REDACTED VERSION

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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 24 Mine, New Mexico: No Further Action Under CERLCA Recommended**

Site name	Section 24	**Alias**	NA	**Street Address**	NA
City	NA	**State**	New Mexico	**Zip code**	NA
County	McKinley County				
Latitude	35° 25' 20.48" N	**Longitude**	107° 51' 08.90" W		

Site physical description:
The Section 24 mine is located in Section 24, T14N, R10W approximately 6.5 miles northwest of the junction of State highways 509 and 605 in the Ambrosia Lake area. The Section 24 mine was an underground uranium mine in the Ambrosia Lake Mining Sub-District. The underground workings covered most of section 24 and a portion of section 26. The Section 24 mine had approximately 26 acres of disturbed surface. The Quivira Mining Company (QMC) started reclamation of the disturbed surface at the Section 24 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 24 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 Section 24 mine is one of approximately 97 legacy uranium mines identified in the Ambrosia Lake 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 24 mine commenced in 1957 with mine development. With subsequent completion of the mine shaft, the first ore production from the mine occurred in September 1959. To date, the Section 24 mine has produced over two million tons of uranium ore. In the early 1980s the Section 24 mine shut down conventional mining activities due to the depressed condition of the uranium market. However, beginning in 1984, areas of the mine were used for old stope leaching methods (Ref. 1). Old stope leaching was discontinued in January, 2000 and the Section 24 mine permanently suspended operations in December, 2002 (Ref. 2).

The QMC began reclamation of the disturbed surface areas at the Section 24 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 24 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). From 2003 through 2005 RAML performed additional surface 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. 3). To date the NMEMNRD has not released the Section 24 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 plan (DP) under the NMWQCC Regulations [20.6.2.3000 NMAC]. In 1985, DP-362 authorized QMC to conduct old stope leaching in the Ambrosia Lake area by recirculating mine water with some water fortified with sodium bicarbonate or sulfuric acid to be injected into 8 underground uranium mines 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 the addition of four underground uranium mines; the Section 13, 15, 23 and 25 mines. NMED records are not conclusive that all mines under DP-362 were used for old stope leaching but records show the Section 24 mine did and that some injected water was fortified with sodium bicarbonate or sulfuric acid. All underground injections ceased 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. There is a ranch with several residences approximately 2.2 miles northeast of the Section 24 mine. During NMEDs ground water investigation of San Mateo Creek a domestic well was sampled at this residence. This well does not appear on the OSE database (Ref. 4). The analytical results from the sampled well show ground water concentrations below the Environmental Protection Agency (EPA) Maximum

Contaminant Levels (MCL) and the 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 24 (NM0016) 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 24 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 24 mine (Ref. 6).

Site ownership and Potential Responsible Parties:
Kerr McGee Corporation owned and operated the Section 24 mine from 1959 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 24 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 24 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 Section 23 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. Wells within a Four Mile Radius for Section 24 Mine, Office of the State Engineer[1].

OSE File Number	Well Use	Well Owner	Section	Town-ship	Range	Depth of Well (ft)	Depth of Water (ft)	Water Column (ft)
Wells (>1 and <2 miles)								
B 00366	Mining[a]	RIO ALGOM MINING LLC	24	14N	10W	760	*	*
B 00994	Mining[a]	RIO ALGOM MINING LLC	19	14N	09W	779	*	*
B 00372	Mining[a]	SABRE-PINON CORPORATION	23	14N	10W	796	*	*
B 00994	Mining[a]	RIO ALGOM MINING LLC	17	14N	09W	1094	*	*
B 00371	Mining[a]	SABRE-PINON CORPORATION	25	14N	10W	752	*	*
B 00364	Mining[a]	ANDERSON DEVELOPMENT CORP.	30	14N	09W	735	*	*
B 00994	Mining[a]	RIO ALGOM MINING LLC	30	14N	09W	810	*	*
B 00363	Mining[a]	RIO ALGOM MINING LLC	22	14N	10W	745	*	*
Wells (>2 and <3 miles)								
B 01558	Livestock[a]	(b) (6) [redacted]	(b) (6) [redacted]			800	600	*
B 00994	Mining[a]	RIO ALGOM MINING LLC	22	14N	10W	827	*	*
B 00365	Mining[a]	ANDERSON DEVELOPMENT CORP.	20	14N	09W	793	*	*
B 00539	Public Works	NM HIGHWAY DEPT.	31	14N	09W	*	*	*
B 00680	Construction	STAR LAKE RR	31	14N	09W	*	*	*
B01145	Highway[a]	NM HIGHWAY DEPT.	31	14N	09W	*	*	*
B 00994	Mining[a]	RIO ALGOM MINING LLC	30	14N	09W	750	*	*
B 00362	Mining[a]	RIO ALGOM MINING LLC	22	14N	10W	3093	*	*
Wells (>3 and <4 miles)								
B 01246	Livestock[a]	(b) (6) [redacted]	(b) (6) [redacted]			1200	700	*
B 00143	Domestic					90	60	30

[1] = Taken from Section 23 Well Data

* = Value Unknown

[a] = Well may be used as a domestic well

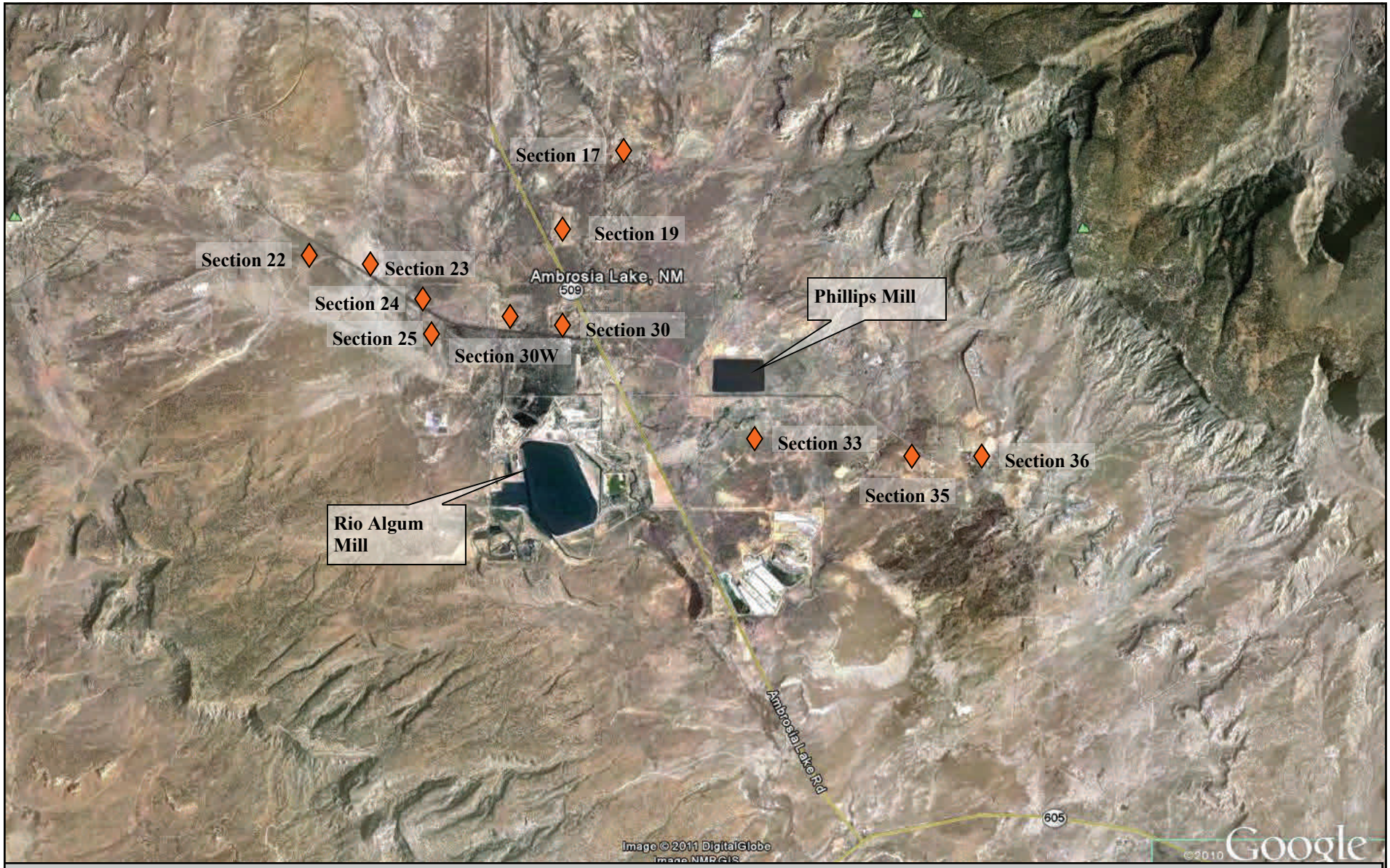

Figure 1. Ambrosia Lake Mining District, Rio Algom Mine Sites

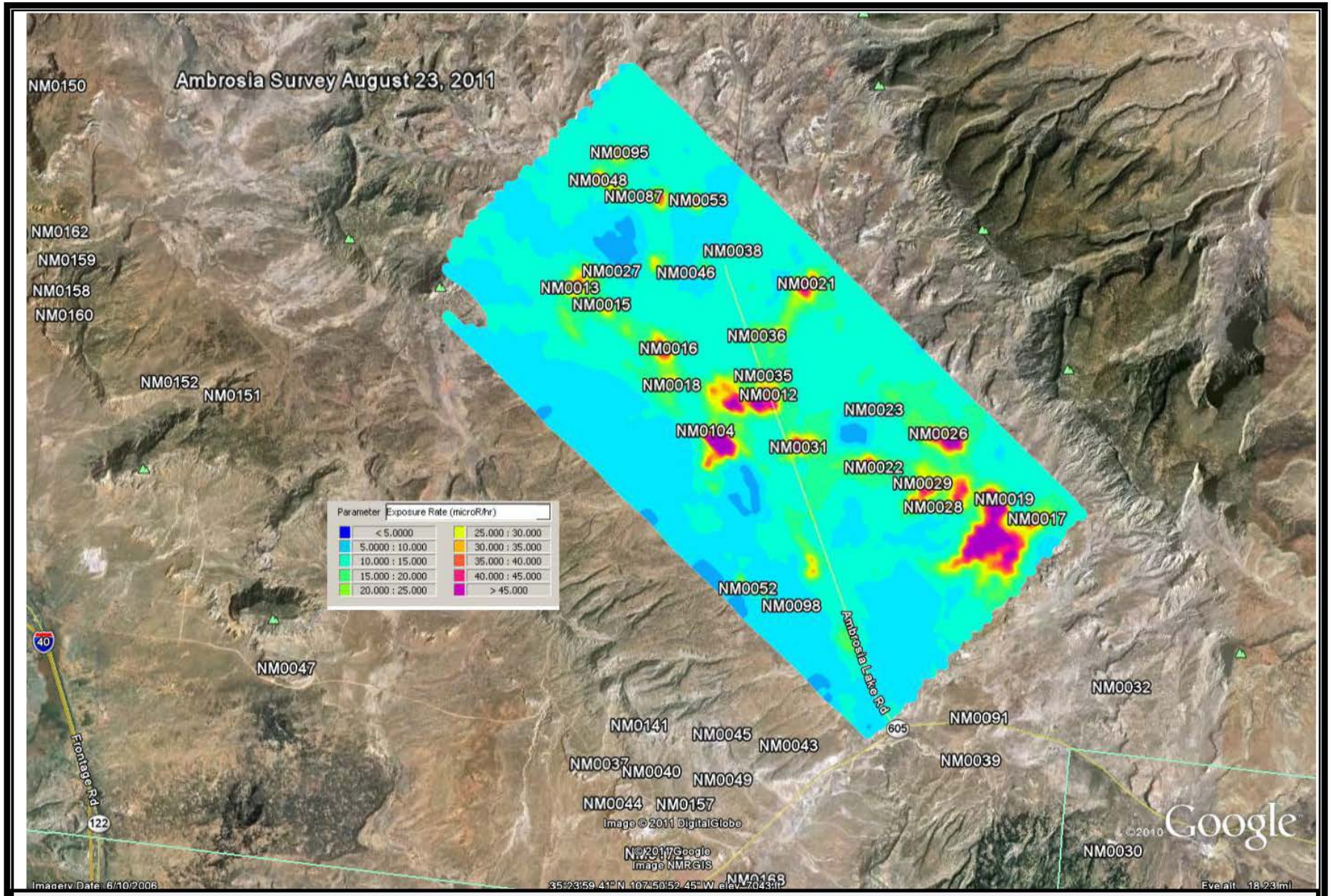

Figure 2. U.S. EPA ASPECT Exposure Rate Contour Map of Ambrosia Lake Mining District.