Potable Waters in the Grant Mineral Belt, New Mexico, Office of Enforcement, Denver, Colorado.
6. Court of Appeals of New Mexico, 2002, NMEMNRD vs United Nuclear Corporation, Docket No. 21,288,21,290.
7. United Nuclear Corporation, 2004, Section 27 Mine Closeout Plan, Prepared by MWH for UNC Existing Mine Permit Application.
8. New Mexico Environment Department, 2004, Letter to UNC, Abatement Plan Required at the Section 27 Mine Site.
9. MWH, 2004, Technical Memorandum to UNC/GE, Groundwater Quality in the Westwater Canyon Member at the Section 27 Mine,
10. New Mexico Environment Department, 2006, Letter to GE, Environmental Compliance Determination Section 27 Mine, Permit No. MK005RE.
11. New Mexico Environment Department, 2006, Letter to UNC, Conditional Approval of Stage 1 Abatement Plan Proposal, Section 27 Mine.
12. New Mexico Environment Department, 2010, Phase 1 Site Investigation Report of the San Mateo Creek Legacy Uranium Mines, CERCLIS ID NMN00060684.
13. US EPA Region 6, 2011, Airborne Spectral Photometric Environmental Collection Technology, Radiological Aerial Survey, Exposure Rate Contour Map of the Ambrosia Lake Mining Sub-District.
14. General Electric General Electric, 2007, Letter to Holland Shepherd, Mining and Minerals Division, New Mexico Energy Minerals and Natural Resources Department.

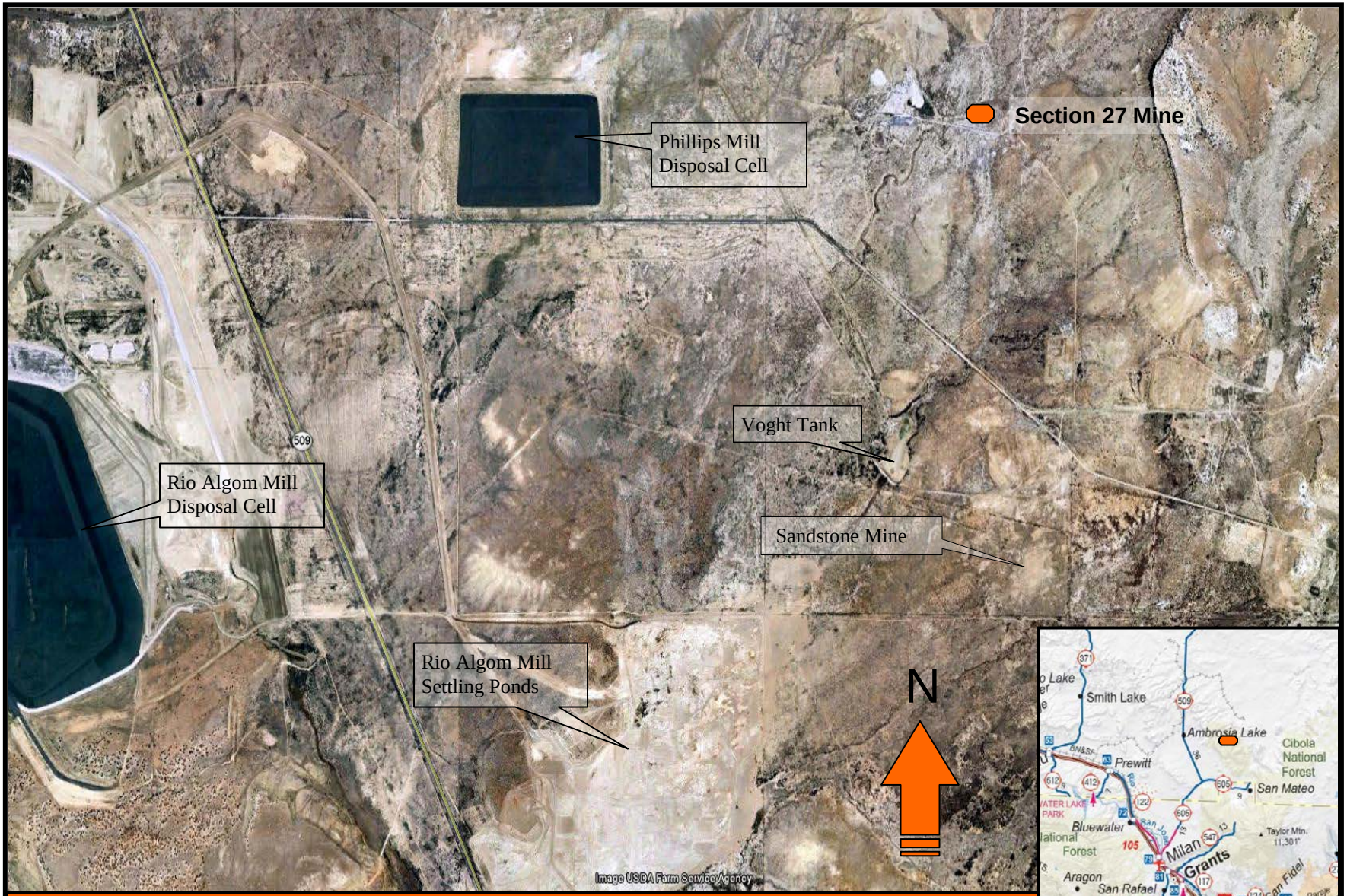

Figure 1. Section 27 Mine Location, Ambrosia Lake Mining District, McKinley County, New Mexico

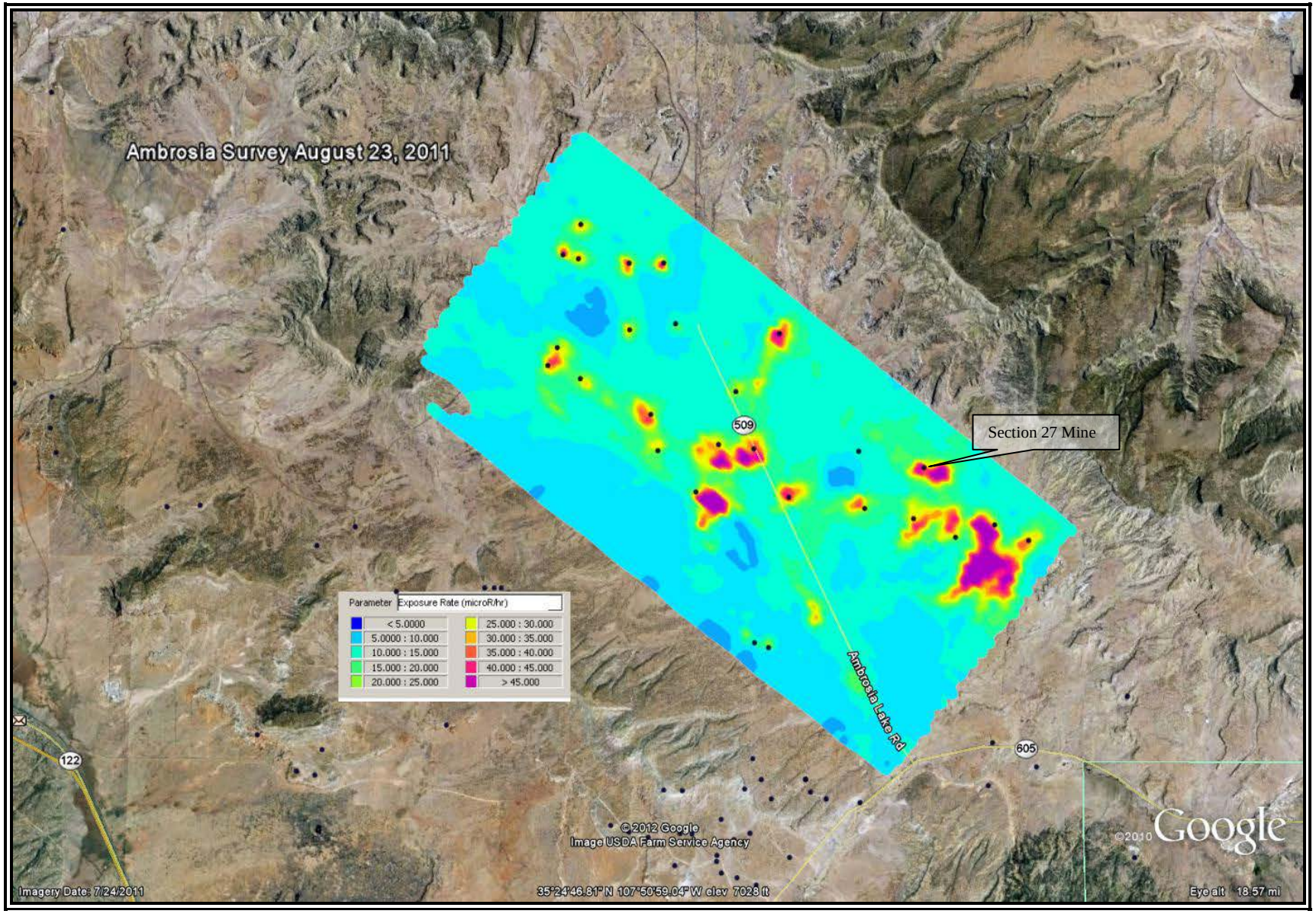

Figure 2. ASPECT Ambrosia Lake Aerial Survey, Radiological Exposure Rates (microR/hr)

Table 1. Domestic Wells within a Five Mile Radius of the Section 27 Mine, Office of the State Engineer

OSE Well Number	Well Use	Well Owner	Section	Town-ship	Range	Depth of Well	Depth to Water	Water Column
Wells (>3 and <4 miles)								
B 01190	Livestock[a]	(b) (6) [redacted]	11	13N	09W	390	37	353
B 00456	Livestock[a]	(b) (6) [redacted]	14	13N	09W	700	*	*
B 01104	Domestic	(b) (6) [redacted]	14	13N	09W	303	247	56
B 01115	Domestic	(b) (6) [redacted]	15	13N	09W	478	204	274
Wells (>4 and <5 miles)								
B 01636	Domestic	(b) (6) [redacted]	22	13N	09W	260	80	180
B 01544	Domestic	(b) (6) [redacted]	18	13N	08W	715	624	91
B 00659	Domestic	(b) (6) [redacted]	22	13N	09W	220	190	30
B 00390	Irrigation[a]	FERNANDEZ CO. LTD	18	13N	08W	1800	900	900

* = Value Unknown

[a] = Wells are permitted for household use

Table 2. Domestic Wells Sampled within a Five Mile Radius of the Section 27 Mine**

Well ID	Well Use	Well Owner	Gross Alpha	226RA	U	SE
			picoCuries/Liter (pCi/L)		micrograms/Liter (µg/L)	
B 01104	Domestic	(b) (6) [redacted]	16.0	0.01	20.6	13.2
B 01115	Domestic	(b) (6) [redacted]	46.6	0.96	63.9	73.6
B 00659	Domestic	(b) (6) [redacted]	20.7	0.01	13.8	66.2
B 01636	Domestic	(b) (6) [redacted]	6.2	0.42	10.1	27.1
*	Domestic	(b) (6) [redacted]	56.0	2.9	2.0	2.0
*	Domestic	(b) (6) [redacted]	0.9	0.28	2.5	2.0
*	Domestic	(b) (6) [redacted]	6.7	0.1	2.5	ND

* Not permitted with the NMOSE

** Water Samples collected for the Phase 1 Site Investigation San Mateo Legacy Uranium Sites, 2009

Bold Exceeds the EPA MCL and or NMWQCC Ground Water Standard.