

Abandoned Mine Assessment for the Black Copper Site (NM0258)

FINAL REPORT

Prepared For:



New Mexico Energy, Minerals and
Natural Resources Department
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Prepared By:



NM0258

September 29, 2010

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1.0 INTRODUCTION

INTERA Incorporated (INTERA) has prepared this Abandoned Mine Site (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 Black Copper Site (Site), MMD ID: NM0258 on September 03, 2010.

1.1 PREVIOUSLY KNOWN INFORMATION ABOUT THE SITE

According to Anderson (1980), workings at the Site consisted of several small prospect pits and a collapsed shaft approximately 300 ft deep with three interconnecting adits, also collapsed. Remains of the headframe for the shaft and a stamp mill were also found at the site (Anderson, 1980). In addition, a 40 ft wide by 50 ft long dump pile consisting of waste rock extends south from the main workings toward Black Copper Creek (Anderson, 1980). Mineralization at the site appears to be associated with a set of shear zones containing galena, chalcopyrite, sphalerite, and chalcocite.

McLemore (1983) reported that in 1957 five tons of ore yielding three pounds of U_3O_8 at an average grade of 0.03% U_3O_8 were produced from the site. Production may have been associated with a radioactive gold-silver vein within Precambrian granite near a fault contact with Tertiary volcanic rocks (McLemore, 1983).

1.2 SITE LOCATION AND DIRECTIONS

The Black Copper Site is located on a tract of private land within the Carson National Forest, in the northwest quarter of Section 29, Township 28 North, Range 15 East. This Site is located in Taos County and is approximately 5 miles south of the town of Red River.

To reach the 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, continue north onto NM-68 N toward Taos. Follow NM-68 N 45 miles, and continue through Taos onto US-64 W. Continue straight onto NM-522 N where it joins US-64 W about 4 miles north of Taos. Follow NM-522 N 20 miles north to Questa and turn right onto NM-38 E to Red River. Continue south from Red River onto NM-578 E about 5 miles and turn left onto Black Copper Canyon Rd. Continue approximately 0.8 miles up this road until it ends at a locked gate. The Site can be accessed on foot from here by following this road approximately 500 feet further up the canyon. Permission to enter beyond the locked gate must be obtained from the landowner.

1.3 SITE GEOLOGY

The Site is located in the middle Sangre de Cristo Mountains, which are formed by an upthrown fault block composed of Precambrian granite, gneiss, schist, quartzite, and pegmatite (McLemore, 1989). Uranium mineralization at the site location may occur within epithermal

veins associated with faulting between the Precambrian granite country rock and Tertiary volcanic and intrusive rocks (McLemore, 1989).

1.4 SITE HYDROGEOLOGY

The Site is located on the northern rim of Black Copper Canyon. Surface runoff at the site drains into Black Copper Creek, which joins Red River approximately 0.9 miles northwest of the site. Red River joins the Rio Grande approximately 18 miles west of the Site.

The Site is located along the eastern boundary of the Taos Water Planning Region (Daniel B. Stephens & Associates, Inc., 2008). The area surrounding the Site is comprised of Precambrian crystalline rocks overlain by Quaternary alluvial deposits. Most groundwater in the area is contained within shallow alluvial sediments along stream valleys. Groundwater flow at the vicinity of the Site follows surface flow, generally to the northwest (Daniel B. Stephens & Associates, Inc., 2008).

1.5 REGIONAL TOPOGRAPHY AND TERRAIN

The Site can be found on the Red River Pass Quadrangle 7.5 minute United States Geological Survey topographic map at an elevation of approximately 9,550 feet above mean sea level (please see Figure 2). The Site is located along the northern rim of Black Copper Canyon, a steep side canyon of the Red River valley, to the west. Figure 3 shows an aerial photograph of the terrain surrounding the 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 Site features using a Trimble Global Positioning System (GPS), and entered details about the features into the GPS using the MMD data dictionary. Four waste piles, four structures, one shaft, and one adit were found onsite. Please see the Photo Log in Appendix A for photos of the Site features, Table 1 for a list of the Site features, and Figures 4a and 4b for the locations of the Site features.

2.1 MINE SHAFTS, ADITS, AND DECLINES

One shaft (ShaftPly-1) and one adit (Adit-1) were found at the Site. The shaft was capped by a 15 ft wide and 20 ft long concrete slab at the surface (see Photo 12 in Appendix A). Adit-1 is approximately 30 feet east of ShaftPly-1 and its opening measures approximately 4 ft high by 5 ft wide. Gamma radiation for these features did not vary significantly above background levels.

2.2 MINING AND EXPLORATION PITS AND OPEN CUTS

No open cuts or mining pits were identified at the Site.

2.3 WASTE AND ORE PILES AND DISTURBANCES

Three waste piles (PilePly-1, -2 and -3) and a debris pile (DumpPly-1) were found at the Site. PilePly-1 extends down slope to the south of StrucPly-1 (see Photo 6 in Appendix A). This pile consists of waste rock and is approximately 20 ft wide, 50 ft long and 1 ft high. PilePly-2 consists of waste rock and is approximately 100 ft wide, 150 ft long and 2 ft high. This pile covers the slope to the south of ShaftPly-1 and StrucPly-2 (see Photo 9 in Appendix A). PilePly-3 is a smaller waste rock pile located up slope of these features and is approximately 4 ft tall, 10 ft wide and 20 ft long (see Photo 15 in Appendix A). DumpPly-1 is a pile consisting of construction debris found at the bottom of the slope below StrucPly-2 (see Photo 10 in Appendix A). Gamma radiation for these features did not vary significantly above background levels.

2.4 MINING RELATED BUILDINGS AND FOUNDATIONS

Four mining related structures (StrucLn-1, StrucPly-1, -2, and -3) were found onsite. StrucPly-1 is a 25 ft-tall stamp mill, approximately 25 ft wide and 30 ft long (see Photos 1-6 in Appendix A). StrucLn-1 is a partially collapsed wooden wall that is approximately 5 ft high, 1 ft wide and 35 ft long (see Photo 13 in Appendix A). StrucPly-2 is a collapsed wooden structure southwest of ShaftPly-1, possibly the headframe associated with the shaft (see Photo 10 in Appendix A). StrucPly-3 is a concrete support structure measuring approximately 2 ft tall, 5 ft wide and 6 ft long located northwest of ShaftPly-1 (see Photo 14 in Appendix A).

2.5 OTHER MINE FEATURES

Two mine roads (Rd-1, Rd-2) exist at the Site. These roads extend to the southeast from the main access trail up Black Copper Canyon (Access-1), approximately 1,000 feet from the gated entrance to the property. Rd-1 is an old mine road leading up to the main excavation features and associated structures. Rd-2 is located below the mine features and runs along the base of PilePly-1 and PilePly-2.

2.6 BOREHOLES

No boreholes were evident at the Site.

2.7 RECLAMATION ACTIVITIES

ShaftPly-1 is capped by a concrete block. Two other adits onsite were reportedly backfilled. These closures were put in place in 2000 (Rodarte, 2010).

3.0 ARCHEOLOGICAL SITES

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

4.0 SITE GAMMA RADIATION READINGS

The background gamma radiation readings at the Site were measured approximately 1,500 feet from the Site. The background gamma level was measured at 13 $\mu\text{R/hr}$ (microroentgens per hour) at the ground surface and 12 $\mu\text{R/hr}$ at 4 feet above the ground surface. Please see Table 2 for all of the gamma radiation readings taken at the Site.

The gamma radiation readings at the Site did not vary significantly above background levels.

5.0 CURRENT LAND USES

5.1 HUMAN ACTIVITY AND RECREATIONAL SITE USE

The Site is privately owned and not open to the general public. MMD occasionally visits the site to monitor reclamation activities.

5.2 NEARBY RESIDENTIAL, COMMERCIAL AND INDUSTRIAL STRUCTURES

Several private homes are located within a mile of the Site, along NM-578 E and along Black Copper Canyon Road (Access-1) (see Figure 3).

5.3 NEARBY DOMESTIC WELLS

Forty three domestic wells lie within 1 mile of the Site. These domestic wells were drilled from 1976 to 2007 and range in depth from 42 to 420 feet below ground surface with a depth to water of 0 to 108 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 site.

5.5 EVIDENCE OF WILDLIFE

Grouse and several other species of birds were seen near the Site. Rabbit, deer, and bear droppings were also observed.

6.0 VEGETATION

The Black Copper 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. Grass species included indian woodoats. 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 the Site.

7.2 ENVIRONMENTAL IMPACTS

There is no evidence of soil staining from chemicals potentially brought to the 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.
- Dick–Peddie, William A, 1999. New Mexico Vegetation: Past, Present, and Future. University of New Mexico Press.
- 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 Resources 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.
- Daniel B. Stephens & Associates, Inc., 2008. Taos Regional Water Plan. Prepared for Taos Regional Water Planning Steering Committee.
- Raymond Rodarte, 2010. New Mexico Energy, Minerals and Natural Resources Department, Mining and Minerals Division. Personal communication, August 26, 2010.

TABLES

**Table 1
Site Features**

**Black Copper-NM0258
Abandoned 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 Maintained	--	--	--	--	--	--	--	--
Adit-1	Yes	--	--	--	4	5	--	Yes	No	--	NM0258_011	looking southeast
DumpPly-1	Yes	Historic	--	--	1	15	20	--	--	--	NM0258_008	looking east
PilePly-1	Yes	Waste	--	Rock	1	20	50	--	--	--	NM0258_007	looking south
PilePly-2	Yes	Waste	--	Rock	2	100	150	--	--	--	NM0258_009	looking southeast
PilePly-3	Yes	Waste	--	Rock	4	10	20	--	--	--	NM0258_015	looking northwest
Rd-1	Yes	Dirt	--	Dirt Nonmaintained	--	--	--	--	--	--	--	--
Rd-2	Yes	Dirt	--	Dirt Nonmaintained	--	--	--	--	--	--	NM0258_016	looking southeast
ShaftPly-1	Yes	Main	Headframe	--	0	15	20	No	--	Capped	NM0258_012	looking east
StrucLn-1	Yes	Wall	--	Wood	5	1	35	--	--	--	NM0258_013	looking north
StrucPly-1	Yes	Mill	--	Wood	25	25	30	--	--	--	NM0258_001 NM0258_002 NM0258_003 NM0258_004 NM0258_005 NM0258_006	looking south, west, east, north, north, northwest
StrucPly-2	Yes	Headframe	--	Wood	6	20	30	--	Yes	--	NM0258_010	looking north; collapsed
StrucPly-3	Yes	--	--	Concrete	2	5	6	--	--	--	NM0258_014	looking east

Notes:

-- designates no information



Table 2
Gamma Radiation Survey Results

Black Copper-NM0258
Abandoned Mine Assessments

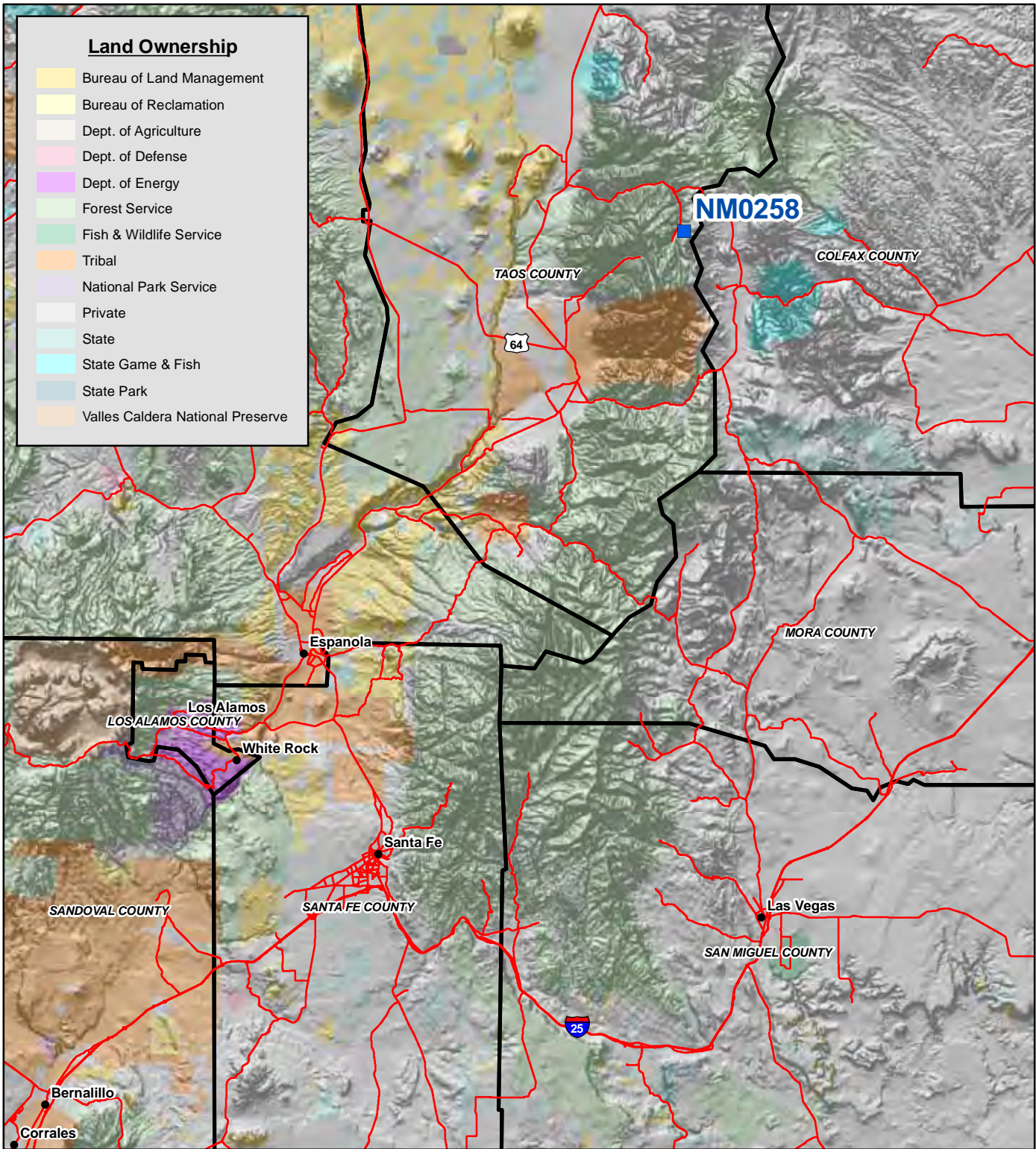
Reading ID	Associated Features	0 ft ($\mu\text{R/hr}$)	4 ft ($\mu\text{R/hr}$)	Associated Photos
Rad-1	strucply-1	11	10	--
Rad-2	strucply-1	12	11	--
Rad-3	pileply-1	14	13	--
Rad-4	pileply-1	15	13	--
Rad-5	dumpply-1	15	14	--
Rad-6	pileply-2	16	14	--
Rad-7	pileply-2	16	14	--
Rad-8	strucply-2	15	13	--
Rad-9	adit-1	22	17	--
Rad-10	strucIn-1	11	11	--
Rad-11	pileply-3	12	12	--
Rad-12	--	12	12	--
RadBack-1	--	13	12	--

Notes:

All gamma readings at this site taken by Ludlum 192 μR /Ratemeter
 $\mu\text{R/hr}$ =microroetgens per hour
 -- designates no information



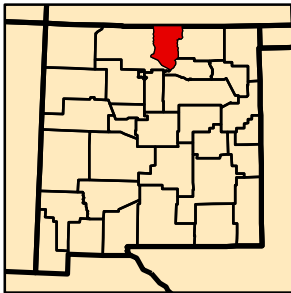
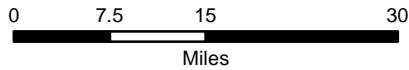
FIGURES



Land Ownership

Yellow	Bureau of Land Management
Light Yellow	Bureau of Reclamation
Light Orange	Dept. of Agriculture
Pink	Dept. of Defense
Purple	Dept. of Energy
Light Green	Forest Service
Green	Fish & Wildlife Service
Orange	Tribal
Light Purple	National Park Service
White	Private
Light Blue	State
Cyan	State Game & Fish
Blue	State Park
Dark Orange	Valles Caldera National Preserve

Map Source(s):
Ownership - BLM, 2008

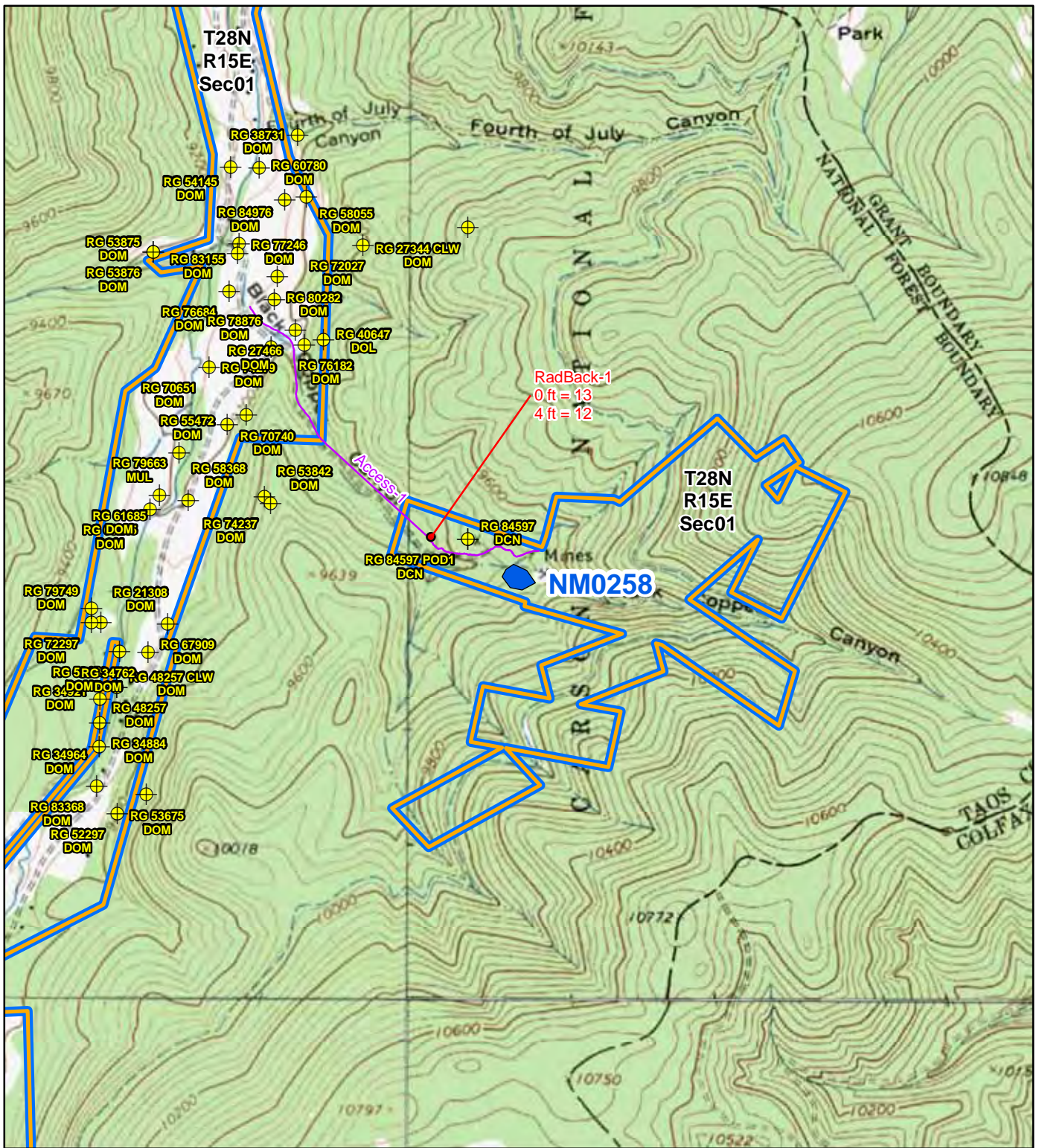


Legend

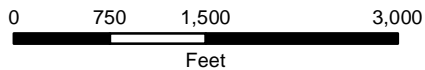
Blue square	Mine Location
Red line	Road
Black outline	County Boundary

Figure 1
Site Location Map
NM0258-Black Copper
Abandoned Mine
Assessment





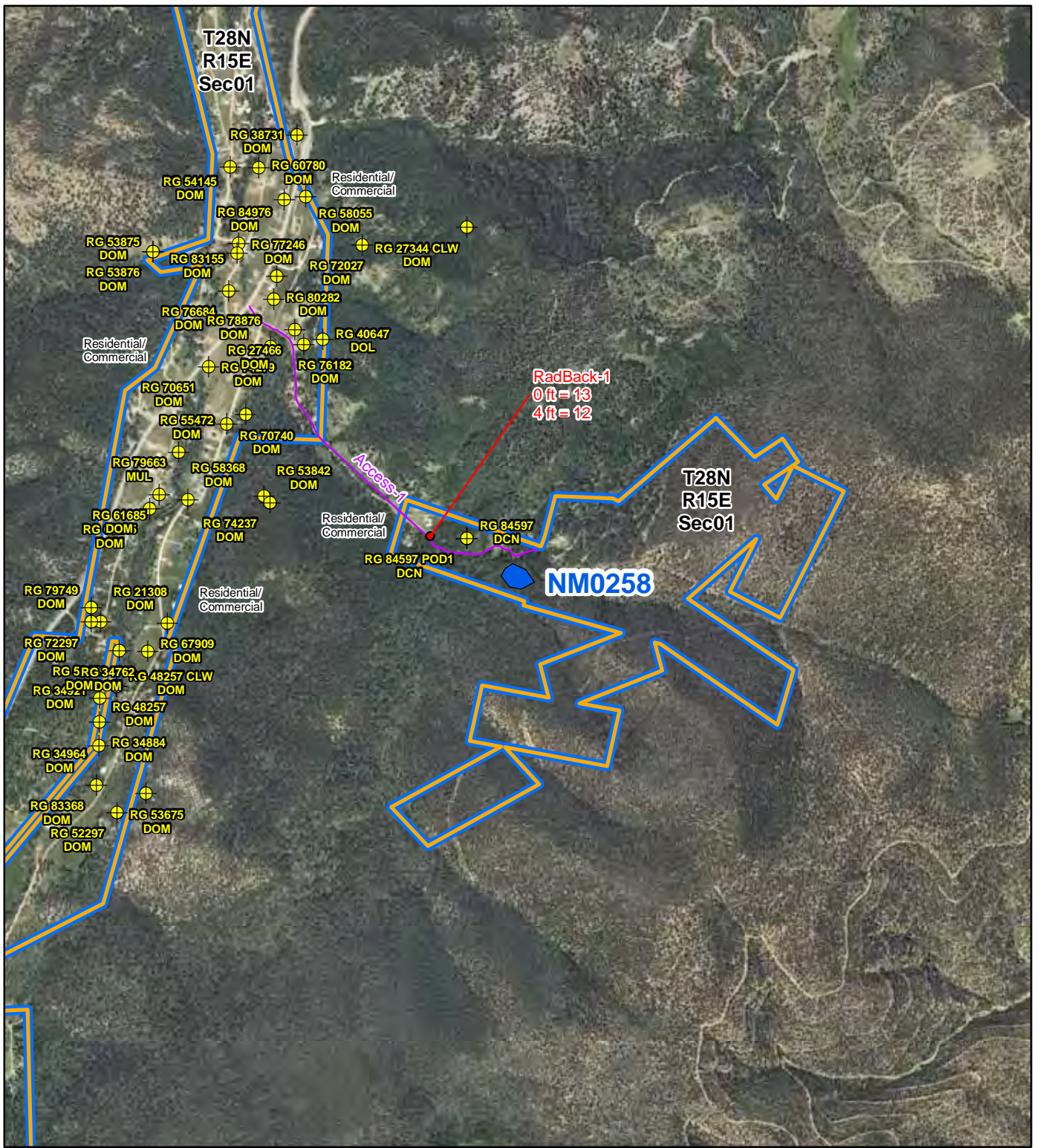
Map Source(s):
 U.S. Geological Survey 7.5-Minute
 Topographic Map
 -Eagle Nest, 1963
 -Red River, 1963
 -Red River Pass, 1963
 -Wheeler Peak, 1963



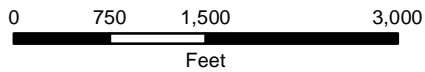
Legend

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

Figure 2
Topographic Map
NM0258-Black Copper
 Abandoned Mine
 Assessment



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



Legend

● Radiation Readings ($\mu\text{R/hr}$)	Location Boundary (MMD Provided)
⊕ Well Within 1 Mile of Site	Section Boundary
— Access Route	Township/Range Boundary

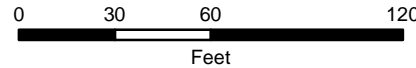
Figure 3
Aerial Photo
NM0258-Black Copper
 Abandoned Mine
 Assessment





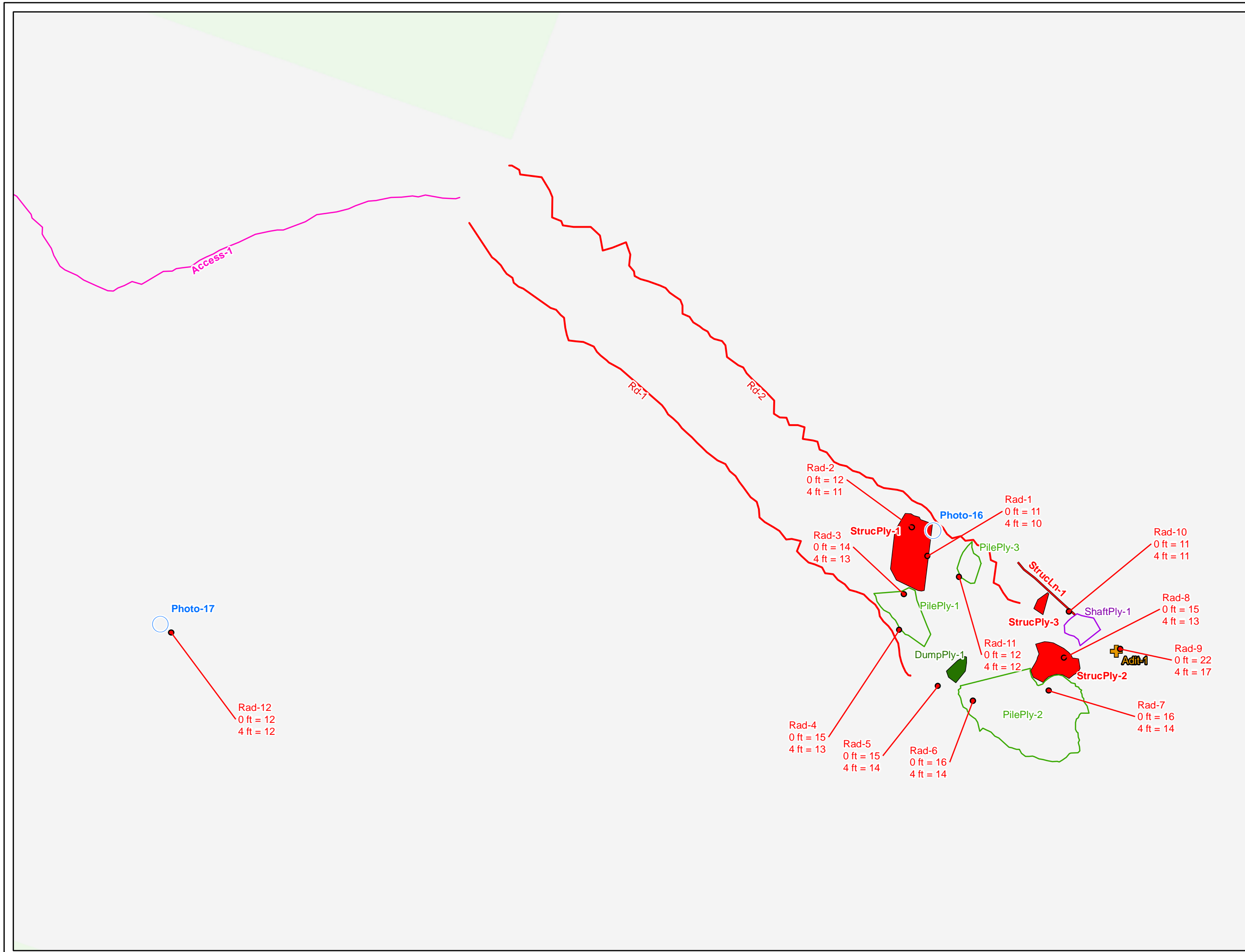
Legend

- Radiation Readings ($\mu\text{R/hr}$)
- Photo Location
- ⊕ Adit
- Mine Road
- Access Route
- Structure
- Pile Boundary
- Shaft Boundary
- Dump Boundary
- Structure Boundary



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

Figure 4a
Site Map on
Aerial Photo
NM0258-Black Copper
 Abandoned Mine
 Assessment

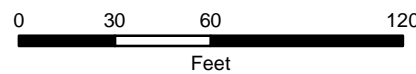


Legend

- Radiation Readings (μR/hr)
- Photo Location
- ⊕ Adit
- Mine Road
- Access Route
- Structure
- ▭ Pile Boundary
- ▭ Shaft Boundary
- ▭ Dump Boundary
- ▭ Structure Boundary

Surface Ownership

- ▭ Forest Service
- ▭ Private



Map Source(s):
Ownership - BLM, 2008

Figure 4b
Site Map with
Surface Ownership
NM0258-Black Copper
 Abandoned 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-Looking south at StrucPly-1, the stamp mill in Anderson photo A.



Photo 2-Looking west from Rd-2 at StrucPly-1, the stamp mill in Anderson photo A.



Photo 3-Looking east from Rd-1 at StrucPly-1, the stamp mill in Anderson photo A.



Photo 4-Looking north at StrucPly-1, the stamp mill in Anderson photo A.



Photo 5-Looking north at StrucPly-1, the stamp mill in Anderson photo A.



Photo 6-Looking northwest at StrucPly-1, the stamp mill in Anderson photo A.



Photo 7-Looking south at PilePly-1.



Photo 8-Looking east at DumpPly-1.



Photo 9-Looking southeast at PilePly-2.



Photo 10-Looking north at StrucPly-2.



Photo 11-Looking southeast at Adit-1, replicating Anderson photo E.



Photo 12-Looking east at ShaftPly-1.



Photo 13-Looking north at StrucLn-1.



Photo 14-Looking east at StrucPly-3.



Photo 15-Looking northwest at PilePly-3.



Photo 16-Looking south at Rd-2; site location photo.



Photo 17-Looking east from center of MMD polygon.



Photo 18-Vegetation at the Site.



Photo 19-Vegetation at the Site.



Photo 20-Vegetation at the Site.



Photo 21-Vegetation at the Site.



Photo 22-Vegetation at the Site.



Photo 23-Vegetation at the Site.

APPENDIX B
FIELD NOTES

55 9/3/10 ALT Abandoned Uranium Mines

Site Name: NMO258, Black Copper

Objective: Site Assessment

Personnel: Annelia Tinklenberg
Alex Resovsky

Equipment: Rental truck, Trimbel Geo XM (SN: 494844727, 2008 Series), Ludlum 192 (SN: 234149), Fuji film digital camera (No. OTB31259), backup Garmin GPS, cell phone amplifier, field laptop

700 ^{ALT}
~~700~~ Leaving Red River

720 Meeting up with Richard Holmes of the Forest Service.
Hiking in. 575-586-0520

750 At the AUM site.

Struct-1 - old Stamp Mill, last standing Stamp Mill in New Mexico. 25' tall, 25' wide, 30' long

Photo-1 - Struct-1 looking south

Photo-2 - Struct-1 looking ^{West} ~~South~~ ^{ALT} from Mine Rd-2

Photo-3 - Struct-1 looking east from Mine Rd-1

Photo-4 - Struct-1 looking north

Photo-5 - Struct-1 looking north

Photo-6 - Struct-1 looking ~~South~~ ^{ALT} north west

Mine Rd-1 - Below Struct-1 runs north-south

Rad-1 - Struct-1; Om-11 uR/h; Im-10 uR/h

Rad-2 - Struct-2; Om-12 uR/h; Im-11 uR/h

Pile Ply-1 - 1' deep, 20' wide, 50' long; 50° slope; below stamp mill

Photo 7 - Pile Ply-1 looking south

9/3/10 ALT Abandoned Uranium Mines

56

Rad 3 - Pile Ply-1; Om-14 uR/h; Im-13 uR/h

Rad 4 - Pile Ply-1; Om-15 uR/h; Im-13 uR/h

Dump Ply-1 - 1' high, 15' wide, 20' long; wood and steel pipe

Photo 8 - Dump Ply-1 looking east

Rad 5 - Dump Ply-1; Om-15 uR/h; Im-14 uR/h

Pile Ply-2 - 2' tall, 100' wide; 150' long, 50° slope waste rock below main shaft

Photo 9 - Pile Ply-2 looking southeast

Rad 6 - Pile Ply-2; Om-16 uR/h; Im-14 uR/h

Rad 7 - Pile Ply-2; Om-16 uR/h; Im-14 uR/h

Struct-2 - Headframe, collapsed; 6' high, 20' wide, 30' long

Photo 10 - Struct-2, looking north

Rad 8 - Struct-2; Om-15 uR/h; Im-13 uR/h

Adit-1 - southeast, 4' high; 5' wide, unknown length

Photo 11 - Adit-1 looking southeast

Rad 9 - Adit-1; Om-22 uR/h; Im-17 uR/h

Shaft Ply-1 - sealed cement pad is 15' wide, 20' long; unknown depth

Photo 12 - Shaft Ply-1 looking east

StructIn-1 - timber and steel wall; 5' tall, 1' wide, 35' long

Photo 13 - StructIn-1 looking north

Rad 10 - StructIn-1; Om-11 uR/h; Im-11 uR/h

Struct Ply-3 - foundation support, cement; 2' tall, 5' wide, 6' long

Photo 14 - Struct-3 looking east

~~Rad 11 - Struct-3; Om- uR/h; Im- uR/h~~ ALT

Pile Ply-3; 4' tall, 10' wide, 20' long, 25° slope

Photo 15 - Pile Ply-3 looking northwest

Rad 11 - Pile Ply-3; Om-12 uR/h; Im-12 uR/h

Mine Rd-2 - from shaft

~~900~~ 1040 Photo 16 - Mine Rd-2 and site ID location looking south

Rad 12 - Om-12 uR/h; Im-12 uR/h

Photo 17 - center of MMD polygon looking east

57 9/3/10 ACT Abandoned ^{ACT} Uranium Mines

Background Rad - 0m - 13 μ R/h; 1m - 12 μ R/h

Photos 18-23 - Vegetation

Access Rd - 1

1100 Leaving site

E. Neal Holden 918-288-7466

505-754-2287 summer phone

↳ wrote historical report about the Black Copper Mine

Rush Pierce → wrote document about a ditch that runs ~ 42 miles, above the mine site.

Soils: Yellow-tan to red sandy soils. Rocky and thin.

Rocks: Tan and pink granites. Intrusive gray to black dikes.

Wildlife: Small birds, two grouse, rabbit and deer droppings. Bear scat.

Human Activities: Historical mining, summer homes nearby.

