NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

Harold Runnels Building
1190 St. Francis Drive, P.O. Box 5469
Santa Fe, NM 87502-5469
Phone (505) 827-2900 Fax (505) 827-2965
www.nmenv.state.nm.us

SUSANA MARTINEZ
Governor
JOHN A. SANCHEZ
Lieutenant Governor

F. DAVID MARTIN
Secretary
Butch Tongate
Deputy Secretary

Memorandum

Date: **March 20, 2012**

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

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

Subject: **Pre-CERCLIS Screening Assessment of the Section25 Shaft Mine (Grants Mining District), McKinley County, New Mexico: Further Investigation under CERCLA Recommended**

Site name	Section 25 Shaft Mine	**Street address**	not applicable		
City	not applicable	**State**	New Mexico	**Zip code**	not applicable
County	McKinley				
Latitude	35.333398	**Longitude**	-107.841972	**TRS**	T13N, R10W, Sec 25 NE, NE

Site physical description:
The Section 25 Shaft Mine ("Site") is located approximately 1.7 miles northwest of the junction of State highway 605 and Poison Canyon Road (Ref. 1) in McKinley County. The Site is approximately 15 miles north of Grants, NM. The Site is located in the Dos Lomas 7.5 minute USGS 1:24000 scale topographic map quadrangle at latitude 35.333398, longitude -107.841972, and elevation approximately 6,920 ft. above sea level (Ref. 1 and Ref. 2). The total area of the Site is estimated to comprise an area of approximately 18.58 acre (Ref. 3). The specific location data for the Section 25 Shaft is inconsistent among the various sources used in this report so NMED has relied on the report by Anderson 1980 (Ref. 3); the Mining and Mineral Department (MMD) Abandoned Uranium Mine (AUM) Exempt Files (Ref. 4); the Dos Lomas 7.5 minute quadrangle map (Ref. 1); and Google Earth (Ref. 5) to interpolate and estimate the approximate Site location. Anderson also refers to more than one "Shaft" in the Section 25 area which adds some confusion to the location of mines in this section. The Section 25 Shaft Mine referred to in this document is located in the very northeast corner of Section 25 close to the southeast corner of Section 24 (Ref. 2).

Figure 1 is a regional location map of the Section 25 Mines that includes the Section 25 Shaft Mine. Figure 2 is a topographic map of Section 25 Mines that includes the Section 25 Shaft Mine (yellow triangle 2). Figure 3 is a Google Earth location map of the Section 25 Shaft Mine. Figures 1, 2, and 3 are contained in Attachment A.

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The Site is located in along the southern edge of the Mesa Montanosa landform in the Haystack Mining District, and west of Poison Canyon (NMD980878771, Ref. 6 and Ref. 7). The western part of Section 25 borders part of the Navajo Indian Reservation in Section 26 (Ref. 1 and Ref. 2).

Site identification:
The Site is one of numerous legacy uranium sites within the Grants Mining District, Ambrosia Lake Subdistrict, San Mateo Creek watershed, Bluewater Underground Basin.

Site summary:
The Site is part of the Poison Canyon uranium mineralization trend which occurs in the Jurassic Todilto Limestone Formation (Ref. 6, Ref. 7, and Ref. 8). According to the information from the New Mexico Energy, Mineral, and Natural Resource Department, Mining and Minerals Division (MMD), the Section 25 Shaft Mine may not have produced any economic amount of uranium ore, or the amount was so low as to be exempt from state regulation (Ref. 3).

The Section 25 Shaft Mine was visited, photographed and described by Anderson in 1980 (Ref. 2). The Section 25 Shaft Mine featured a vertical shaft with a 35 ft. high head frame and an 18 ft. X 32 ft. hoisting shed (See photographs in Attachment B). The total depth of the mine was possibly a maximum of 120 ft. based on the estimated length of cable wrapped around the hoisting spool at the time of the Anderson visit (Ref. 2.). Mine waste rock dump areas were noted north and south of the head frame with the largest workings on the north side that possibly extended past the Section 25 boundary and into Section 24. The north side waste rock area included an 8 ft. X 20 ft. concrete slab and possibly covered a ventilation shaft (Ref. 2).

Based on the photographs in the 1980 Anderson report, the Shaft was located northeast of Poison Canyon Road (also know as Haystack Road), and it was along a north-south line with the Section 25 Decline Mine (See photographs in Attachment B). MMD's information describes the disturbed area for the Shaft as 18.58 acres (Ref. 3). The Anderson report describes the mine and number for the Site as, "Section 25 Shaft, NM-149-4-18" on page 141 which is included in the MMD data for mine identification number NMMK0215 (Ref. 3 and Ref. 4). There is no Section 25 Shaft Mine described in the information in the MMD Exempt file for Abandoned Uranium Mines (Ref. 4).

In 2009 representatives for the Navajo Nation Abandoned Uranium Mines (AUM) program attempted to visit what was referred to as the Section 25 Decline Mine, but were not able to acquire the land owner's permission to access the Site (Ref. 9). NMED's's interpretation of information is that the 2009 Navajo AUM report location for the Section 25 Decline Mine may be incorrect and is instead the location for the Section 25 Shaft Mine. NMED is basing their interpretation on photographs and information from the 1980 Anderson report (Ref. 3). Additional information will be necessary to clearly identify which mine site was considered in the 2009 AUM report where the Section 25 Decline Mine was referenced.

In the area around the Section 25 Shaft Mine, radioactivity counts were reported up to 4,000 counts per second (cps) (Ref. 2). Radioactivity readings in the second, covered shaft area north of the head frame were about 2,000 cps and the dump area ranged between 1,200 to 1, 700 cps (Ref. 2).

The Poison Canyon area Section 25 mines werevisited by investigators working for the National Uranium Resource Evaluation (NURE) Project in 1979 (Ref. 10). Dry sediment samples were collected, sieved, and submitted for laboratory analysis of metals and select radionuclides. Figure 4 presents the general location of the NURE sediment samples and the Section 25 Mine Sites (See Attachment A). The laboratory data for the NURE sediment sample locations in the Dos Lomas 7.5 minute quadrangle has not been formally evaluated and presented in any report to date.

Targets:
The Site is located within an unnamed ephemeral drainage that is part of the Poison Canyon watershed. Surface and ground water in Section 25 appear to flow eastward toward the western bank of the alluvial channel for the San Mateo Creek surface water drainage system. The San Mateo Creek alluvial drainage system is in hydraulic connection with bedrock aquifer units in the area. There is a potential for contaminants at the Site to

become mobilized by wind and surface water to where off site exposure is a possibility. The Site is located approximately 3 miles west of Highway 609 along Poison Canyon Road, and could be accessed by trespassers traveling along the road. It is assumed the Site is accessible by cattle and local animals like deer, coyotes, and prairie dogs. The Site is located approximately 3.5 miles from the west bank of the channel for San Mateo Creek.

The mine sites in the Section 25 area are "dry" in that the ore zone occupies an elevation that is higher or above the top of the ground water table elevation. Mining operations at the Section 25 Shaft Mine did not include dewatering and discharge of ground water. Waste rock and ore-bearing units exposed at the Section 25 Shaft Mine surface may contribute contaminant releases that propagate episodically down gradient in response to ephemeral stream flows within the San Mateo Creek drainage system. Current details of alluvial ground water flow are unknown, but are thought to follow general topographic slope (i.e., locally east and south from the site in the direction of surface water flow). Such alluvial ground water impacts may also propagate into underlying bedrock aquifers through stratigraphic, structural, and/or anthropogenic (e.g., leaky wells, mine shafts) interconnections.

Well records from the New Mexico Office of the State Engineer (OSE) that are located within a four-mile radius of the Site are identified in Table 1 (Ref. 11). Figure 5 presents a map of the wells that are located within a four-mile radius of the Section 25 Mine Sites. According to the information from the OSE, no domestic use wells are located between 0 and 1.0 miles of the Site. One well located between 1.0 to 2.0 miles from the Site is designated, "household."

NMED sampled a number of wells in the vicinity of the Section 25 Shaft Mine in 2008, 2009, and 2010 as part of an overall ground water quality evaluation of the San Mateo Creek basin (Ref. 12 and Ref. 13). Within a four-mile radius of the Section 25 Shaft Mine, 15 wells completed in alluvial and bedrock aquifer units were sampled. Ground water samples from these wells were submitted for laboratory analysis of various major and minor ions, metals, radionuclides, and select isotopes in some instances. Based on a comparison of the 15 samples to federal maximum contaminant levels (MCLs) and the New Mexico Water Quality Control Commission (NMWQCC) standards, the number of exceedances for analytes includes: hydrogen ion concentration (pH), 2; total dissolved solids (TDS), 9; sulfate (SO_4), 10; arsenic (As), 7; iron (Fe), 1; manganese (Mn), 1; nitrate (NO_3), 4; selenium (Se), 7; gross alpha radioactivity (12); gross beta radioactivity, 3; and uranium (U), 12.

Figures 6, 7, and 8 present a Google Earth location map for the Section 25 Mines during the years 1997, 2005, and 2009 (Attachment A). Figure 6 shows in 1997, there were no residential structures and no new roads in the vicinity of the Section 25 Shaft Mine. Figure 7 shows in 2005 there is one new residential structure and one new road approximately 1,111 ft. southwest of the Section 25 Shaft Mine. Figure 7 also shows a large rectangular feature that is assumed to be the disturbance of ground surface from the construction of a fence around the property containing the new residential structure, the Divide Mine, and the Section 25 Shaft Mine. Figure 8 shows in 2009 there are two more new residential structures and two new roads in the vicinity of the Section 25 Shaft Mine. In Figure 8 one new residential structure is approximately 160 ft. northwest of the Section 25 Shaft Mine. Figure 8 shows another new residential structure and road that are approximately 1,160 ft. south of the Section 25 Shaft Mine.

Site ownership and Potential Responsible Parties:
The Section 25 Shaft Mine is located on private land (Ref. 2, Ref. 3, and Ref. 4). The surface ownership is designated Elkins Real Estate and Berryhill Ranch Ltd. and the mineral ownership is designated Newmont Mining Corporation (Ref. 3). According to the information in the Anderson report, Farris Brothers Mines was the last operator in 1967 (Ref. 2).

File review:
Files and information sources that were reviewed for this assessment are listed below in the reference section.

Site reconnaissance:
NMED has not made an attempt to visit and screen the Section 25 Shaft Mine for hazards. Mr. David Mayerson with NMED investigated the ownership and accessibility of the Site. Mr. Jack Elkins, the property owner refused to grant NMED access to the Site (Ref. 14).

Recommendation:
Additional investigation of the Site under CERCLA authority is recommended to assess the areal extent of elevated radioactivity readings noted in the Site reconnaissance to determine if threats to human health and the environment exist. NMED also recommends assessment of sediments in the Site vicinity in order to evaluate the potential occurrence of impacts from dispersal of waste materials that have been left on-Site.

The Site should be formally characterized for the radionuclide concentration in the soil profile following a methodology that incorporates a specific grid design and sample node spacing interval to enable the correlation of field readings with laboratory soil sample analysis. The field and laboratory data from the next phase of Site characterization and assessment would indicate the extent of potential hazardous material release and the threat it would present to on Site and off site receptors via the soil exposure pathways. Potential physical hazards at the Site, especially the long term performance of soil cover and backfilling of the Shaft should be assessed and mitigated as soon as possible.

Currently, the existence of regional impacts from legacy uranium sites to the ground water system has not been determined. Radiological surveying and limited sampling of the 0-6 inch interval of soil at the Site is recommended to determine the extent potential release to the surface. Some samples of the soil profile at intervals of 12, 24, 36, and 48 inches may be appropriate at some locations if field and/or laboratory results indicate more characterization is necessary.

References:
1. USGS, 1957 and 1980. Dos Lomas, N, Mex. 7.5 minute quadrangle topographic map, 1:24,000 scale.
2. Anderson, Orin J., 1980. "Abandoned or inactive uranium mines in New Mexico." New Mexico Bureau of Mines and Mineral Resources Open-file report 148.
3. New Mexico Energy, Mineral and Natural Resources Department, undated. "2007-07-20 to NMED-GWQ-Sfund.xls." Spreadsheet excerpt.
4. MMD Files in Exempt AUM Sites Folder, November 29, 2010.
5. New Mexico Environment Department, August 4, 2009. Uranium site list.
6. Google Earth, kh.google.com, Build Date 11/13/2010, Section 25 area, Latitude: 35.333398; Longitude -107.841972.
7. McLaughlin, E. D., Jr., 1963, "Uranium Deposits in the Todilto Limestone of the Grants District", *in* Geology and Technology of the Grants Uranium Region, New Mexico Bureau of Mines and Mineral Resources, Memoir 15, p. 146.
8. Rapaport, I., 1963. "Uranium deposits of the Poison Canyon Ore Trend, Grants District", *in* Geology and Technology of the Grants Uranium Region, New Mexico Bureau of Mines and Mineral Resources, Memoir 15, pp. 122-135.
9. EPA Region IX, May 2009. "Navajo Abandoned Uranium Mine Site Screen Report, Section 25 Shaft AUM Site", prepared by Weston Solutions, 10 p.
10. NURE, 1981. "National Uranium Resource Evaluation (NURE) Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) Program", Brief History and Description of Data, Gallup Quadrangle (NURE HSSR study GJBX -186-80) and Grants Special Study GJBX-351-81 report, Smith, S. M., 2006. http://pubs.usgs.gov/of/1997/ofr-97-0492/quad/q_gallup.htm.
11. New Mexico Office of the State Engineer (OSE). "Jan_2011_wells." Shapefile.
12. New Mexico Environment Department, June 2010. Draft Report: "Preliminary Geochemical Analysis and Interpretation of Ground Water Data Collected as part of the Anaconda Company Bluewater Uranium Mill Site Investigation (CERCLIS ID NMD007106891) and San Mateo Creek Site Investigation (CERCLIS ID NMN00060684), McKinley and Cibola County, New Mexico", 128 p.
13. New Mexico Environment Department, February 28, 2011. "Analytical results for sample collected by the New Mexico Environment Department within the Grants Mining District (CERCLIS ID NMN00060684)," Letter from Dana Bahar to well owner describing sample analyte concentrations to regulatory standards, 2 p. with enclosures.
14. New Mexico Environment Department, March 14, 2011. Email from Mr. David Mayerson to Mr. Earle Dixon regarding the Section 25 and Section 25 Shaft Mines ownership and access information.

Table 1. Well records from the New Mexico Office of the State Engineer located within a 0 – 4 mile distance ring from the Section 25 Shaft Mine Site, Grants Mining District, New Mexico.

distance interval (miles)	point of diversion basin	point of diversion number	well number	point of diversion record number	county	well completion date	well depth (feet)	depth to water (feet)	well casing diameter (inches)	use of well	well owner last name
0 to 0.25 miles											
0 - 0.25	Bluewater	01486	B 01486	176399	McKinley	12/20/2005	460	280	5	LIVESTOCK	ELKINS
0 - 0.25	Bluewater	01713	B 01713 POD1	230123	McKinley		600	0	5		CARPENTER
0.25 to 0.50 miles											
0.0 - 0.50	*No wells*										
0.50 to 1.0 miles											
1.0 - 2.0	Grants	01106	G 01106	156829	McKinley	4/6/2000	0	0	0		BERRYHILL
1.0 - 2.0	Bluewater	01480	B 01480	174459	McKinley	4/6/2000	0	0	7		BERRYHILL
1.0 - 2.0	Bluewater	01485	B 01485	175541	McKinley	1/28/2002	580	280	4	ONE HOUSEHOLD	MARQUEZ
1.0 to 2.0 miles											
2.0 - 3.0	Bluewater	00414	B 00414	1386	McKinley		0	0	0		RESERVE OIL & MINERALS CORP
2.0 - 3.0	Grants	02834	G 02834 POD1	255235	McKinley	6/30/2010	160	60	4	DOMESTIC	BURSON
2.0 - 3.0	Bluewater	00044	B 00044 AS	224051	Cibola		0	0	0		STAR LAKE RAILROAD COMOANY
2.0 - 3.0	Bluewater	01783	B 01783 POD1	247885	McKinley	5/23/2010	700	300	5	STOCK	CANDELARIA
2.0 to 3.0 miles											
3.0 - 4.0	Bluewater	00415	B 00415 O-10	18	McKinley	8/30/1977	59	30	5	OBSERVATION	NEW MEXICO E.I.A.
3.0 - 4.0	Bluewater	00415	B 00415 O-8	165	McKinley	8/30/1977	54	30	5	OBSERVATION	NEW MEXICO E.I.A.
3.0 - 4.0	Bluewater	00415	B 00415 O-9	328	McKinley	8/30/1977	57	32	5	OBSERVATION	NEW MEXICO E.I.A.
3.0 - 4.0	Bluewater	00415	B 00415 O-11	992	McKinley	8/30/1977	72	30	5	OBSERVATION	NEW MEXICO E.I.A.
3.0 - 4.0	Bluewater	00521	B 00521	1440	Cibola	9/25/2003	320	198	4	DOMESTIC	DAVEY
3.0 - 4.0	Bluewater	00188	B 00188	179436	McKinley	6/21/1963	905	0	0	EXPLORATION	SUTTON
3.0 - 4.0	Bluewater	00558	B 00558	180546	McKinley		0	0	0		N.M. STATE HWY DEPT.
3.0 - 4.0	Surface Permit	03384	SP 03384	227069	McKinley		0	0	0		ROUNDY
3.0 to 4.0 miles											
3.0 - 4.0	Bluewater	01115	B 01115	804	McKinley	7/21/1986	478	204	4	DOMESTIC	MARQUEZ
3.0 - 4.0	Bluewater	00415	B 00415 O-13	991	Valencia	8/31/1977	74	50	5	OBSERVATION	NEW MEXICO E.I.A.
3.0 - 4.0	Bluewater	00861	B 00861	1004	McKinley		0	0	0		SANDOVAL
3.0 - 4.0	Bluewater	00415	B 00415 O-12	1378	Valencia	8/31/1977	60	0	0	OBSERVATION	NEW MEXICO E.I.A.
3.0 - 4.0	Bluewater	00659	B 00659	1391	McKinley	1/18/1979	220	190	0	DOMESTIC	GARCIA
3.0 - 4.0	Bluewater	01458	B 01458	163876	Cibola	3/7/2001	702	126	4	ONE HOUSEHOLD	ELKINS
3.0 - 4.0	Bluewater	01636	B 01636	209713	McKinley	5/10/2005	260	80	4	ONE HOUSEHOLD	GARCIA
3.0 - 4.0	Bluewater	01771	B 01771 POD1	244036	Cibola	3/17/2009	600	360	5	DOMESTIC	SOUTH

Attachment A

Figures 1 through 8

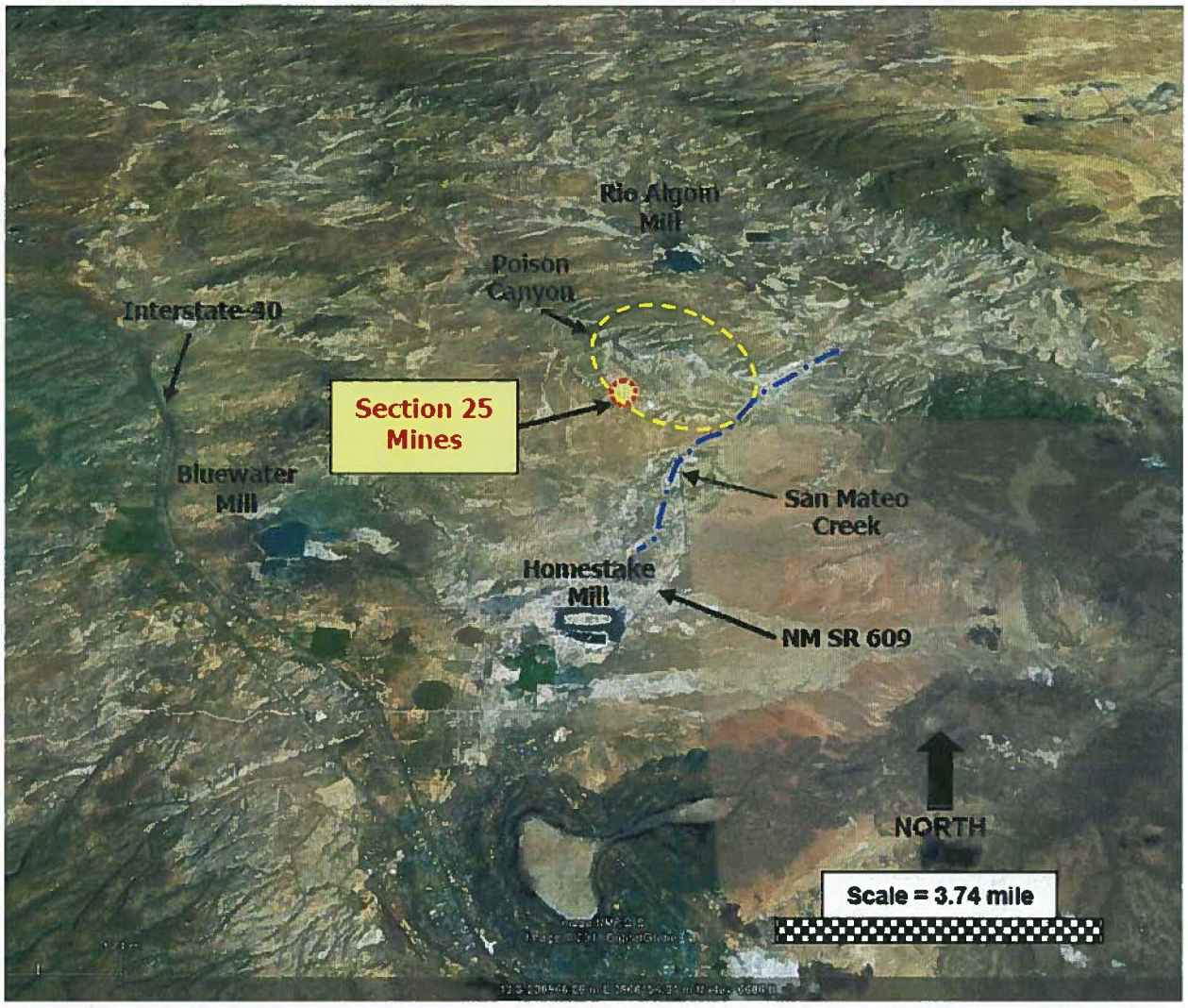

Figure 1. Google aerial location map of the Section 25 Mines in the Ambrosia Lake Mining Subdistrict, Grants Mining District, New Mexico.

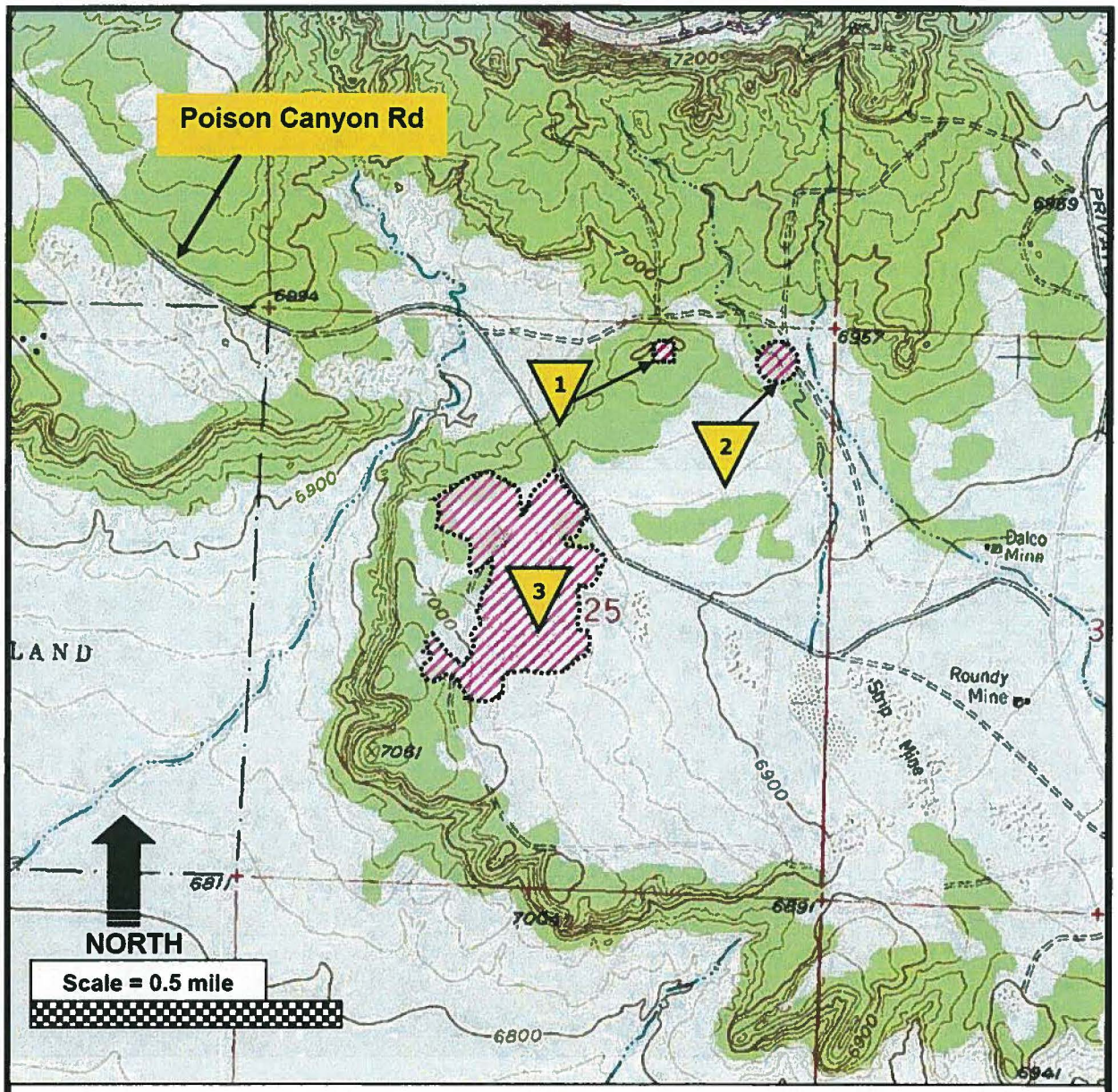

Figure 2. TopoQuest.com location map of three mines in Section 25 of the Dos Lomas Quadrangle USGS 7.5 topographic map, T13N, R10W, Sec 25, Ambrosia Lake Subdistrict, Grants, NM. Divide Mine = (1); Section 25 Shaft = (2); and Section 25 Decline = (3).

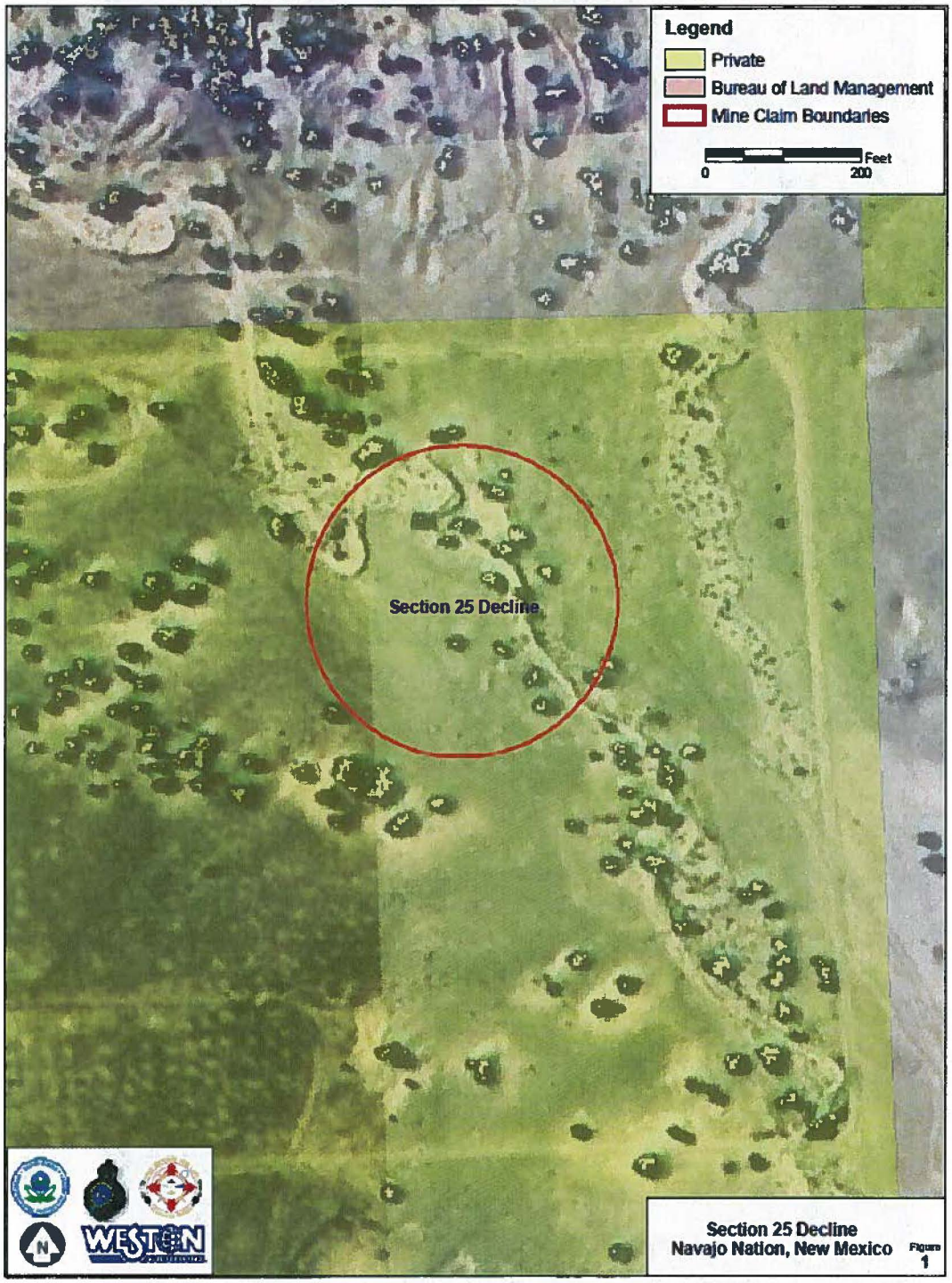

Figure 3. Location map of the Section 25 Decline Mine property boundaries as presented in the 2009 Navajo Abandoned Uranium Mine Screening Report authored by Weston Solutions. Note: this location in the far northeast corner of Section 25 is considered by NMED to be incorrect and is actually the location for the Section 25 Shaft Mine.

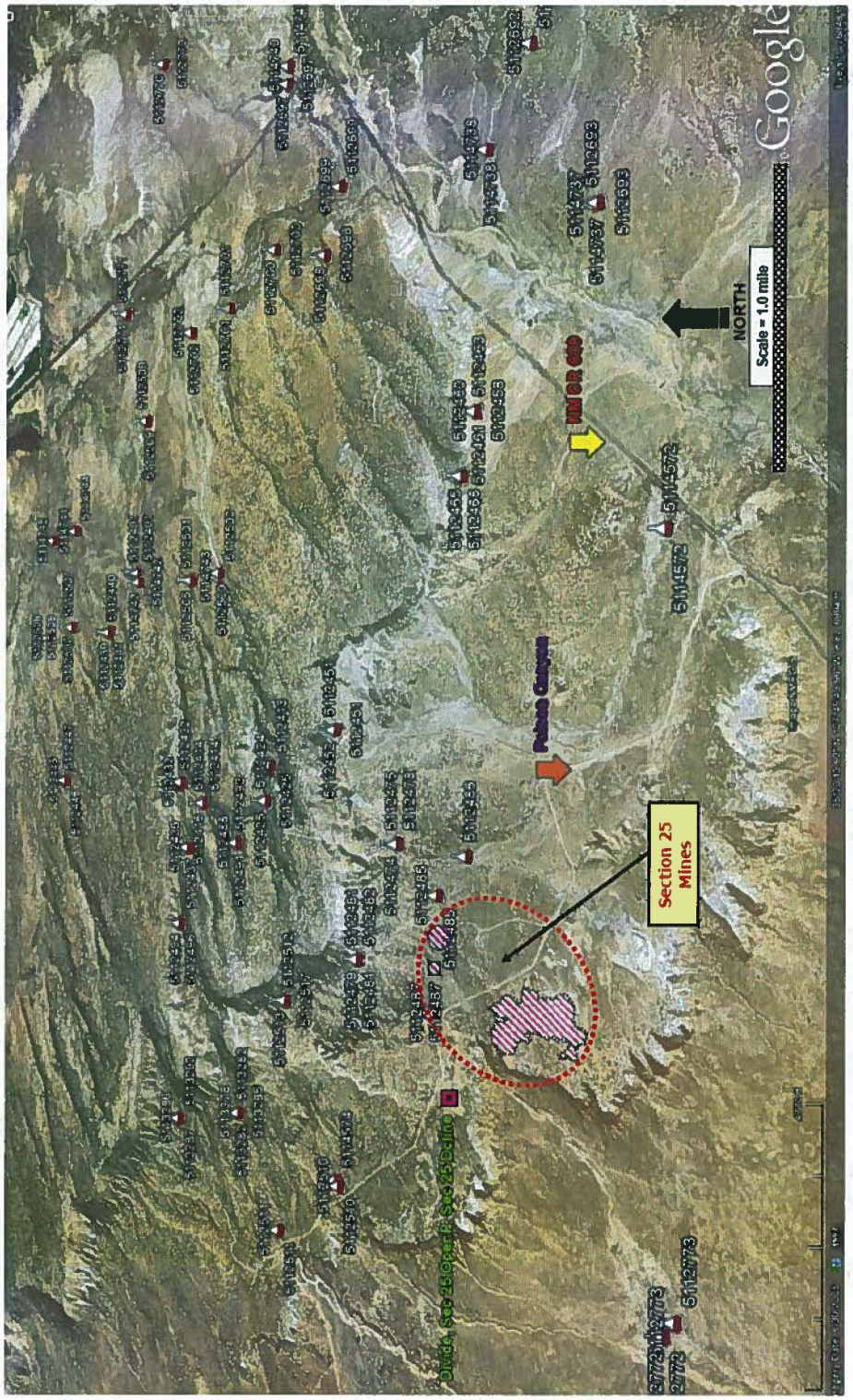

Figure 4. Google Earth location map showing the Section 25 Mines and the sediment sample locations from the National Uranium Resource Evaluation (NURE) project, Grants Mineral Belt Special Project, Grants, New Mexico.

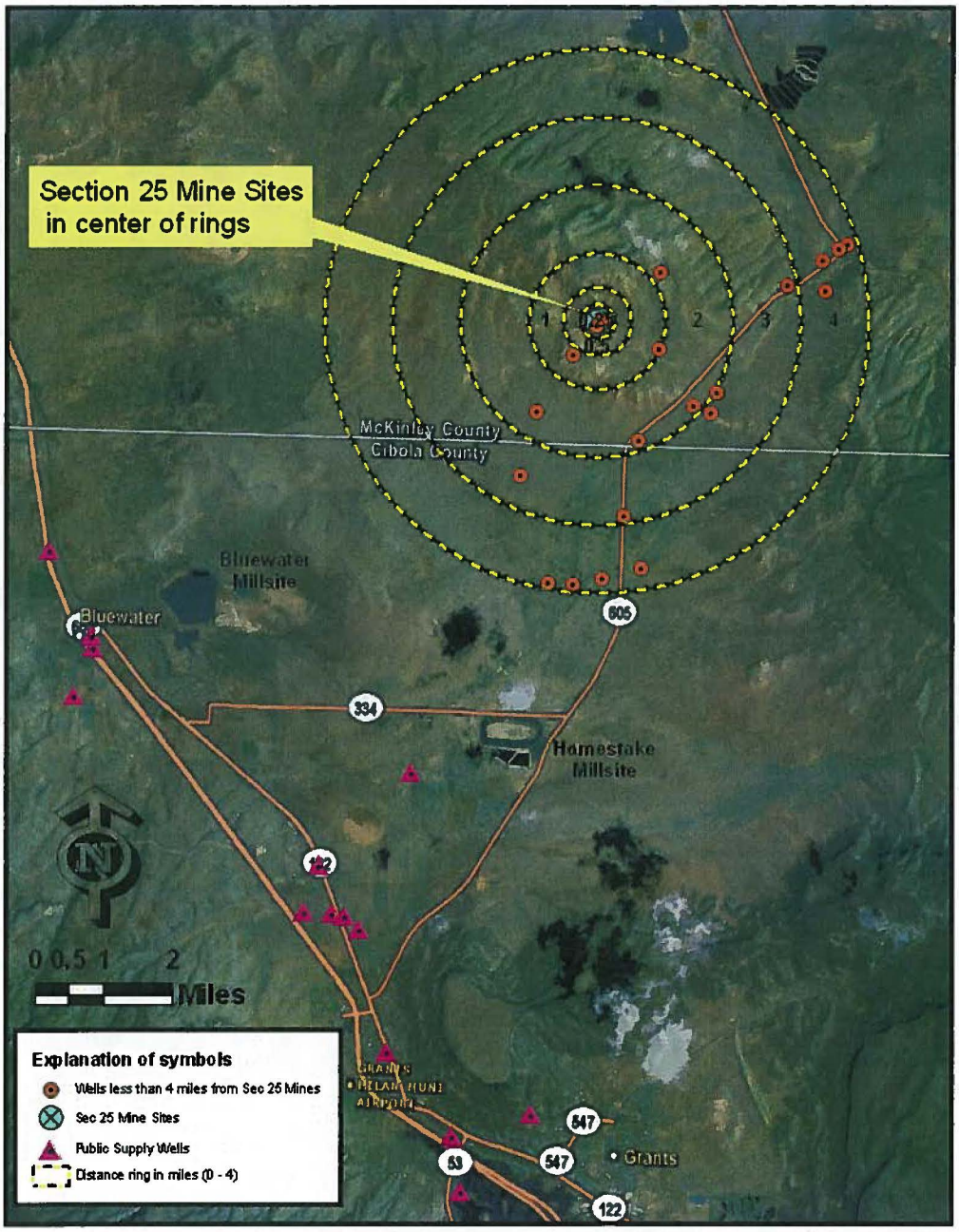

Figure 5: Wells within a 4-mile radius of the Section 25 Mine Sites (Divide, Sec 25 Decline, & Sec 25 Shaft), Dos Lomas 7.5 min. quadrangle map, Grants Mining District, New Mexico (OSE 2011).

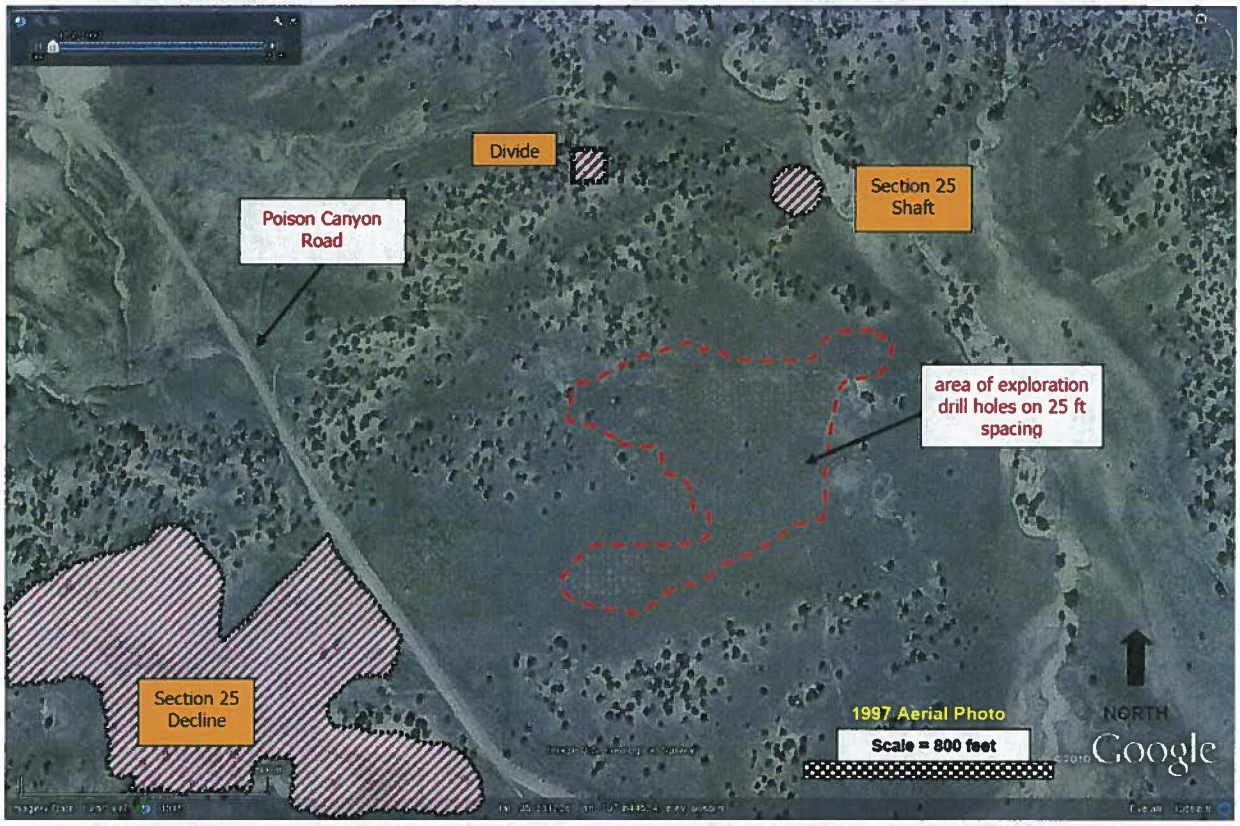

Figure 6. 1997 Google Earth location map of the Section 25 Mines showing no residential structures in the area near the mine sites.

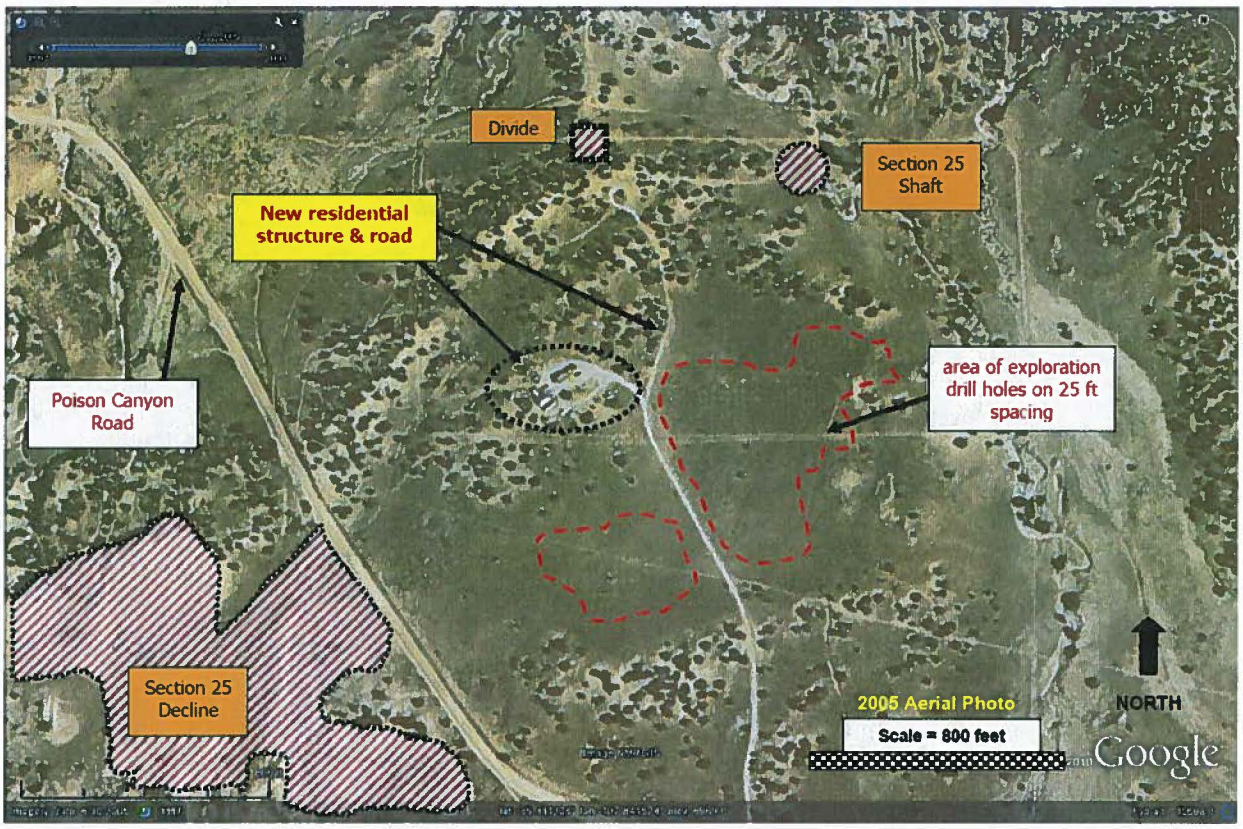

Figure 7. 2005 Google Earth location map of the Section 25 Mines showing one residential structure and a new road in the area near the mine sites.

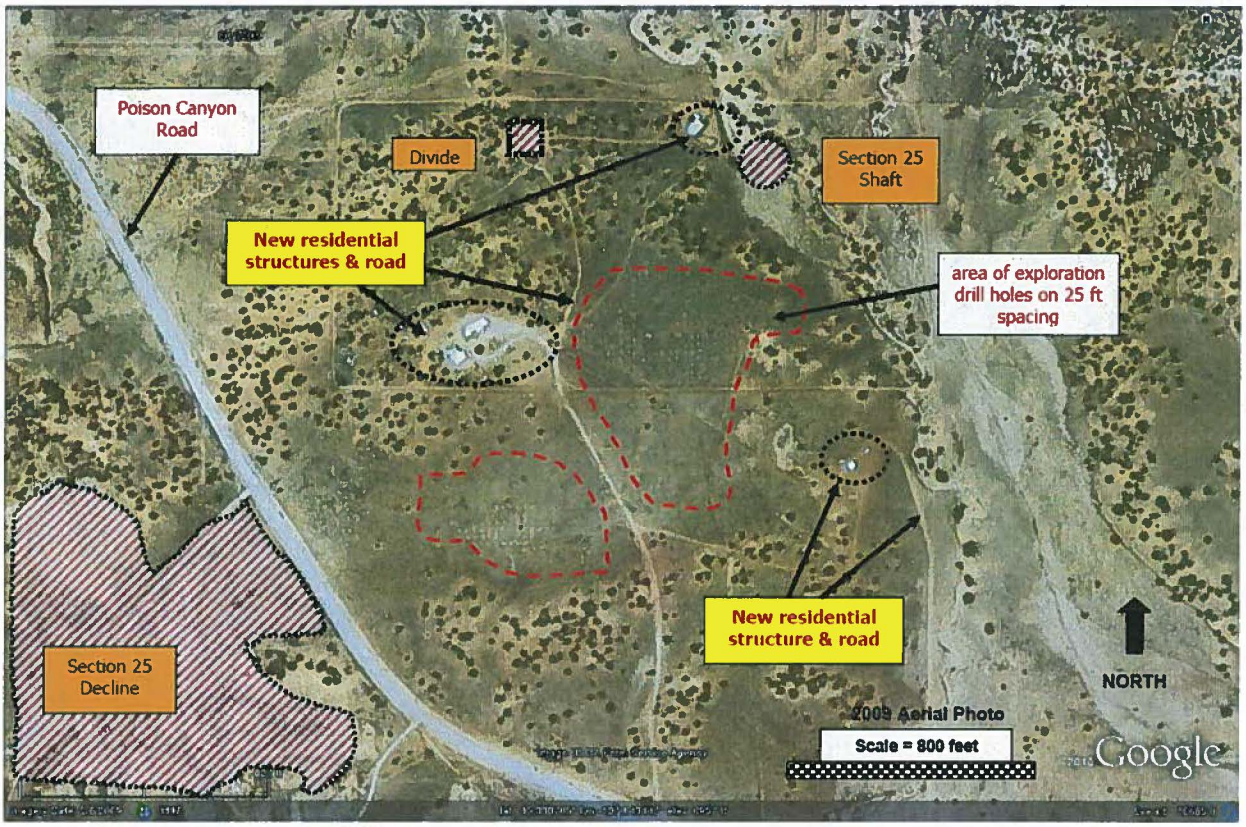

Figure 8. 2009 Google Earth location map of the Section 25 Mines showing three residential structures and two new roads in the area near the mine sites.

Attachment B

Photographs 1, 2, and 3 are from the Anderson 1980 report, pages 142-143.

Photograph 4 is from the Anderson 1980 report, page 146.

Photo (a) Looking north at head frame and hoisting shed at Sec. 25 shaft; note small dump area in foreground. Shaft is about 35' high.

Photo (b) Close up of head frame, showing the skip suspended over shaft at ground level, and small ore pile lying below chute where person is standing.

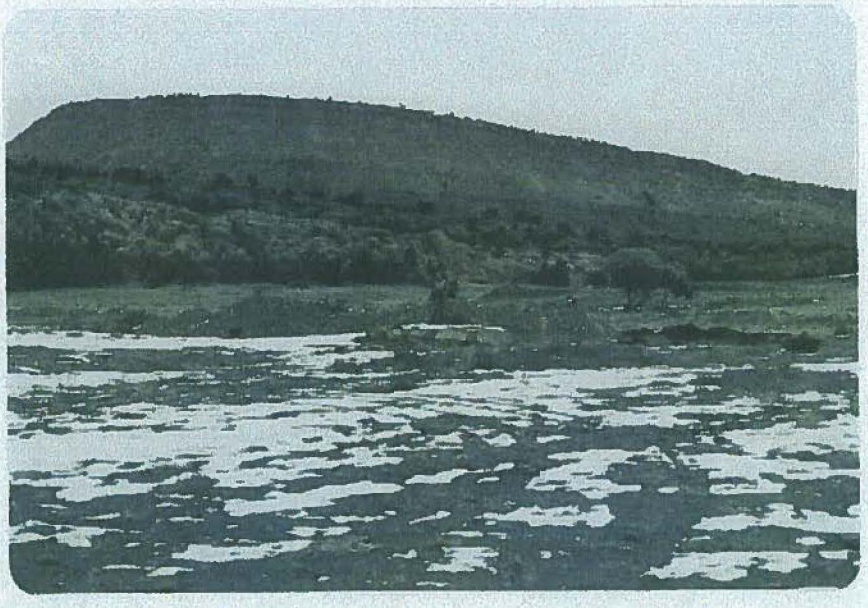

Photo (c) View to northwest of shaft and head frame, showing an extensive mine dump area that continues into the background, and an 8' x 20' concrete slab covering a small ventillation shaft and/or escapeway; person is standing on concrete slab.

overburden.

Photo (d) Looking northward into box cut with decline driven eastward at bottom. Close-up of decline is given on next page. Note section 25 head frame in background 1,000' away.