Abandoned Uranium Mine Site Assessment for the Abo Mine (NM0259)

FINAL REPORT

Prepared For:

New Mexico Energy, Minerals and
Natural Resources Department
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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 Abo Mine (AUM Site), MMD ID: NM0259, on December 17, 2009.

1.1 PREVIOUSLY KNOWN INFORMATION ABOUT THE SITE

The AUM Site was mined by surface mining methods in 1916. One known alias for the mine was Sandstone Copper. This deposit is a uraniferous stratabound sedimentary-copper deposit in the Abo formation, and is not known to have produced any uranium (McLemore and Chenoweth, 1989).

This AUM Site was not included in the Anderson Report (Anderson, 1980).

1.2 SITE LOCATION AND DIRECTIONS

The AUM Site is located on United State Department of Agriculture Forest Service (USDA Forest Service) land in the northeast quarter of Section 22, Township 3 north, Range 5 east. This AUM Site is located in Torrance County and is approximately 3 miles north of Highway 60, and 9 miles north of the city of Mountainair (please see Figure 1).

To reach this AUM Site from Albuquerque, drive south on I-25 for approximately 55 miles. Take exit 175 for US-60 E toward Bernardo. Merge onto NM-116 S/Old U.S. 85 S/US-60 E, and continue east on US-60 for 30 miles. Turn left at County (Co) Rd B005/NM-513 N (Follow signs for the Abo Ruins). After the Abo Ruins, Co Rd B005 becomes a dirt road. Continue north from the Ruins approximately 1 mile and the road will reach a locked gate. Turn sharply right at this gate to continue east on Co Rd B005. After approximately 0.5 miles, the road bends sharply to the left. Continue north on Co Rd B005 from this bend for 1 mile, passing an abandoned 2-story house on the left. The road will follow along a fenceline and come to a fork. Go left at this fork, through an unlocked gate with a USDA Forest Service property boundary sign (remember to close the gate). Go about 0.5 miles down this road to Phister tank (on the right) and turn left at the "T" on an unnamed dirt road. Continue along this road through a rocky drainage system and up onto a plateau. After about 0.5 miles, look carefully for a set of tracks bearing off to the left. Follow this set of tracks south. After about 500 feet, there will be an unlocked gate in a barbed wire fence (remember to close it). Continue about one mile further to the Abo well, a small tank. At this T, turn right. After 0.2 mi, the road dips through a wide, shallow drainage. Continue through this drainage 0.4 miles to an intersection with a two track road. Go right at this intersection. Follow the tracks 0.6 miles, and park on top of the ridge. The AUM Site is down on the side of the ridge, just to the west of the parking area, and is visible from the ridge.

1.3 SITE GEOLOGY

The AUM site is located within a series of well-exposed late Pennsylvanian to early Permian sedimentary rocks. Near the Pennsylvanian-Permian boundary in much of New Mexico, marine

environments of the Pennsylvanian were subjected to influx of large volumes of red fluvial, floodplain, deltaic, and coastal plain terrigenous clastic sediments, in response to a shift to dryer climates during the lower Permian. This shift is typically represented in New Mexico by a transitional zone of interbedded clastics and marine limestones between Madera Group strata below and the red clastics of the overlying Abo Formation (Kues and Giles, 2004). The Abo sandstone was deposited locally as a series of coarse basin-fill strata, mainly derived from the Paleozoic Pedernal uplift, which was situated southeast of the present-day location of the site. The Abo Sandstone is locally 200-300 m thick, and is overlain to the east by the later early Permian (Leonardian) Yeso Formation.

Mining operations were active along the western slope of a north-south trending ridge forming part of the southern end of the Manzano uplift. This ridge is composed of strata that dip eastward, and are mainly formed from interbedded coarse fluvial and shallow marine red sandstones. Radioactivity readings were found to originate from several waste rock piles consisting largely of grayish-brown, matrix-supported sandstone conglomerates, with pebble to boulder-sized angular limestone clasts.

1.4 SITE HYDROGEOLOGY

The groundwater and surface water at the AUM Site are hydraulically connected with basins of the Rio Grande Valley. The AUM Site is approximately 3 miles north of Abo Arroyo. The surface waters at the AUM Site drain southwest out of the site into the Abo Arroyo and the Abo Canyon. The Abo Arroyo drains to the west into the Rio Grande flood plain.

The aquifer bearing formations around the AUM Site, in the Middle Rio Grande Groundwater Basin, are the Quaternary alluvial and fluvial deposits. The groundwater flow direction is hydraulically connected with the surface water flow direction and in general flows from higher elevations in the east to west toward the Rio Grande Valley.

1.5 REGIONAL TOPOGRAPHY AND TERRAIN

The AUM Site can be found on the Scholle Quadrangle 7.5 minute United States Geological Survey topographic map at an elevation of approximately 6300 feet above mean sea level (please see Figure 2). The regional topography on either side of the escarpment on which the AUM Site is located is gently sloped, while the escarpment itself has a gradient of 24 percent, sloping to the west. There is a minor, unnamed, ephemeral drainage 3000 feet to the east of the AUM Site, that flows south into the Abo Arroyo, and eventually into the Rio Grande. Surface flow at the AUM Site flows to the east, into the Cañon Saladito, which flows to the southeast, into the Abo Canyon, and eventually into the Rio Grande, 20 miles to the west. 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 Abo AUM Site is a cut in the side of a steep

escarpment running from north to south. The sediment has been cut on the upper side (east) of the AUM Site, and filled on the lower (west) side to create a round, flat landing. The mine features include one adit, two benches, two open cuts, eight piles, one mine road, and one structure. Please see the Photo Log in Appendix A, 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

One adit (adit-1) was found at the AUM Site, with dimensions of 4 feet high and 5 feet wide. The entrance to the adit has soil piled in front of it, and it is not evident how far the adit advances into the rock. The adit is, however, still slightly open, above the soil piled in front of it. This opening is approximately 1-foot high by 2 feet wide.

2.2 MINING AND EXPLORATION PITS AND OPEN CUTS

Two pile ridges and two open cuts were traced with the GPS at the AUM Site. The features labeled as open cuts (cut-1 and cut-2) are the bottom edges of the cuts that were made in the escarpment. The areas to the west of these cuts form horizontal benches at the AUM Site, to the east of each of these lines is a steep cut face. The features labeled as pile ridges (pile ridge 1 and pile ridge 2) are the benches formed out of the material removed from the previously mentioned open cuts. The area between the cuts and the benches has been leveled.

2.3 WASTE AND ORE PILES AND DISTURBANCES

Eight waste rock piles (pile-1 through pile-8) were found at the AUM Site. Several of the piles (pile-1 through pile-3) were used as fill to flatten the topography. One pile (pile-4) is located above the adit opening, and may have been placed at the same time as the material that was used to block the entrance to the adit. The other piles (pile-5 through pile-8) appear to have been stockpile locations for ore material or waste rock. One of these piles (pile-7) may have been the uranium ore stockpile.

2.4 MINING RELATED BUILDINGS AND FOUNDATIONS

Observation submitted under confidential Appendix C.

2.5 OTHER MINE FEATURES

The only other feature found at the AUM Site is a mining road (rd-1) that goes northwest from the north side of the AUM Site boundary and was likely the haul road for the mine.

2.6 BOREHOLES

There were no visible boreholes at this AUM Site.

2.7 RECLAMATION ACTIVITIES

No apparent reclamation activities have taken place at this AUM Site. The opening to the adit is partially filled with soil. None of the piles have been reclaimed.

3.0 ARCHEOLOGICAL SITES

Archeological observation submitted under confidential Appendix C.

4.0 SITE GAMMA RADIATION READINGS

The background gamma radiation readings at the AUM Site were measured close to where the vehicle was parked, approximately 100 yards east of the AUM Site. The background gamma readings measured approximately 10 to 15 microroentgens per hour (µR/hr) at the ground surface and 10 to 15 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 highest gamma radiation reading was at location rad-10, which was located on top of a pile (pile-7), and had readings of 450 µR/hr at the ground surface, and 110 µR/hr at 4 feet above the ground surface. This pile could have been the uranium ore stockpile.

5.0 CURRENT LAND USES

5.1 HUMAN ACTIVITY AND RECREATIONAL SITE USE

No evidence of human activity was found at this AUM Site. Based on the difficulty of getting to this location by vehicle, it is unlikely that humans have recently visited this AUM Site.

5.2 NEARBY RESIDENTIAL, COMMERCIAL AND INDUSTRIAL STRUCTURES

There is one visible structure within 1 mile of the AUM Site. It appears to be a residence with associated agricultural buildings.

5.3 NEARBY DOMESTIC WELLS

Two privately owned domestic wells were identified within 1 mile of the AUM Site. They are both located to the southwest of the AUM Site and are likely associated with the nearby residence. Well RG-46015 was drilled in July 1986 to a total depth of 400 feet below ground surface (bgs). Depth to water information was not available. Well RG-46015-CLW was drilled in August 1986 to a total depth of 120 feet bgs, with a depth to water of 50 feet bgs (OSE, 2008).

The Abo Well, visible on the topographic map (Figure 2) to the southeast of the AUM Site, is not registered with the Office of the State Engineer, and no information about this well was readily available.

5.4 EVIDENCE OF GRAZING OR AGRICULTURE

Evidence of grazing (wld-1) was noted by hoof prints in the soil at the AUM Site.

5.5 EVIDENCE OF WILDLIFE

There was very little evidence of wildlife in the area. There were, however burrow holes visible, which could be home to rodents. Birds that may have been present near the AUM Site this time of year include species of woodpeckers, sparrows, warblers, hawks and owls, although none were observed during the site visit.

6.0 VEGETATION

The identified vegetation at the AUM Site includes Juniper trees (Juniperus), Creosote bush (Larrea tridentate), and Mesquite (*Prosopis*). Other small unidentified woody shrubs and forbs as well as various types of grasses were also present throughout the AUM Site (Carter, 1997).

7.0 POTENTIAL OFFSITE IMPACTS

7.1 EROSION

There is one notable erosional feature (erospt-1) at the AUM Site, downgradient to the east of the AUM Site. It is approximately 2 feet deep, 5 feet wide, and 20 feet long.

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 imminently dangerous to humans, livestock, or wildlife potentially present at the AUM Site.

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.

Carter, Jack L., 1997. Trees and Shrubs of New Mexico. Johnson Books; Boulder, CO.

Kues, Barry S., and Katherine A. Giles. "The Late Paleozoic Ancestral Rocky Mountains System in New Mexico." New Mexico Geological Society. *The Geology of New Mexico: A Geologic History* (2004): 95-136.

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

Site Name – NM0259 Abo
Abandoned Uranium Mine Assessments

Feature Name	Feature Type	Material	Activity	Associated Photo	Depth or Height (ft)	Length (ft)	Width (ft)	On Site?	Collapsed?	Open?	Associated Feature	Notes
adit-1	adits	--	--	Photos 5, and 19-21	4	--	5	Yes	No	Yes	rad-6	--
erospt-1	erosion3	--	--	Photos 11-13	2	20	5	Yes	--	--	--	--
fenc-1	fences	wire/wood	--	--	--	--	--	No	--	--	--	fence along ridge above AUM Site
pile ridge 1	General2	--	--	Photo 27	30	--	--	Yes	--	--	rad-8	top of bench
pile ridge 2	General2	--	--		--	--	--	Yes	--	--	--	top of bench
cut-1	openCuts	--	--	Photo 40	12	--	--	Yes	--	--	--	top of bench
cut-2	openCuts	--	--	Photo 40	50	--	--	Yes	--	--	--	bottom of hill cut
pile-1	piles	--	--	Photo 8	10	--	--	Yes	--	--	rad-3	--
pile-2	piles	--	--	Photos 9-10	6	10	8	Yes	--	--	rad-4	--
pile-3	piles	--	--	Photos 16-17	7	10	30	Yes	--	--	--	--
pile-4	piles	--	--	Photos 22-23	10	--	15	Yes	--	--	--	
pile-5	piles	--	--	Photos 25-26	15	20	30	Yes	--	--	rad-7	--
pile-6	piles	--	--	Photo 30	3	5	15	Yes	--	--	rad-9	--
pile-7	piles	--	--	Photos 30-33	3	5	15	Yes	--	--	rad-10	--
pile-8	piles	--	--	Photo 34	3	10	5	Yes	--	--	rad-11	--
rd-1	roadcntr	dirt		Photo 18	--	--	--	No	--	--	--	Road north from AUM Site
wld-1	wildlife	--	Grazing	Photo 24	--	--	--	Yes	--	--	--	Cattle tracks

Table 2
Gamma Radiation Survey Results

Site Name – NM0259 Abo
Abandoned Uranium Mine Assessments

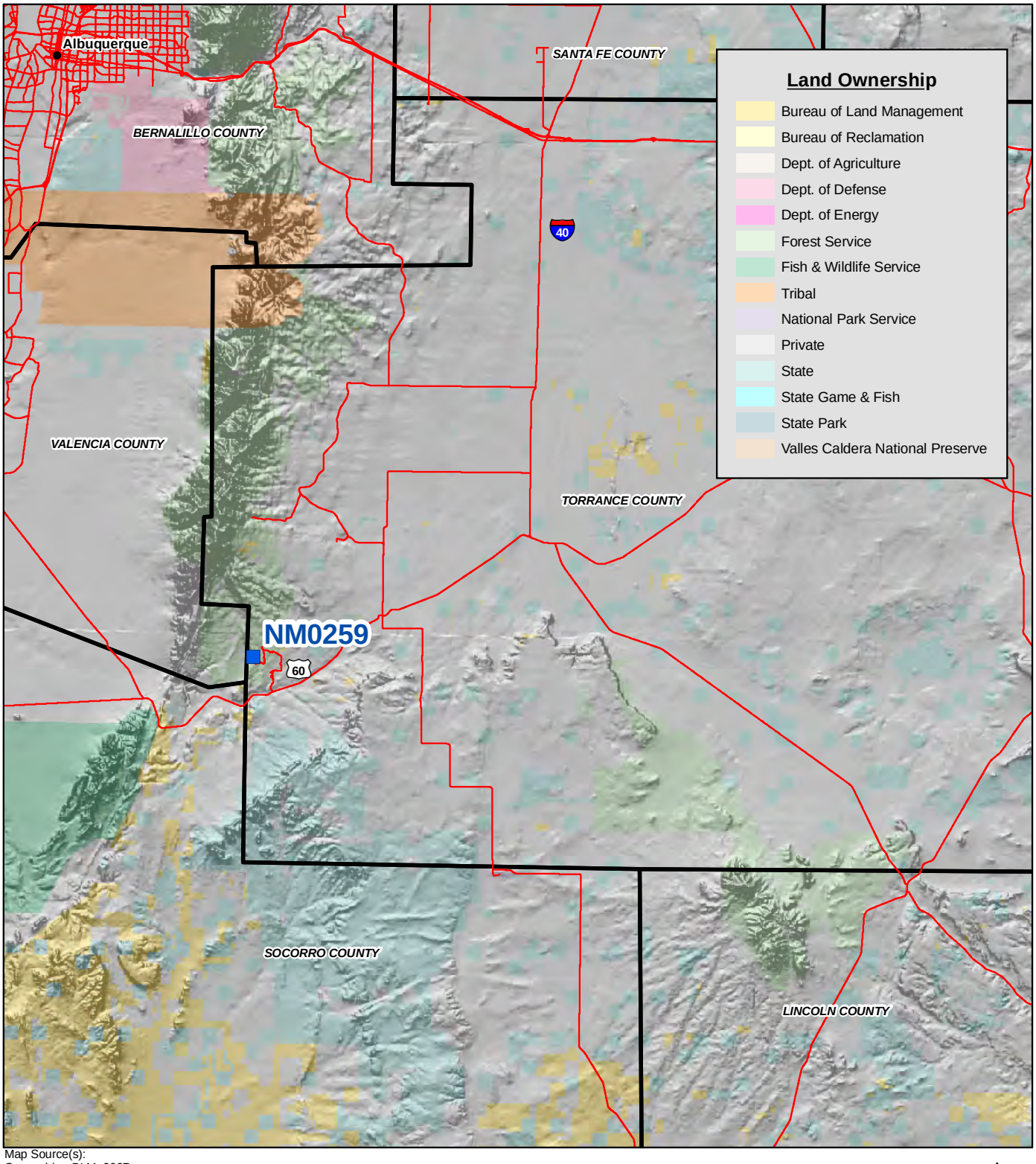
Reading ID	Reading at 0ft Above Ground (µR/hr)	Reading at 4ft Above Ground (µR/hr)	Associated Photos	Associated Features
background	10-15	10-15	none	none
rad-1	17	18	Photo 1	none
rad-2	18	19	none	none
rad-3	160	35	Photo 2	pile-1
rad-4	60	40	none	pile-2
rad-5	120	25	Photo 15	none
rad-6	25	20	Photos 19-21	adit-1
rad-7	60	25	Photo 25-26	pile-5
rad-8	40	25	Photos 27-28	pile ridge 1
rad-9	60	40	Photo 30	pile-6
rad-10	450	110	Photo 31-33	pile-7
rad-11	140	50	Photo 34	pile-8
rad-12	19	20	none	none
rad-13	20	23	none	none
rad-14	160	37	Photo 40	none
rad-15	29	27	none	none

Notes:

All gamma readings at this Site were taken using a Ludlum 19 µR/Ratemeter.

µR/hr = microroentgens per hour

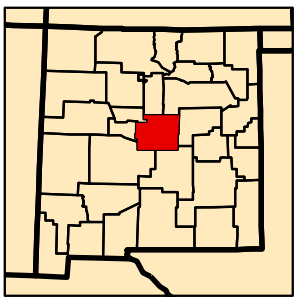
FIGURES



Map Source(s):
Ownership - BLM, 2007

0 5 10 20
Miles

NORTH



Legend

- AUM Location
- Road
- County Boundary

Figure 1
Site Location Map
Abo-NM0259

Abandoned Uranium Mine Assessment

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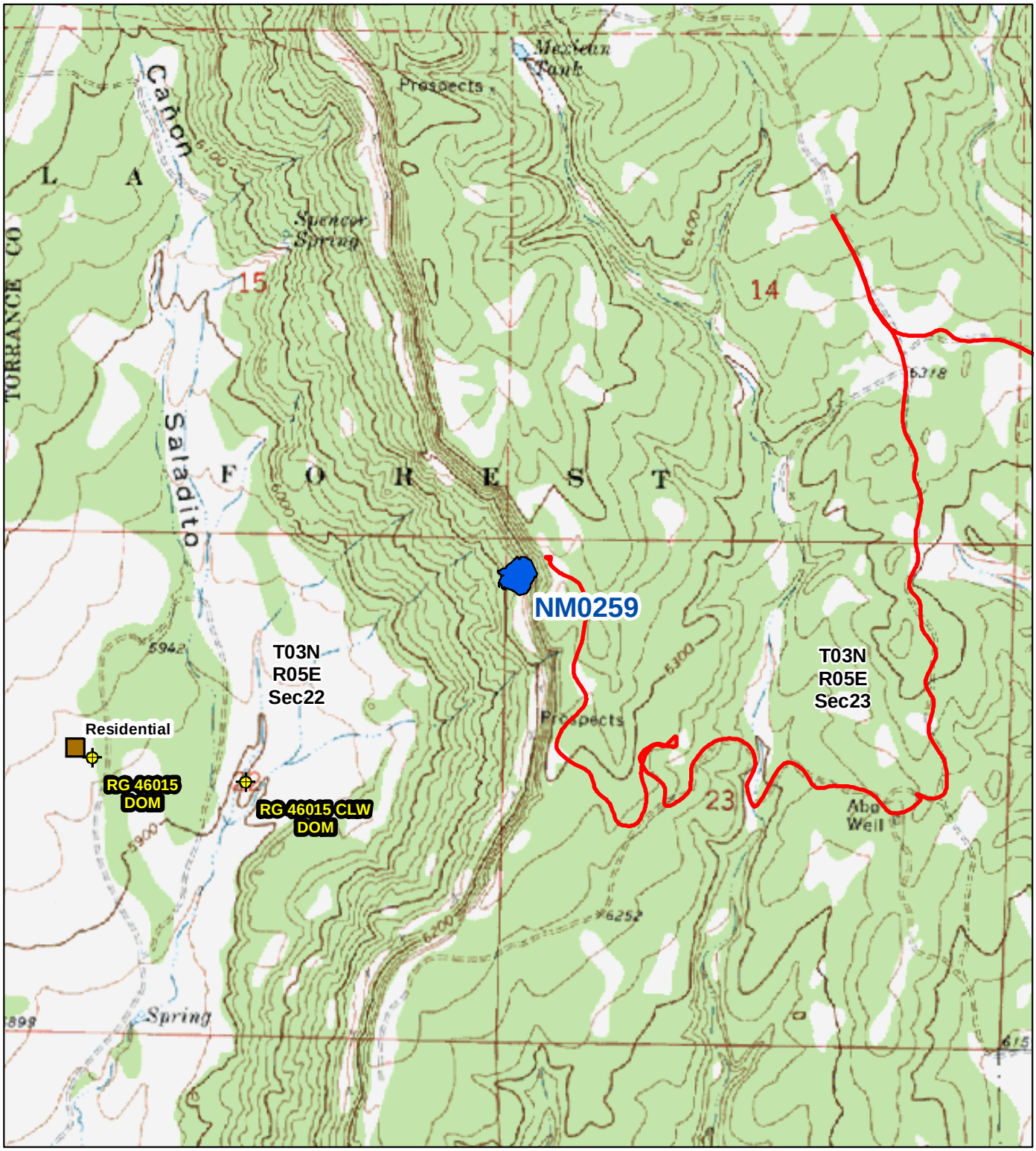


Map Source(s):
U.S. Geological Survey 7.5-Minute
Topographic Map
-Scholle, 1972

0 750 1,500 3,000
Feet

NORTH

Legend

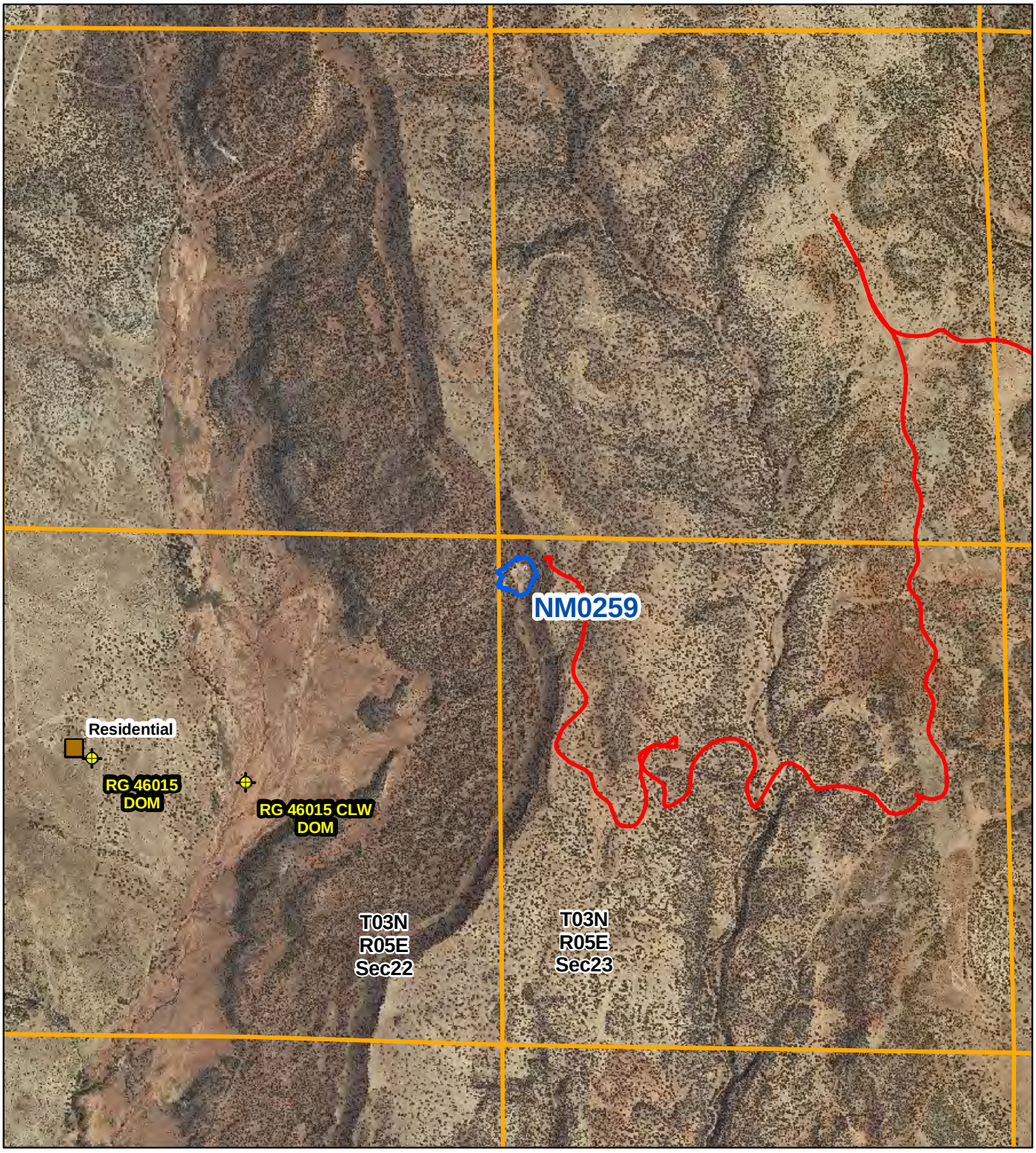
- Well Within 1 Mile of Site
- AUM Location Boundary
- Mine Road
- Structure

Figure 2
Topographic Map
NM0259-Abo

Abandoned Uranium
Mine Assessment

INTERA

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0259-Abo\GIS\Map\Topo_Map.mxd 01/08/2010



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

0 750 1,500 3,000
Feet

NORTH

Legend

- Well Within 1 Mile of Site
- Section Boundary
- Mine Road
- Structure
- AUM Boundary

Figure 3
Aerial Photo
Abo-NM0259

Abandoned Uranium
Mine Assessment

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0259-Abo\GIS\Map\Aerial_Map.mxd 12/30/2009

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

0 37.5 75 150
Feet

Note: See Table 1 for Site Feature descriptions.

NORTH

Legend

- Radiation Readings (µR/hr)
- Adits
- Photo Location
- Mine Road
- AUM Boundary

Figure 4a
Site Map
on Aerial Photo
NM0259-Abo
Abandoned Uranium
Mine Assessment

INTERA

File: S:\Projects\EMMD-001_Abandoned Uranium Mine Assessment\Sites\NM0259-Abo\GIS\Map\Closeup_Map_Aerial.mxd 01/08/2010

rad-12
0 ft = 19
4 ft = 20

rd-1

route frm ruins

fenc-1

photo-17

photo-18

rad-13
0 ft = 20
4 ft = 23

photo-16

photo-22

cut-1

adit-1

rad-background
0 ft = 15
4 ft = 15

rad-5
0 ft = 120
4 ft = 25

rad-6
0 ft = 25
4 ft = 20

rad-14
0 ft = 160
4 ft = 37

rad-11
0 ft = 140
4 ft = 50

rad-1
0 ft = 17
4 ft = 18

pile ridge 2

rad-4
0 ft = 60
4 ft = 40

photo-14

erospt-1

photo-9

rad-15
0 ft = 29
4 ft = 27

cut-2

photo-11

photo-10

rad-10
0 ft = 450
4 ft = 110

rad-8
0 ft = 40
4 ft = 25

photos-27-28

rad-9
0 ft = 60
4 ft = 40

photo-30

pile-5

pile ridge 1

rad-3
0 ft = 160
4 ft = 35

rad-7
0 ft = 60
4 ft = 25

rad-2
0 ft = 18
4 ft = 19

Map Source(s):
Ownership - BLM, 2007

0 37.5 75 150
Feet

Note: See Table 1 for Site Feature descriptions.

NORTH

Legend

- Radiation Readings (µR/hr)
- Adits
- Photo Location
- Mine Road
- AUM Boundary
- **Surface Ownership**
- Forest Service

Figure 4b
Site Map with
Surface Ownership
NM0259-Abo

Abandoned Uranium
Mine Assessment

INTERA

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 will be provided in the final deliverable.

Photo 3 – Looking west at AUM Site from above.

Photo 5 – View of AUM Site with adit (adit-1) on north side of AUM Site.

Photo 6 – View of AUM Site, looking north.

Photo 7 – Waste rock pile (pile-1), looking south.

Photo 8 – Waste rock (pile-1, rad-3) with radiation reading of 160 µR/hr, looking north.

Photo 9 – Waste rock (pile-2), looking east.

Photo 10 – Waste rock (pile-2), looking north.

Photo 12 – View of erosion downgradient of the AUM Site (erospt-1), looking northeast.

Photo 13 – View of erosion downgradient of AUM Site (erospt-1), looking southeast.

Photo 14 – Rock cairn at western edge of AUM Site, looking north.

Photo 15 – Sandstone rock (rad-5) with radiation reading of 120 µR/hr.

Photo 16 – Waste rock (pile-3), north side of AUM Site, looking east.

Photo 17 – Waste rock (pile-3), looking south.

Photo 18 – Road going north from AUM Site.

Photo 19 – Adit (adit-1), looking east.

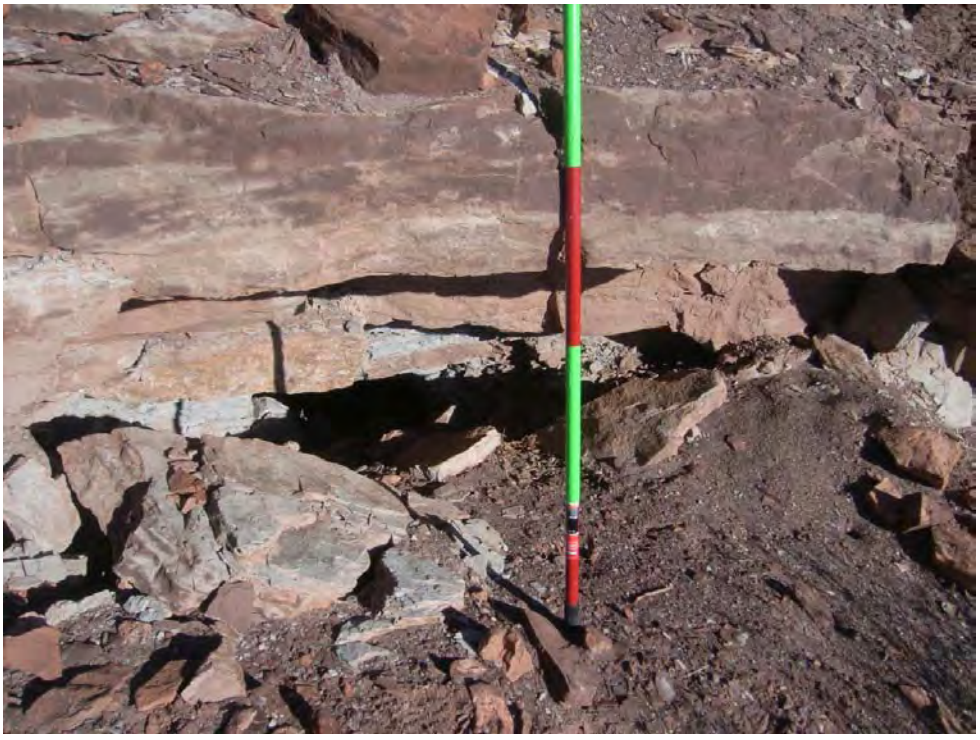


Photo 20 – Adit (adit-1), looking east.

Photo 21 – Adit (adit-1), looking north.

Photo 22 – Waste rock (pile-4), above Adit (adit-1).

Photo 23 – Waste rock (pile-4) and Adit (adit-1).

Photo 24 – Cattle tracks (wld-1), showing evidence of grazing.

Photo 25 – Waste rock (pile-5), looking east.

Photo 26 – Waste rock (pile-5), looking east.

Photo 27 – Top of ridge (pile ridge 1), looking south at fill surface.

Photo 28 – Top of ridge (pile ridge 1), looking south at fill surface.

Photo 29 – View of AUM Site, looking southeast.

Photo 30 – Waste rock (pile-6 and pile-7), looking north.

Photo 31 – Waste rock (pile-7), looking northeast.

Photo 33 – Waste rock (pile-7), close-up of rock (possible source material for uranium ore).

Photo 34 – Waste rock (pile-8), looking north.

Photo 35 – Photo of AUM Site, looking east.

Photo 38 – AUM Site, looking southeast.

Photo 39 – AUM Site, looking south.

Photo 40 – Rock outcrop forming part of base of open cut in hillside. Sandstone with approximately 7ft thick layer of limey conglomerate.

Photo 41 – Looking west into valley downgradient of the ridge where the AUM Site is located. Residential structure is visible in center of photograph, approximately 1 mile west of the AUM Site.

Photo 42 – View of AUM Site, looking south.

Photo 43 – Empty plastic tank on ridge approximately 60 yards south of AUM Site. Evidence of grazing.

Photo 45 – Above-ground storage tank located approximately 30 yards east of plastic tank.

APPENDIX B

FIELD NOTES

Site Name: NM0259, Abo Mine

Objective: Site Assessment

Personnel: Amy Andrews - INTERA
Alex Resovsky - INTERA

Equipment: Rental truck, ~~borrowed~~ rental AEA Trimble GeoXH (SN: 4712432334, PN: 60950-00, IC: 1750A-612, 2005 Series), borrowed Ludlum 19 (SN: 175926), rental GPS camera (IC: 1441-3005EW1, Ricoh Caplio 500SE-W), backup digital camera, backup GPS, cell phone amplifier, and field laptop

900 Left office for site

1020 Arrived at Abo Ruins Visitor Center. Spoke with a Forest Ranger who said that he had not heard of any uranium mines in the area, but that he thought there might be a few gates in our way, but they shouldn't be locked.

1040 Leaving Abo Ruins in search of site

1210 Arrived at parking area, above Abo Mine, on ridge, after many encounters with locked gates.

1230 H+S meeting
background gamma 10-15 uR/hr at 0ft and 10-15 uR/hr at 4ft

1245 All packed up and heading down to site

Photo 1 Site Name sign
Photo 2 Looking down on site
Photo 3 Site - Looking West

Rad 1 - above site, on slope - 0ft: 17 uR/hr, 4ft: 18 uR/hr

Photo 4 - disturbance area at N of site, from above
Photo 5 - N disturbance again
Photo 6 - Site - Looking N

Rad 2 - south side, site boundary - 0ft: 18 uR/hr, 4ft: 19 uR/hr
Rad 3 - SW boundary - 0ft: 160 uR/hr, 4ft: 35 uR/hr

Photo 7 - U bearing rock
Photo 8 - U bearing waste rock pile 1

Note: Site boundary was difficult to walk due to trees, so boundary line will need to be cleaned up in the office

Rad 4 - W site boundary - 0ft: 60 uR/hr, 4ft: 40 uR/hr pile 2
Photo 9 - pile 2, looking E
1340 Photo 10 - pile 2, looking N

Photo 11
Photo 12 } Erosion Pit 1 - looking NE
Photo 13

Erosion pit 1 - 2ft deep, 5ft N-S, 20ft E-W

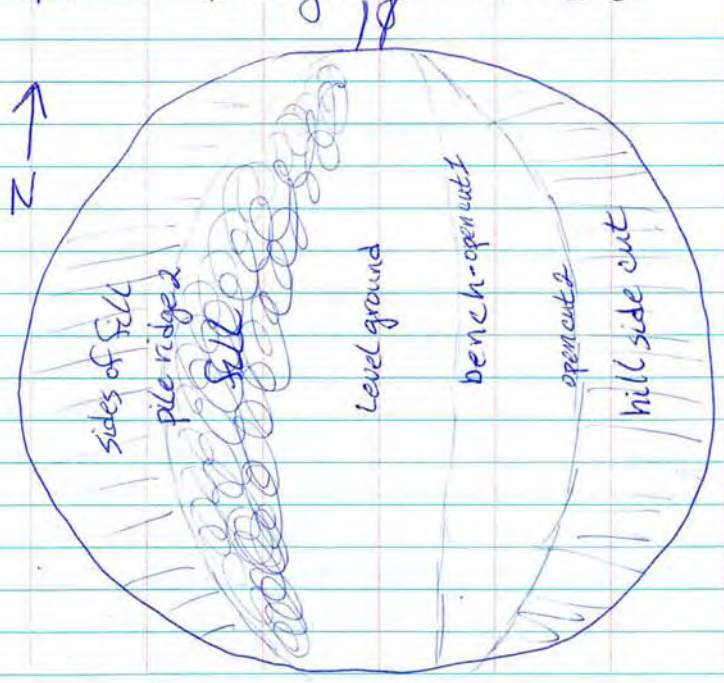
Photo 14 - cairn - looking N

Rad 5 - rock N of cairn - 0ft: 120uR/hr, 4ft: 25uR/hr

Photo 15 - U bearing rock, Rad 5

Photo 16 - pile 3, north side of site, looking E
Photo 17 - pile 3, looking S

Photo 18 - road going N from site



Open cut 1, bench in middle of site, tracing top of cut. 12 ft vertical height

Open cut 2 - bottom of hill cut, 50ft vertical

Adit 1 - N side of site, 4ft high, 5ft across
hole in top of adit opening 1ft high, 2ft wide
dirt pile in front of adit
Rad 6 - 0ft: 25uR/hr, 4ft: 20uR/hr
~~Photo 19~~ AEA

Photo 19 - Adit 1, looking E
Photo 20 - " "
Photo 21 - Adit 1, looking N

Pile 4 - above Adit 1, can't get close enough for rad reading, 10ft high, 15ft across

Photo 22 - Pile 4
Photo 23 - Pile 4 + Adit 1

Photo 24 - Cow prints, evidence of grazing

Soil is silty clay, silicic, rock armored

Pile 5 - 15ft high, 20ft x 30ft area
Rad 7 - 0ft: 60uR/hr, 4ft: 25uR/hr
Photo 25 - pile 5, looking E
Photo 26 - pile 5, looking E

Went back to formally record piles that we saw while walking the site boundary

Pile 1 - 10ft high, ~~20ft x 4ft area~~ AEA

Pile Ridge 1 - Pile 1 is part of a bench created by waste rock, bench is 30ft deep

Rad 8 - 0ft: 40 uR/hr 4ft: 25 uR/hr

Photo 27 - top of Pile Ridge 1, looking S
Photo 28 - top of Pile Ridge 1, looking S

Pile 2: 6ft hight, 10ft x 8ft area

Pile 3: 7ft high, 30ft x 10ft area

1510
Photo ~~28~~ AEA 29 - Site, looking SE

Pile Ridge 2 - main bench

~~PH~~ AEA Pile 6 - 3 ft high, 5ft x 15ft area
Pile 7 - 3ft high, boulder size limestone conglomerate 5ft x 15ft area

Photo 30 - piles 6+7, looking N

Rad 9 - pile 6 - 0ft: 60 uR/hr, 4ft: 40 uR/hr

Photo 31 - pile 7, looking NE

Rad 10 - pile 7, 0ft: 450 uR/hr, 4ft: 110 uR/hr

Photo 32 - pile 7, closeup of rock, likely the source material for the ore
Photo 33 - redo of 32, with scale

Pile 8 - 3ft high, 10ft x 5ft area

Photo 34 - pile 8, looking N
Rad 11 - pile 8 - 0ft: 140 uR/hr, 4ft: 50 uR/hr

Photo 35 - Site photo looking E

Structure 1 - length of rock wall 6ft, height 1ft potential archeological site
Photos 36-37 - structure 1

Photo 38 - site photo, looking SE
Photo 39 - " " S

Rad 12 - 0ft: 19 uR/hr 4ft: 20 uR/hr

Road 1 - N of site, heads N

1545
Rad 13 - 0ft: 20 uR/hr, 4ft: 23 uR/hr

Rad 14 - 0ft: ~~45 uR/hr~~ 160 AEA uR/hr, 4ft: 37 uR/hr

Photo 40 - rad 14 - rock outcrop sandstone w/ sandy conglomerate

Rad 15 - 0ft: 29 uR/hr, 4ft: 27 uR/hr

~~1552 - heading back to truck~~ AEA

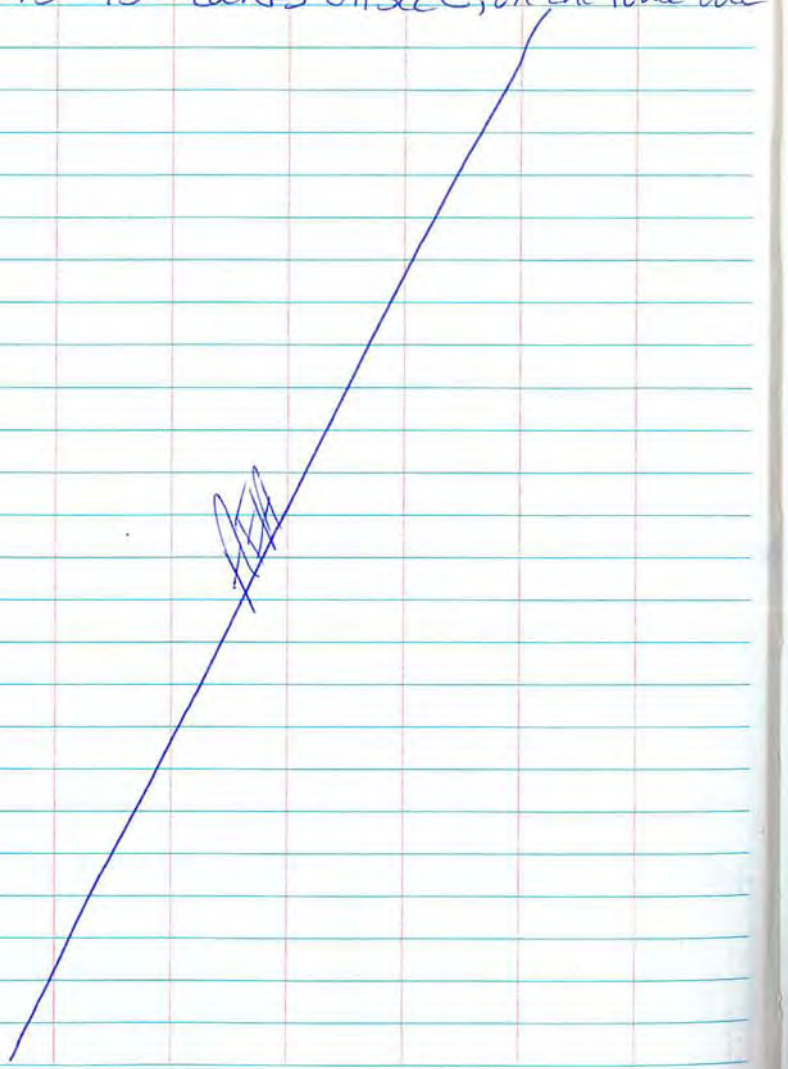
Photo 41 - evidence of residence downgradient of site
Photo 42 - site photo, looking S

11 12/17/09 AEA Abandoned Uranium Mines
1558 headed back to truck

Fence 1 - runs along upper mesa ridge, above site

1604 offsite to Abq

Photos 43-45 tanks offsite, on the route out



12/21/09 ALT Abandoned Uranium Mines 12

Site Name: NM0251, Paran Mine

Objective: Site Assessment

Personnel: Annelia Tinklenberg - INTERA
Amy Andrews - INTERA

Equipment: Rental truck, borrowed Trimble GeoXH (SN: 4712432334, PN: 60950-00, IC: 1756A-612, 2005 Series), borrowed Ludlum (SN: 175926, Model 19), rental GPS camera (IC: 1441-500SEWI, Ricoh Caplio 500SE-W), backup digital camera, backup Garmin GPS, cell phone amplifier, and field laptop

10:00 Left Albuquerque for site

13:00 Arrived at general site location and tried to determine safest access route.

14:10 Parked car and packed equipment for hike to site.
Photo 1 Site from across drainage (S-SW of the site) looking N-NE.
Photo 2 Site name from same location as photo 1. looking N-NE

14:36
~~RadAir~~
Background Rad - below site - 0ft: 10-15 uR/hr and 4ft: 10-15 uR/hr

APPENDIX C

CONFIDENTIAL ARCHEOLOGICAL FEATURES

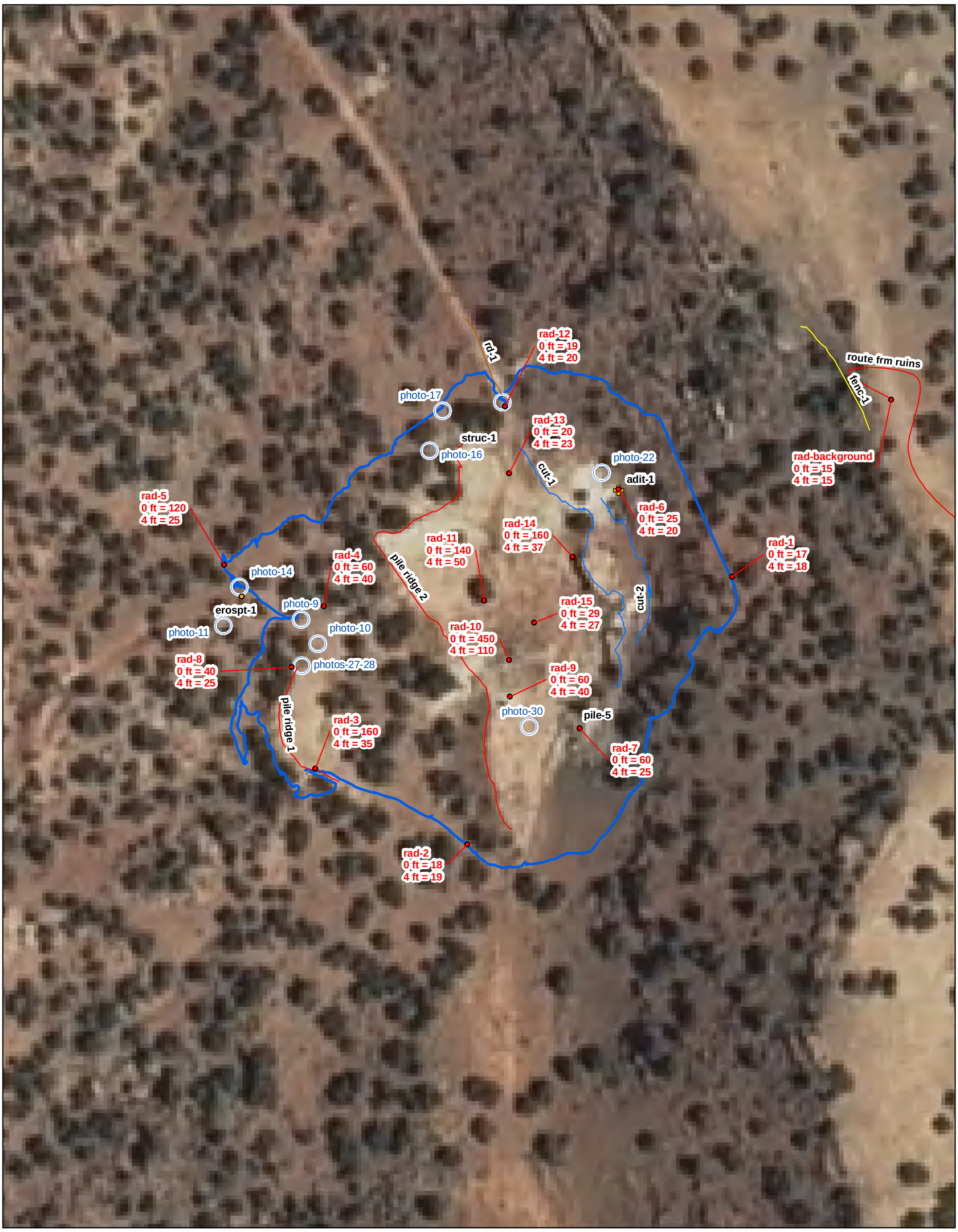
ARCHEOLOGICAL SITES

The stone structure (struc-1) found at the AUM Site may be a potential archeological site. An 8-foot length of flat sandstones has been piled into a wall-like structure on top of a large rock. The purpose of this structure is unclear.

TABLE C
SITE FEATURES

Feature Name	Feature Type	Associated Photo	Height (ft)	Width (ft)	Length (ft)	On Site?	Associated Feature	Notes
struc-1	Possible archeological structure	Photos 36-37	1	6	--	Yes	--	

Photo 36 – Structure (struc-1) possible archeological evidence.



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

0 37.5 75 150
Feet

Note: See Table 1 for Site Feature descriptions.

NORTH

Legend

- Radiation Readings (µR/hr)
- Adits
- Photo Location
- Mine Road
- AUM Boundary

Figure C-4a
Site Map
on Aerial Photo
NM0259-Abo
Abandoned Uranium
Mine Assessment

rad-12
0 ft = 19
4 ft = 20

rd-1

photo-17

rad-13
0 ft = 20
4 ft = 23

struc-1

photo-16

photo-22

cut-1

adit-1

route frm ruins

fenc-1

rad-background
0 ft = 15
4 ft = 15

rad-5
0 ft = 120
4 ft = 25

rad-6
0 ft = 25
4 ft = 20

rad-14
0 ft = 160
4 ft = 37

rad-11
0 ft = 140
4 ft = 50

rad-1
0 ft = 17
4 ft = 18

rad-4
0 ft = 60
4 ft = 40

pile ridge 2

photo-14

photo-9

erospt-1

cut-2

rad-15
0 ft = 29
4 ft = 27

photo-11

photo-10

rad-10
0 ft = 450
4 ft = 110

rad-8
0 ft = 40
4 ft = 25

photos-27-28

rad-9
0 ft = 60
4 ft = 40

photo-30

pile-5

pile ridge 1

rad-3
0 ft = 160
4 ft = 35

rad-7
0 ft = 60
4 ft = 25

rad-2
0 ft = 18
4 ft = 19

Map Source(s):
Ownership - BLM, 2007

0 37.5 75 150
Feet

Note: See Table 1 for Site Feature descriptions.

NORTH

Legend

- Radiation Readings (µR/hr)
- Adits
- Photo Location
- Mine Road
- AUM Boundary
- **Surface Ownership**
- Forest Service

Figure C-4b
Site Map with
Surface Ownership
NM0259-Abo

Abandoned Uranium
Mine Assessment