# Abandoned Uranium Mine Assessment for the Sparks-Stone Site (NM0236)

## FINAL REPORT

**Prepared For:**

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# 1.0 INTRODUCTION

INTERA Incorporated (INTERA) has prepared this Abandoned Uranium Mine (AUM) Site Assessment Report for the Mining and Minerals Division (MMD) of the New Mexico Energy, Minerals and Natural Resources Department (EMNRD) in compliance with the Professional Service Agreement dated November 2, 2009. INTERA visited the Sparks-Stone Mine Site (AUM Site), MMD ID: NM0236, on August 2, 2010.

## 1.1 PREVIOUSLY KNOWN INFORMATION ABOUT THE SITE

The AUM Site is located in the Tecolote area of San Miguel County. Uranium at the AUM Site reportedly occurs in Pegmatite veins within Precambrian rocks, in association with Thorium and other rare earth elements (McLemore and Chenoweth, 1989). According to Anderson (1980), an Office Memorandum of the U.S. AEC, dated July 1960, stated that 4 tons of .06% $U_3O_8$ and 13 tons of .13% $U_3O_8$ were shipped from the AUM site. The controller reportedly lost interest after the second ore shipment in mid-1956. AEC records show the workings consist of a small open pit about 20' x 50' and 5' deep (Anderson, 1980).

Anderson (1980) reported being unable to reach the mine site due to locked gates, no trespassing signs, and unavailability of land owners. In addition, Anderson reported that the 1960 Office Memorandum of the U.S. AEC stated that officials of that agency tried to reach the mine, but ran into road closures and blocked roads (Anderson, 1980). The memorandum further stated that reports made earlier by an agency certification engineer indicated previous road problems at "distances of 3 or more miles from the property" (Anderson, 1980).

## 1.2 SITE LOCATION AND DIRECTIONS

The Sparks-Stone Mine Site is located on National Forest land in the northeast quarter of Section 5, Township 16 North, Range 14 East. This AUM Site is located in San Miguel County and is approximately 15 miles west-northwest of the town of Las Vegas, along the eastern edge of the Santa Fe National Forest (please see Figure 1).

To reach the AUM Site from Albuquerque, drive approximately 120 miles north on Interstate 25 and take exit 343 for Las Vegas. Turn right from the off-ramp onto NM-518, and then turn right onto the I-25 frontage road headed back south. Go approximately 1 mile and turn right at the overpass onto NM-283 W. Follow highway 283 approximately 12 miles until it becomes an unpaved road. Go 2 miles further until this road arrives at Camp Blue Haven. Continue through the camp onto County Road A16B (Blue Canyon Road). Turn right 0.5 miles ahead where the road forks. The management at the Camp Blue Haven can provide a key for a gate at the entrance to this road. Continue up the road into Blue Canyon. This road will end approximately 2 miles ahead. The AUM Site is located up a side road bearing off to the west from this point, in Topside Canyon (please see Figure 2). This road is blocked by a locked gate for which Camp Blue Haven has no key. Continue up this road on foot approximately .75 miles, and then continue up the northern slope of the canyon to reach the site.

### 1.3 SITE GEOLOGY

The AUM Site is located on the southern end of the Sangre de Cristo range. Minor uraniferous deposits are found locally within pegmatite veins and dikes in Precambrian granite exposures in the area. Minor deposits of Thorium and other rare earth elements may also occur in these rocks (McLemore and Chenoweth, 1989).

### 1.4 SITE HYDROGEOLOGY

The AUM Site is located on the northern rim of Topside Canyon, a steep-sided canyon containing a small creek that drains eastward into Blue Canyon, which in turn drains into Tecolote Creek approximately 2 miles to the southeast.

The AUM Site is located in the Sangre de Cristo groundwater region of the Mora-San Miguel-Guadalupe water planning region. Groundwater in this region is found in the alluvial deposits along drainages. Groundwater flow in the vicinity of the AUM Site follows surface flow, generally to the southeast (DBSA, 2005).

### 1.5 REGIONAL TOPOGRAPHY AND TERRAIN

The AUM Site can be found on the El Porvenir Quadrangle 7.5 minute United States Geological Survey topographic map at an elevation of approximately 8000-8400 feet above mean sea level (please see Figure 2). The Site is south-southeast of Bear Mountain, a peak over 9300 feet high. Bear Mountain is part of the Santa Fe Mountains, a subrange which forms the southeastern Sangre de Cristo Mountains, the southernmost range of the Rocky Mountains. The high topography in this area is comprised of steep hills and deep canyons. Figure 3 shows an aerial photograph of the terrain surrounding the AUM Site.

## 2.0 MINE FEATURES

The mine features described below are based on the features provided to INTERA by MMD in the GIS Data Dictionary (MMD, 2009). INTERA marked the locations of the AUM Site features using a Trimble Global Positioning System (GPS) and entered details about the features into the GPS using the MMD data dictionary. The AUM Site contained very few, if any apparent mining related features. Please see the Photo Log in Appendix A for photos, Table 1 for a list of all AUM Site features, and Figures 4a and 4b for the locations of the AUM Site features.

### 2.1 MINE SHAFTS, ADITS, AND DECLINES

No mine shafts, adits or mining related declines were evident at the AUM site.

### 2.2 MINING AND EXPLORATION PITS AND OPEN CUTS

No mining related exploration pits or open cuts were evident at the AUM site.

### 2.3 WASTE AND ORE PILES AND DISTURBANCES

No mining related waste or ore piles were evident at the AUM site.

### 2.4 MINING RELATED BUILDINGS AND FOUNDATIONS

No mining related buildings and foundations were evident at the AUM Site.

### 2.5 OTHER MINE FEATURES

A road (Rd-1) exists within the northern portion of the site and cuts east-west across the AUM Site. This road connects with an old 4x4 trail (Rd-2) that runs approximately north-south along the western perimeter of the MMD-provided site boundary.

### 2.6 BOREHOLES

No boreholes were evident at the AUM Site.

### 2.7 RECLAMATION ACTIVITIES

No evidence of ongoing or past reclamation was found at or near the AUM Site.

## 3.0 ARCHEOLOGICAL SITES

No apparent archeological sites were identified at or near the AUM Site.

## 4.0 SITE GAMMA RADIATION READINGS

The background gamma radiation readings at the AUM Site were measured approximately ¾ of a mile from the eastern edge of the site boundary. The background gamma level was measured at 9 µR/hr (microroentgens per hour) at the ground surface and 8 µR/hr at 4 feet above the ground surface. Please see Table 2 for all of the gamma radiation readings taken at the AUM Site.

The gamma radiation readings at the AUM Site did not vary significantly above background levels. The highest radiation reading was at Rad-9, where 23 µR/hr was recorded at contact with an outcrop of metamorphic rock. Please see Table 2 for details.

## 5.0 CURRENT LAND USES

### 5.1 HUMAN ACTIVITY AND RECREATIONAL SITE USE

The 4x4 trail (Rd-2) along the western perimeter of the site boundary is badly eroded and covered with fallen trees. This road appears disused, except perhaps by the occasional backpacker or hiker. No tire tracks or footprints were found on the AUM Site.

### 5.2 NEARBY RESIDENTIAL, COMMERCIAL AND INDUSTRIAL STRUCTURES

A cabin is located immediately to the south of the site boundary, in Topside Canyon. There are also several other residences within Blue Canyon, located approximately 0.8 miles east of the site.

### 5.3 NEARBY DOMESTIC WELLS

Ten domestic wells lie within 1 mile of the AUM Site. These domestic wells were drilled from 1989 to 2007 and range in depth from 27 to 254 feet below ground surface with a depth to water of 6 to 92 feet below ground surface (NMOSE, 2008). Please see Figures 2 and 3 for the locations of the domestic wells.

### 5.4 EVIDENCE OF GRAZING OR AGRICULTURE

No evidence of grazing was found at the AUM site.

### 5.5 EVIDENCE OF WILDLIFE

Several small species of birds were seen on site, as well as deer droppings.

## 6.0 VEGETATION

The Sparks-Stone Site is located in the Subalpine Coniferous Forest vegetation type of northern New Mexico. Woody vegetation at the AUM Site included douglas fir, ponderosa pine, gambel and emory oaks, wolfberry, and mountain mahogany. Grass species included needlegrass and june grass. A few aster species were also present. No evidence of noxious weeds was observed onsite.

## 7.0 POTENTIAL OFFSITE IMPACTS

### 7.1 EROSION

No evidence of mine related erosion was observed on site.

### 7.2 ENVIRONMENTAL IMPACTS

There is no evidence of soil staining from chemicals potentially brought to the AUM Site, or from constituents present in the ore or waste rock. Gamma radiation levels at the AUM Site are not significantly above background level.

## 8.0 REFERENCES

Anderson, Orin J., 1980. Abandoned or Inactive Uranium Mines in New Mexico. New Mexico Bureau of Mines and Mineral Resources Open File Report 148.

Daniel B. Stephens & Associates, Inc. (DBSA), 2005. Mora-San Miguel-Guadalupe Regional Water Plan. Prepared for: Tierra y Montes Soil and Water Conservation District and the Mora-San Miguel-Gaudalupe Regional Water Planning Steering Committee.

Dick–Peddie, William A, 1999. New Mexico Vegetation: Past, Present, and Future. University of New Mexico Press.

McLemore, Virginia T. and William L. Chenoweth, 1989. Uranium Resources in New Mexico. New Mexico Bureau of Mines & Mineral Resources, Resource Map 18.

Mining and Minerals Division (MMD), 2009. Mine Feature Data Dictionary.

New Mexico Office of the State Engineer (NMOSE), 2008. Wells and Surface Diversions in New Mexico. WATERS_PODS_may08.shapfile. OSE Waters Database.

# TABLES

# Table 1
# Site Features

## Sparks-Stone-NM0236
## Abandoned Uranium Mine Assessments

| Feature Name | On Site? | Feature Type | Associated Feature | Material | Height or Depth (ft) | Width or Diameter (ft) | Length (ft) | Open | Collapsed | Closure Type | Associated Photos | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Access-1 | No | Access | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Access-2 | No | Access | -- | Dirt Nonmaintained | -- | -- | -- | -- | -- | -- | -- | -- |
| Access-3 | No | Access | -- | Dirt Maintained | -- | -- | -- | -- | -- | -- | -- | -- |
| Fenc-1 | No | Barbwire | -- | Metal | 4 | -- | -- | -- | -- | -- | NM0236_006 | -- |
| Rd-1 | Yes | Dirt | -- | Dirt Nonmaintained | -- | -- | -- | -- | -- | -- | NM0236_003 NM0236_004 | photo 3 looking west, photo 4 looking east |
| Rd-2 | No | Dirt | -- | Dirt Nonmaintained | -- | -- | -- | -- | -- | -- | -- | jeep trail on topo map |

**Notes:**
-- designates no information

## Table 2
## Gamma Radiation Survey Results

## Sparks-Stone-NM0236
## Abandoned Uranium Mine Assessments

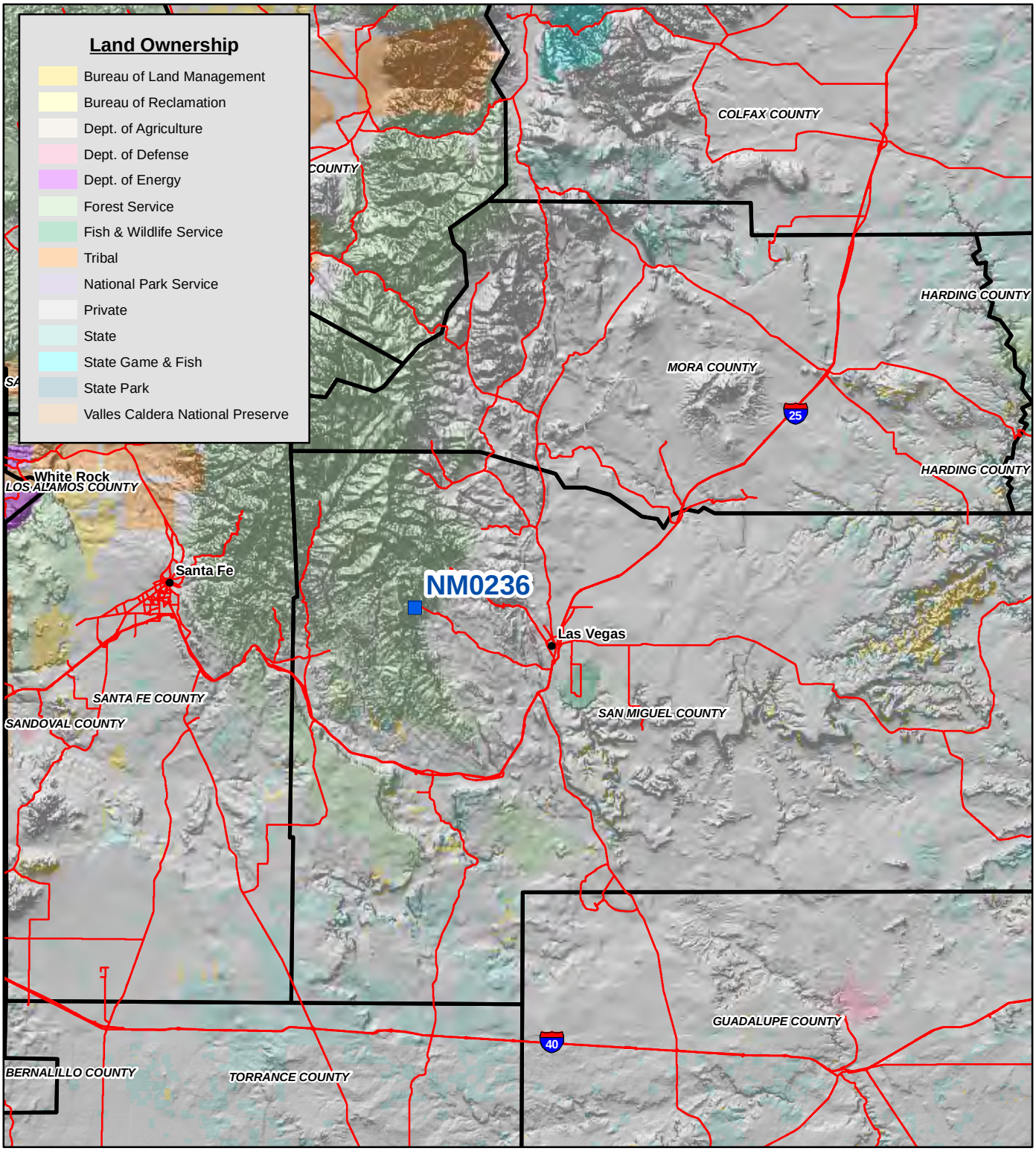
| Reading ID | Associated Features | 0 ft (µR/hr) | 4 ft (µR/hr) | Associated Photos |
|---|---|---|---|---|
| Rad-1 | -- | 16 | 16 | NM0236_001 |
| Rad-2 | -- | 7 | 8 | NM0236_002 |
| Rad-3 | Rd-1 | 9 | 8 | -- |
| Rad-4 | -- | 6 | 6 | NM0236_005 |
| Rad-5 | -- | 9 | 7 | NM0236_007 |
| Rad-6 | -- | 8 | 8 | NM0236_008 |
| Rad-7 | -- | 6 | 7 | NM0236_009 |
| Rad-8 | -- | 6 | 8 | NM0236_010<br>NM0236_011 |
| Rad-9 | -- | 23 | 17 | NM0236_012 |
| Rad-10 | -- | 10 | 10 | NM0236_013 |
| Rad-11 | -- | 19 | 18 | NM0236_014 |
| RadBack-1 | -- | 9 | 8 | -- |

**Notes:**

All gamma readings at this site taken by Ludlum 192 µR/Ratemeter

µR/hr=microroetgens per hour

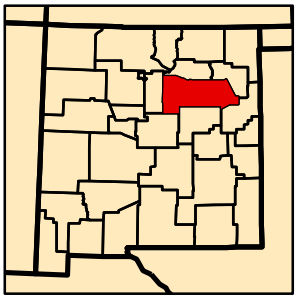
# FIGURES




Map Source(s):
Ownership - BLM, 2008

0 7.5 15 30
Miles

NORTH

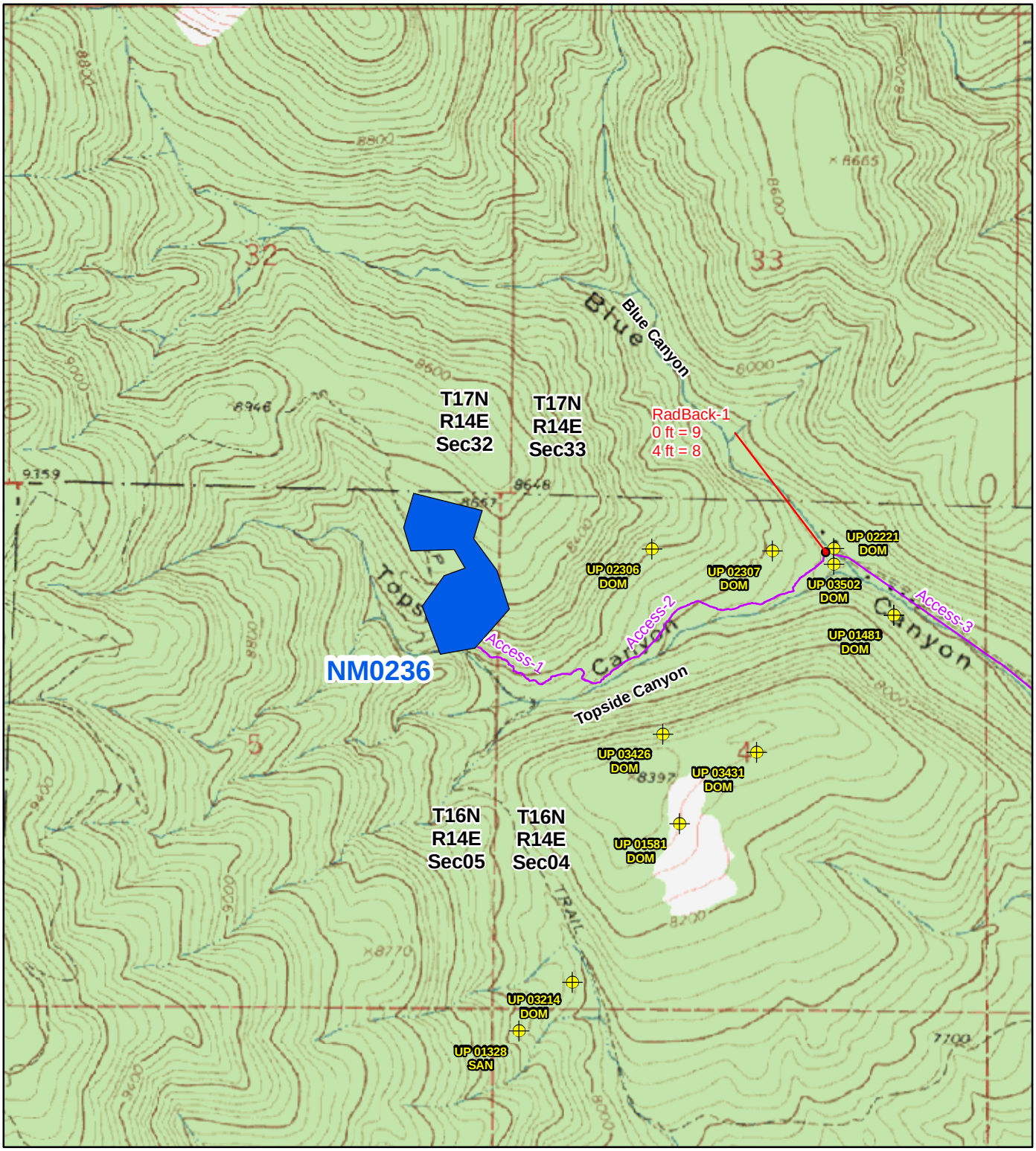


## Legend

- AUM Location
- Road
- County Boundary

**Figure 1**
**Site Location Map**
**NM0236-Sparks Stone**
Abandoned Uranium Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0236-Sparks_Stone\GIS\Maps\Site_Map_SparksStone_CP.mxd 08/05/2010




Map Source(s):
U.S. Geological Survey 7.5-Minute
Topographic Map
-El Porvenir, 1961

0 750 1,500 3,000
Feet

NORTH

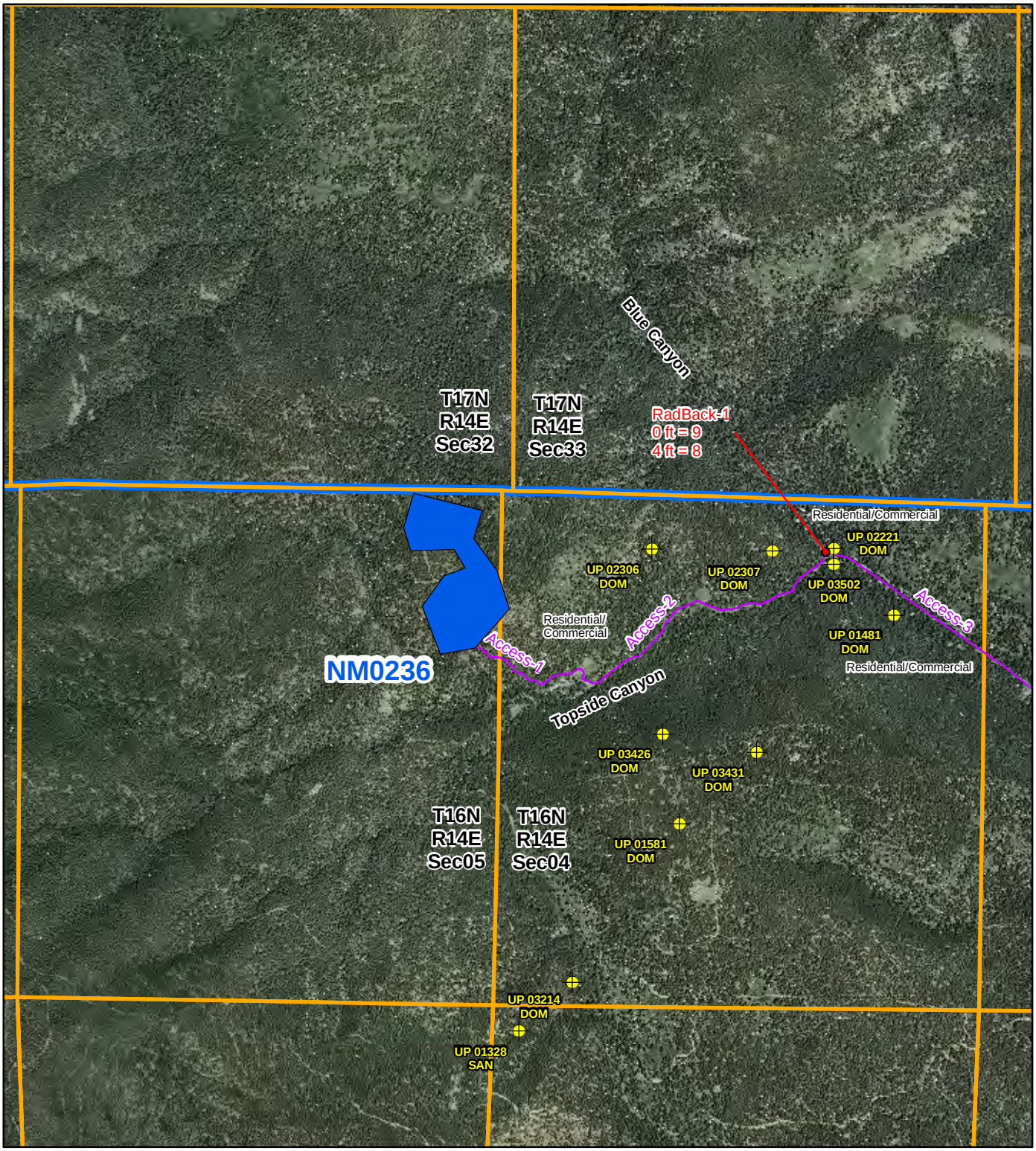
## Legend

- Radiation Readings (µR/hr)
- Well Within 1 Mile of Site
- Access Route
- AUM Location Boundary (MMD Provided)

**Figure 2**
**Topographic Map**
**NM0236-Sparks Stone**
Abandoned Uranium
Mine Assessment

INTERA

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0236-Sparks_Stone\GIS\Maps\Topo_Map_SparksStone_CP.mxd 08/10/2010




Map Source(s):
U.S. Geological Survey 7.5-Minute
DOQQ County Mosaic
-San Miguel County, 2009

0 750 1,500 3,000
Feet

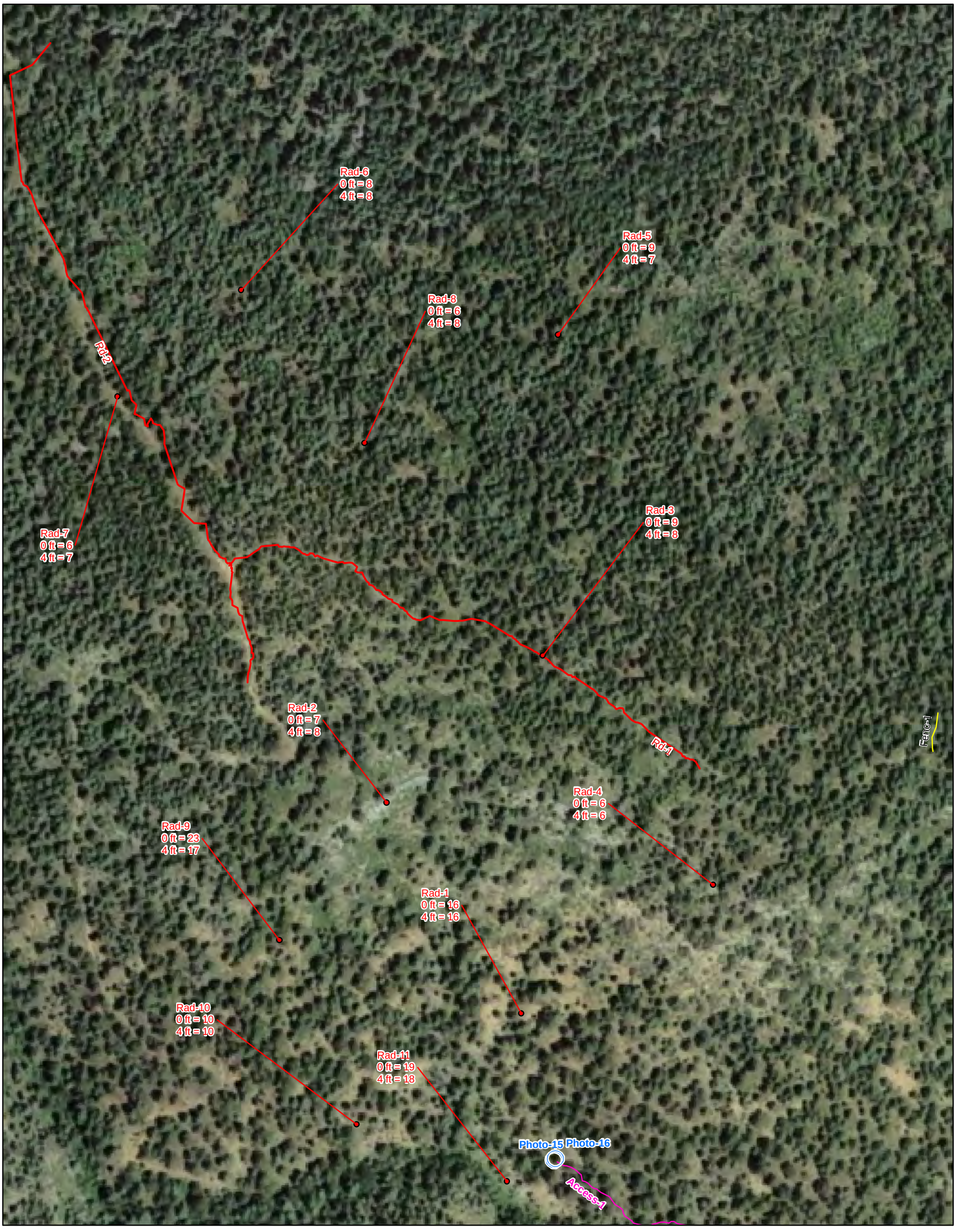
NORTH

## Legend

- Radiation Readings (µR/hr)
- Well Within 1 Mile of Site
- Access Route
- AUM Location Boundary (MMD Provided)
- Section Boundary
- Township/Range Boundary

**Figure 3**
**Aerial Photo**
**NM0236-Sparks Stone**
Abandoned Uranium
Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0236-Sparks_Stone\GIS\Maps\Aerial_Map_SparksStone_CP.mxd 08/10/2010




Map Source(s):
U.S. Geological Survey 7.5-Minute
DOQQ County Mosaic
-San Miguel County, 2009

0 80 160 320
Feet

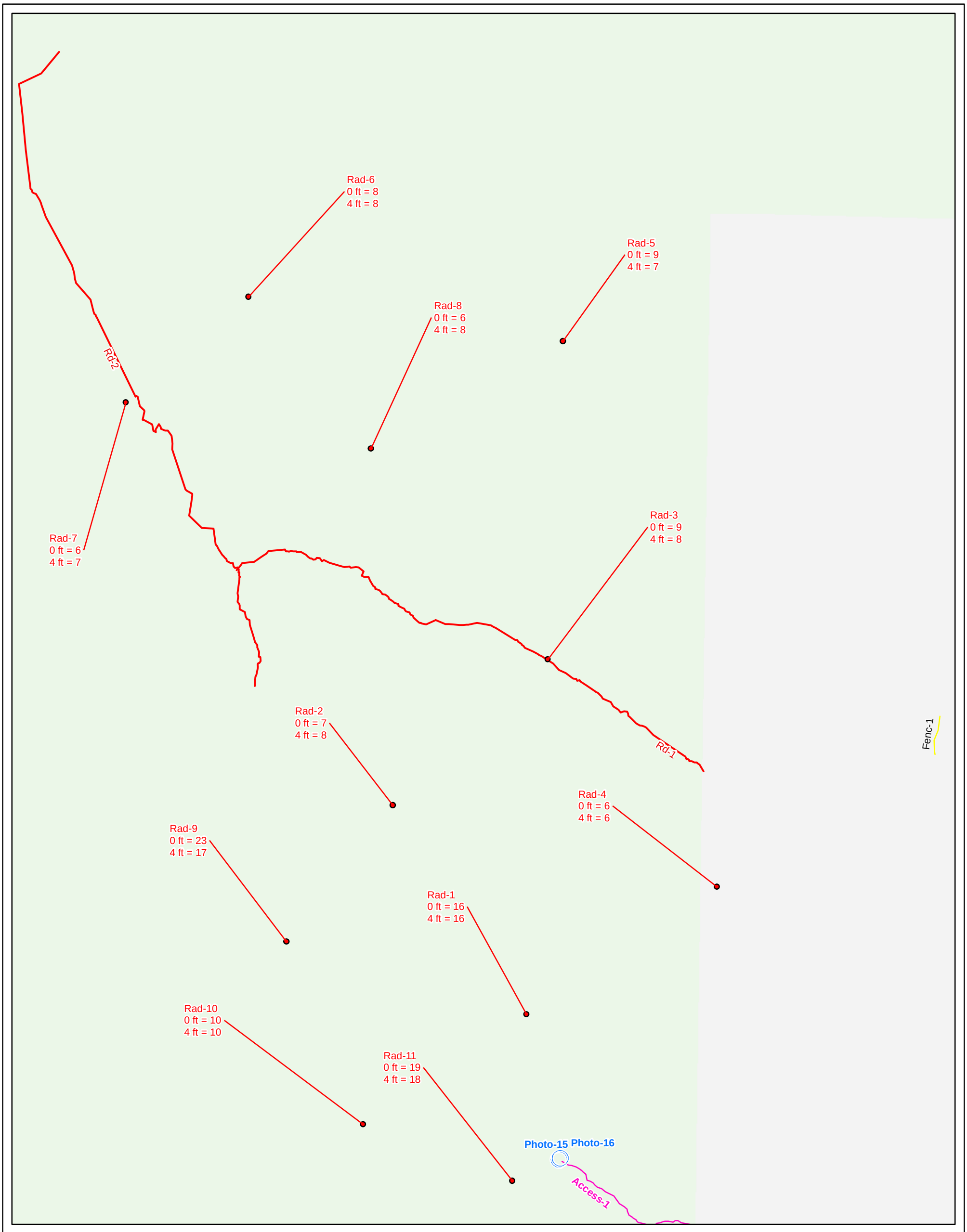
NORTH

**Legend**

- Radiation Readings (µR/hr)
- Photo Location
- Mine Road
- Fence
- Access Route

**Figure 4a**
**Site Map on**
**Aerial Photo**
**NM0236-Sparks Stone**
Abandoned Uranium
Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0236-Sparks_Stone\GIS\Maps\CloseUpAerial_Map_SparksStone_CP.mxd 08/06/2010




Map Source(s):
Ownership - BLM, 2008

0 80 160 320
Feet

NORTH

## Legend

- Radiation Readings (µR/hr)
- Photo Location
- Mine Road
- Fence
- Access Route

**Surface Ownership**

- Forest Service
- Private

**Figure 4b**
**Site Map with**
**Surface Ownership**
**NM0236-Sparks Stone**
Abandoned Uranium
Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0236-Sparks_Stone\GIS\Maps\CloseUpOwnership_Map_SparksStone_CP.mxd 08/06/2010

# APPENDIX A

# PHOTO LOG

Note: Gaps in the numbering sequence of the photos is the result of removing photos not suitable for the report. A full set of photos is provided in the electronic deliverable.

Photo 1-Looking northwest at southern end of MMD polygon boundary.

Photo 2-At Rad-2, looking north.

Photo 3-Looking west at Rd-1.

Photo 4-Looking east at Rd-1.

Photo 5-At Rad-4, looking west from eastern edge of MMD polygon boundary.

Photo 6-Looking south at Fenc-1.

Photo 7- At Rad-5, looking north at northeastern end of MMD polygon boundary.

Photo 8- At Rad-6, looking northeast.

Photo 9- At Rad-7, looking southwest.

Photo 10-At Rad-8, looking east.

Photo 11-At Rad-8, looking west.

Photo 12-At Rad-9, metamorphic rock outcrop in western part of MMD Polygon.

Photo 13-At Rad-10, looking northwest.

Photo 14-At Rad-11, looking northeast.


Photo 15-Site photo, looking west at MMD polygon area.


Photo 16-Site photo, looking north at MMD polygon area.

Photo 17-Vegetation at AUM Site.

Photo 18-Vegetation at AUM Site.

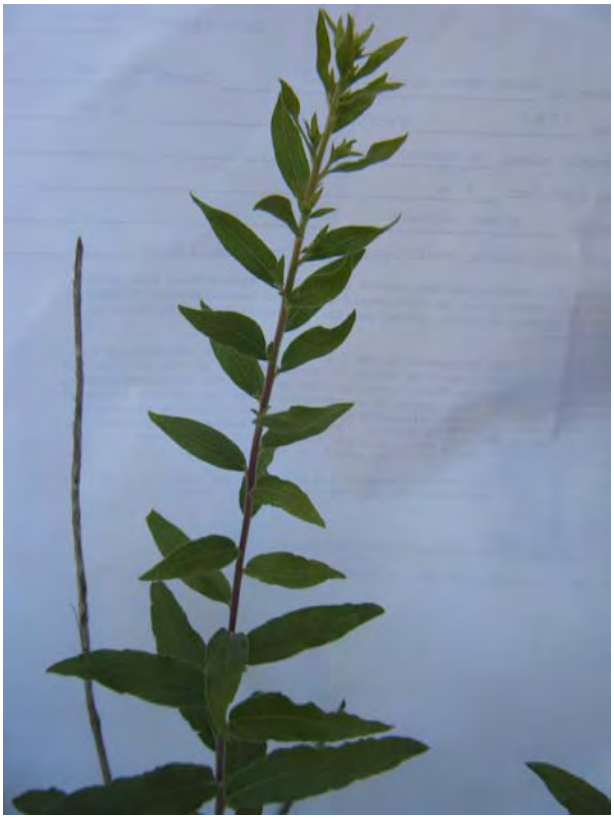


Photo 19-Vegetation at AUM Site.

Photo 20-Vegetation at AUM Site.

Photo 21-Vegetation at AUM Site.

Photo 22-Vegetation at AUM Site.

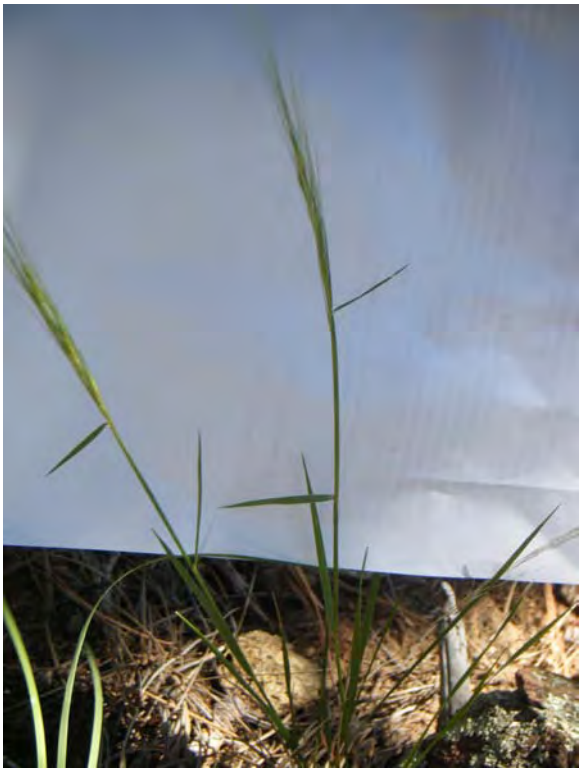


Photo 23-Vegetation at AUM Site.

Photo 24-Vegetation at AUM Site.

Photo 25-Vegetation at AUM Site.

Photo 26-Vegetation at AUM Site.

Photo 27-Vegetation at AUM Site.

Photo 28-Vegetation at AUM Site.

Photo 29-Vegetation at AUM Site.

Photo 30-Vegetation at AUM Site.

Photo 31-Vegetation at AUM Site.

# APPENDIX B

# FIELD NOTES

Site Name: NM0236, Sparks - Stopine ALT

Objective: Site Assessment

Personnel: Annelia Tinklenberg
Alex Resovsky

Equipment: Rental truck, Trimbel GeoXM (SN: 4948 44727, 2008 Series), Ludlum 192 (SN: 234149), Fuji Film digital camera (No. 50839493), backup Garmin GPS, cell phone amplifier, field laptop

8am Leave Albuquerque for site

10am Arrive at Camp Blue Haven, talked to office manager and get key for Blue Canyon. No key to gate in Topside Canyon, will have to hike.

11am Arrive at gate for Topside Canyon, prepare to hike and Health and Safety meeting

1145 Difficulties with GPS, leaving truck for Site. GPS ~~problems~~ ALT problems solved).
Background Rad - at truck 0m - 9uR/h; 1m - 8uR/h

1237 At southern end of polygon. No mine features visible.

Rad 1 - southern end of polygon, offsite 0m - 16uR/h; 1m - 16uR/h

Photo 1 - looking ~~south~~ north ALT west at southern end of polygon at Rad 1

Rad 2 - at western end of polygon, offsite 0m - 7uR/h; 1m - 8uR/h

Photo 2 - looking north at Rad 2; no visible mine features

Rad 3 - Mine Road 1 0m - 9uR/h; 1m - 8uR/h

- mine road through Polygon; Photo 3 & 4 at center looking west then east



Photo 3 - looking west at Mine road 1

Photo 4 - looking east at mine road 1

Rad 4 - eastern end of polygon - 0m - 6uR/h; 1m - 6uR/h

Photo 5 - at Rad 4 looking west at eastern end of polygon

Fenceln-1 - fence, barbed wire along road - Private ~~road~~ ALT property beyond.

Photo 6 - Fenceln-1, looking south

Rad 5 - northeastern end of polygon; 0m - 9uR/h; 1m - 7uR/h

Photo 7 - at Rad 5 northeastern end of polygon looking north

Rad 6 - northern part of polygon; 0m - 8 uR/h; 1m - 8 uR/h

Photo 8 - looking northeast at Rad 6; no visible features

Rad 7 - northwest part of polygon; 0m - 6uR/h, ALT 1m - 7uR/h

Photo 9 - looking southwest at Rad 7, no visible mine features

Mine Road - 2; north of site on jeep trail marked on topo map. no visible features along road

Rad 8 - middle of northern part of polygon; 0m - 6 uR/h; 1m - 8 uR/h

Photo 10 - looking east at Rad 8, no visible mine features

Photo 11 - looking west at Rad 8, no visible mine features

1500 Still no visible mine features. We have hiked the northern part of the polygon and beyond its boundaries within the forest service boundary. East of forest service boundary appears to be private property and may belong to Camp Blue Haven but we are not certain so we have not crossed the fence.

Rad 9 - western end of southern part of polygon; 0m - 23uR/h; 1m - 17uR/h

Photo 12 - metamorphic rock outcrop in ALT western part of polygon at Rad 9

Rad 10 - southwestern end of polygon; 0m - 10uR/h; 1m - 10uR/h

Photo 13 - looking northwest at Rad 10; no visible mine features

25 8/2/10 AGT Abandoned Uranium Mines

Rad 11 - Southeast corner of polygon; 0m-1940R/h; 1m-18mR/h

Photo 14 - looking northeast at Rad 11, no visible features

Photo 15 - look west at polygon area

Photo 16 - looking north at polygon area

1600 Vegetation collection

Photo 17-30 - Vegetation

1615 - Heading back to truck

Access 1 - hike cross-country to road, follows animal trail part of the way

Access 2 - nonmaintained dirt road following Topside Canyon

Access 3 - maintained dirt road following Blue Canyon.

1645 - Back at truck

1700 - Back at Camp Blue Haven to return gate key.

Did not find any mine features. Steep terraine

Soils: Tan sandy thin soils

Rocks: Grey limestone, cliff-forming layer. Pink, feldspar and granite ~~dominated~~ AGT dominated granite.

Wildlife: Small birds, vulture; deer scat

Human Activities: Private properties, summer homes.