NEW MEXICO
ENVIRONMENT DEPARTMENT

*Ground Water Quality Bureau*

Harold Runnels Building
1190 St. Francis Drive, P. O. Box 5469
Santa Fe, NM 87502-6110
Phone (505) 827-2918 Fax (505) 827-2965
www.nmenv.state.nm.us

SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

DAVE MARTIN
Cabinet Secretary

BUTCH TONGATE
Acting Deputy Secretary

# Memorandum

**To:** **LaDonna Turner, Site Assessment Manager**
**Technical and Enforcement 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 Section 23 Mine, McKinley County, New Mexico: No Further Action under CERLCA Recommended**

---

| | | | | | |
|---|---|---|---|---|---|
| **Site name** | Section 23 Mine | **Street address** | NA | | |
| **City** | NA | **State** | New Mexico | **Zip code** | NA |
| **County** | McKinley County | | | | |
| **Latitude** | 35° 25' 47.95"N | **Longitude** | 107° 52' 17.97" W | | |

**Site physical description:**
The Section 23 mine is located in Section 23, T14N, R10W, approximately 7.5 miles northwest of the junction of State highways 509 and 605 in the Ambrosia Lake area (Figure 1). The Section 23 mine was an underground uranium mine in the Ambrosia Lake Mining Sub-District. The surface facilities and main shaft are located in Section 23 and the underground workings extend into parts of Section 23. The Section 23 mine had approximately 100 acres of disturbed surface. The Section 23 mine was reclaimed by Homestake Mining Company of California (HMC) in 1991 and 1992 under the Prior Reclamation Criteria of the New Mexico Mining Act Rules (19.10.5.511 NMAC). Reclamation work included removal of all surface facilities, shaft and borehole sealing, pond closure, injection well sealing, contouring the site and waste pile, soil capping and revegetation (Ref. 1).

**Site identification:**
The Section 23 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 Miining, 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].

**Site summary:**
Section 23 is one of 4 underground uranium mines in the Ambrosia Lake Mining Sub-District that HMC owned and/or operated (Ref. 2). The Section 23 mine commenced in 1956 with mine development. With subsequent completion of the mine shaft, the first ore production from the mine occurred in 1959. In 1989 the Section 23 mine shut down conventional mining activities due to the depressed condition of the uranium market. Old stope leaching was also used at the Section 23 mine and continued until April1990 when operations were permanently suspended (Ref. 2 and Ref. 3). To date, the Section 23 mine has produced over 2.5 million tons of uranium ore (Ref. 2).

HMC began reclamation of the disturbed surface areas at the Section 23 mine site in 1991 under the Prior Reclamation Criteria of the New Mexico Mining Act Rules [19.10.5.511 NMAC]. In 1995 an inspection 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). Reclamation work included removal of all surface facilities, shaft and borehole sealing, pond closure, injection well sealing, contouring the site and waste pile, and revegetation (Ref. 1). In 1996 the surface estate for the Section 23 mine was sold to the RAML which then became responsible for final reclamation (Ref. 4). A follow up inspection in 1997 by the NMEMNRD found reclamation measures to be satisfactory and released the Section 23 mine from further requirements of the NMMA. Currently the Section 23 mine is listed in the Existing Mine Permit (MK009RE) under the NMMA Rules [19.10.5 NMAC], with the NMEMNRD (Ref. 5).

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 RAML to conduct old stope leaching by recirculating mine water with some 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 or that additives to the water were used. RAML 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. 6).

The Section 23 mine under the operation of HMC did utilize old stope leaching methods during its operational life. Recycled mine water was injected into holes drilled into the mined out stope areas from the ground surface (Ref. 1). No record was found to suggest that HMC notified NMED of this discharge. In 1996 RAML purchased the surface estate for the Section 23 mine from HMC with the intent of including the mine under its old stope leaching program. The

Section 23 mine is listed in both the DP-362 and the Existing Mining Permit MK009RE.

**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 2.8 miles to the east of the Section 23 mine. During NMED's ground water investigation of San Mateo Creek a domestic well was sampled at this residence. This well was not identified in the OSE database (Ref. 7). 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. 8).

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 23 (NM0015) 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 23 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 23 mine (Ref. 9).

**Site ownership and Potential Responsible Parties:**
The Section 23 mine was in operation from 1959 to 1989. The Section 23 mine was originally operated under the United Nuclear-Homestake Partners under a lease from the Santa Fe Pacific Railroad, owner of the mineral rights. In 1981 the partnership dissolved and the operator became Homestake Mining Company-Grants, later renamed Homestake Mining Company of California (Ref. 1). Currently RAML is the owner of the surface estate and the Uranium Resources Incorporated (URI) is the owner of the mineral estate (Ref. 10).

**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. 11). A site reconnaissance was not performed as part of this Pre-CERCLIS screening assessment.

**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 23 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 23 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. Homestake Mining Company of California, 1994, Reclamation Report Section 23 Mine, compiled by AK GeoConsult, Inc.
2. New Mexico Energy, Minerals and Natural Resources Department, 2007, Abandoned and inactive uranium mines in New Mexico database, Mining and Minerals Division.
3. New Mexico Energy, Minerals and Natural Resources Department, 1990, Annual Report of Uranium Operations, Homestake Mining Company of California.
4. Homestake Mining Company, 1997, Letter to Mining and Minerals Division.
5. Homestake Mining Company, 1999, Application for Existing Mine Permit to Mining and Minerals Division
6. New Mexico Environment Department, DP-362 files.
7. 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.
8. 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.
9. EPA, 2011, Airborne Spectral Photometric Environmental Collection Technology Exposure Rate Contour Map of Ambrosia Lake Mining District
10. Rio Algom Mining, LLC, 2010, Electronic Mail to New Mexico Environment Department.
11. 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 23 Mine, Office of the State Engineer.

| 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] | LARRY GRIDER | 33 | 14N | 10W | 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] | JERRY ELKINS | 33 | 15N | 10W | 1200 | 700 | * |
| B 00143 | Domestic | IRVIN R. ANDREWS | 35 | 15N | 10W | 90 | 60 | 30 |

* = Value Unknown

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

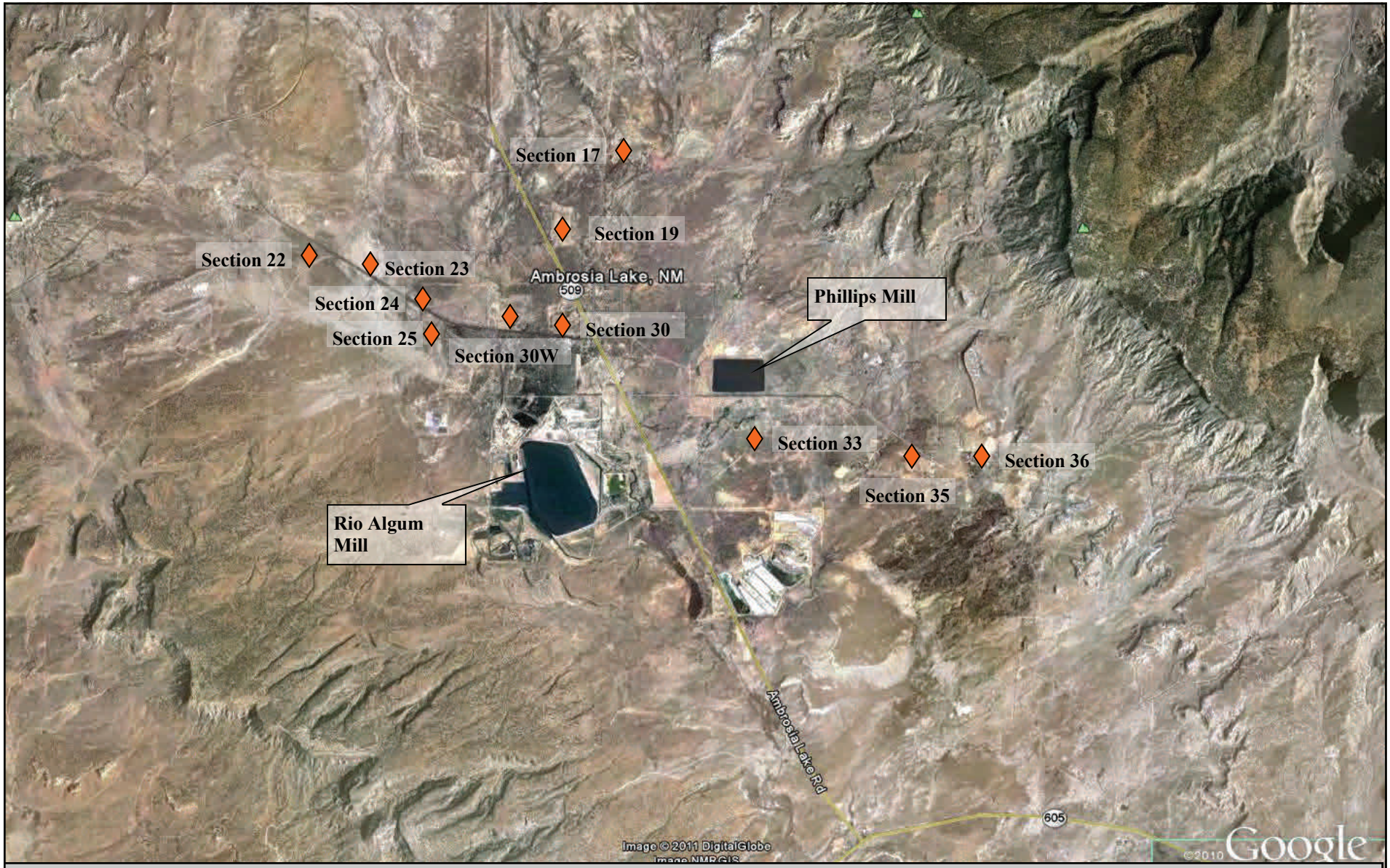


Figure 1. Ambrosia Lake Mining District, Rio Algom Mine Sites

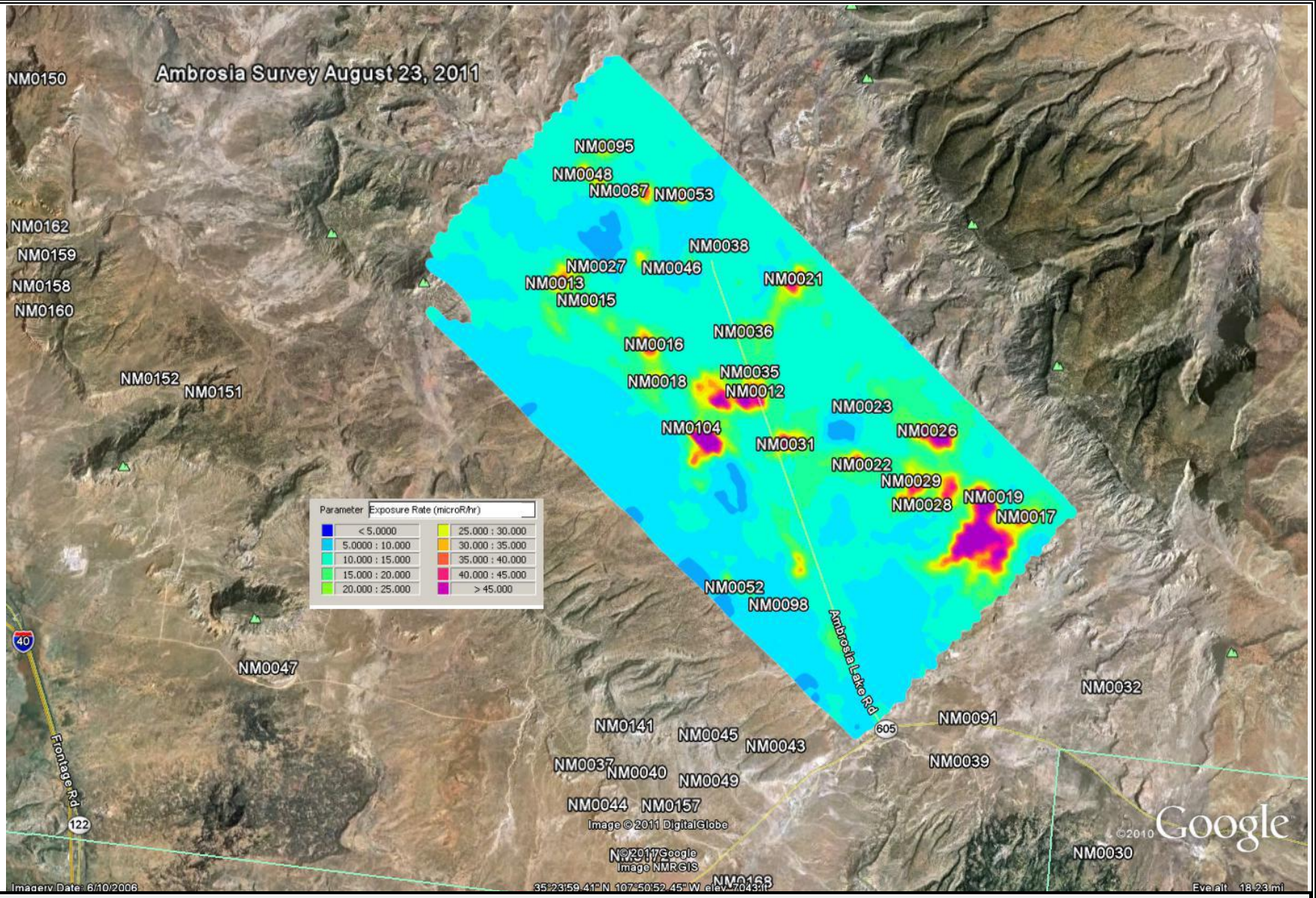


Figure 2. U.S. EPA ASPECT Exposure Rate Contour Map of Ambrosia Lake Mining District.