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Memorandum

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

From: **Dana Bahar, Manager, Superfund Oversight Section, Ground Water Quality Bureau, New Mexico Environment Department**

Date: **October 31, 2011**

Subject: **Pre-CERCLIS Screening Assessment of the Section 33 Mine, New Mexico: No Further Action Under CERLCA Recommended**

Site name	Section 33	**Alias**	NA	**Street Address**	NA
City	NA	**State**	New Mexico	**Zip code**	NA
County	McKinley County				
Latitude	35° 24' 08.26" N	**Longitude**	107° 47' 37.88" W		

Site physical description:
The Section 33 mine is located in Section 33, T14N, R9W, approximately 3.8 miles north of the junction of State highways 509 and 605 in the Ambrosia Lake area. The Section 33 mine was an underground uranium mine in the Ambrosia Lake Mining Sub-District. The surface facilities and main shaft are located in Section 33 and the underground workings extend into parts of Section 33 and Section 29. The Section 33 mine had approximately 28 acres of disturbed surface. The Quivira Mining Company (QMC) started reclamation of the disturbed surface at the Section 33 mine site in 1994 under the Prior Reclamation Criteria of the New Mexico Mining Act Rules [19.10.5.511 NMAC] (Ref. 1). Additional surface reclamation work occurred at the Section 33 mine from 2003 through 2005 under an Existing Mine Permit through the New Mexico Mining Act Rules [19.10.5.500 NMAC] (Ref. 2).

Site identification:
The Site is one of 97 legacy uranium sites identified within the Ambrosia Mining Sub-District of the Grants Mining District. It is one of 11 mines that are being addressed by Rio Algom Mining, LLC (RAML) under a discharge permit (DP-362) in accordance with the New Mexico Water Quality Control Commission (NMWQCC) Regulations [20.6.2.3000 NMAC].

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Site summary:
The Section 33 mine commenced in 1957 with mine development. With subsequent completion of the mine shaft, the first ore production from the mine occurred in 1959. To date, the Section 33 mine has produced over 1.6 million tons of uranium ore. In 1984 the Section 33 mine shut down conventional mining activities due to the depressed condition of the uranium market. However, beginning in 1984, areas of the mine were available for old stope leaching methods (Ref. 1). Old stope leaching was discontinued in January, 2000 and the Section 33 mine permanently suspended operations in December, 2002 (Ref. 2).

QMC began reclamation of the disturbed surface areas at the Section 33 mine site in 1994 under the Prior Reclamation Criteria of the New Mexico Mining Act Rules [19.10.5.511 NMAC]. From 1995 through 1998 several inspections by the New Mexico Energy Minerals and Natural Resources (NMEMNRD) found the reclamation measures did not satisfy the requirements of the New Mexico Mining Act (NMMA). Currently the Section 33 mine maintains an Existing Mine Permit (MK009RE) under the New Mexico Mining Act Rules [19.10.5 NMAC], with the NMEMNRD. MK009RE required QMC to develop an approved Closeout Plan (Ref. 3). In 2002 through 2005 QMC performed additional reclamation work under the Closeout Plan which included further demolition and disposal of surface facilities, contour work and revegetation of the surface along with the plugging of the main shaft, ventilation holes and injection holes (Ref. 2). To date the NMEMNRD has not released the Section 33 mine from further requirements of the NMMA.

In 1983 the New Mexico Environment Department (NMED) determined that the old stope leaching process would require a discharge permit (DP) under the NMWQCC Regulations [20.6.2.3000 NMAC]. In 1985, DP-362 authorized QMC to conduct old stope leaching by recirculating mine water fortified with sodium bicarbonate or sulfuric acid to be injected into 8 underground uranium mines in the Ambrosia Lake Mining Sub-District for the secondary recovery of uranium. These 8 mines included the Section 17, 19, 22, 24, 30, 30W, 33 and 35 mines. In 1999 a modification to DP-362 included four additional underground uranium mines; the Section 13, 15, 23 and 25 mines. NMED records are not conclusive that all mines listed in DP-362 were actually used for old stope leaching. QMC ceased all underground injections by 2000. To ensure an adequate Closure Plan is implemented in accordance with NMWQCC Regulations [20.6.2.3107 NMAC], and pursuant to Condition 6 of DP-362, RAML submitted a ground water flow and geochemical model to NMED for approval. NMED approved the ground water flow model but not the geochemical model. In 2008, NMED required RAML to submit an Abatement Plan to assess regional ground water conditions related to the RAML mines addressed in DP-362 with the exception of the Section 13 and 15 mines which RAML never owned or operated. In 2009, NMED allowed RAML to conduct abatement under NMWQCC Abatement Regulations [20.6.2.4000] rather than as a condition of DP-362 (Ref. 2).

Targets:
Wells that are registered with the New Mexico Office of the State Engineer (OSE) and located within a 4-mile radius are shown in Table 1. The Site is within the 4 mile radius of the junction of State highway 509 and 605 which includes a small community, and residences, that rely on private and domestic wells (Ref 4). 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 NMWQCC ground water standards (Ref. 5).

Airborne Spectral Photometric Environmental Collection Technology (ASPECT) operated by EPA has developed exposure rate contour map of the Ambrosia Lake Mining Sub-District that includes the Section 33 (NM0022) 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 33 mine are over one thousand times higher than the typical range, that is, ground surface radiological hazards were identified at most Ambrosia Lake uranium mine sites including the Section 33 mine (Ref. 6).

Site ownership and Potential Responsible Parties:
Kerr McGee Corporation owned and operated the Section 33 mine from 1969 until 1984. QMC, a subsidiary of Kerr McGee Corporation, took over mining operations in 1984. Rio Algom Mining Company (RAMC) acquired QMC in 1989 (Ref. 7). Billiton plc purchased RAMC in 2000. Broken Hill Proprietary Company Limited (BHP) merged with Billiton plc to form BHP Billiton Limited, which changed RAMC to RAML a wholly-owned subsidiary (Ref. 8).

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

Site reconnaissance:
The last documented site reconnaissance occurred in 2004 by NMEMNRD personnel (Ref. 9). NMED has not conducted a site reconnaissance for this Pre-CERCLIS Screen.

Recommendation:
Data collected from the Ambrosia Lake Mining Sub-District has shown a release of CERCLA hazardous substances to both the ground surface, and ground water. In addition, an Aerial Radiological Survey conducted by EPA of the Ambrosia Lake Mining Sub-District measured radiological exposure rates above background in and around the eleven RAML mine sites.

On-going remedial activities at the Section 33 mine are being conducted by RAML under state oversight in accordance with NMWQCC regulations under DP-362 and a separate Abatement Plan. RAML is required to investigate and abate radiological and metal contamination for the regional impacts to the ground water system from legacy RAML uranium sites in the Ambrosia Lake area. In order to ensure that all reclamation work completed by RAML will meet applicable environmental standards which includes surface water, ground water and soils, NMED is also requiring RAML to submit all documentation and data related to completed surface reclamation for review for possible inclusion under NMWQCC abatement regulations because although RAML completed surface reclamation under a NMEMNRD Closeout Plan it did so without concurrence from NMED.

NMED recommends that no further action is required at the Section 33 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 Mineral District is recommended as part of regional ground water quality characterization.

References:

1. New Mexico Energy, Minerals and Natural Resources Department, 2007, Abandoned and inactive uranium mines in New Mexico database, Mining and Minerals Division.
2. New Mexico Environment Department, DP-362 files.
3. Rio Algom Mining, LLC, 1999, Application for Existing Mine Permit to Mining and Minerals Division
4. New Mexico Office of the State Engineer, 2011, New Mexico water rights reporting system database, point of diversion by location, four mile radius of Sandstone Mine.
5. New Mexico Environment Department, 2010, Phase 1 Site Investigation Report San Mateo Creek Legacy Uranium Sites, CERCLIS ID# NMN00060684, McKinley and Cibola Counties, New Mexico.
6. EPA, 2011, Airborne Spectral Photometric Environmental Collection Technology Exposure Rate Contour Map of Ambrosia Lake Mining District.
7. Quivira Mining Company, 1994, Letter to the Mining and Minerals Division.
8. Rio Algom Mining, LLC, 2001, Letter to the Mining and Minerals Division.
9. Mining and Minerals Division, 2004, Annual Inspection Report of Rio Algom Mining, LLC in the Ambrosia Lake Mining District.

Table 1. Domestic Wells within a Four Mile Radius of the Section 33 Mine, Office of the State Engineer[1].

OSE Well Number	Well Use	Well Owner	Section	Town-ship	Range	Depth of Well	Depth to Water	Water Column
Wells (>2 and <3 miles)								
B 01190	Livestock[a]	MELOIN MARQUEZ	11	13N	09W	390	37	353
B 00456	Livestock[a]	CARLOS SANDOVAL	14	13N	09W	700	*	*
Wells (>3 and <4 miles)								
B 01104	Domestic	ALVIN D. SANDOVAL	14	13N	09W	303	247	56
B 01115	Domestic	MELVIN MARQUEZ	15	13N	09W	478	204	274
B 01636	Domestic	MICHAEL GARCIA	22	13N	09W	260	80	180
B 01544	Domestic	THOMAS JACKSON	18	13N	08W	715	624	91
B 00659	Domestic	MICHAEL G. GARCIA	22	13N	09W	220	190	30
B 00390	Irrigation[a]	FERNANDEZ CO. LTD	18	13N	08W	1800	900	900

[1] = Taken from Sandstone Mine Well Data
* = Value Unknown
[a] = Wells are permitted for household use

Table 2. Domestic Wells Sampled within a Four Mile Radius of the Section 33 Mine

OSE Well Number	Well Use	Well Owner	Gross Alpha	226RA	U	SE
			picoCuries/Liter (pCi/L)		micrograms/Liter (µg/L)	
B 01104	Domestic	ALVIN D. SANDOVAL	16.0	0.01	20.6	13.2
B 01115	Domestic	MELVIN MARQUEZ	46.6	0.96	63.9	73.6
B 00659	Domestic	MICHAEL GARCIA	20.7	0.01	13.8	66.2
B 01636	Domestic	MICHAEL GARCIA	6.2	0.42	10.1	27.1
*	Domestic	SCHMITT-1	56.0	2.9	2.0	2.0
*	Domestic	SCHMITT-6	0.9	0.28	2.5	2

* = Not permitted with the NMOSE

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

pCi/L = picoCuries/Liter

µg/L = micrograms/Liter

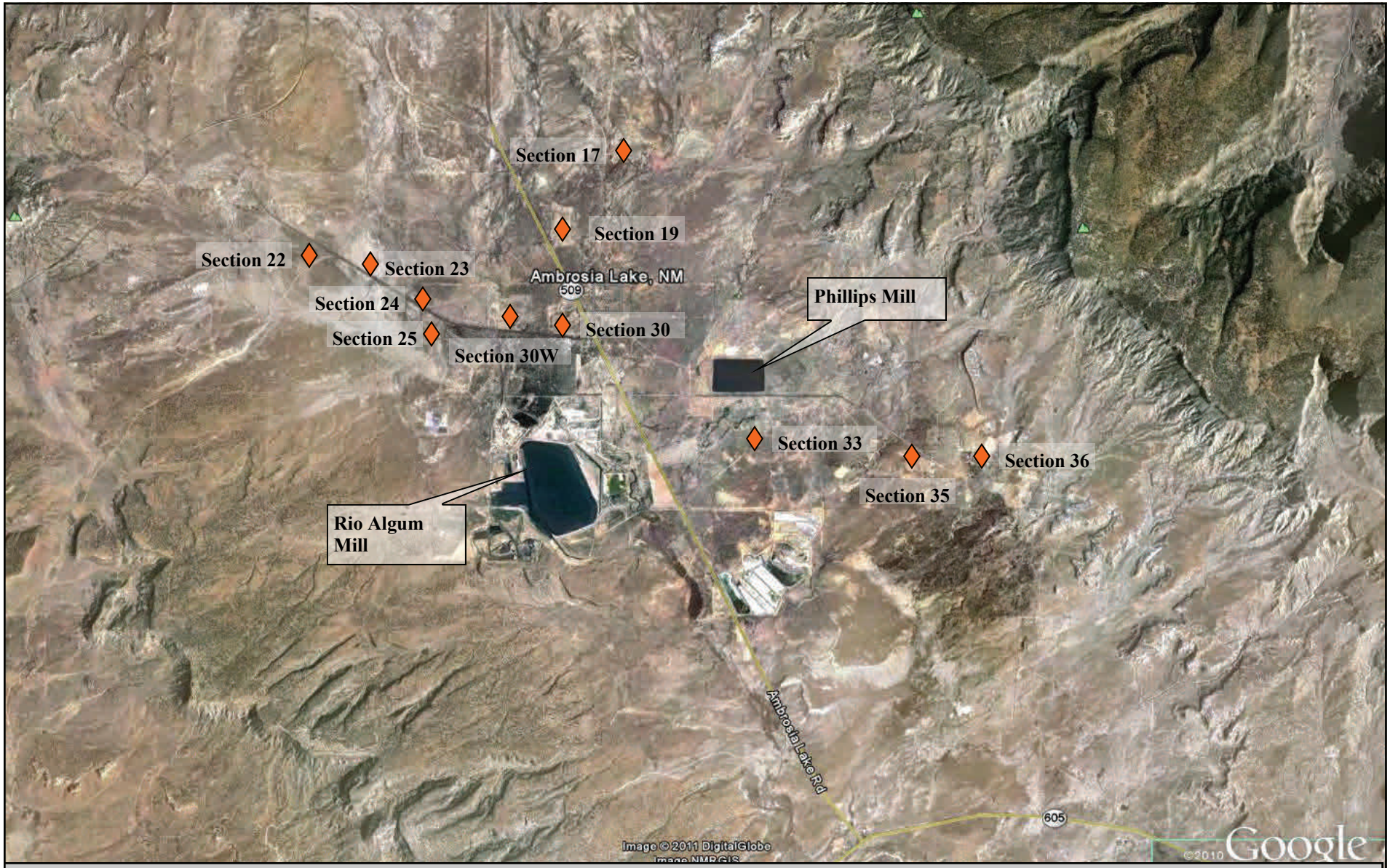

Figure 1. Ambrosia Lake Mining District, Rio Algom Mine Sites

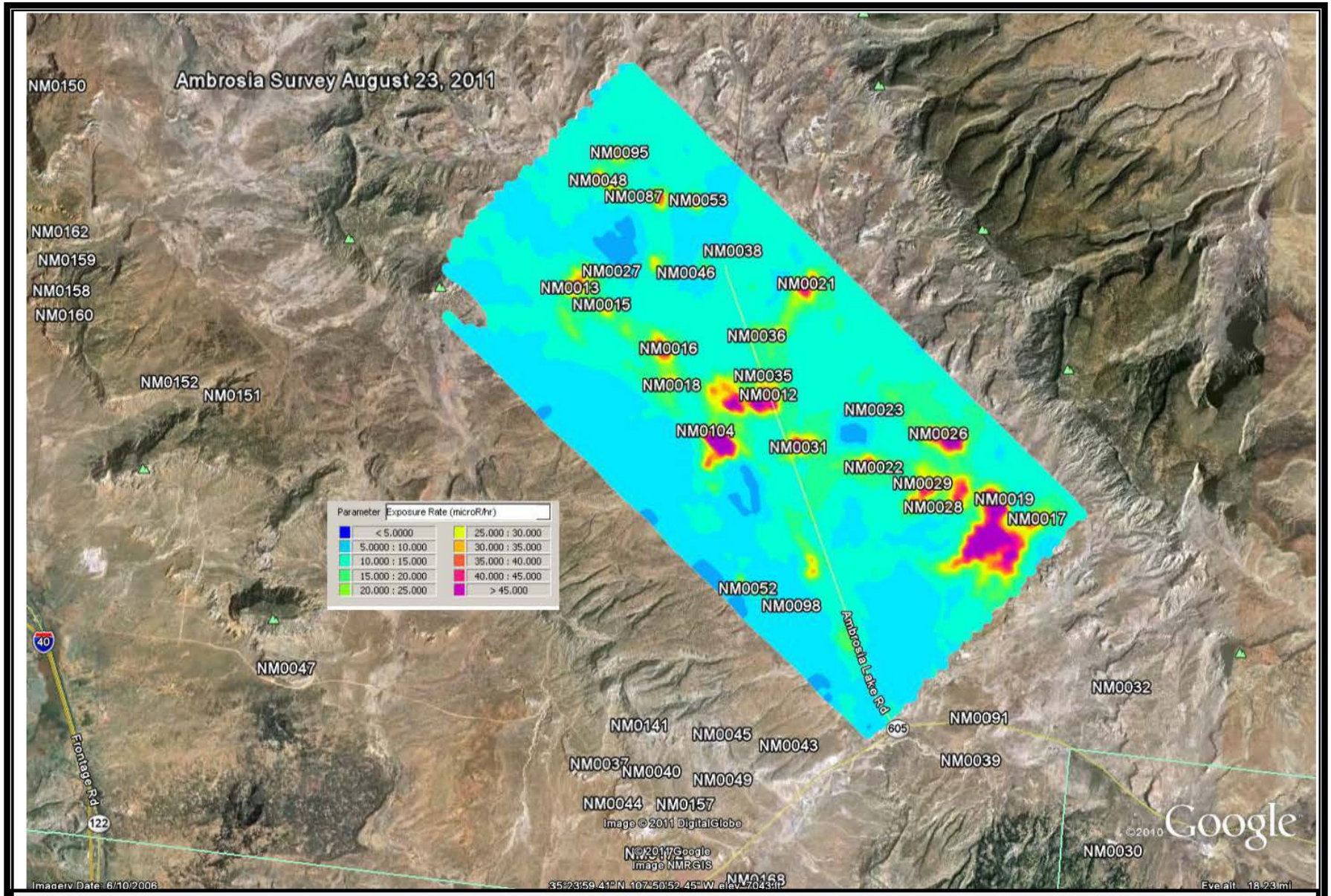

Figure 2. U.S. EPA ASPECT Exposure Rate Contour Map of Ambrosia Lake Mining District.