# Abandoned Uranium Mine Assessment for the J.O.L. Site (NM0178)

## FINAL REPORT

**Prepared For:**

New Mexico Energy, Minerals and
Natural Resources Department
Wendell Chino Building
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

**Prepared By:**

INTERA

NM0178

**September 29, 2010**

# TABLE OF CONTENTS

## TABLES



## FIGURES



## APPENDICES

# 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 J.O.L. Site (AUM Site), MMD ID: NM0178 on September 01, 2010.

## 1.1 PREVIOUSLY KNOWN INFORMATION ABOUT THE SITE

According to Anderson (1980), workings at the AUM Site consist of a collapsed adit, with the collapsed area 15-20 ft wide, 25-30 ft deep, and approximately 15 ft high. A dump extends to the south and west of the adit, with dimensions of 50 ft by 25-30 ft (Anderson, 1980).

McLemore (1983) reported that eight tons of ore yielding six pounds of $U_3O_8$ at an average grade of 0.04% $U_3O_8$ were produced from the site in 1956. Chemical analyses of samples collected at the site contained up to 0.17% Uranium (McLemore, 1983).

## 1.2 SITE LOCATION AND DIRECTIONS

The J.O.L. Site is located within the Carson National Forest in the northwest quarter of Section 24, Township 28 North, Range 7 East. This AUM Site is located in Rio Arriba County and is approximately 10 miles west of the town of Tres Piedras.

To reach the AUM Site from Albuquerque, drive approximately 57 miles north on Interstate 25 and take exit 282 for US-84 W/US-285 N. Continue through Santa Fe and follow US-84 W/US-285 N approximately 26 miles north to Española. In Española, turn left on Paseo de Onate to continue following US-84 W/US-285 N. Continue 8.5 miles farther to the junction of US-84 W and US-285 N and turn right to continue following US-285 N. Drive approximately 47.5 miles farther on US-285 N and turn left at US-64 W in Tres Piedras. Drive 11.6 miles on US-64 W and then turn left at Forest Rd 91. Follow this road approximately 3.2 miles to a fork, and bear left. Drive 0.3 miles farther to a second fork and bear left again. Drive approximately 0.4 miles farther and turn right onto a road that follows Cleveland Gulch around the west side of Tusas Mountain. Drive 0.5 miles down this road and look for a road bearing off to the left. Follow this road approximately 0.4 miles around the south side of Tusas Mountain. At 0.4 miles, the site will be up the hill on the left side of the road.

## 1.3 SITE GEOLOGY

The AUM Site is located in the Tusas Mountains, the southernmost subrange of the Rocky Mountains. Precambrian, pale greenish-gray, platy to laminar schist comprises the bedrock throughout much of the surrounding area (Bingler, 1968). At the AUM Site this schist is intruded by a mass of granitic gneiss, which underlies Tusas Peak (Bingler, 1968). Uranium mineralization occurs as fracture fillings within the schist country rock and within epithermal veins associated with the granitic intrusion (Anderson, 1980).

### 1.4 SITE HYDROGEOLOGY

The AUM Site is located on the southern slope of Tusas Mountain. Surface drainage flows into Cleveland Gulch, which joins the Rio Tusas approximately 5 miles to the southeast. The Rio Tusas joins the Rio Vallecitos and then the Rio Ojo Caliente. The Rio Ojo Caliente in turns joins the Rio Chama approximately 37 miles south of the AUM Site.

The AUM Site is located near the eastern boundary of the Rio Chama Watershed, which covers most of the Rio Chama Water Planning Region (La Calandria Associates, Inc., 2006). The area surrounding the AUM Site is comprised of Precambrian crystalline rocks overlain by Quarternary alluvial deposits. The Precambrian rocks contain small amounts of groundwater in faults and weathered zones, and may serve as sources of springs and surface stream flow (La Calandria Associates, Inc., 2006). Groundwater flow in the vicinity of the AUM Site tends to follow surface flow, generally to the south.

### 1.5 REGIONAL TOPOGRAPHY AND TERRAIN

The AUM Site can be found on the Burned Mountain Quadrangle 7.5 minute United States Geological Survey topographic map at an elevation of approximately 9,800 feet above mean sea level (please see Figure 2). The AUM Site is located along the southern slope of Tusas Mountain, a peak over 10,100 feet high. 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. One adit, four waste piles, one trench and one disturbed area were found onsite. Please see the Photo Log in Appendix A for photos of the AUM Site features, Table 1 for a list of the AUM Site features, and Figures 4a and 4b for the locations of the AUM Site features.

### 2.1 MINE SHAFTS, ADITS, AND DECLINES

One collapsed adit (Adit-1) was found on site. Gamma radiation at the adit was measured to be 240 µR/hr (microroentgens per hour) at 0 ft above ground and 75 µR/hr at 4 ft above ground at radiation survey point Rad-3 (see Table 2). Timber that may have been associated with the adit was found nearby (See Photo 3 and 4 in Appendix A).

### 2.2 MINING AND EXPLORATION PITS AND OPEN CUTS

One trench (Trench-1) was found at the AUM Site. The adit (Adit-1) was found at the back of Trench-1. The trench is filled with large boulders of igneous and metamorphic rock (See photos 2 and 4 in Appendix A). The maximum gamma radiation measurement for this feature was 210 µR/hr at 0 ft above ground at radiation survey point Rad-2 (see Table 2).

### 2.3 WASTE AND ORE PILES AND DISTURBANCES

Four waste piles (PilePly-1, -2, -3, and -4) and one disturbed area (DistPly-1) were found onsite. PilePly-1, -2, and -3 consisted of excavated waste rock. The largest of these was PilePly-1, located down slope from Adit-1. It is approximately 3 ft tall and 30 ft by 30 ft. PilePly-4, located down slope from the other features, appeared to consist mainly of topsoil bulldozed from the adjacent DistPly-1. DistPly is approximately 40 ft wide by 50 ft long. The maximum gamma radiation measurement for these features was 490 µR/hr at 0 ft above ground at radiation survey point Rad-4 on PilePly-1 (see Table 2).

### 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 mine road (Rd-1) exists at the AUM Site. This road extends from Adit-1 and Trench-1 at its northern end and connects to Access-1 approximately 500 feet to the southeast. PilePly-2 and -3 and DistPly-1 are located along this road (see Figures 4a and 4b).

### 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 were measured approximately 800 feet southeast of the AUM Site boundary, along Access-1 (Please see Figures 2 and 3). The background gamma level was 20 µR/hr at 0 ft above ground and 19 µR/hr at 4 ft above ground. Please see Table 2 for all of the gamma radiation readings taken at the AUM Site and Figures 4a and 4b for the locations of the radiation readings.

The maximum gamma radiation measured on site was 490 µR/hr at 0 ft above ground and 160 µR/hr at 4 ft above ground at radiation survey point Rad-4 at PilePly-1. A gamma radiation measurement taken at PilePly-3 (radiation survey point Rad-7, see Photo 8 in Appendix A) recorded 360 µR/hr at 0 ft above ground and a gamma radiation measurement taken at Adit-1 (radiation survey point Rad-3) recorded 240 µR/hr at 0 ft above ground.

# 5.0 CURRENT LAND USES

## 5.1 HUMAN ACTIVITY AND RECREATIONAL SITE USE

Cows observed nearby indicate that the land at the AUM site is used for ranching. The area also sees hunting and logging activity.

## 5.2 NEARBY RESIDENTIAL, COMMERCIAL AND INDUSTRIAL STRUCTURES

No structures were sighted within a mile of the AUM Site.

## 5.3 NEARBY DOMESTIC WELLS

No wells, domestic or otherwise, lie within a mile of the AUM Site.

## 5.4 EVIDENCE OF GRAZING OR AGRICULTURE

The presence of cows, cow tracks and droppings, fences, and cattle guards at the AUM indicate that the site may see frequent grazing activity.

## 5.5 EVIDENCE OF WILDLIFE

Several species of birds were seen near the AUM Site as well as squirrels and chipmunks. Deer and elk droppings and tracks were also observed.

# 6.0 VEGETATION

The J.O.L. Site is located in the Subalpine Coniferous Forest vegetation type (Dick–Peddie, 1999). Woody vegetation at the site included ponderosa pine, aspen, spruce and douglas fir. The grass species included a green needlegrass and junegrass. No forb species were collected from the site. No noxious weeds were noted from photographs of the site.

# 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.

# 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.

Bingler, Edward C., 1968. Geology and Mineral Resources of Rio Arriba County, New Mexico. New Mexico Bureau of Mines and Mineral Resources Bulletin 91.

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

La Calandria Associates, Inc., 2006. Rio Chama Regional Water Plan. Prepared for Rio de Chama Acequias Association and Rio Arriba County.

McLemore, Virginia T., 1983. Uranium and Thorium Occurrences in New Mexico: Distribution, Geology, Production, and Resources, with Selected Bibliography. New Mexico Bureau of Mines and Mineral Resoures Open File Report OF-183.

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

## J.O.L.-NM0178
## 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 | -- | Dirt Nonmaintained | -- | -- | -- | -- | -- | -- | -- | -- |
| Adit-1 | Yes | -- | Timber | -- | -- | -- | -- | No | Yes | Collapse | NM0178_004 | looking southwest |
| DistPly-1 | Yes | -- | -- | -- | -- | 40 | 50 | -- | -- | -- | NM0178_009 | looking north |
| PilePly-1 | Yes | Waste | -- | Rock | 3 | 30 | 30 | -- | -- | -- | NM0178_005 | looking west |
| PilePly-2 | Yes | Waste | -- | Rock | 1 | 20 | 25 | -- | -- | -- | NM0178_006 | looking east |
| PilePly-3 | Yes | Waste | -- | Rock | 1 | 10 | 15 | -- | -- | -- | NM0178_007 | looking north |
| PilePly-4 | Yes | Other | -- | Soil | 5 | 10 | 15 | -- | -- | -- | NM0178_010 | looking north |
| Rd-1 | Yes | Dirt | -- | Dirt Nonmaintained | -- | -- | -- | -- | -- | -- | -- | -- |
| Trench-1 | Yes | -- | -- | -- | 20 | 20 | 50 | -- | -- | -- | NM0178_002 | looking north |

**Notes:**

-- designates no information

## Table 2
## Gamma Radiation Survey Results

## J.O.L.-NM0178
## Abandoned Uranium Mine Assessments

| Reading ID | Associated Features | 0 ft (µR/hr) | 4 ft (µR/hr) | Associated Photos |
|---|---|---|---|---|
| Rad-1 | trench-1 | 130 | 90 | -- |
| Rad-2 | trench-1 | 210 | 60 | -- |
| Rad-3 | adit-1 | 240 | 75 | -- |
| Rad-4 | pileply-1 | 490 | 160 | -- |
| Rad-5 | pileply-2 | 40 | 45 | -- |
| Rad-6 | -- | 47 | 45 | -- |
| Rad-7 | pileply-3 | 360 | 160 | NM0178_008 |
| Rad-8 | distply-1 | 37 | 36 | -- |
| Rad-9 | pileply-4 | 44 | 42 | -- |
| Rad-10 | rd-1 | 29 | 28 | -- |
| RadBack-1 | -- | 20 | 19 | -- |

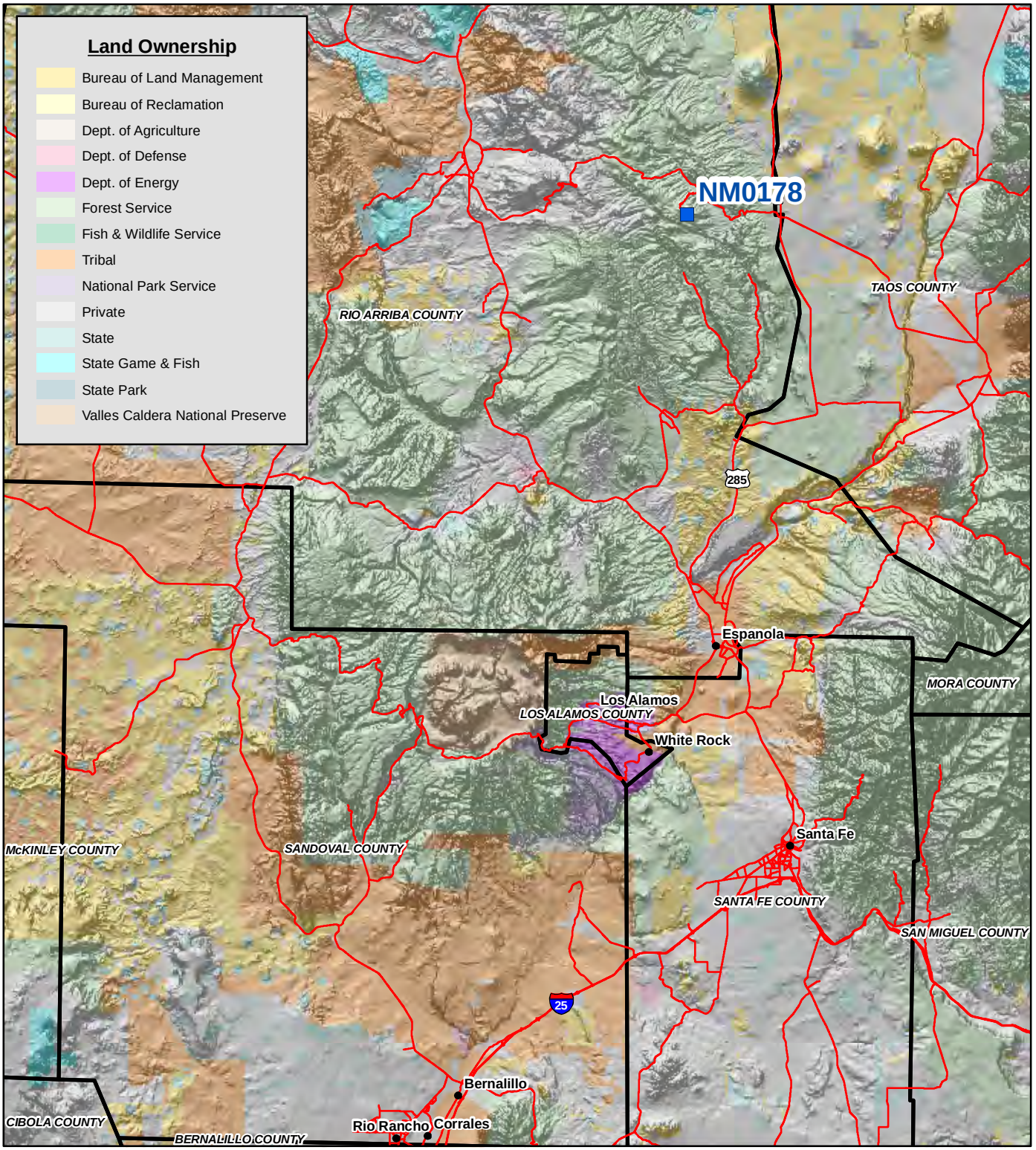
**Notes:**

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

µR/hr=microroetgens per hour

-- designates no information

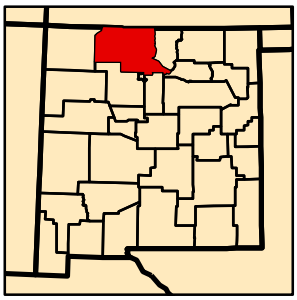
# FIGURES




Map Source(s):
Ownership - BLM, 2008

0 7.5 15 30
Miles

NORTH

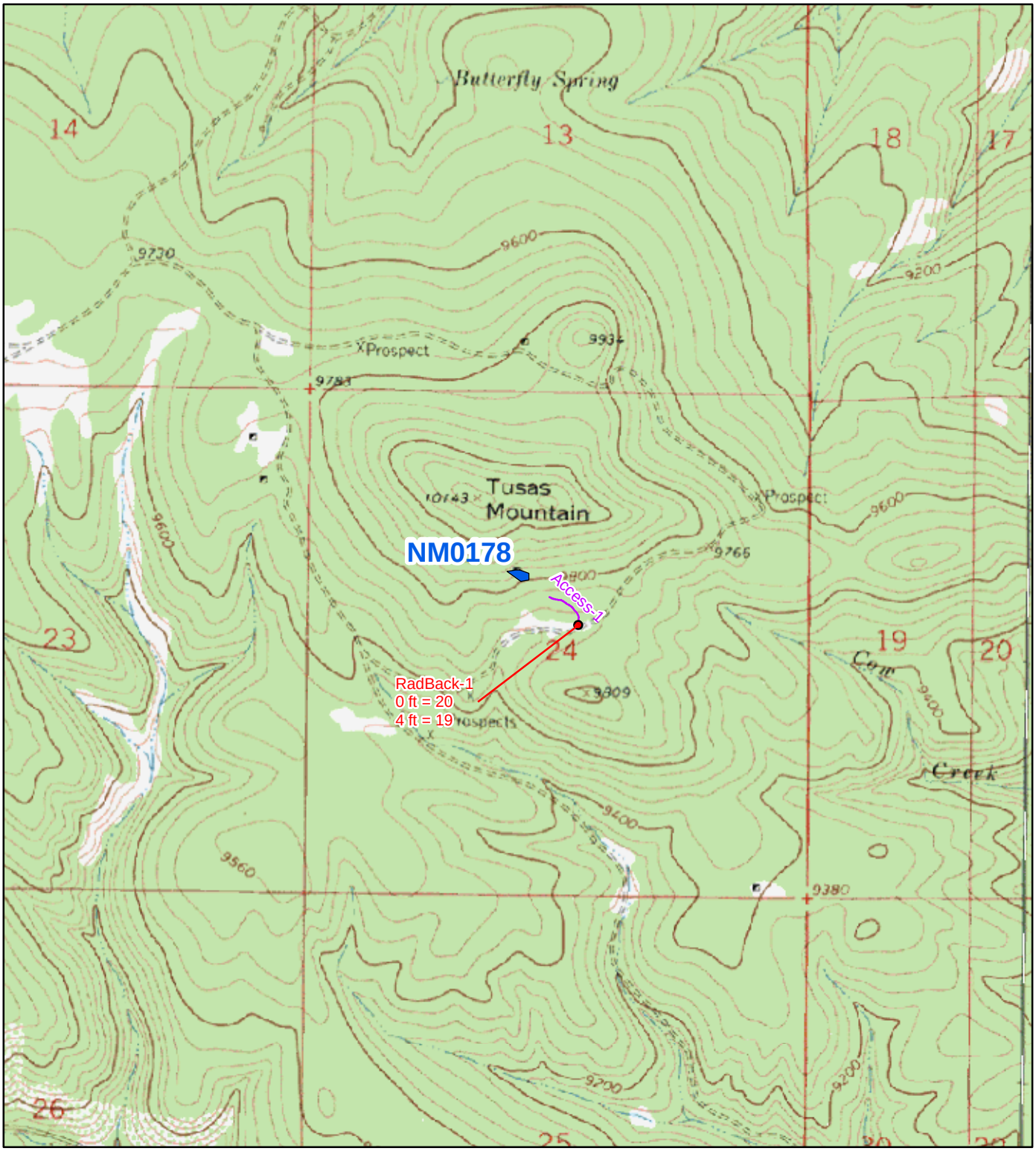


**Legend**

- AUM Location
- Road
- County Boundary

**Figure 1**
**Site Location Map**
**NM0178-J.O.L.**
Abandoned Uranium Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0178-JOL\GIS\Maps\Site_Map_JOL_CP.mxd 09/14/2010




Map Source(s):
U.S. Geological Survey 7.5-Minute
Topographic Map
-Burned Mountain, 1963
-Mule Canyon, 1963

0 750 1,500 3,000
Feet

NORTH

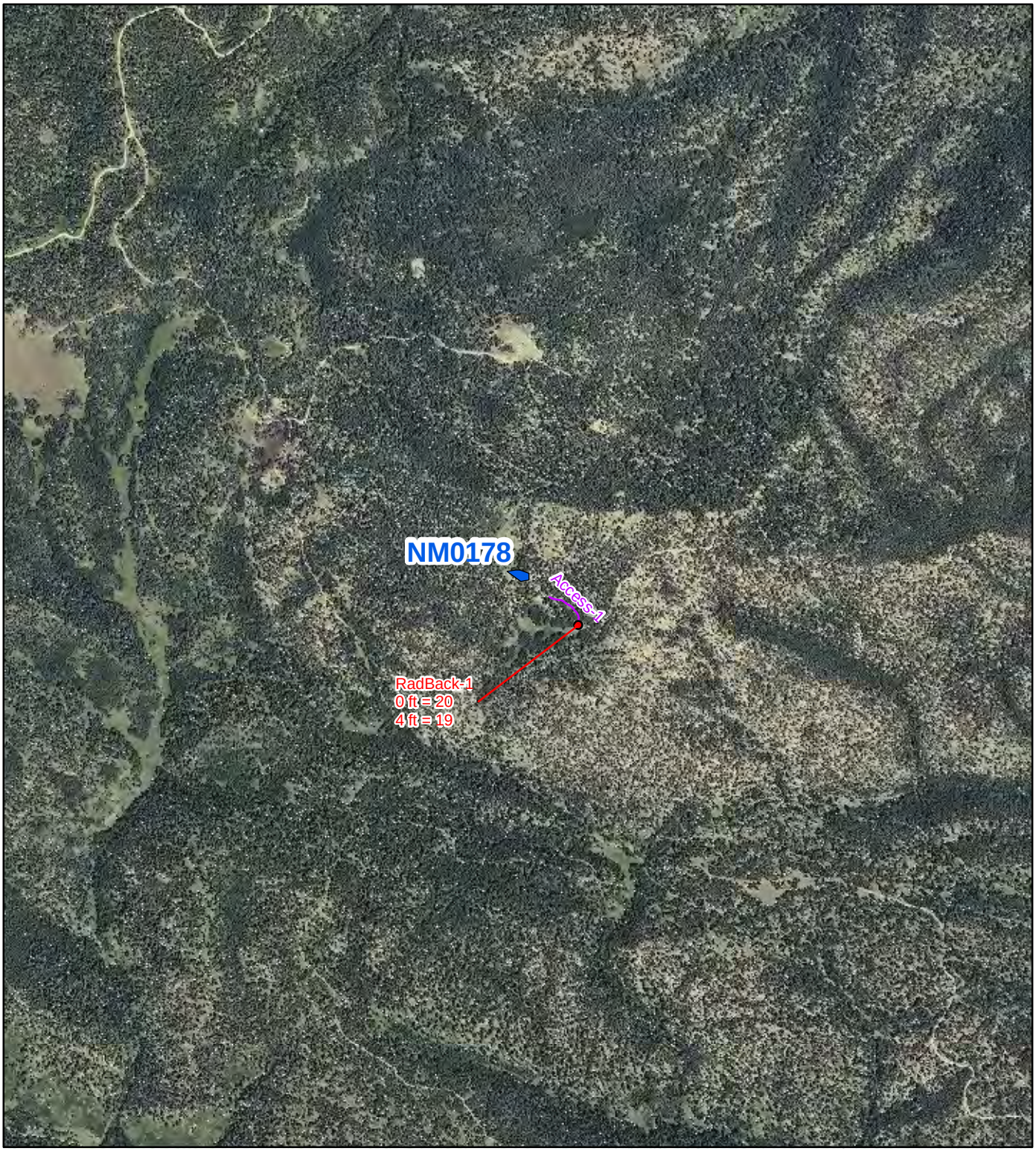
## Legend

- Radiation Readings (µR/hr)
- Access Route
- AUM Location Boundary (MMD Provided)

Note:
There are no wells within 1 mile of the Site.

**Figure 2**
**Topographic Map**
**NM0178-J.O.L.**
Abandoned Uranium
Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0178-JOL\GIS\Maps\Topo_Map_JOL_CP.mxd 09/14/2010




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

0 750 1,500 3,000
Feet

NORTH

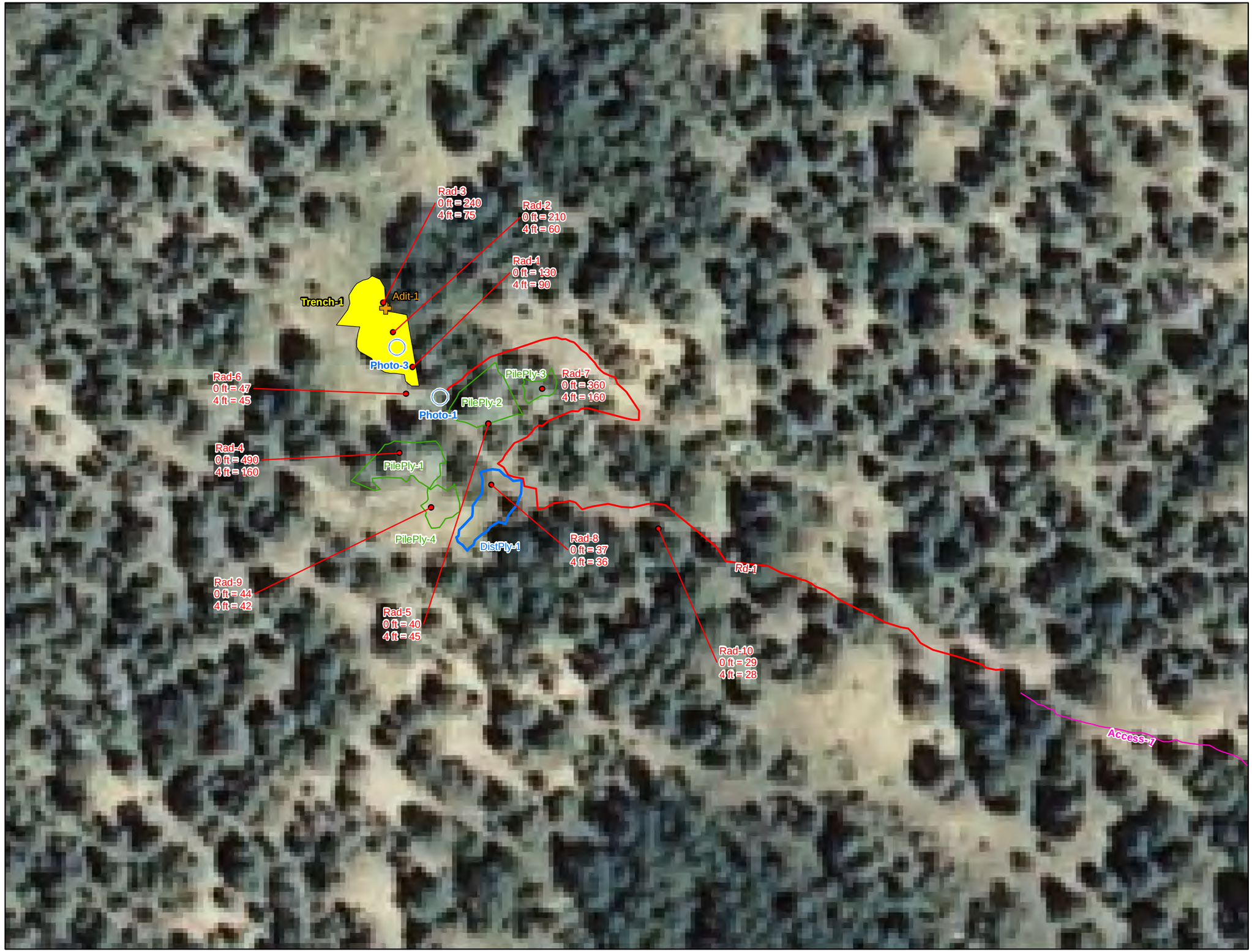
## Legend

- Radiation Readings (µR/hr)
- Access Route
- AUM Location Boundary (MMD Provided)

Note:
There are no wells within 1 mile of the Site.

**Figure 3**
**Aerial Photo**
**NM0178-J.O.L.**
Abandoned Uranium Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0178-JOL\GIS\Maps\Topo_Map_JOL_CP.mxd 09/14/2010




## Legend

- Radiation Readings (µR/hr)
- Photo Location
- Adit
- Mine Road
- Access Route
- Pile Boundary
- Other Disturbance Area
- Trench

0 30 60 120

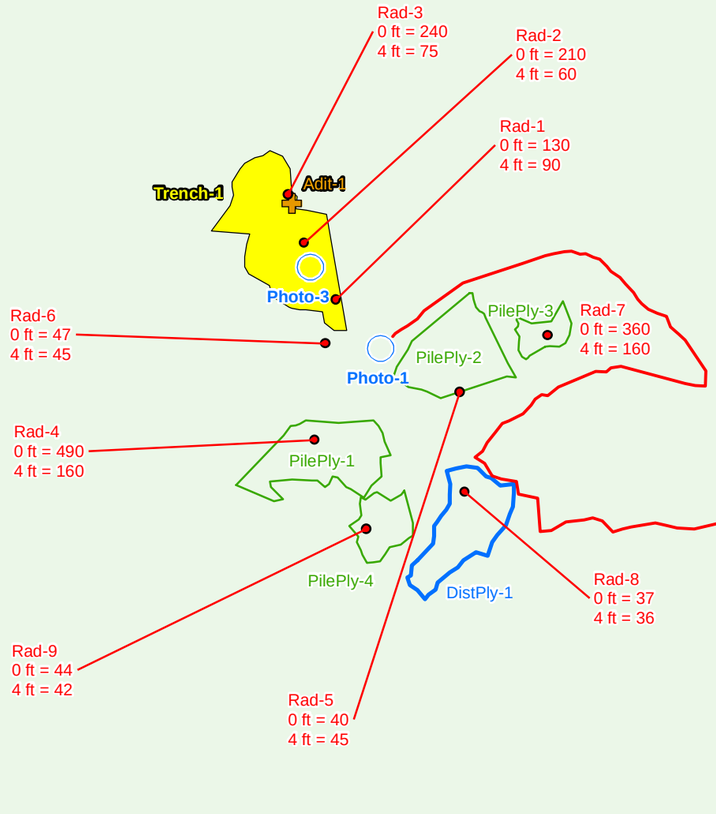
Feet

NORTH

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

**Figure 4a**
**Site Map on**
**Aerial Photo**
**NM0178-J.O.L.**
Abandoned Uranium
Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0178-JOL\GIS\Maps\CloseUpAerial_Map_JOL_CP.mxd 09/15/2010




## Legend

- Radiation Readings (µR/hr)
- Photo Location
- Adit
- Mine Road
- Access Route
- Pile Boundary
- Other Disturbance Area
- Trench

**Surface Ownership**

- Forest Service

0 30 60 120
Feet

NORTH

Map Source(s):
Ownership - BLM, 2008

**Figure 4b**
**Site Map with**
**Surface Ownership**
**NM0178-J.O.L.**
Abandoned Uranium
Mine Assessment

# 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-Site location photo looking north, replicating Anderson photo B.

Photo 2-Looking north at Trench-1.

Photo 3-Timber in Trench-1.

Photo 4-Looking southwest at Adit-1.

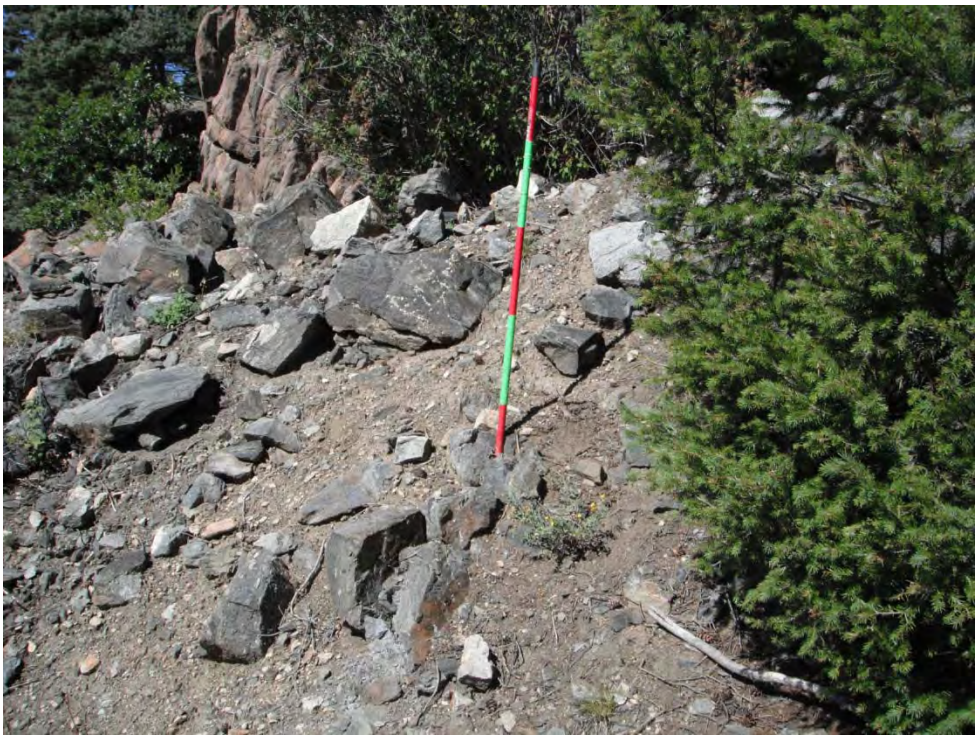


Photo 5-Looking west at PilePly-1.

Photo 6-Looking east at PilePly-2.

Photo 7-Looking north at PilePly-3.


Photo 8-At Rad-7 looking west.

Photo 9-Looking north at DistPly-1, replicating Anderson photo A.

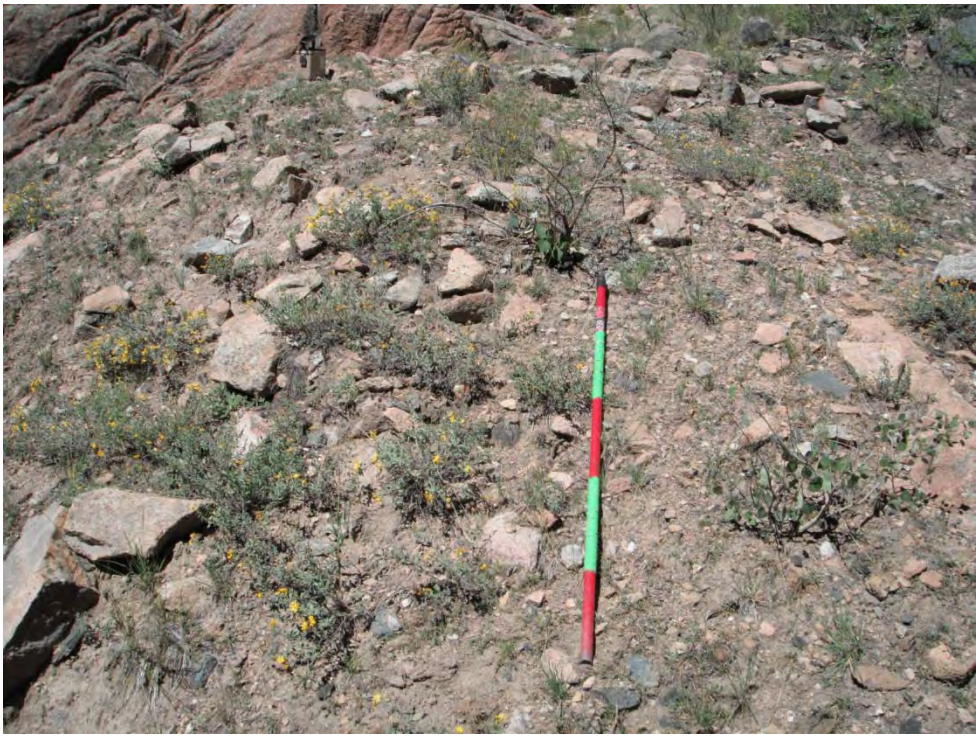


Photo 10-Looking north at PilePly-4.

Photo 11-Vegetation at AUM Site.

Photo 12-Vegetation at AUM Site.

Photo 13-Vegetation at AUM Site.

Photo 14-Vegetation at AUM Site.

Photo 15-Vegetation at AUM Site.

Photo 16-Vegetation at AUM Site.

# APPENDIX B

# FIELD NOTES

45 9/1/10 AUM Abandoned Uranium Mines

Site Name: NM0178; J.O.L

Objective: Site Assessment

Personnel: Annelia Tinklenberg
Alex Reservsky

Equipment: Rental truck, Trimbel GeoXM (SN: 4948447 27, 2005 series), Ludlum 192 (SN: 234149), Fujifilm digital camera (No. OTB31254), backup Garmin GPS, cell phone amplifier, field laptop.

7:30 Leaving Espanola
1020 At AUM site off of forest service road

Photo 1 - Site ID location, looking north, replicating Anderson Photo C.

Trench-1 - 20' deep, 50' long, 20' wide; collapsed adit in northern end.

Photo 2 - Trench-1 looking north

Rad-1 - Trench-1; 0m - 130 MR/h; 1m - 90 MR/h

Rad-2 - Trench-1; 0m - ~~160~~ 210 ACT MR/h; 1m - 60 MR/h

Photo 3 - timber in trench-1, possible headframe for Adit-1

Rad 3 - Adit-1; 0m - 240 MR/h; 1m - 75 MR/h

Adit-1, north end of Trench-1; collapsed

Photo 4 - collapsed Adit-1, looking southwest

PilePly-1; 3' tall, 30' x 30', 45° slope, waste rock falling down hillslope

Photo 5 - PilePly-1; ~~looking west~~ ~~MR/h, 1m - MR/h~~ ACT

Rad 4 - PilePly-1; 0m - 490 MR/h; 1m - 160 MR/h

PilePly-2 - 1' tall, 20' wide, 25' long, 45° slope, waste rock spreading down hillslope



Photo 6 - PilePly-2 looking east

Rad 5 - PilePly-2; 0m - 40 MR/h; 1m - 45 MR/h

Rad 6 - 0m - 47 MR/h; 1m - 95 MR/h

~~Mine Rd~~ ACT

MineRd-1 - Mine road leading to trench-1

PilePly-3 - 1' tall, 10' wide, ~~15'~~ 45' ACT long; 35°

Photo 7 - PilePly-3 looking north

Rad 7 - PilePly-3; 0m - 360 MR/h; 1m - 160 MR/h

Photo 8 - Rad 7 - looking west at Rad 7, ~~replica~~ ACT

DistPly-1 - 40' wide, 50' long

Photo 9 - DistPly-1 looking north, replicating Anderson Photo A

Rad 8 - DistPly-1; 0m - 37 MR/h; 1m - 36 MR/h

Rad 9 - PilePly-4; 0m - 44 MR/h, 1m - 42 MR/h

PilePly-4 - 5' tall, 10' wide, 15' long, 45°

Photo 10 - PilePly 4 looking north

Rad 10 - MineRd-1; 0m - 29 MR/h; 1m - 28 MR/h

Background Rad - 0m - 20 MR/h; 1m - 19 MR/h

Access Rd-1 - Road from Access-2 to mine

1150 - Leaving AUM site

Soils: Thin tan sandy soils. Rocky.

Rocks: Quartz and feldspar-rich granite; pink. Gray to black schist.

Wildlife: Gray squirrel, chipmunk, robin, other small birds. Rabbit and deer and elk droppings and tracks.

Human Activities: Hunting and logging. Cattle grazing, cows, droppings, fences, tracks, cattle guards.

Sketch → next page

#47 9/1/10 HCT Abandoned Uranium Mines