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RE: Uranium Recovery GEIS; Draft GEIS Comments

Dear Chief:

Enclosed are the Southwest Research and Information Center's ("SRIC"), the Bluewater Valley Downstream Alliance's ("BVDA"), Eastern Navajo Diné Against Uranium Mining's ("ENDAUM") and the Haaku Water Office of the Acoma Pueblo's ("Haaku Water Office"), comments on Nuclear Regulatory Commission's Draft Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities, NUREG-1910 ("GEIS") in electronic format on a compact disk. Hardcopies of these comments will follow by U.S. mail, first class. If you have any questions, please do not hesitate to contact me.

Sincerely,

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Dear Chief:

The Southwest Research and Information Center ("SRIC"), the Bluewater Valley Downstream Alliance ("BVDA"), Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and the Haaku Water Office of the Acoma Pueblo ("Haaku Water Office"), and with the support of the undersigned organizations and individuals, hereby submit the following comments on Nuclear Regulatory Commission's Draft Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities, NUREG-1910 ("GEIS").

I. Introduction

The Nuclear Regulatory Commission's ("NRC") draft GEIS is grossly deficient and violates the National Environmental Policy Act of 1969 ("NEPA"), the Council on Environmental Quality ("CEQ") regulations and guidance on NEPA, and the NRC's own regulations implementing NEPA. The draft GEIS violates NEPA, CEQ regulations and guidance, and NRC regulations in a number of ways. Most important, issuing the draft GEIS before adopting regulations governing ISL operations clearly violates NEPA and

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appears to be nothing more than a way to expedite the NRC's licensing process. The NRC also violates NEPA in other fundamental ways, including, but not limited to, failing to address regional cumulative impacts, failing to evaluate in any meaningful way mitigation measures and failing to address reasonable alternatives. By ignoring significant environmental impacts both past and present from an industry that has yet to fully clean up its pollution, the draft GEIS represents a significant, if not complete, abdication of the NRC's responsibility to carefully evaluate the environmental impacts of uranium mining. Equally important, the GEIS' substantial deficiencies have robbed the public of its opportunity to meaningfully participate in the NEPA process because its environmental analyses are so thin as to be meaningless. Because the GEIS's failures are so broad and deep, the NRC must withdraw the draft GEIS and start the scoping and drafting process again from the beginning.

II. Factual Background

On July 24, the U.S. Nuclear Regulatory Commission published a Notice of Intent ("NOI") to publish a Generic Environmental Impact Statement for Uranium Milling Facilities ("GEIS") in the Federal Register. 72 Fed. Reg. 40344 (July 24, 2007). The GEIS purports to assess the potential "generic" impacts of in-situ leach ("ISL") milling in the "western United States" and the impacts of alternative methods of uranium recovery, including conventional milling. *Id.* at 40,444 – 40,345. The Draft GEIS was issued on July 28, 2008. *Notice of Availability of Draft Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities*, 73 Fed. Reg. 43795 (July 28, 2008). The NRC held a series of public hearings in Nebraska, Wyoming and New Mexico. *See*, http://www.nrc.gov/materials/fuel-cycle-fac/licensing/geis.html#schedule.

Representatives from SRIC, ENDAUM, BVDA, the Haaku Water Office and the New Mexico Environmental Law Center provided oral comments at the hearings in Gallup, Grants, and Albuquerque, New Mexico. The following comments are intended to supplement, advance and incorporate by reference those comments.

III. The NRC Must Promulgate ISL Regulations Before Issuing an ISL GEIS.

The GEIS's stated purpose is to "improve the efficiency of NRC's environmental reviews for ISL license applications" under NEPA. GEIS at 1-1. However, issuing the GEIS before the NRC has any regulations that apply specifically to ISL operations violates NEPA and places already polluted communities at further risk of environmental contamination.

Currently, the NRC has no regulatory framework that specifically addresses ISL operations. The Commission has acknowledged this fact on several occasions. In *Hydro Resources, Inc.*, the Commission stated:

> We agree with the Presiding Officer's general conclusion that section 40.31(h) and Part 40, Appendix A, "were designed to address the problems related to mill tailings and not problems related to injection mining." In passing the Uranium Mill Tailings Radiation Control Act (UMTRCA), Congress sought to address the potential harm arising from unregulated uranium tailings piles left at milling sites. Likewise, when the NRC promulgated regulations to implement UMTRCA, it did so with the primary focus of ensuring the control of tailings at sites involving conventional mining and milling. While, as a general matter, Part 40 applies to ISL mining, some of the specific requirements in Part 40, such as many of those found in Appendix A, address hazards posed only by conventional uranium milling operations, and do not carry over to ISL mining. **In amending the requirements in Part 40 over the years, NRC has refrained from addressing issues specific to ISL mining and, instead, has generally addressed tailings from conventional operations.**
>
> ....

> We agree that those requirements in Part 40, such as many of the provisions in Appendix A, that, by their own terms, apply only to conventional uranium milling activities, cannot sensibly govern ISL mining. At the same time, there are a number of general safety provisions in Part 40, Appendix A, such as Criteria 2, 5A, and 9, that are relevant to ISL mining and, as such, have been appropriately reflected in the license. **The current version of Part 40 specifically addresses ISL mining only to a limited extent.**
>
> .....
>
> Until the Commission develops regulatory requirements specifically dedicated to the particular issues raised by ISL mining, we will have no choice but to follow the **case-by-case** approach taken by our Staff in issuing HRI's license.

Id., CLI-99-22, 50 NRC 3, 8-9 (1999) (emphasis added). This gaping regulatory hole creates significant problems for the NRC Staff. In considering a new Part 41 regulatory framework governing ISL operations, the Commission explained the impetus in considering new regulations for ISL:

> Regulating the ISL facilities in the absence of specific regulatory requirements for ISL recovery activities has become increasingly problematic and more complicated for the staff, which has relied heavily on guidance documents and license conditions in this area, as the recovering uranium production industry seeks to expand ISL facility production and submits new applications for additional facilities.

Draft Rulemaking Plan: Domestic Licensing of Uranium and Thorium Recovery Facilities – Proposed New 10 CFR Part 41, SECY-99-11 at 2 (Jan. 15, 1999)[1]. In particular, the current Part 40 regulations do not provide for groundwater protection, specific to ISL mining. *Id.*, *Draft Rulemaking Plan,* at 2. In sum, the NRC has been regulating new technology under an old regulatory framework – in essence trying to put a square peg into a round hole. *Id.*

[1]The proposed Part 41 regulations were never promulgated.

Additionally, while NEPA goes beyond the requirements of the Atomic Energy Act ("AEA"), the concerns of the two statutes overlap. *Limerick Ecology Action v. NRC,* 869 F.2d 719, 730 (3 rd Cir. 1989), citing *Citizens for Safe Power, Inc. v. NRC,* 524 F.2d 1291, 1299 (D.C. Cir. 1975). Indeed, by setting minimal requirements for the safe operation of nuclear facilities, including ISL operations, the AEA, NEPA and NRC implementing regulations establish the NRC's first line of defense against environmental risks. *Citizens for Safe Power,* 524 F.2d at 1298-99 (holding that AEA requirements may not be viewed "separate and apart" from NEPA requirements).

In order to be compliant with *Limerick Ecology Action* and *Citizens for Safe Power,* every NRC EIS has or should have a section that addresses the question of whether the proposed action will comply with NRC regulations for protection of public health and safety. In the case of a generic environmental impact statement, where environmental impacts of an entire class of facilities are evaluated, it is particularly important that the EIS be able to address regulatory compliance issues on a generic rather than *ad hoc* basis.

Thus, for example, the GEIS for renewal of nuclear power plant licenses contains various sections which address the question of whether nuclear plants will comply with NRC regulations during their license renewal term. NUREG-1437, *Final Generic Environmental Impact Statement for Renewal of Nuclear Power Plant Licenses* (1996) ("License Renewal GEIS"). In § 3.8.1.9, for example, the License Renewal GEIS evaluates radiation doses to the public during nuclear power plant license renewal terms, comparing them to the radiation dose limits in Appendix I to 10 C.F.R. Part 50. *Id.* at 3-41. Similarly, the GEIS for decommissioning of nuclear facilities evaluates the impacts of decommissioning nuclear facilities against several proposed alternative regulatory schemes. *NUREG-0586, Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* (1988). Finally, NUREG-0706, the last GEIS to address uranium milling impacts prior to the Draft GEIS, discusses the environmental impacts of uranium milling under a range of alternative schemes for regulating them. *NUREG-0706, Final Generic Environmental Impact Statement on Uranium Milling* at 3 (1980).

In contrast, the Draft GEIS admits that the NRC does not have a clear set of regulations for the protection of public health and safety from ISL mines. With respect to aquifer restoration — the most significant and potentially devastating environmental impact of ISL uranium mining — the Draft GEIS states that:

> NRC's restoration standards are found in Appendix A to 10 CFR Part 40, and NRC historically has supplemented these regulatory standards through the use of guidance documents and conditions in NRC-issued licenses for ISL facilities. [NRC is currently engaged in a rulemaking that would clarify the requirements for groundwater protection at ISL mines.]

Id. at 2-26. In fact, Appendix A to Part 40 does *not* have restoration standards for ISL mines; those standards have historically been imposed through license conditions, with reference to non-binding NRC guidance documents. *See, Final Cited Brief for Federal Respondents* at 6-7, *ENDAUM et. al. v. NRC et. al.*, U.S. Court of Appeals for the 10th Circuit, No. 07-9505 (Nov. 19, 2007); SECY-99-11, *Draft Rulemaking Plan* at 2, n.2. Thus, the NRC has no regulatory basis against which to assess the environmental impacts of ISL mines. It does not even have a set of proposed alternative regulatory schemes that could be used as a basis for a comparison of environmental impacts, as was the case with NUREG-0706. Because the fundamental basis for an environmental analysis of regional

ISL operations — a regulatory framework — is missing, the NRC must withdraw the Draft GEIS, promulgate regulations governing ISL operations and begin the NEPA process for a new GEIS, if necessary.

IV. <u>Most Environmental Impacts from ISL Operations are Site-Specific and May Not be Analyzed Generically.</u>

Although programmatic environmental evaluations are acceptable and encouraged in some circumstances, because ISL operations take place in hydrogeologic environments that often vary wildly over a relatively small area, many of the environmental impacts of ISL operations cannot be reasonably evaluated in a region-wide generic manner.

Generally, programmatic environmental impact statements are used to evaluate the broad and common impacts of a proposed federal action. When a more detailed site-specific environmental analysis is required, site-specific EISs are "tiered" off the programmatic EIS. The Council on Environmental Quality regulations describe "tiering" as:

> the coverage of general matters in broader environmental impact statements with subsequent narrower statements or environmental analyses incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared.

40 C.F.R. 1508.28. However, general environmental impact discussions from programmatic EISs are not appropriate for site-specific environmental impact statements or environmental assessments when there are significant and important site-specific environmental issues. *Natural Resources Defense Council v. NRC*, 606 F.2d 1261, 1270 n.32 (D.C. Cir. 1979). In this case, there are four impact areas that cannot be evaluated generically: groundwater, surface water, socioeconomics, radioactive air emissions, and environmental justice.

A. Groundwater Impacts Can Only be Reasonably Evaluated in Site-Specific Environmental Impact Statements.

In its description of the affected environment, the NRC offers only a broad description of the regional hydrogeology in northwestern New Mexico. GEIS § 3.5.4.3.1, pp. 3.5-18 – 3.5-21. At the same time, however, the information provided in the GEIS implicitly acknowledges local variability. *See, e.g.*, GEIS at 3.5-20, lines 44-45 (Crownpoint groundwater concentrations of TDS vary from 281 mg/L to 3180 mg/L). This implicit acknowledgement and the discussion at VI.C.3-4, below, demonstrate that local hydrogeology is highly variable and cannot be reasonably discussed in a generic manner. The importance of site-specific information is illustrated by the Nebraska Department of Environmental Quality's ("NDEQ") comments on Crow Butte Resources' proposed North Trend Expansion to its Crow Butte Nebraska ISL operation. *NDEQ Technical Review of Aquifer Exemption Petition for North Trend Expansion,* Attachment A. There, Crow Butte Resources provided only gross regional formational hydrogeological information to support its North Trend Expansion, much like the NRC has provided in the GEIS. *Id.* at 1. However, NDEQ found this information inadequate, and required site-specific hydrological, geological, and geochemical data, even though the proposed expansion was only 1 ½ miles from the existing Crow Butte ISL mine. *Id.* at 1-2.

In addition to local hydrogeological variability, how local water uses will interact with local hydrogeology cannot be evaluated generically. The number of private and municipal wells in use nearby a proposed site and how the groundwater consumption from those wells affects the local hydrological gradient are considerations that cannot be evaluated generically.

Moreover, as demonstrated in Section VI.C.7, no commercial ISL operation has ever fully restored groundwater quality to pre-mining conditions. Because irreversible groundwater contamination is an expected impact from ISL operations, this impact is "significant" and must be analyzed in site-specific EISs.

B. Surface Water Impacts Can Only be Reasonably Evaluated in Site-Specific Environmental Impact Statements.

Like groundwater impacts, surface water impacts are necessarily locally variable and must be evaluated in site-specific EISs. The GEIS gives only a cursory and general description of surface waters. § 3.5.4 at 3.5-14. The GEIS also describes the impacts to surface waters only in very general terms. § 4.2.4 at 4.2-14 – 4.2-17. However, like groundwater, surface water conditions are site specific. New Mexico often has locally important ephemeral streams and perennial water courses and springs. These surface waters can be and often are hydrologically connected to groundwater sources near proposed mining operations and therefore may be affected by groundwater pumping from the operation and other nearby private or municipal water system wells.

Further, the GEIS characterizes the impacts on surface water from ISL operations as "small" to "moderate", indicating that a site-specific EIS on these impacts may not be necessary. GEIS at 4.2-14 – 4.2-17. However, as demonstrated in Section VI.C.7, below, discharges from an ISL operation in Texas completely destroyed an ephemeral water source. Additionally, because local surface and groundwater sources could be hydrologically connected, failure to restore groundwater could eventually affect surface water quality. Therefore, the impacts to surface water could be significant.

Because local surface water impacts from ISL operations are unique and significant, they cannot be evaluated generically. The NRC must evaluate these impacts in site-specific EISs.

C. Socioeconomic Impacts Can Only be Reasonably Evaluated in Site-Specific Environmental Impact Statements.

The GEIS describes socioeconomic impacts only in general terms. GEIS at 4.5-30 to 4.5-34. In particular, the NRC gives only cursory discussion to the socioeconomic impacts of aquifer restoration. *Id.*, § 4.2.10.3 at 4.2-50. However, as demonstrated by report by Dr. Thomas Power of the University of Montana,[2] attached as Attachment B, the economic impacts of uranium operations are quite site-specific, varying with such factors as ore grade, reserve size, and operation-specific worker productivity and salary levels. These site-specific conditions must be analyzed in a site-specific EIS.

Moreover, the socioeconomic impact of groundwater restoration at ISL operations is significant. Although the NRC characterizes the socioeconomic impacts from groundwater restoration as "small", indicating that site-specific EISs are unwarranted, the irrevocable loss of a natural resource can have far-reaching and significant economic impacts. Therefore, socioeconomic impacts from ISL operations cannot be analyzed on a generic level and site-specific EISs must be prepared for each proposed ISL operation.

D. Radioactive Air Impacts Can Only be Reasonably Evaluated in Site-Specific Environmental Impact Statements.

The NRC characterizes the air impacts from ISL operations during the construction and operations phases as "small", suggesting that no site-specific EISs evaluating these impacts will be warranted. GEIS, §§ 4.2.6.1, 4.2.6.2 at 4.2-34 – 4.2-35.

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[2] Thomas Michael Power, research professor and professor emeritus, The University of Montana. An Economic Evaluation of a Renewed Uranium Mining Boom in New Mexico. Prepared for the New Mexico Environmental Law Center (Santa Fe), October 2008 (hereinafter, "Power Report").

However, in northwestern New Mexico, the existing ambient radiological air quality varies greatly from locality to locality.[3] In some of these localities, ambient radon levels have been increased from past uranium mining and milling, and radioactive mine wastes have been dispersed by wind onto public rights-of-way and private grazing lands. Declaration of Melinda Ronca Battista at 8-9 and 17-20, *In the Matter of Hydro Resources, Inc.* (ACN ML 051660423) (June 10, 2005) attached hereto as Attachment C. The impacts of new ISL projects must be considered in addition to the existing radioactive contamination and could be significant in that light. Moreover, the NRC's policy of characterizing radiation from existing mine waste as natural background is inapplicable in the context of NEPA. *See*, note 8, p.14.

Finally, the NRC averages **regional** air quality to arrive at a background air quality level. GEIS, § 3.2.11.1 at 3.2.-80. This averaging masks the actual air quality at localities and implies a misleadingly low level of radioactive air contamination in certain areas of each of the regions analyzed. Because radioactive air impacts from ISL operations are locally variable and significant, those impacts cannot be evaluated generically and the NRC must require site-specific EISs on those impacts for each proposed ISL mine.

E. Environmental Justice Impacts Can Only be Reasonably Evaluated in Site-Specific Environmental Impact Statements.

Finally, the NRC concluded in the GEIS that it would require an environmental justice analysis **only** when a proposed project would cause adverse environmental

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[3] Thomas Buhl, Jere Millard, David Baggett, SueTrevathan. Radon and Radon Decay Product Concentrations in New Mexico's Uranium Mining and Milling District. Radiation Protection Bureau, New Mexico Environmental Improvement Division (Santa Fe, N.M,), March 1985 (hereinafter, "Buhl Study"). *See,* Declaration of Bernd Franke at 12 (June 12, 2005) and Exhibit C to Franke Declaration (copy of the Buhl Study), *In the Matter of Hydro Resources, Inc.* (ACN ML051660423) (June 13, 2005).

impacts. § 6.1.1 at p. 6-4. In other words, whether a site-specific environmental justice analysis is done hinges on whether the NRC finds a project will have significant environmental impacts.

As noted in the preceding four subsections, the NRC's characterization of most potential environmental impacts from ISL mining as "small" to "moderate" calls into question whether the NRC would ever require anything more than a site-specific Environmental Assessment for a single ISL license application. However, as demonstrated in the aforementioned sections, the actual environmental impacts from ISL operations are likely to be significant. Moreover, the NRC's own generic analysis indicates that all existing or potential ISL operations are located in low-income areas. GEIS at 6-12, lines 47-48. Likewise, most, if not all the existing or proposed ISL operations in New Mexico are located in or near predominantly minority areas[4]. Thus, the NRC should require a site-specific environmental justice analysis for each proposed ISL operation.

V. <u>The Draft GEIS Fails to Analyze the Cumulative Impacts of ISL Mining on a Regional Scale.</u>

Assuming that the GEIS is the NRC's version of a programmatic EIS, as stated in the GEIS, arguably the only utility the GEIS might have is to analyze the region-wide cumulative impacts of widespread ISL mining. GEIS at § 1.8, p.1-24, lines 47-49. However, the GEIS fails to analyze cumulative impacts in three significant ways.

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[4] The NRC incorrectly states that the Navajo Nation is located approximately 1 mile from the nearest potential ISL facility. GEIS at 6-8, lines 41-42. The Hydro Resources, Inc., Crownpoint Uranium Project has several sites that are squarely **within** the Navajo Nation. Section 17 in Church Rock Chapter is located on tribal trust land, the Unit 1 site is on Navajo allotted land in Crownpoint Chapter, and the Crownpoint site and main processing plant is located within the town of Crownpoint, which is the administrative hub of the Eastern Navajo Agency. *See, HRI, Inc v. EPA*, 198 F.3d 1224 (10^{th} Cir. 2000)

A. The GEIS Ignores Radioactive and Toxic Contamination from Past Uranium Mining and Milling.

The Council on Environmental Quality ("CEQ") defines a cumulative impact as:

> The impact on the environment which results from the incremental impact of the action when added to **other past, present, and reasonably foreseeable future action regardless of what agency (Federal or non-Federal)** or person undertakes such other actions.

40 C.F.R.§ 1508.7 (emphasis added).

Here, the NRC fails to address the significant cumulative impacts of new ISL mining combined with the impacts of radioactive and toxic wastes from past uranium mining and milling on groundwater quality, soils, radioactive air emissions and human health. Incredibly, the NRC has determined that impacts from past uranium milling are beyond GEIS's scope. § 1.5.4, p. 1-13, line 14. Equally as incredible, the GEIS does not even **mention** environmental impacts from past mining. The NRC's rational for these glaring omissions is both circular and nonsensical:

> Because the need for the GEIS is to address NRC's licensing reviews for ISL facilities, topics related to conventional milling will not be addressed in the GEIS. The legacy of past conventional uranium milling will be identified in terms of cumulative impacts in the GEIS; however, a detailed cumulative impacts analysis is a site-specific evaluation.

GEIS at A-26. From this explanation, the public is left to wonder what the NRC intends to cover in the GEIS. Whatever the NRC's intent, NEPA requires more than merely listing or briefly acknowledging past impacts.

In this case, the impacts of past uranium mining and milling combined with the impacts of anticipated ISL operations are critical to a meaningful environmental analysis of ISL operations on a regional scale. It is well established that substantial areas of northwestern New Mexico have been contaminated by past uranium mining and conventional milling operations. *See, e.g.*, Homestake Mining Company, Milan N.M. Superfund site (EPA ID# 007860935, www.epa.gov/earth1r6/6sf/pdffiles/0600816.pdf); United Nuclear Corporation Church Rock Uranium Mill Superfund site;[5] uranium contamination on the Navajo Nation, including around the UNC Northeast Church Rock (www.epa.gov/region09/waste/sfund/navajo-nation/index.html); and *Abandoned Uranium Mine Field Survey Project* prepared for the New Mexico Mining and Minerals Division (July 18, 2008), attached hereto as Attachment D. As a result, large areas of land have elevated radiation levels[6] and billions of gallons of groundwater have been contaminated.[7] In addition to the damage to natural resources from past uranium mining and milling, historic contamination has led to increased death rates and illnesses among uranium workers and increased environmental exposures to people living in uranium-impacted communities. *See*, Shuey, Chris *Uranium Exposure and Public Health in New Mexico and the Navajo Nation: Literature Summary*, attached as Attachment E. The cumulative and synergistic effects of these historic impacts, both in terms of damage to natural resources and human exposure to dangerous levels of radiation and toxic heavy

[5] Navajo Nation Environmental Protection Agency: www.epa.gov/ciconference/previous/2007/2007_presentations/wednesday/830am/unc_superfund_site.pdf; and NRC: www.nrc.gov/info-finder/decommissioning/uranium/united-nuclear-coroporation-unc.html.

[6] Bill Brancard, director, New Mexico Mining and Minerals Division. New Mexico Progress Report Abandoned Uranium Mine Work. Slide 8 in presentation to Joint Hearing of the Indian Affairs Committee and Radioactive and Hazardous Materials Committee, New Mexico Legislature (Crownpoint, N.M.), October 1, 2008.

[7] Milton Head, Bluewater Valley Downstream Alliance. Grants Mineral Belt Uranium Mining and Milling: Identified Environmental Effects on Groundwater. Slide 2 in presentation to Joint Hearing of the Indian Affairs Committee and Radioactive and Hazardous Materials Committee, New Mexico Legislature, October 1, 2008. *See*, Attachment F.

metals, must be evaluated when combined with the impacts from anticipated ISL operations[8].

B. The GEIS Fails to Meaningfully Analyze Impacts from Reasonably Foreseeable Regional Federal Projects.

The cumulative impact analysis in Chapter 5 with respect to reasonably foreseeable federal projects is wholly inadequate. As noted in Section V.A, above, a cumulative impact analysis must include an analysis of past environmental impacts as well as reasonably foreseeable future impacts, irrespective of whether those impacts are generated by Federal or non-Federal entities. Moreover, the GEIS must be detailed enough to foster both informed decision-making and informed public participation. *California v. Block*, 690 F.2d at 761.

In the GEIS, however, the NRC merely lists draft and final environmental impact statements for concurrent and reasonably foreseeable federal projects that could contribute to cumulative impacts in each of the four targeted regions. *See, e.g.* Table 5.2-6 at 5-11. Merely providing a list of federal projects that could contribute to cumulative impacts in the four targeted regions and identifying which general areas (land use, groundwater, air, etc.) might be impacted is not a substitute for a reasonably detailed discussion of regional cumulative impacts as required by NEPA. In order to comply with NEPA, the GEIS must analyze, in reasonable detail, the cumulative impacts of proposed

[8] The NRC's policy that radiation from mine waste is not included in calculation of Total Effective Dose Equivalent ("TEDE") because it is considered "background radiation" as defined by 10 C.F.R. § 20.1003 does not apply to a NEPA analysis. *Hydro Resources, Inc.*, CLI-06-14, 63 NRC 510, 517-518 (2006). The purpose of calculating TEDE is to measure the radioactive emissions from a licensed operation to determine compliance with 10 C.F.R § 1302. NEPA's purpose, however, is to force federal agencies to take a hard look at all the reasonable environmental impacts, past and present and to encourage public participation in that process. NEPA's goal is frustrated if the NRC adopts its policy on excluding mine waste from the TEDE calculation in the context of NEPA.

ISL operations with the reasonably foreseeable federal projects. The NRC must withdraw the GEIS and re-issue a new draft with this analysis for public comment.

C. The GEIS Fails to Evaluate Impacts from Non-Federal Projects.

In the GEIS, the NRC acknowledges the need to address reasonably foreseeable future actions in evaluating cumulative impacts. § 5.2., p. 5-3, lines 4-7. However, the NRC staff has decided to only consider future and concurrent Federal actions in evaluating cumulative impacts. § 5.2.2, p. 5-3, lines 45-46 ("[o]ne indicator of present and future RFFAs in the four uranium milling regions is the number of draft and final EISs prepared by federal agencies within a recent time period."). This superficial treatment of projects that could contribute to regional cumulative effects undermines the purposes of NEPA. For example, concurrent and reasonably foreseeable oil and gas exploration and production on private and state lands, which are regulated by state agencies, within the four geographical regions covered by the GEIS could have substantial impacts on air and groundwater resources and land use that should be considered in conjunction with the proposed ISL projects in the region.

A similar analysis should be applied to impacts from concurrent reasonably foreseeable conventional uranium (and other hard rock) mining and milling operations. In New Mexico, this information is easily accessible at the New Mexico Mining and Minerals Division website and the New Mexico Oil Conservation Division website[9]. Because the GEIS fails to evaluate the cumulative impacts of reasonably foreseeable non-Federal projects, it is inadequate under NEPA. The NRC must withdraw the draft GEIS,

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[9] *See*, http://www.emnrd.state.nm.us/mmd/MARP/MARPNewPermitApplicationsandCloseoutPlans.htm; http://www.emnrd.state.nm.us/OCD/Hearings.htm.

provide a reasonably detailed analysis of cumulative impacts from non-Federal actions, and re-issue the GEIS for public comment.

VI. <u>The Draft GEIS is Factually Inaccurate, Contradictory and Misleading.</u>

NEPA's two primary goals are to promote informed agency decisions and facilitate informed public participation. *Baltimore Gas & Electric Co. v. Natural Resources Defense Council*, 462 U.S. 87, 97 (1983). Neither of these goals can be accomplished by an environmental impact statement that contains significant factual errors and misleading information. The draft GEIS contains substantial factual errors, incomplete information, and contradictory information. The GEIS, therefore, cannot serve as a basis for a reasonable environmental analysis. Below are some of the most glaring factual errors in the GEIS.

A. Pre-Construction Requirements are Misleading.

The NRC explains pre-construction requirements for ISL operations in Section 2.2, pp. 2-6 – 2-7; however, this explanation does not reflect NRC practice. For example, the GEIS states that ISL license applicants are required to determine baseline water quality for both the production zone and the adjacent non-mineralized zone. *Id.* at 2-6, lines 28-29. In practice, the NRC staff has permitted averaging of production zone water with non-production zone within the mine area to allow for artificially high baseline contaminant levels for the purposes of granting a license. *Hydro Resources, Inc.*, LBP-05-17, 62 NRC 77, 95 (2005). Additionally, with respect to characterizing radiation levels in soils at an ISL site, the NRC's policy is to allow applicants to characterize radiation from past mine waste as "natural background". *Id.* CLI-06-14, 63 NRC at 517-518. In order to facilitate informed public participation in compliance with NEPA, the

NRC must withdraw the GEIS, and re-issue a new draft disclosing the details of NRC practice as it relates to pre-construction requirements.

B. The Characterization of Impacts is Inconsistent with NEPA.

In § 1.4.3, the NRC states that impacts will be classified and analyzed in the GEIS based on three categories — "small impacts", "medium impacts" and "large impacts". GEIS at 1-6. However, nowhere in the GEIS does the NRC explain how these impact categories relate to NEPA's requirement that a federal agency evaluate any "significant" environmental impact. In other words, it is unclear which category of impact would trigger a full-blown environmental impact statement and which category would be sufficient for an EA and FONSI.

These impact classifications violate the NRC's own regulations, which require that an EIS be prepared when a proposed action has a "significant" impact on the human environment. 10 C.F.R. § 51.20(a)(1). Without classifying an impact as significant or insignificant, the NRC cannot reasonably evaluate the environmental impacts of ISL operations, nor can the public meaningfully participate in evaluating environmental impacts. The NRC must withdraw the GEIS, characterize impacts as either "significant" or "insignificant" so that the public can meaningfully evaluate how the NRC will treat particular impacts, and re-issue a new draft.

Further, by failing to classify impacts as "significant" or "insignificant" the NRC is violating the Administrative Procedure Act and its own regulations with respect to promulgating regulations. 5 U.S.C §553; 10 C.F.R. § 2.802 (requiring an EIS when environmental impacts are "significant"). In essence, the NRC is re-writing its NEPA regulations by introducing new categories of impacts without following the notice and comment process required by law.

Finally, in the chapter on environmental justice, the NRC states "[i]mpacts that are significant, unacceptable, or above generally accepted levels, such as regulatory limits or state and local statutes and ordinances may be considered high and adverse." GEIS, § 6.1.1 at 6-5, lines 6-8. It is unclear from this statement whether ISL operations whose impacts would violate state or local laws would automatically require a full EIS or just stand-alone environmental justice analysis. If the latter is the case, then the NRC should disclose that **any** proposed ISL operations within Navajo Indian Country would require a full EIS, since any ISL operation within Navajo Indian Country would automatically run afoul of the Diné Natural Resources Protection Act, which prohibits uranium mining and processing. *See*, www.sric.org/uranium/DNRPA.pdf. Moreover, it seems that the NRC should be loathe to grant a license to **any** proposed ISL operation that would violate any federal, state, or local law, regulation or standard. The current impact classifications are meaningless under NEPA and should be changed or explained in the final GEIS.

C. The NRC's Description of the Affected Environment is Incomplete and Misleading.

The NRC's description of the affected environment in Chapter 3 is incomplete and misleading in several respects.

1. <u>The GEIS Does Not Disclose Sites Where Previous Uranium Mining and Milling Occurred.</u>

Although the NRC determined that the impacts from past uranium mining and milling would not be considered in the GEIS, it does not follow that the sites where past mining and milling occurred should also be excluded from the GEIS's description of the affected environment. Yet this is exactly what the NRC has done with respect to the northwestern New Mexico region. Maps of the region in the GEIS do not include the locations of the Anaconda Mill at Bluewater, the SOHIO L-Bar Mill at Cebolleta, the Mobil Section 9 Pilot Project[10] near Crownpoint, nor any of the more than 200 uranium mine locations in the region. *See, e.g.*, GEIS at 3.5-3, 3.5-15, and 6-11; *see also*, Attachment D. As explained above, without this fundamental information, the NRC cannot reasonably evaluate environmental impacts, particularly cumulative impacts, and the public cannot meaningfully participate in the NEPA process. The GEIS therefore violates NEPA and must be withdrawn.

2. <u>The NRC Fails to Disclose Contamination from Past Uranium Mining and Milling Sites.</u>

The NRC also failed to disclose the contamination of groundwater and soil caused by past uranium mining and milling. Again, although the NRC has improperly and in violation of NEPA determined that the impacts from past uranium mining and milling are beyond the GEIS's scope, the fact remains that contamination has occurred and that fact should be disclosed in the GEIS. For example, there is no indication of the extensive groundwater contamination in the Ambrosia Lake-Milan area from past uranium mine water discharges and mill tailings seepage. BVDA has calculated that over 1.2 million acre-feet of alluvial and bedrock groundwater has been contaminated by past uranium mine and mill discharges. *Grants Mineral Belt Uranium Mining and Milling: Identified Environmental Effects on Groundwater*, powerpoint presentation from Bluewater Valley

[10] That the U.S. Department of Energy has assumed ownership and control of the Bluewater and Cebolleta millsites and tailings disposal cells under licenses issued by NRC is not sufficient reason for NRC to have excluded their locations and any relevant information about them from the GEIS. The Mobil Section 9 pilot project failed to restore nearly 60% of contaminants after only 10 months of leaching in 1979 and 1980, and remains the only ISL mining experience in New Mexico. *See*, Table 4-13 and pages 4-38 – 4-39 of NUREG-1508 (February 1997); GEIS at 2-56 and 3.5-85. Lessons learned for groundwater protection from the experiences at each of these facilities are not addressed in the GEIS.

Downstream Alliance, slide 2, attached hereto as Attachment F. The public needs to have this information to determine, for example, if, as a policy matter, it would support additional contamination of natural resources before remediation of existing contamination. Further, this information is needed to reasonably evaluate cumulative impacts, alternatives, and mitigation measures. Failure to disclose this information violates NEPA and the GEIS must be withdrawn.

3. The NRC's Characterization of Groundwater Quality in Northwestern New Mexico is Inaccurate and Misleading.

The NRC characterizes the groundwater quality at the sites of the proposed Hydro Resources, Inc. ("HRI") Crownpoint Uranium Project as violating drinking water standards for some pollutants. However, this characterization is inaccurate because it is based on averaging good quality non-ore zone water with poor quality ore zone water. The groundwater in this locality is used for human drinking water and in fact supplies Crownpoint and at least seven other Navajo communities with their drinking water supply. Indeed, chlorination and fluoridation are the only treatments the Navajo Tribal Utility Authority ("NTUA") gives water from its Crownpoint wells; NTUA does not filter or otherwise treat groundwater to reduce or remove radionuclides and heavy metals. The NRC must accurately disclose this information in compliance with NEPA.

4. The NRC's Characterization of the Hydrology in Northwestern New Mexico is Oversimplified and Misleading.

The NRC's characterization of the ore bearing aquifers in northwestern New Mexico is grossly oversimplified and misleading. GEIS § 3.5.4.3.2, pp. 3.5-19 – 3.5-21. The NRC fails to disclose that much of the hydrogeology in the area, particularly the Westwater Canyon Member of the Morrison Formation, is characterized by overlapping, meandering, discontinuous, and stacked paleo-stream channels that have higher permeability than surrounding rock. *See*, Condon, S. M. and Peterson, F., *Stratigraphy of Middle and Upper Jurassic rocks of the San Juan Basin: Historical perspective, current ideas, and remaining problems: American Association of Petroleum Geologists Studies* in 22 Geology 7-26 at 21 (1986). These paleo-channels are more permeable than the surrounding rock and act as preferred pathways that facilitate relatively rapid migration of contaminants. In contrast, the groundwater velocities disclosed by the NRC at p. 3.5-20, which suggests that groundwater would move very slowly, incorrectly assumes a homogeneous aquifer.

Additionally, the NRC's description of confining formations at p. 3.5-20 leaves the impression that ore bearing aquifers in northwestern New Mexico are always bounded by extensive and impermeable aquitards that preclude vertical movement between aquifers. However, it is well established that both the Recapture and the Brushy Basin formations are both locally and regionally discontinuous, and moreover, are also subject to local fracturing and faulting. Lucas, S. G. and Heckert, A. B., *Jurassic stratigraphy in west-central New Mexico*, 54 New Mexico Geological Society Guidebook 289-301 (2003). Accordingly, the NRC must disclose in the GEIS the true hydrogeology of the area and the fact that this hydrogeology will facilitate extensive and deep groundwater contamination, through contaminant migration through paleo-channels, faults and fractures. The NRC's failure to disclose this information prevents it from reasonably evaluating the environmental impacts of ISL operations and prevents the public from meaningfully participating in the NEPA process. The GEIS must therefore be withdrawn.

5. The NRC's Description of Uranium Geochemistry is Inadequate.

Even in light of the NRC's "generic" description and evaluation of ISL impacts, its treatment of uranium geochemistry is astonishingly inadequate. In § 2.1.1, the NRC devotes a **single paragraph** to describing uranium geochemistry. GEIS at 2-1. This description ignores a number of significant issues. For example, there is no discussion about the range of redox values and concentration ranges for uranium, radium, arsenic, selenium, molybdenum or other significant contaminants generally seen in undisturbed ore deposits. Further, there is no discussion about how regional geochemistry has been affected by past uranium mining, milling, and exploration. Without disclosing this basic information, the public cannot meaningfully compare the anticipated impacts of ISL operations to pre-mining conditions.

6. The NRC's Evaluation of Socioeconomic Impacts is Inadequate.

In § 4.5.10, the NRC offers only a very superficial evaluation of socioeconomic impacts. GEIS at 4.5-30 – 4.5-34. The NRC fails to consider any of the following: how much of the existing uranium reserves in northwestern New Mexico might be exploited, which would affect the employment, revenue, etc. impacts; the effect of increased worker productivity on employment and wages; the effect volatile uranium prices would have on communities; and whether the increased pressure on infrastructure and services would be offset by increased revenue from uranium operations. Most important, however, the NRC fails to evaluate the economic impacts of lost natural resources caused by environmental contamination and how damage to the environment affects long-term economic stability in the region's communities. Given that **no** commercial ISL facility has been able to completely restore ore-zone groundwater to pre-mining conditions, groundwater sources where ISL operations occur will necessarily be irrevocably contaminated and unfit for human or non-human consumption. *See* Section VI.C.7. The NRC must consider the costs of irrevocably losing an important natural resource.

Moreover, the socioeconomic and cultural impacts of irrevocably losing a groundwater source are highly variable from community to community. The socioeconomic impact from the loss of a particular groundwater resource in a completely isolated region would not be as significant as the loss of a groundwater resource in an existing community such as Crownpoint. Some of these impacts have been evaluated by Dr. Power, who concluded that negative economic impacts of renewed uranium mining in New Mexico could be significant. *See*, Attachment B. Because socioeconomic impacts will inevitably be significant and highly variable, the NRC should require site-specific environmental impact statements on socioeconomic impacts for every ISL permit application.

7. <u>The NRC's Evaluation of the ISL Industry's Operational and Groundwater Restoration History and Impacts is Incomplete and Misleading.</u>

Finally, the NRC's description of ISL industry's operating history and impacts is incomplete and misleading. In the GEIS chapter describing the ISL industry's operational and restoration record, the NRC leaves the impression that ISL operations have very few impacts and that groundwater restoration is invariably successful. GEIS Chapter 2. This superficial analysis is seriously misleading and simply inaccurate.

In reality, ISL operations, like most heavy industry, have a lengthy record of spills, accidents, leaks, and excursions. Adverse environmental impacts occur at all stages of the ISL process, which the NRC should disclose. For example, in Texas, Uranium Energy Corp. was recently issued notices of violations and sued in Federal court because of groundwater and private well contamination it caused during exploration activities. The complaint in that case is attached hereto as Attachment G.

Perhaps the most notable recent example of operational and restoration problems occurred at the Smith Ranch-Highland Uranium Project in Wyoming — the largest uranium ISL mine in the U.S. The mine's operator, Cameco Resources — the largest and likely best capitalized uranium mining company in the world — was issued three notices of violations in the past year alone, and fined nearly $1.1 million, for, among many things, failing to initiate and achieve restoration of groundwater in compliance with state permit conditions, failing to properly plug and abandon wells, and failing to fully report leaks and spills. A series of Wyoming Department of Environmental Quality documents summarizing those violations is attached hereto as Attachment H. Among those documents is a November 21, 2007, investigations report by a Wyoming Department of Environmental Quality ("WDEQ") district supervisor who reported that Cameco, and its subsidiary Power Resources, Inc., had restored only two of 12 operational wellfields in 20 years of ISL mining. One of those wellfields, Mine Unit A at the Highland Project, required nearly 13 years of active restoration and stability monitoring before being certified as "restored" by both WDEQ and NRC in 2003 and 2004, respectively. However, WDEQ officials feared that the continued presence of extraordinarily high levels of radium-226 remaining in the production zone (levels that exceeded, after restoration, the pre-mining baseline average[11]) would move past the wellfield's monitor

[11] The average post-restoration radium concentration in A-Wellfield was 675 picoCuries per liter ("pCi/l"), which exceeded the average ore-zone baseline level of 609 pCi/l and the Wyoming groundwater classification standard of 5 pCi/l. See Note 12 below for the sources of these data.

well ring, contaminating groundwater suitable for domestic use. To address this risk, WDEQ required Cameco to implement a "monitored natural attenuation" plan to determine, over an indefinite period, if natural conditions will lessen radium levels. NRC concurred with the plan in June 2004.[12] The GEIS (at 2-49) briefly discusses the restoration challenges at the Highland A-Wellfield, but does not use the experience to predict similar long-term groundwater impacts at future ISL mines or to suggest technical and management controls to mitigate the effects of failed groundwater restoration methods.

Additionally, the history of spills associated with the ISL industry is extensive. Attached as Attachment I is a spreadsheet summarizing the history of uranium mining spills in Wyoming since 1999.[13]

Further, discharges from ISL operations have resulted in significant environmental impacts. Uranium Resources, Inc. ("URI"), an ISL operator in Texas, serves as an example of how extensive and damaging discharges during operation can be. During the course of operations in Duval County, Texas, URI discharged significant amounts of uranium and radium contaminated water into an arroyo, completely destroying the riparian habitat. That spill resulted in a lawsuit, which URI subsequently settled. The complaint in that lawsuit and data on the extent of contamination is attached hereto as Attachment J.

Restoration at ISL sites has proven even more problematic. In addition to the restoration problems encountered by Cameco referred to above, a recent survey of

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[12] Documentation for the A-Wellfield story is found in two documents cited in the GEIS (at 2-54 and 2-56): ML04180470 (NRC, June 29, 2004) and ML040300369 (PRI, January 15, 2004).

[13] The attached list was compiled from Wyoming Department of Environmental Quality files and databases, including http://deq.state.wy.us/wqd/events/1203rpt.htm.

groundwater restoration at ISL operations in Texas reveals that ISL operators are almost invariably granted alternate concentration limits ("ACLs") because they are unable to restore ore-zone groundwater to baseline standards. That survey is attached hereto as Attachment K.

The ISL industry's inability to restore groundwater is not surprising given that injection of lixiviant into an aquifer irrevocably changes the aquifer's geochemistry. In a study commissioned by the NRC, the U.S. Geological Survey concluded that long-term monitoring of ISL sites is necessary because even after treatment with hydrogen sulfide to encourage reducing conditions, contaminants such as uranium and arsenic that were mobilized by ISL operations remained mobilized, posing a threat to undisturbed groundwater outside the mine area. *Consideration of Geochemical Issues in Groundwater Restoration at Uranium In-Situ Leach Mining Facilities*, NUREG/CR-6870 at 18-22 (Jan. 2007). In the final GEIS, the NRC should disclose a comprehensive operating and restoration history of ISL operation so that both the agency and the public can make adequately informed environmental choices.

D. The Characterization of Groundwater Impacts is Inaccurate.

Finally, the characterization of groundwater impacts from ISL operations and groundwater restoration as "small" to "large" is inaccurate and misleading. GEIS, Executive Summary at xli-xlii; GEIS at 4.2-18 – 4.2-27. Given that **no** commercial ISL operation has successfully restored groundwater to pre-mining conditions (*see*, Section VI.C.7), the impacts on groundwater can only reasonably be construed to be "large" or "significant". Because groundwater impacts will necessarily and invariably be large or significant, the NRC must require a full site-specific environmental impact statement for every proposed ISL operation.

VII. <u>The Purpose and Need for the GEIS is Unrelated to Anticipated Environmental Impacts.</u>

An environmental impact statement's statement of "purpose and need" is the foundation for the rest of the document. The "purpose and need" statement frames the agency's goals and is the basis for all other analyses, such as evaluation of alternatives, mitigation measures, and environmental impacts flow. The NRC has failed to provide an adequate statement of "purpose and need" in the GEIS because the purpose and need used to justify issuing the GEIS — NRC's "need" to improve regulatory efficiency — is unrelated to the anticipated environmental impacts of the general actions which the GEIS will ultimately cover.

The purpose of an action evaluated by an agency must be sufficiently broad to allow reasonable exploration of alternatives. *Simmons v. U.S. Army Corps of Engineers*, 120 F.3d 664, 666 (7th Cir. 1997). Moreover, the environmental analysis and alternatives considered in an impact statement must be related to the general goal or action proposed by an agency. *Id.* at 669.

The GEIS's stated purpose is to "improve the efficiency of NRC's environmental reviews" for ISL license applications. GEIS at § 1.1, p.1-1, lines 13-14; § 1.3, p. 1-4. However, this purpose is unrelated to the actual environmental impacts analyzed in the GEIS. Instead, the GEIS's entire architecture seems geared toward "improving" the NRC's environmental review efficiency by glossing over environmental impacts, ignoring cumulative impacts, and shortchanging public participation in order to facilitate issuing ISL licenses. The NRC's purpose cannot be to facilitate issuing licenses — under the AEA, its primary purpose is to protect public health and safety. If the NRC were truly concerned with improving ISL licensing efficiency, it would have taken more obvious and meaningful steps, such as promulgating ISL-specific regulations or recruiting additional staff. These steps would improve efficiency without undermining the NRC's primary responsibility under the AEA or its NEPA obligations. Because the purpose and need are unrelated to the impacts or alternatives analyzed, the GEIS violates NEPA and must be withdrawn.

VIII. The NRC Fails to Fulfill its Trust Obligations with the GEIS.

Since the early years of this nation, the federal government has been a trustee for Indian Tribes. *Worcester v. Georgia*, 31 U.S. 515, 553-554 (1832). This responsibility extends to the entirety of the federal government, not just certain agencies. *Parravano v. Babbitt*, 70 F.3d 539, 546 (9th Cir. 1995). The federal government's trust responsibility extends not only to those rights established by treaty (*see*, *Worcester v. Georgia*, 31 U.S. at 553-555), but also for Tribes' natural resources. *Pyramid Lake Paiute Tribe v. U.S. Dept. of the Navy*, 898 F.2d 1410, 1420 (9th Cir. 1990). This obligation extends to impacts to treaty rights and tribal natural resources that occur **outside** tribal jurisdiction. *Id.*, *see also Parravano v. Babbitt*, 70 F.3d 539. Moreover, the NRC's trust responsibility extends beyond mere consultation with tribes that may be affected by ISL operations and inviting those tribes to participate in the licensing process in ways that are already guaranteed by statute and regulation and afforded to the general public. *See*, *U.S. Nuclear Regulatory Commission Strategy for Outreach and Communication with Indian*

Tribes Potentially Affected by Uranium Recovery Sites, http://www.nrc.gov/info-finder/materials/uranium/ind-tribe-strat.pdf.[14]

The Draft GEIS is deficient in that it fails to even acknowledge the NRC's trust obligations to Indian tribes in the areas where ISL mining is expected to occur, much less analyze how the expected ISL operations will affect tribal treaty rights and natural resources.

For example, the treaty between the Navajo Nation and the United States provides that Navajo tribal members have the right to maintain livestock and hunt within the reservation. *Treaty between the United State and Navajo Tribe of Indians*, Articles V, XIII (June 1, 1868) ("Treaty of 1868"). However, in instances where ISL operations occur on Tribal lands[15], tribal members will effectively be excluded from those lands and will be unable to run livestock or hunt, breaching the right to do so guaranteed by treaty. The NRC's tribal trust obligation is particularly implicated when tribal members are precluded from hunting or maintaining livestock from large areas of land due to multiple ISL operations over the northwestern New Mexico region. *See*, *Parravano v. Babbitt*, 70 F.3d 539 (Court upheld Secretary of Interior reduction of ocean salmon harvest under Magnuson Act to protect upstream tribal fishing rights guaranteed by treaty). Additionally, Article II of the Treaty of 1868 provides that the Navajo Nation may exclude any individual except U.S. government officials exercising their official duties.

[14] Compare the NRC's "strategy" with the Environmental Protection Agency's *Policy for Administration of Environmental Programs on Indian Reservations* (Nov. 11, 1984), most recently reaffirmed in 2005. http://www.epa.gov/tribal/pdf/indian-policy-84.pdf. In contrast to the NRC's "strategy" the EPA's policy recognizes the inherent sovereignty of Indian tribes and tribal authority over reservation resources. The EPA strives to incorporate these fundamental premises into EPA permitting, enforcement and policy actions that have any effect on a tribe's environment.

[15] As explained in note 4, above, HRI's proposed Crownpoint Uranium Project has two sites that are on Navajo land.

Id. at Article II. Because the Diné Natural Resources Protection Act prohibits uranium mining and processing within Navajo Indian Country, the Navajo Nation could exclude any individual or company that is furthering such activity, even if the uranium mining or processing is occurring off-reservation, affecting access to ISL sites and transportation of yellowcake. The NRC must analyze how its obligation to respect tribal laws, vis à vis its treaty obligation, will affect ISL operations in the northwest New Mexico region.

Finally, widespread regional ISL operations could significantly impact the natural resources of tribes in the area, even when the ISL operations are outside tribal lands. For example, failure to restore groundwater at an ISL site upgradient from a tribe or Pueblo could ultimately affect ground or surface water that tribes or Pueblos have guaranteed rights to. The effects of widespread regional ISL operations, which will require substantial groundwater pumping, on the quantity of groundwater should be analyzed for its effect on the amount of groundwater available to Pueblos and tribes. Finally, the regional hydrological connection between groundwater pumping and surface water availability and quality must be analyzed in the context of the effects on tribal water rights and cultural use.

The cultural uses of ground and surface water, moreover, may be protected under federal statutes such as the American Indian Religious Freedom Act ("AIRFA"). The impacts of regional ISL operations must be analyzed in the context of AIRFA and other federal statutes, regulations and Executive Orders in order to fulfill the NRC's trust obligations to tribes.

IX. The GEIS Fails to Adequately Address Mitigation Measures.

The GEIS also violates NEPA because it fails to adequately address mitigation measures. NEPA requires that an environmental impact statement include a detailed statement about adverse environmental effects that cannot be avoided. *Carmel by the Sea v. U.S. Dept. of Transportation*, 123 F.3d 1142, 1153-1154 (9th Cir. 1997). This requirement entails a duty to discuss measures to mitigate adverse environmental effects. *Id.*, citing 10 C.F.R. § 1502.16(h) and *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351-352 (1989). Mitigation measures must be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated. *Id.* at 1154.

The GEIS fails to meet NEPA's requirements. First, the NRC fails to disclose unavoidable environmental impacts. For example, in § 4.5.4.2.3, the NRC discusses potential impacts to groundwater from aquifer restoration. GEIS at 4.5-16 – 4.5-18. However, in this discussion, the NRC does not disclose which impacts to groundwater are unavoidable. Given that the no ISL operator in the United States has ever been able to fully restore ore-zone groundwater to pre-mining conditions, permanent groundwater contamination should have been disclosed as an unavoidable environmental impact. Further, because excursions have occurred at every ISL operation in the United States, contamination of water outside the mining area should have been disclosed as an unavoidable environmental impact. These and other unavoidable impacts must be disclosed in the GEIS.

Additionally, the NRC has failed to discuss in **any** detail mitigation measures for unavoidable environmental impacts. Instead, in the GEIS' section covering mitigation merely lists "best management practices" that an ISL operator might or might not employ in its operation[16]. GEIS § 7. Listing potential best management practices cannot substitute for a reasonably detailed discussion of mitigation measures. The GEIS, therefore, fails to meet the NEPA requirement that mitigation measures be discussed.

X. <u>The GEIS Fails to Adequately Address Alternatives.</u>

Even if, for the sake of argument, the GEIS could be construed to adequately analyze environmental impacts on a programmatic or generic level, the GEIS nevertheless still violates NEPA because it does not adequately address alternatives. NEPA requires that an agency provide a reasonable discussion of alternatives to the preferred action in its evaluation of a proposal. Project alternatives derive directly from the impact statement's "purpose and need" section. *Carmel by the Sea v. U.S. Dept. of Transportation*, 123 F.3d at 1155. The stated goal of a project necessarily dictates the range of reasonable alternatives. *Id.* Consideration of a reasonable range of alternatives is critical to realizing the action forcing and public participation goals of NEPA. *Envt'l Defense Fund v. Froehlke*, 473 F.3d 346, 350 (5th Cir. 1972).

As with its discussion of cumulative impacts and mitigation measures, the NRC's alternatives discussion is hobbled by its failure to adequately describe a purpose and need. Indeed, the section in the GEIS that evaluates alternatives amounts to approximately one page consisting of four paragraphs. The GEIS neither identifies a preferred alternative, as required by NEPA, nor does it discuss any alternative except the no-action alternative. §§ 2.12 – 2.13 at 2-51 – 2-52. The NRC merely notes that the GEIS does not constitute the NRC's final consideration of reasonable alternatives for the site-specific environmental reviews of ISL license applications. § 2.12, p. 2-51, lines 37-

[16] Some of the "best management practices" are actually regulatory requirements, e.g. "decontaminate and decommission facilities" and "plug and abandon wells". GEIS at 7-3. Actions required by statute or regulation should not be considered "best management practices".

39. As discussed below, the NRC missed the opportunity to discuss a range of alternatives that might better realize what are assumed to be the NRC's goals in issuing the draft GEIS.

Although it is not clear, there appear to be two distinct goals in the GEIS. One is expressed in the statement of purpose and need — to increase NRC's efficiency in processing ISL permit applications. The second, as revealed throughout the rest of the GEIS, is to facilitate development of uranium resources in four areas of the U.S. In neither case has the NRC adequately discussed alternatives.

If one assumes the NRC's goal in issuing the draft GEIS is to evaluate the environmental impacts of the NRC increasing its licensing efficiency, the GEIS fails absolutely. Nowhere does the NRC discuss alternatives that could increase licensing efficiency without compromising environmental analysis or public participation in the NEPA process[17]. For example, an alternative to the truncated environmental review advocated in the GEIS would be to promulgate a regulatory framework governing ISL operations. *See*, Section III. Indeed, the NRC has indicated that a new regulatory framework governing ISL operations would serve that exact purpose. SECY-99-11, *Draft Rulemaking Plan* at 7. Another alternative that could increase licensing efficiency would be to implement recruitment and retention programs within the NRC to increase NRC staff license review capability. Another could be reviewing and changing NRC internal staff procedures to make more efficient use of existing staff resources. Yet another alternative not discussed would be to encourage agreement state status or some other regulatory burden sharing framework in New Mexico, Wyoming, South Dakota and

[17] As discussed in their comments on scoping, ENDAUM, SRIC, BVDA and the Haaku Water Office anticipate that the GEIS will be used to limit site specific environmental review and public participation. ENDAUM, SRIC BVDA and Haaku Water Office hereby incorporate those comments by reference.

Nebraska, so the NRC staff would not be solely responsible for reviewing ISL license applications in those states. The NRC does not discuss these or any other reasonable alternatives. The GEIS is therefore insufficient under NEPA and the NRC's own regulations, 10 C.F.R. § 51.45(a)(3).

If, on the other hand, one assumes the NRC's goal in issuing the draft GEIS is to evaluate the environmental impacts of increased uranium development in the four regions identified in the GEIS, presumably to meet national or global energy demand, the GEIS is also inadequate. As discussed above, the GEIS does not discuss **any** alternatives to regional uranium development. Such alternatives could include evaluating existing global reserves to determine whether any uranium development, including development in the four areas covered by the GEIS, is needed to meet demand for nuclear fuel[18]; limiting development to existing ISL operations; evaluating renewable sources of energy in the four regions to meet energy demand; or evaluating energy efficiency to decrease energy demand. Because the NRC failed to evaluate these or any other reasonable alternatives, the GEIS is deficient under NEPA and the NRC's own regulations. The NRC should withdraw the current GEIS and re-issue a new draft GEIS after considering all reasonable alternatives.

XI. CONCLUSION

The NRC has failed to provide the public with a meaningful opportunity to deal with the complex and significant issues involved in permitting ISL facilities. This failure

[18] Such an inquiry would not be difficult to undertake. The Southwest Research and Information Center has already undertaken a preliminary analysis of global reserves and determined that global nuclear fuel demand can be met with existing mining operations. *See*, Paul Robinson, *Need or Greed? Uranium Prices and Demand*, 7 Voices from the Earth 2 (Fall 2006) attached hereto as Attachment L. Moreover, if this is the NRC's goal in issuing the GEIS, the U.S. Department of Energy would be required to be a cooperating agency. 40 C.F.R. § 1501.6; 10 C.F.R. 51.10(b)(2).

has taken place at a crucial phase of the NEPA process. The NRC is now just one step away from processing the current draft into a final GEIS that unless substantial measures are taken, will not comply with NEPA's requirements. In order to comply with NEPA's requirements, the NRC must now address all the gaps, errors, and other problems raised in these comments. After considering these comments and comments raised by others, the NRC should re-issue a draft GEIS and accept public comments on the new draft. Only in this way will NRC have realized its obligations under NEPA and its own regulations.

Sincerely,

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NOV 0 8 2007

Mr. Stephen P. Collings
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RE: Technical Review of Aquifer Exemption Petition for North Trend Expansion

Dear Mr. Collings:

The Nebraska Department of Environmental Quality (NDEQ) has completed a preliminary review of the Crow Butte Resources (CBR) "Petition for Aquifer Exemption North Trend Expansion Area" received by this office on August 20, 2007. The document was reviewed by Mr. Dave Carlson of NDEQ, Mr. Dave Miesbach of NDEQ, Professor Jim Swinehart of the University of Nebraska-Lincoln, Conservation and Survey Division, and myself.

NDEQ evaluates a petition for an aquifer exemption on the merits of site specific data collected, the incorporation of historical and contemporary research from the study area and vicinity, and the synthesis of that information to support scientific interpretations presented. As a general statement, the document provided for review by CBR lacks site specific data, inclusion of recent research, and the presentation of well supported scientific interpretations to be considered acceptable. This specifically applies to the repeated reference in the document to data collected from the original Crow Butte Study Area (CSA), and the application of that data to interpretations of subsurface conditions within the North Trend Expansion Area (NTEA). Site specific data from the NTEA including sedimentologic and petrophysical studies of cores as well as aquifer tests (heretofore not provided to NDEQ) will be required. In addition, the most recent geologic and hydrogeologic research of the area must be incorporated and referenced, and subsurface interpretations within the NTEA must utilize the most recent stratigraphic nomenclature and subdivisions. Finally, the subsurface structural anomaly (the White River Fault/Fold) that is present in the southern portion of the NTEA is inadequately defined and must be accurately delineated for consideration of this petition.

EXHIBIT
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While NDEQ appreciates CBR's efforts to date, the current document is inadequate for public notice. Detailed comments are provided on the accompanying pages that highlight specific questions or noted deficiencies in the data provided to date. We trust that our review of the information provided will be helpful in your future efforts to secure an aquifer exemption for your mine expansion efforts. If you have any questions, or require additional information please feel free to contact me at your convenience at 402-471-4290.

Sincerely,

Dr. Steven A. Fischbein, P.G.
Program Manager
Underground Injection Control – Mineral Exploration
Water Quality Division – Ground Water Unit

cc.

Dr. Jim Stokey – CBR: Cover letter w/enclosure
Mr. Wade Beins – CBR: Cover letter w/enclosure
Professor Jim Swinehart – UNL-CSD: Cover letter w/enclosure
Mr. Stephen Cohen – NRC: Cover letter w/enclosure
Mr. Dave Carlson – NDEQ: Cover letter w/enclosure
Mr. Mike Linder – NDEQ: Cover letter
Mr. Dave Miesbach – NDEQ Cover letter

Crow Butte Resources
Petition for Aquifer Exemption: North Trend Expansion Area
Technical Review of Aquifer Exemption Petition Dated August 15, 2007

NDEQ Detailed Technical Review Comments

General comment on nomenclature: Within these comments, NDEQ has followed CBR's nomenclature used in the reviewed document to provide relational consistency between the document and the comments. However, these comments should in no way reflect an acceptance by NDEQ of the nomenclature utilized by CBR. The nomenclature utilized by CBR is outdated and does not conform to widely accepted and published geologic literature from the area. Specific comments on, and references for nomenclature are provided within the body of the following text.

Page 1: CBR states that North Trend is comparable to the original Crow Butte Study Area (CSA). Other than on a gross formational level scale, there is no evidence collected at North Trend to support this claim. This is a recurring theme throughout the document.

Page 5: CBR states that the Basal Chadron Aquifer does not currently serve as a source of drinking water and will not in the future serve as a source of drinking water, with supporting evidence purported to be contained in Section 5 of the document. As elaborated on later in this review, this statement may not be accurate.

Page 6: Figure 1 Reference; Figure 1 should show the position of the site relative to the State of Nebraska. A county level statewide map would be useful in this instance as there are many county references in this document, but no maps showing county boundaries.

Page 7, CBR states that regional deposition between North Trend and the existing CBR mine are similar. Therefore the expectation is that the ore and chemistry will be similar, as well as groundwater characteristics. However, they fail to discuss the differences between the two areas which are significant in that the Basal Chadron at North Trend was deposited into a basin that may have been actively subsiding at the time of deposition; that North Trend is dominated by an artesian groundwater system, significantly different from the existing mine site; and that overlying aquitards or aquicludes may be significantly different texturally due to basin subsidence. No site specific evidence is presented, such as core data from the NTEA highlighting mineralogy and chemistry to support such a position.

Page 8: Section 3.2 – A sample portion of an elog should be shown in this section. The elog should be from the Pierre, Basal Chadron and above to show how the elogs are interpreted to generate the cross-sections. These interpretive figures and associated text should explain the log traces, and their relationship to lithology. The public has no way to understand the context in which the data is presented and should be shown what it means.

Page 8: Section 3.2 – Reference to Figure 4; Figure 4 or another map should show all borehole locations for the North Trend prospect. Only very limited borehole data is shown on figure 4, leading the reader to assume that little subsurface investigation has been completed. This is misleading, and should either be shown on this or another map, along with the total number of boreholes drilled and logged within the North Trend area. This should also be summarized in the text.

Page 8: Section 3.3 – Nomenclature and descriptions are important here. The statement that *"the interior paleosol has been scoured away by the overlying Chadron Sandstone"* is incorrect. The erosional event that preceded the deposition of the Basal Chadron Sandstone is the control on the removal/erosion of the interior paleosol, and should be stated as such. Also, see comments on the use of "interior paleosol" in the following paragraphs.

Page 8: Section 3.3 – The document refers to two deep wells either within or near to the proposed aquifer exemption area (Heckman #1 and Soester #1). This citation is used to delimit the thickness of the Pierre Shale in the vicinity of the site. These well locations should be shown on a figure in the context to the position of the existing mine site and North Trend. The logs for these wells should be shown on a separate cross section to display the thickness of the Pierre relative to overlying strata and the mining zone, and the potential for deformation within and below the Pierre. An interpretation of structure in the study area from these deep holes, coupled with data from shallow holes would be appropriate here. It will likely show how little is known about the exact nature and origin of the structure.

Page 9: Second paragraph; The nomenclature of the "Interior Paleosol" is no longer accepted within the literature. As early as 1983, Retallack showed that this unit was composed of two separate paleosols. The two units are the "Yellow Mounds Paleosol" that developed on the Pierre Shale and the "Upper Interior Paleosol" developed on top of the overlying fluvial sediments. It is unclear in the last sentence of this paragraph what eroded the surface of the Pierre. We all know sandstones don't erode things. It is the erosive event prior to the deposition of the sandstones that controls the magnitude and extent of incision, and that sandstones are what are deposited on that eroded surface. This needs to be cleared up before public notice.

Page 9: Paragraph 3; Again, the interpretation of log curves will be crucial to display to the general public in way that is informative and easy to understand. Not only should a blow-up section of an interpreted elog be shown, but also the cross sections should be presented at such a scale that the scale on each log can be easily read. This should likely be as a fold out plate at 36 x 48 dimensions. Additionally, not only should the cross-section show the A-A' or B-B' designation, but the sections should also be clearly labeled on each end "north" or "south", "east" or "west".

Page 9: Paragraph 4 - The Chadron Formation; The absence of reference to Terry's (1998) lithostratigraphic revision of the White River Group is unacceptable. This was published as GSA Special Paper 328 and established revisions of the stratigraphy now used by the Nebraska Conservation and Survey Division - Geological Survey and most other geologists working in Nebraska and South Dakota. All stratigraphic interpretations must be revised to reflect this now accepted lithostratigraphic framework (this includes all cross-sections).

Page 9: Basal Chadron Sandstone; Using the most recent and widely accepted nomenclature, the "Basal Chadron Sandstone" is actually the channel sandstone facies of the Chamberlin Pass Formation. Additionally, an interpretation regarding the depositional environment for the Upper/Middle Chadron sand has been placed in the last sentence of the paragraph on page 9. This does not belong in this section, and should be moved to the next section of the document.

Page 10: Paragraph 1; The Basal Chadron Sandstone at North Trend is described as being overlain by "*a persistent clay horizon, typically brick red in color generally marks the upper limit of the Basal Chadron Sandstone*". However, reports from Dave Carlson, as well as meetings between NDEQ and CBR indicate that observed borehole cuttings at North Trend do not contain the "red clay"; there is no "red clay" zone picked on any logs shown; and that it is in fact missing completely in the North Trend area. This change is depositional in nature, likely relates to structure, and requires a detailed review and explanation. Further, this distinctive and persistent red clay or mudstone horizon is the overbank mudstone lithofacies of the Chamberlin Pass Formation (Terry, 1998, pg 26) and typically ranges from 0.8 to 1.8 m thick in outcrop.

Page 10: Paragraph 2; Basal Chadron Sandstone is reported to thicken to 170 feet west of the "North Trend Property Boundary". However, at what point on the western boundary does this occur? Only one east-west cross section was presented in the document, and it is at the very southern boundary of the North Trend Expansion Area. Why does this thickening happen? What is the relationship of sediment thickness to the local structure? What is the change in associated stratigraphic architecture, and how will that play a role in hydraulic control of the site?

Page 10: Paragraph 4; Text in this paragraph references thin section mineralogy of the Basal Chadron Sandstone for the original Crow Butte Study Area (CSA) and implies that the mineralogy of the Basal Chadron at North Trend is exactly the same. This data is not site specific for North Trend and is therefore unacceptable. This is especially true when it appears likely that the deposition of the Basal Chadron Sandstone at North Trend may have been contemporaneous with deformation of the Pierre. Therefore, there may be significant textural changes in the Basal Chadron as well as mineralogical changes that would be related to deformation along the Crawford/White River Structural Uplift. Core samples will need to be collected from North Trend at a variety of locations (i.e., spatially representative) and analyzed for mineralogy and petrologic characteristics, as well as fundamental petrophysical characteristics to describe North Trend-local textural, mineralogical, porosity and permeability parameters.

Page 10: Section on Middle Chadron and Upper Middle Chadron Sand (first paragraph); The Middle Chadron" would appear to be the revised Peanut Peak Member of the Chadron Formation (Terry, 1998; Terry and LaGarry, 1998) and the Upper/Middle Chadron Sandstone appears to be the Big Cottonwood Creek member of the Chadron Formation (Terry, 1998; Terry and LaGarry, 1998).

This section begins discussion by stating the Middle Chadron is a confining layer above the Basal Chadron Sandstone, that ranges in North Trend from 200 to 300 feet thick. However, no supporting evidence is provided to establish the permeability of the Middle Chadron within North Trend, or where this unit thickens and thins. Bentonitic interbeds are referenced as being present, however no reference to how bentonitic mineralogy has been determined is mentioned. This is something that can only be substantiated through x-ray diffraction or microprobe analysis, so where is the data to support this claim? The authors claim that the "light green-gray sticky clay of the Chadron serves as an excellent marker bed in drill cuttings and has been observed in "virtually all' drill holes within the Crow Butte area, including North Trend." If this is the case, then where has it not been observed, since "virtually all" implies that it is not present at some locations. Where are the lithologic logs to back this claim? One thing that is conspicuously missing from this document are ANY lithologic logs. Further, the hydraulic conductivity of the "Middle Chadron" at North Trend is inferred from vertical hydraulic conductivity data collected from the original Crow Butte Study Area (CSA). Again, as previous, why is this data not site specific? Additionally, how is it possible that the mineralogical, petrologic, and petrophysical character of the Middle Chadron at North Trend is the same as the CSA when it is clear (from the data presented in this document) that the "Middle Chadron" at North Trend has been deposited into an actively subsiding basin. This depositional environment is completely different than that to the south of the Crawford/White River Structure, which is where the original CSA is located. The structural and stratigraphic data presented in this document indicates that, at a minimum, a textural change should be evident in samples collected from south to north across the structure (i.e., from the highland into the basin). As such, a textural change is likely across this boundary, and that textural change will likely impact potential vertical and horizontal hydraulic conductivities. These textural changes may also be coincident with mineralogical changes that ultimately correspond to significant facies shifts across the Crawford/White River Structure and into the associated Crawford Basin.

Page 10: Section on Middle Chadron and Upper-Middle Chadron (second paragraph); This paragraph is obtuse, difficult to read, and needs substantial revision to convey whatever message it is aimed at communicating. Is the Upper/Middle Chadron a sand or a sandstone? Data in this document indicates a sandstone. Therefore, call it sandstone, and make sure it is noted as an informally named unit. If it is detailed within more recent revisions of the stratigraphic nomenclature, then you must utilize that terminology, and again, if it would appear to be an informal unit within the most recent nomenclature then it must be referenced as such. Additionally, a reference is made to a "regional depositional model", without a citation as to what or whose model it is. Also, if this model has validity, does it apply to the Basal Chadron as well as the purported Middle Chadron? If a model is referenced, it must be substantiated. This document forms the foundation for any future discussion for an aquifer exemption. Each claim made within the document must be substantiated and appropriately referenced and based on sound science. If the claim is made out of original research, from original unpublished data collected, then the data set must be shown, along with the associated interpretation. Anyone reading this document, who decides to research the referenced claims, must be able to reach the same conclusions. If it is new data presented, then the interpretation of this data must be supported by the data. At this point in the document, there is a lack of ANY supporting evidence that has been collected and analyzed directly from the North Trend prospect.

Page 11: First Paragraph; The Upper Middle Chadron sandstone is described as being very "_similar in appearance to the Basal Chadron Sandstone, and is typically very fine-to-fine grained, well sorted, poorly cemented sandstone. At other locations it is of poor quality_." Does this refer to the Basal Chadron or to the Upper Middle Chadron? If this is the Upper/Middle Chadron Sandstone, then it is not at all similar to the Basal Chadron as described previously in this document. On page 10 of this document the Basal Chadron is described as a coarse-grained arkosic sandstone with varying amounts of clay interbeds that grades vertically into a fine grained sandstone with varying amounts of interstitial clay and persistent clay interbeds. Additionally, what does a "poor quality" mean? The inference is that the sandstone is of "poor quality", however this meets no known geologic textural or mineralogical description that we are aware of. Is it of "poor quality" as compared to some property of another sandstone? Please define or remove. Provide an appropriate stand-alone description of the Upper Middle Chadron Sandstone that is representative of the unit when found within boreholes. This description should be inclusive of observations obtained from both cuttings and cores.

Page 11: Second Paragraph; CBR states in this paragraph that the Upper-Middle Chadron Sandstone be included in the Aquifer Exemption due to its potential for commercial grade uranium deposits. However, CBR has presented no evidence that this unit contains ANY concentrations of uranium that may be considered to be of commercial value. This request may be denied unless it can be supported with widespread evidence within the proposed exemption boundary that it may be a viable production target.

Page 11: Third Paragraph; The "Upper Chadron" unit would appear to be within the Big Cottonwood Creek Member of the Chadron Formation (Terry and LaGarry, 1998). Therefore, some of the stratal inconsistencies highlighted below may be resolved utilizing the accepted lithostratigraphic revision. CBR states that the Upper Chadron represents a major facies shift from stratigraphically lower units in the Chadron Formation, and that this "Upper Chadron" is continuous, but of varying thickness through the North Trend prospect area. Stratal thicknesses within this zone change by over 150 ft. Are these thickness changes explained by facies variations, stratigraphic architecture, or post-depositional modifications (or all of these), or by lithostratigraphic revision? What effect might these factors play in overall hydraulic conductivity? It is not clear where the lithologic characteristics referenced in this paragraph come from. It is likely these data are from the original Crow Butte Study Area (CSA) and therefore are not acceptable as local descriptors for the Upper Chadron at North Trend. Again, changes in structural accommodation for sediment storage also likely plays a key role in stratigraphic architecture and sediment dispersal patterns. North Trend specific data for this unit that is spatially representative is required for this petition.

Page 11: Paragraph 4; Terry and LaGarry (1998) state that the Brule/Chadron contact is intertounging except where the channel sandstone of the Orella Member of the Brule incise into the Big cottonwood Creek Member. CBR states that the contact between the Brule and Chadron is conformable, but is also gradational and not easily distinguished. As stated above, others would argue that this is not the case and that there is a lithologic break between the two formations that is identifiable. As such, it is inappropriate to lump the Brule and Chadron together as a single confining interval for the purpose of this discussion. Additionally, siltstones and claystones of the Lower Brule may be fractured due to the structural modification on the Crawford/White River Structure, and thus may be more permeable than other locales. This coupled with the widely dispersed or intermittent channel sandstones of the lower Brule may create permeability pathways that are heretofore uncharacterized. Again, site specific core data will be required to proceed with the aquifer exemption.

Page 11: Paragraph 5; CBR states that Upper Brule siltstones "*have a larger grain size than the lower part of the Brule Formation*". Where is the sieve data to support this grain size differentiation? How was this determined? What is the criteria that was used to make this statement? Also, Terry and LaGarry (1998) should be reviewed and referenced in this section.

Page 11: Paragraph 5; CBR states that small sandstone units of limited lateral continuity and water bearing capacity are found in the upper part of the Brule.

They also state that "*These sandstones have been included in the upper part of the Brule Formation and are illustrated on the series of cross-sections as overlying the upper confinement (Figures 5a and 5b).*". However, in reviewing the cross-sections presented on Figures 5a and 5b, there is no differentiation of units or interpretation of internal architecture for the Brule, and only a formational rank break is shown as the contact between the Chadron and Brule. It is unclear if this formational pick is as implied in the preceding Paragraph 4, and that the Lower Brule is lumped in with the Upper Chadron, and therefore the actual formation break shown between the Chadron/Brule is somewhere below that shown on the cross-sections. The above underlined passage is thus misleading, as the reader anticipates architectural information to be presented on the cross-section showing the relative positions and geometry of sandstone bodies within the Brule. Instead the reader finds a single formational level break between the two formations, and that break may in fact, not be representative of the base of the Brule. Cross-sections must be reworked to show accurate formation level breaks and as much 2D internal architecture as possible. Confining unit interpretations should be shown using a different symbology, so that cross-sections do not become over-simplified representations. Therefore, cross-sections should ultimately show 1) accurate depth scaling; 2) formational breaks; 3) member breaks; 4) bed or unit level breaks; 5) 2D architectural information at all levels of stratigraphic hierarchy; 6) separate, but overprinted symbology for interpreted hydrogeologic characteristics (this should include confined water table elevations, direction of groundwater gradient, position of confining unit placement especially if these are not coincident with formational level boundaries, placement of multiple aquifers, potentiometric surfaces and multiple confining units, etc.). This will allow the end user to immediately relate the text to the cross-section, and find the data to support the interpretations proposed.

Page 12: Paragraph 1; Alluvium is described in this section, and is noted as covering the North Trend area in variable thickness from 0 to 30 ft. The alluvium is reported as being potentially water bearing, but not reliable water source due to the discontinuous nature of the deposits. The relative stratigraphic position and location of the alluvial deposits are not shown on the cross sections. Cross sections should be modified to show the alluvial units. If the cross-section scale needs to be modified to achieve this goal, then it should be done. These cross-sections suffer in general from being to small, and thus scales on actual electric logs or nuances in elog curves cannot be visualized. If cross-sections were provided on 36 by 48 fold-out plates, scales could easily be shown, as well as the basic occurrence and geometry of alluvial units as well as other architectural elements within specific formations. These data will allow the user to gain a greater understanding of the details that are currently missing in the existing oversimplified cross-sections.

Page 12: Paragraph 2; Site Stratigraphy; This section is NOT the site stratigraphy section. The preceding section detailed the site stratigraphy. This section interprets the 3D geometry of planar surfaces at formation, member, or subunit rank, as well as provides a visualization of the interpreted structural deformation, especially along the top of the Pierre. It is not correct to state that the figures referenced (Figures 10A through D) within this section provide evidence for showing the hydraulic isolation of the proposed Aquifer Exemption interval from any underlying or overlying units. These figures clearly do not display ANY hydrogeologic data, or provide a visualization of the total thickness of any single unit. Rather, basal or top surfaces are picked to display the geometry of the bounding plane. What would very useful in aiding in any interpretations would be the 3D geometry of the thickness of each unit of interest, and the position of the unit relative to the interpreted structure on the Pierre. What would also be very useful is this same technique applied to the thickness of the Pierre, to help interpret fault or fold status.

Page 12: Section 3.4: Structural Geology; Is figure 11 the most up-to-date structural interpretation of the area? Based on the most recent interpretations, is a new structure map needed?

Page 12: Structure- Paragraph 2; CBR has drilled hundreds of holes in the area and has a huge data set available for interpretation, yet is relying on a 1969 interpretation of a limited regional data set to interpret localized structure. This does not seem reasonable. Additionally, why is there no reference to more recent data, such as Figure 4 from LaGarry (1998) or Figure 3 from Terry and LaGarry (1998) which shows details of faulting in the Toadstool Park area.

Page 12: *Structure – Paragraph 3;* CBR states that the bedrock geologic map indicates that the Brule subcrops below the NT expansion area . However, upon examination of Figure 12, the geologic map, the Brule is not shown as an individual unit but rather the White River Group is shown in total (map symbology Tw). In addition, map symbology for the White River (Tw) is missing from the enlarged view of the study area. The text in this section should accurately reflect the data shown on the map. The faults discussed in the text are not shown on the State geologic map because DeGraw did not have them mapped accurately. See Hunt (1990) GSA Special Paper 244 for a more accurate map of faults in northwest Nebraska. Also see A. Lisenbee, 1985, Tectonic map of the black Hills uplift, Montana, Wyoming and South Dakota: Geological Map Series 13, scale 1:250,000; and Lisenbee, A.L., 1988; Tectonic history of the Black Hills uplift, in Diedrich, R.P. and others, Wyoming Geological Association Annual Field Conference Guidebook, pp. 45-52.

Page 13: Paragraph 1; The descriptions of formation dips in this paragraph are misleading. CBR states that "*As a result of structural uplifts (Figure 11), formations in the North Trend Expansion Area generally dip gently to the south...*". This is not an accurate statement after reviewing the data that has been presented herein. In general, units within the northern portion of the North Trend Expansion Area (NTEA) dip steeply to the south (see figure 5a) and units in the southern portion of the NTEA deep very steeply to gently to the north (see figure 5a). In addition, dips depicted on figure 5b indicate that there is also a pronounced westerly dip component. A complete analysis of all available borehole data may yield very steep dips to the northwest in the southern NTEA and steep to moderate dips to the southwest in the northern NTEA. This may also be substantiated using the 3D surface models generated and shown on Figures 10a – d, which represent a larger proportion of the available borehole dataset. Structure contour maps generated shown on Figures 13 and 14 also do not support the concept of "gentle southerly dips".

Further, it is apparent on the cross-sections presented that there is likely an evolution of dips as the Crawford Basin filled. Basal fill in the basin was more profoundly influenced by basinal subsidence than were later fill components. It is likely, as previously commented on in the stratigraphy section, that this change in accommodation for the fill has impacted the stratigraphic architecture of the units overlying the Basal Chadron Sandstone. Changes in accommodation, potentially related to deformational events likely control the influx and distribution of the Middle Chadron Sandstone as well as the facies changes (and again, stratigraphic architecture) of all fill above the basal member. This is very apparent when comparing the data presented on the Brule Formation as compared to the Chadron. The contact between the Brule and the Chadron is generally flat lying or gently dipping rather than steeply dipping into the basin. This would indicate that accommodation within the Crawford Basin was very limited by the time Brule sediments were being deposited and the basin was close to full.

Page 13: Paragraph 2; CBR indicates that previous exploration efforts yielded data to support the interpretation of a fault (known as the White River Fault) immediately northeast of Crawford. CBR states that throw along this fault is interpreted to be approximately 200 ft to the south-southeast. However, data presented on the cross-sections (Figure 5a-b) indicate more than 400 ft of offset along this structure (~2980 to 3420 along the base of the Basal Chadron Sandstone). The structure contour map shown on Figure 6 also indicates more than 400 feet of elevation change in the Pierre within less than ½ mile horizontal distance (see southeast quarter of section 34, Figure 6). A more accurate accounting of relief along this structure is required.

CBR also states at the end of this paragraph that they are now interpreting this structure to be a deep seated fault that does not penetrate the Pierre, but rather deforms the Pierre as a monocline. CBR goes on in the following paragraphs on page 13 (paragraphs 3 and 4) to attempt to justify this interpretation. However, no hard evidence is presented for either argument (that is, fault or fold) but rather that a fold interpretation is equally as justified given the current data set as is a fault interpretation.

CBR states that "*cross-sections show that the Basal Chadron Sandstone is pervasive and correlatable throughout the area and does not appear to exhibit* *thickness changes across the White River fault/fold, suggesting that movement along this feature did not impact deposition of the Basal Chadron Sandstone*". However cross-section 5a and isopach maps of the Basal Chadron Sandstone show some subtle thickening of the Basal Chadron Sandstone into the basin depocenter. This thickening may have been the result of contemporaneous subsidence with the deposition of the Basal Chadron Sandstone. Clearly this basal unit is deformed over the structure shown on the top of the Pierre, but stratigraphically up section, units reflect less deformation (or structural influence) over unit thickness, and thus may reflect architecture related to infilling of accommodation within the basin. Multiple views of the 3D geometry of the full thickness of individual basin fill units, rotated to differing views would aide significantly in interpreting these data.

Page 14: Paragraph 1; CBR states that the "*Upper and Middle Chadron/Lower Brule thin across the mapped fault suggesting that movement along the monocline/fold may have impacted deposition of the Upper/Middle Chadron*". However, is this unit thinning over the structural high or is it thickening into the adjacent basin as part of the composite fill? As previously stated in this review, the gross architecture of units appear to be that of a basin filling in response to initial subsidence, but not one that is necessarily continuously subsiding. Episodes of pulsed uplift along the structure may be reflected in the distribution of the Middle Chadron Sandstone. More data and detailed subsurface mapping on both sides of the Crawford/White River Structure are required to resolve this question. Mapping should be generally widespread, and be inclusive of data collected to the south at the existing mine site, as well as data collected to the north at NTEA. Conspicuously missing is the gap represented by the town of Crawford, and exploration efforts should include this area to appropriately define the subsurface structure and the impact it may have on the distribution of the mining zone and overlying and underlying confining units.

In addition, how would this interpretation change if the revised stratigraphy of Terry and LaGarry (1998) had been used? As they demonstrated, faults clearly offset the Peanut Peak and Big Cottonwood Creek Members of the Chadron Formation in Toadstool Park (see Fig 3 of Terry and LaGarry (1998) and Fig 4 of LaGarry (1998)). How is the offset of these units at Toadstool related to the structure at Crawford? Is it related at all? If there have been a series of deformational events, how does this effect the hydrogeology of the area.

Page 14: Paragraph 2; As previously stated, there is not enough evidence presented to support the interpretation suggested in this paragraph. Additional exploration and mapping are required to adequately define this structure.

Page 14: Summary of Site Geology; There is a discrepancy in the summary between the first and second paragraphs regarding the thickness of the confining unit above the Basal Chadron Sandstone. CBR states in paragraph 1 in this section that "*The Basal Chadron is overlain by over 500 feet of the impermeable* *to low permeability Upper and Middle Chadron and Brule Formations".* In the second paragraph in this section, CBR states that "*The thickness of the upper confinement ranges from 150 to 250 feet within the North Trend Area.*" Therefore there seems to be a fundamental discrepancy regarding the purported thickness of the "confining" unit.

Page 14 and 15: Summary of Geology; last paragraph on page 14 and first paragraph on page 15; CBR states that "*Based on core analysis from the CSA, it is evident that the upper and lower confining beds (the Upper Chadron through Brule and Pierre Shale, respectively) contain significant percentages of montmorillonite clay and other clays and/or calcite. Those would indicate the presence of clay minerals with very fine grain sizes. Core and hydrologic data from the CSA indicate that the vertical hydraulic conductivity of the confining shales and clays overlying and underlying the Basal Chadron Sandstone are on the order of 10^{-10} cm/sec, or lower. The geologic information presented in this application clearly demonstrates the lateral continuity of the overlying and underlying confining zones on both regional and local scales, as well as the lateral occurrence and distribution of the Basal Chadron Sandstone.*"

As stated previously, these types of statements are unsupported and misleading. Other than on a gross, formational level scale, no sedimentologic evidence has been presented to indicate textural, petrographic, or hydraulic characteristics are continuous across the area from the existing Crow Butte Mine to the North Trend Expansion Area. No site specific sedimentologic or hydrogeologic data has been collected from NTEA, and this must be corrected. An aquifer exemption cannot be predicated on core data collected from another location. Data presented for discussion or to support technical arguments must be site specific. Data from the CSA will not be accepted in lieu of data from NTEA. In addition, the statement that "*Those would indicate the presence of clay minerals with very fine grain sizes.*" is a misleading statement. Is CBR really suggesting that they are differentiating between clay particle sizes? If so where is the supporting evidence?

Page 16: Section 4.2.1; CBR states that "*Alluvial deposits occur intermittently in ephemeral drainages...*". This statement is confusing. That alluvial deposits occur in ephemeral drainages, is correct, as all drainages by definition will contain alluvial sediments. However, it is unlikely the "sediments" are intermittent, but rather the "ephemeral" drainage is what is intermittent.

Page 17: Paragraph 3; CBR states that "*The Upper/Middle Chadron Sand occurs intermittently*". There is no clear evidence presented in this document to support this statement. Previous data shown on Figures 5 and 10 clearly indicate the Upper/Middle Chadron Sandstone is a pervasive feature within the Crawford Basin. If CBR is implying that the Upper/Middle Chadron Sandstone is not found as a regionally extensive unit (that is, outside the Crawford Basin), then

they should state that. However, the Upper/Middle Chadron Sandstone is likely an important unit within the basin.
CBR is presenting conflicting information for review with regards to the Upper/Middle Chadron Sandstone. On page 11 of this document CBR states they want this unit exempted as part of the aquifer exemption due to the potential for mining, however here CBR is stating there was limited groundwater production, and no samples collected. Therefore, based on the data presented, it is unlikely that this unit has any potential for future mining efforts.

Page 17: Paragraph 4; CBR states that "*On a regional basis...Because of limited data density, no potentiometric interpretation is presented...However the available data suggest a regional hydraulic gradient to the north.*". How can an aquifer exemption be granted on the basis of a suggested hydraulic gradient? Why is there limited regional groundwater monitoring data? CBR should install wells and collect the requisite data to provide an accurate and repeatable determination of regional groundwater gradient. Further, data referenced from the CSA for this purpose, are misleading, and have little value in assisting in the interpretation of regional gradient inclusive of the NTEA. These data are collected on the south side of a major structural feature, and represent water levels collected where the aquifer is in a position some 400 feet higher in base elevation than in the NTEA. In this case, regional data is lacking and must be collected for an exemption to be appropriately evaluated.

Page 17: Paragraph 5; In contrast to the above, CBR states that groundwater gradient in the Basal Chadron within the NTEA is to the east (Figure 21). This by itself seems in question, as this gradient is directed, at least in part, towards the uplift on the Crawford/White River Structure. Although this data is placed within the caveat that it is only four data points, it is clear this gradient would be contrary to what would be expected. Again, this analysis suffers from lack of information, and more site specific data would be aid significantly in resolving such discrepancies. More than four data points will be required to provide an accurate estimate of gradient for the purpose of an aquifer exemption.

Page 18; Section 4.2.2- Groundwater Quality Data; Well locations shown on Figures 18 and 19 are unacceptable. This particularly applies to wells that are referenced as sample locations. The proposed aquifer exemption boundary is drawn through well numbers shown on the map and thus obscures the symbols and makes identification of well locations difficult. Additionally, the abandoned well that was previously used for sample collection is not shown. This well location needs to be placed on the map showing as an abandoned well.

All wells identified in the "water user survey" need to be included on a table within this document. A large number of wells are shown on Figures 18 and 19, but there is no summary of well information (other than that provided in Appendix A, that is not referenced in this section). As on the map, where wells have been broken down by stratigraphic position, this also needs to be shown on a table to include: sorting by: owner, registration and number, or document as unregistered; stratigraphic position; well number; legal description; gps location; total depth, depth of screen interval(s), primary seal interval(s); secondary seal interval(s); production flow rate. If this is the data that is supposed to be in Appendix A, then it needs a "call out", and Appendix A data needs to be modified to meet these requirements.

On page 19, paragraph 1, CBR states that "*These data establish the groundwater conditions associated with the mineralized Basal Chadron Sandstone and Brule in the North Trend Area, at a location immediately outside and northeast of the proposed expansion area*". As CBR has stated, these data do not represent groundwater conditions within the aquifer exemption boundary. This is particularly true with regards to the Basal Chadron Sandstone as samples collected are not from within the major mineralized portion of the ore zone. In general, the number and location of wells within the NTEA are few, and not widely distributed or necessarily representative of NTEA. Groundwater monitoring wells should be installed in both the Chadron and Brule formations that are spatially distributed so that the most representative groundwater data can be presented. The Current NRC permit (SUA-1534, Section 10.3) establishes a *minimum* criteria for determination of baseline as three biweekly sampling events from monitoring wells within proposed mine units, and this condition was incorporated into the Class III permit for the current CBR mine site. However, another approach to consider is to compile an accurate pre-mining data set by sampling strategically located, spatially representative wells on a monthly basis for a period of 12 to 24 months to show natural (background) data from at least one or two complete seasonal cycles. The current data presented is spatially limited and temporally disconnected, and does not provide an accurate assessment of the groundwater quality within the Chadron or Brule within the extent of the proposed aquifer exemption boundary.

Page 19: Section 4.3 – Aquifer Testing and Hydraulic Parameter Identification; ***This section is has no validity as pump test results referenced in this section were never reported to NDEQ.*** Pump test data for the referenced aquifer testing must be included in whole with this document as an appendix, or must be submitted under a separate cover. While the technical data from this section is completely unsupported due to the lack of the required documentation, the following comments can be provided:

Page 19, Paragraph 2 under section 4.3; CBR states that the aquifer behaves as an isotropic and homogeneous media. How can this be when this document clearly states that clay discontinuities are widely prevalent within the Basal Chadron Sandstone? As stratigraphic architecture is complex, with many permeability boundaries, how does CBR explain the homogeneous and isotropic behavior?

Page 20, Paragraph 1 – bullets; There is to much mixed and inconsistent nomenclature in this document. There is no Basal Chadron Production Zone, but rather only the Basal Chadron Sandstone. If you want an abbreviation for this, then use a callout such as BCSS. Also, there is no value in now lumping all water bearing units overlying the Basal Chadron Sandstone as "overlying aquifers". Spell out what these units are so that the reader can follow what water bearing zones you are specifically identifying as being isolated from the Basal Chadron Sandstone.

Again, the same applies in Paragraph 3. The generalities of talking about the "production zone" does not fit with the specific stratigraphic identification that has been included to this point in the document. Also, you are talking about rocks here, so the use of the word "sands" is not appropriate. Use either "sandstone" or "aquifer" to make the intended points. The above comments apply to the remainder of this section. It should be completely rewritten to remove the nomenclature issues.

Page 21: Paragraph 2; As stated in the first paragraph for the review of this section of the document, the "North Trend Hydrologic Testing Report" as referenced in this paragraph was never provided to the NDEQ for review or approval. Therefore results claimed within this section of the document and referenced from that report cannot be substantiated. Given that the fundamental aquifer characterization data is missing, Section 4.4 of the document cannot be adequately reviewed at this time. However a few comments can be provided:

Page 21: Section 4.4, Paragraph 3; Please specify on Table 7 the wells from which these data were collected, and from what time period. If the data is collected from multiple, but temporally disconnected time periods, then clearly display that information.

Page 21; Paragraph 4: CBR states that the water bearing zone within the Brule is likely dissected, and is in communication with the White River. Given that this one possible, but important interpretation, wouldn't it be appropriate to provide monitoring data from the White River and from wells set into the Brule aquifer adjacent to sampling locations in the White River? This could be especially important information with regards to future potential failure of injection or production wells through the Brule that may result in communication with surface water. The exact nature of the relationship between groundwater and surface water within the proposed exemption area should be established as part of the exemption process.

Page 22, Paragraph 1; CBR states that the upper contact of the Basal Chadron Sandstone dip to the east, and is concurrent with an easterly groundwater gradient direction within this unit. However data presented in this document contradicts this interpretation, and Figures 10a-d show that both basal and upper surfaces of the Basal Chadron Sandstone dip to the north and west, especially in close proximity to the Crawford/White River Structure. As a side question related to this paragraph, are there any studies that show the change in water quality from what is believed to be the "recharge area" to that of the ore bodies? Is there any sense of transport timing from the recharge area to the mining area?

Page 22: Paragraph 2; CBR states that no hydraulic communication has been identified between the Basal Chadron Sandstone and the White River. Has CBR conducted any surface water monitoring during any aquifer testing programs to verify this statement? What has CBR done to "identify" this possible connection?

Further, CBR states that a monocline or fold is present within the Pierre, Chadron and Brule. There is no clear evidence presented in this document to support this statement. In fact, as previously identified elsewhere in this review, there appears to be more evidence of architectural elements of basin infilling such that by Brule time, contacts entering the basin are relatively flat and uniform, and thus unaffected by folding. Evidence for deeper structural expression is evident at the top of the Pierre and within the Basal Chadron Sandstone but above that unit, structural expression appears subdued, and basin fill architecture may predominate. The statement that groundwater flow does not appear to be defined by the Crawford/White River Structure is not supported. Data needs to be collected on top of, and immediately adjacent to the structure, as well as spatially removed from the structure so that groundwater flow in this region can be appropriately defined. It is not appropriate to wait to collect this information after the aquifer exemption, but rather these data should be part of the aquifer exemption petition. For instance, one contradiction to the current interpretation would be the presence of the artesian wells north of the Crawford/White River Structure. As an example, one possible hypothesis for the explanation of artesian wells to the north would be the large elevation change in the Basal Chadron to the north of the structure coupled with land surface elevation decrease to the north of the structure. Thus, if the potentiometric surface from the existing mine site south of the structure to the NTEA north of the structure are truly connected, then the potentiometric surface across this 400 ft structural divide would provide the head required for artesian flow to the north.

Clearly, as stated elsewhere in this review, this is an area that lacks appropriate site specific data collection. More detailed data will be required to be collected in the vicinity of the Crawford/White River structure to verify hypotheses that are being used to justify the proposed aquifer exemption before the aquifer exemption petition can be appropriately reviewed.

Page 23: Section 4.6 – Lateral and Vertical Extent of the Exempt Aquifer; CBR states that the "Upper/Middle Chadron Sand" should be included in the aquifer exemption, even though it is part of the confining unit, because possible uranium reserves may be present within the "Upper/Middle Chadron Sand". CBR has presented no evidence to support this statement. There have been no reported ore grade uranium discoveries within the "Upper/Middle Chadron Sand" and therefore this premise is wholly unsubstantiated. Unless CBR can show that ore grade deposits exist within this unit within the proposed exemption area, it may not be included in the exemption.

Page 24: Paragraph 3; CBR states that "*In some areas, limited alternative supplies of stock water are provided by the underlying Basal Chadron Sandstone*". This being the case, where are these wells specifically located? Are they shown on any figures included with the document? If so, this is not immediately obvious and should be called out in this text. If these locations are not included, a new figure should be provided showing these locations.

Page 24: Paragraph 5; As mentioned previously in this review, it is unclear where the groundwater summary data was collected. Where is the specific name and location data for these wells? Where are the specific analytical results? The wells used for this summary should be shown on a figure, and the historic data for each well should be provided in tabular form to support the summary.

Page 25: Paragraph 2; As indicated in this text, well 61 shown in Appendix A is used for domestic as well as agricultural purposes. This well, while outside the proposed exemption boundary, will end up being located between two active uranium mining areas. What is the extraction rate from this well? Can another source of domestic water be supplied to this user? Some Basal Chadron wells are located in close proximity to the proposed exemption boundary. What are the historic extraction rates for these wells? How will CBR ensure that these well users will not increase flow rates during mining activities and thus effect the distribution of liberated uranium? What procedures will CBR have in place to be able to monitor flow rates from these wells so that hydraulic adjustments can be made to ensure containment of mining fluids? What are the "RC" wells, and why are they not in use? Are there plans to utilize these wells in the future? What about the location of a Chadron Well in the Crawford cemetery? This well is missing from the data shown, but the well does exist and is reported to be roughly 700 feet deep.

Page 26: Section 5.1; CBR states that there is no domestic use of the Basal Chadron Aquifer within the proposed aquifer exemption boundary. However, in close proximity outside the exemption boundary at least one well is used for domestic purposes, and a number of wells are used for agricultural purposes. This then seems to establish that the groundwater in the vicinity of the NTEA has some beneficial use, and is (or can be) used for domestic purposes. If that is the case, how does the proximity of these beneficial uses affect the argument for exemption?

Page 27: Section 5.2; CBR indicates that within the proposed exemption boundary, the criteria for exemption under Title 122, Chapter 5, Section 004.02A and 004.02C are satisfied, and therefore the exemption should be granted. Title 122, Ch 5, Sec 004 states that "*An aquifer or a portion of an aquifer which meets* *the criteria for an underground source of drinking water may be designated as an exempted aquifer if the following criteria are met: 004.01: It does not currently serve as a source of drinking water; and 004.02: It cannot now and will not in the future serve as a source of drinking water because..."* of the conditions listed under 004.02A-D. However, as stated above, if groundwater from the Basal Chadron may be used as a domestic supply in close proximity to the exemption boundary, then it seems that passage of the test under Title 122, Ch 5, 004.01 is questionable. How will CBR address this issue in a public meeting?

This aquifer however is clearly mineral bearing and due to the mineral type, should not likely ever have been used as a domestic source of drinking water without some primary treatment to remove radioactive nuclide concentrations. This then presents an interesting paradox in that the unit has been used as a drinking water source, but is also mineral bearing and thus meets two contradictory criteria covered within the regulations. Is there possibly an overarching solution that can be presented by CBR with regards to domestic water supplies to protect the health and safety of persons in the vicinity of Crawford?

Page 27: Section 5.2.1; Statements in paragraph two of this section have been commented on elsewhere in this review. Again, here as elsewhere, it is not appropriate to rely on data from the CSA to argue sedimentologic or hydrogeologic characteristics for NTEA. Site specific data from NTEA is required to support claims within the exemption petition, and the document needs to stand alone without linkage to the CSA.

The same discussion applies to Section 5.2.2 on page 28. CBR should supply data from monitoring wells spatially distributed within the ore body at NTEA to make this argument. Presenting data from the CSA is not appropriate for the exemption petition. Data presented to support the argument that wellhead treatment for the removal of radioactive nuclide concentrations is nonspecific and it is not apparent from the discussion presented that costs for such technology would be prohibitive. Costs for wellhead treatment specific to Crawford area residents should be provided for review as part of the exemption petition.

Page 30: Conclusions; As stated in this review, many arguments presented in this document are not derived from site specific data. Therefore any conclusions drawn from these data for the NTEA may be flawed. Site specific data needs to be collected to support conclusions that advocate acceptance of the aquifer exemption petition.

General Comments on Figures and Tables: 1) All cross-sections would be better presented on large format 36 x 48 drawings. This would allow log traces and scales to be readable, and interpretations to be better visualized; 2) Labeling of borehole or well locations can be improved such that they are readable. This is particularly true with regards to the coincidence of holes with boundary lines, or the proximity to other well/borehole locations. Leader lines might help in these instances. 3) Well location 114 on Figure 18 is shown as a Chadron well, yet it is listed in Appendix A as a Brule well. Which is it?; 4) Table 1 should be corrected to show the correct Pennsylvanian-Permian boundary. See Sawin et al., 2006 In Current Research, Kansas Geological Survey; 5) Table 3 should be corrected to show the most up-to-date nomenclature for the area; 6) Table 9 and 9a should have legends explaining units utilized, or a master legend should be supplied at the beginning of the "Tables" section detailing all units utilized on all tables; 7) Appendix A should include the quarter/quarter, section, township, and range location for each well; whether the well is registered or unregistered; well construction details including seal locations; gravel packs, casing and screen intervals; wells should be double checked for accuracy of formation location and depth and operational status, as some locations appear to be incorrect.

B

AN ECONOMIC EVALUATION OF A RENEWED URANIUM MINING BOOM IN NEW MEXICO

A REPORT PREPARED FOR THE
NEW MEXICO ENVIRONMENTAL LAW CENTER

BY

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An Economic Evaluation of a Renewed Uranium Mining Boom in New Mexico

A report prepared for the New Mexico Environmental Law Center

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This report is available online at nmenvirolaw.org.

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Figures and Tables

About the Author

Thomas Michael Power is a Research Professor of Economics at the University of Montana. He retired from teaching and administration in 2007. He served as Chairman of the Economics Department from 1977 to 2007 and has served on the faculty there since 1968. His fields of specialization are resource economics and regional economics.

Professor Power received his undergraduate degree, cum laude and Phi Beta Kappa, in Physics from Lehigh University and his MA and PhD in Economics from Princeton which he attended on a Woodrow Wilson national fellowship. He has taught at Lehigh and Princeton, as well as the University of Montana.

Professor Power is the author or editor of six books including ***Lost Landscapes and Failed Economies: The Search for a Value of Place*** (Island Press, 1996), ***Post-Cowboy Economics: Pay and Prosperity in the New American West*** (with R.N. Barrett, Island Press, 2001), and ***Accounting for Mother Nature: Changing Demands for Her Bounty*** (with T.L. Anderson and L.E. Huggins, eds. Stanford University Press, 2007). He is also the author of over a hundred book chapters, articles, monographs, and reports. In addition, he is a regular commentator on Montana Public Radio and in the regional and national press.

Executive Summary

As a result of a substantial increase in uranium prices between 2004 and 2008, uranium mining companies have shown increasing interest in New Mexico's uranium reserves. After reaching peak levels of production in 1980, New Mexico uranium production plunged dramatically, reaching near-zero levels by 1990. This uranium boom and bust cycle had disruptive impacts in the area between Gallup and Laguna – the Grants mineral belt - where most of New Mexico's uranium mining and processing historically took place. Now uranium mining companies and other business interests are promoting renewed uranium mining as a potential source of $30 billion and almost 250,000 jobs for New Mexico and the Grants area.

This report carefully explores this "economic bonanza" view of renewed uranium mining by first evaluating the calculation that generates the $30 billion and 250,000 jobs figures. Then, to get some perspective on what a renewed uranium mining industry might entail, it looks back at New Mexico's economic experience with uranium mining over the last half-century. In order to understand whether New Mexico and the Grants area really need the economic stimulus that renewed uranium mining would allegedly provide, the report reviews the adjustments that have taken place since the uranium mining bust of the 1980s. With that as background, this report then estimates the upper end of the potential impact of a new uranium mining boom on employment, payroll, and state and local government revenues. The report ends with a discussion of the implications uranium mining has for the new "amenity-supported" economy that has been developing in New Mexico for several decades.

Based on the data and analysis contained in this report, I reach the following conclusions:

1. The $30 billion that industry claims would come to the state in a new round of uranium mining is a gross exaggeration built around indefensible economic assumptions. It assumes that uranium prices return to the $90 to $100 per pound range and stay there indefinitely into the future. It assumes that almost all of New Mexico's uranium reserves would be mined. It assumes that all of the value of the uranium extracted and processed accrues to New Mexico workers and citizens. Finally the $30 billion is based on adding up assumed benefits over a 30 year period, rather than focusing on the *annual* benefits. If more defensible assumptions are made, the upper end of the potential annual direct benefit to New Mexico workers will be only about two-tenths of one percent of that $30 billion claimed. See Sections I and V.

2. New Mexico knows from experience with copper and uranium that metal mining is economically unstable. The state has been through many copper mining booms and busts and a major uranium mining boom and bust cycle. These cycles are a natural feature of global mineral markets and will continue into the future. That means that a renewed uranium boom will also go bust, once again disrupting the economies of towns and regions in the state. Economic instability is one of the public costs associated with uranium mining that has to be balanced against the benefits. See Section II.

3. Since the uranium mining industry went bust in the early 1980s, the state and local economies have diversified, employment has been growing, average real income has been rising, and unemployment rates have returned to relatively low levels. Despite the loss of 10,000 metal mining jobs in New Mexico between 1979 and 2006, the state was able to add 50 new jobs for every metal mining job lost, a total of almost 500,000 new jobs. Real per capita income increased by 40 percent. The unemployment rate has been cut in half from 6.2 percent at the time of peak metal mining employment in 1978 to 3.3 percent in the first quarter of 2008. This is about as close to "full employment" as the economy can get. See Section III.

4. The economies of the Grants area (Cibola and McKinley Counties) have also survived the near disappearance of the uranium industry by successfully diversifying. These small, relatively rural, economies suffered through a half-billion dollar boom and bust in terms of mining payroll and lost 6,400 uranium jobs during the 1980s. But non-mining income and earnings were hardly affected. The mining sectors were effectively isolated from the rest of the economy during both the boom and bust. After the uranium bust, payroll for jobs in the government, services, and trade sectors continued to expand, as did income from retirement and investments. After digesting the loss of the uranium mining jobs, employment, aggregate real personal income and real per capita incomes in McKinley and Cibola Counties rose significantly, and by late 2007 unemployment rates had declined to near full employment levels, 3.5 to 4 percent. In the process, between 1983 and 2005, 17,000 new jobs were created, a 74 percent increase. See Section III.

5. Important environmental and social costs must be considered when evaluating the commercial economic benefits of renewed uranium mining. Uranium mining has most of the same near-permanent environmental costs that metal mining in general has and, because of its radioactive character, uranium poses some additional public health concerns. Substantial natural resources, such as groundwater, have been irreparably contaminated by uranium mining and therefore cannot be considered as a resource to support future economic growth in the area.

   In addition, New Mexico and local communities will need to consider how mine and mill waste will be addressed. At 0.1% average ore grade, the industry will only extract 2 pounds of uranium for each ton of ore mined at conventional mines. At 2 pounds per ton, 157.35 million tons of tailings would be created in order to produce 315 million pounds of uranium. New Mexico already has about 100 million tons of waste at its existing sites. See Section IV.

6. To extract almost all of New Mexico's uranium reserves, over 300 million pounds of uranium, the Uranium Producers of New Mexico have estimated that 15 new mines and 3 new mills will be required. This level of uranium development is highly unlikely for all of the following reasons:

a. It would require uranium prices to remain high (above $90 per pound) indefinitely into the future. Uranium markets have never behaved in this manner.

b. New Mexico, with only 2 percent of the world's uranium reserves will have to compete successfully with the rest of the world's uranium producers many of which have higher grade and lower cost reserves.

c. The Navajo Nation has banned uranium mining and milling in Navajo Indian Country, blocking the development of a substantial part of New Mexico's uranium reserves.

d. Most of the suggested new mines and mills have not yet begun the lengthy permitting process required before production could begin. In addition, new conventional mines probably would not be viable without the construction of a new mill. For those reasons substantial increases in uranium production cannot take place for many years into the future. A boom is not imminent.

e. The financial and credit crisis that developed in 2008 has already blocked some proposed uranium developments in New Mexico. Other suggested developments will also face financial constraints especially given the uncertainty about uranium prices.

f. The current low cost method of extracting uranium, *In Situ* Leaching, can only be applied to part of New Mexico's ore bodies.

7. ***Assuming*** that the uranium mining industry could recover almost all of New Mexico's economically feasible uranium reserves over the next 30 years (a highly unlikely scenario; see 7., below) the following are the economic impacts at the upper end of what is actually likely.

   a. About 1,575 uranium mining and processing jobs could be created. In 2008 this would represent about one-seventh of one percent of total New Mexico employment. Since 2000 the New Mexico economy has created this number of jobs every 4 weeks

   b. In Cibola and McKinley Counties where most of the mining would take place, these jobs would represent an increase in employment of about 4 percent. However, both counties are, according to the official unemployment figures, currently at close to full employment with less than 1,100 workers unemployed, and most of the unemployed are not miners. Most of the new mining jobs would therefore have to be filled by workers commuting in from other areas or new in-migrants, not existing residents.

   c. These new jobs, incomes, and economic activity would have ripple or multiplier impacts that would generate additional jobs. This could increase the impact on personal income by 75 percent and the job impacts by 150 percent. Even then, those impacts would be very modest. Also, many of those "multiplier" jobs would be located in the larger trade centers including Albuquerque where both businesses and workers make their purchases.

d. Tax revenues to the state government would total about $36 million per year in the state's annual general fund budget of $6 billion and total budget of $13 billion. The potential state tax revenues from uranium mining would cover only six-tenths of one percent of the state general fund budget.

e. Revenues to the county governments from the taxes they levy on uranium mining would be about $3.6 million per year. This represents about 5 percent of the two counties' total budgets but as much as 20 percent of the counties' general fund budgets. The new uranium mining industry, its workforce, and the increase in population, however, would also impose additional costs on the county government. There will be a net fiscal gain to the county governments only if the cost of the additional services is less than the increase in tax revenues.

f. In sum, the economic impacts of a renewed uranium boom would be quite modest at best. At the state level the impact would be almost imperceptible. At the local level it would make a difference, boosting both county revenues and county costs to deal with the impacts of renewed mining, but would not in any sense transform the local economies. In both cases the impact would be temporary, until uranium mining retrenched or shut down again. See Section V.

8. Communities and regions that have been successful at attracting significant amounts of new economic activity over the last two decades were not those that continued to specialize in natural resource extraction. In fact those areas lagged all other community economic categories. As economic activity in the American economy has become relatively more mobile, a different set of local characteristics, other than the presence of extractable natural resources, has become important in determining the location of economic activity: the quality of the local labor force, the quality of the public infrastructure, including schools, parks, and libraries, and the quality of the social and natural environments. Areas that are perceived to have the human, public, and environmental resources and amenities that make them attractive residential locations have prospered. See Section VI.

The Grants area can do the same. Cibola County is already a retirement destination county because of its attractive qualities. The ongoing growth in employment, real income, and population despite the disappearance of uranium mining and the loss of 90 percent of metal mining jobs overall in New Mexico makes clear that the Grants area and New Mexico <u>can</u> compete as the location of new economic activity. New Mexico's presentation of itself to the rest of the nation and the world as the "Land of Enchantment" — rather than the land of uranium and copper mining or other industrial activities —sends the message that New Mexico understands the importance of natural and cultural amenities to its continued economic vitality.

The State of New Mexico and Cibola and McKinley counties, after suffering through the expected dislocations and adjustments, successfully "digested" the uranium "bust" of the 1980s and moved on to diversify their economies and expand the range of economic opportunity. The near disappearance of uranium mining and milling did not create ghost towns or permanently disable the state or local economies. Unemployment rates are low, real incomes are rising, and jobs are being created. In that sense, the New Mexico and the Grants area local economies are not irretrievably depressed and in need of rescue by another uranium boom. Citizens of New Mexico communities can afford to be critical, discriminating decision makers who weigh the benefits and costs of a renewed uranium boom.

The social costs associated with uranium mining and processing will remain significant. New Mexico has had intimate experience with the health consequences of past uranium mining practices. New Mexico also faces an enormous negative legacy associated with abandoned mines and very large mines that ultimately will be closed and have to be reclaimed as much as is physically possible. New Mexico and its mining communities have repeatedly suffered through the booms and busts associated with metal mining and its instability due to the volatility of worldwide metal prices. Renewed dependence on uranium mining will expose communities once again to this disruption.

Uranium mining, like all metal mining, is a landscape-intensive activity that almost always has had significant negative impacts on the natural environment. That means that it has the potential to damage one part of the local economic base, environmental quality, while developing another, the mineral deposit. To the extent that the environmental damage could be significant and near permanent while the mineral development, in contrast, is a relatively temporary "boom," significant public economic policy issues are raised: What are the long term public costs of renewed uranium mining? What are the long term benefits, if any, of the metal mining roller coaster? Is there a net gain or loss to the local economic base as a result of developing the uranium deposits?

The environmental record of uranium mining, including that of many mines closed at the end of the last uranium boom, clearly indicates that these questions must be explored carefully and critically. This is not "merely" a matter of aesthetics or an impractical effort to preserve "prettiness." It goes to the heart of the future economic vitality and sustainability of the Grants area and New Mexican economies. That is the reason that a rational review and the careful public regulation of uranium mining must be an important part of New Mexico's economic development policy as well as its environmental policy.

I. The Revival of Uranium Mining in New Mexico: A Bonanza or Just Speculation?

Because of the unusually high uranium prices during the 2006-2008 period, there has been much speculation in the New Mexico news media about a dramatic revival of uranium mining and milling in New Mexico. A recent report commissioned by the Uranium Producers of New Mexico and carried out by the Arrowhead Center at New Mexico State University ("Arrowhead report") projects a return to the uranium boom of the 1955-1985 period.[1] After a five-year period of investment in the construction of new mines and mills, that report projects 30 years of uranium mining that would develop almost all of the uranium reserves that the U.S. Department of Energy estimates are found in New Mexico. Annual production over the 30-year period, 2012-2042, would average 10.4 million pounds of uranium per year, almost identical to the rate of production during the 1955-1985 period in New Mexico.[2] The value produced by the new uranium boom was projected to be close to $30 billion dollars and the employment impact an astonishing 249,000 jobs.[3] Given that the total output of the New Mexico economy (GDP) in 2007 totaled $61 billion and the total number of employed persons in New Mexico in 2008 was about 936,000, this would suggest a major expansion in the New Mexico economy.[4] As high as these projected impacts of renewed uranium mining in New Mexico are, they are actually somewhat modest compared to earlier industry projections that $67 billion would be generated by renewed mining that would produce 600 million pounds of uranium, nearly twice the estimated New Mexico reserves.[5]

The Arrowhead Report calculates the potential value of New Mexico's uranium reserves by multiplying the total estimated reserves by an estimate of the long run price of uranium, e.g. 341 million pounds of uranium reserves valued at $100 per pound = $34.1 billion.[6] Alternatively the value of production is estimated by multiplying the total amount expected to be produced by the estimated average cost of producing it, e.g. 315 million pounds at a cost of $50 per pound = $15.75 billion in production expenditures.[7]

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[1] "The Economic Impact of Proposed Uranium Mining and Milling Operations in the State of New Mexico," James Peach and Anthony V. Popp, Office of Policy Analysis, Arrowhead Center, Inc, New Mexico State University, Las Cruces, NM, August 1, 2008.

[2] Ibid. Projected uranium production from Figure 1.5 and p. 13. Past production is from New Mexico Mining and Minerals Division, Energy, Minerals and Natural Resources Department and the Energy Information Administration, U.S. Department of Energy.

[3] Arrowhead Report, p. 8. Both figures include the impact of mine and mill construction as well as the impact of the operation of the mines and mills over 30 years.

[4] New Mexico GDP in 2008 from http://www.bea.gov/newsreleases/regional/gdp_state/2008/xls/gsp0608.xls .Civilian employment to which military employment has been added from http://laser.state.nm.us/admin/gsipub/htmlarea/uploads/ta2008.pdf

[5] Lenderman, A. "New Mexico's $67 Billion Bonanza," ***The New Mexican***, April 15, 2007, p. A-7. Also see Uranium Producers of American, http://www.uraniumproducersamerica.com. "New Mexico's $67 billion bonanza" link to the April 15, 2007 article in The New Mexican was still on the UPA home page on August 28, 2008.

[6] Arrowhead Report, op. cit. P. 6.

[7] Ibid. P. 8.

There are many ways in which this type of calculation is misleading, significantly exaggerating the likely economic impact of a revival of uranium mining in New Mexico.

- The 341 million pounds of uranium represent all of the known economically viable reserves in New Mexico. That amount is projected to be extracted over 30 years. So the $34.1 billion is a cumulative, *gross value* that could be generated over an extended period of time into the future. The actual average annual "value" produced would be $1.1 billion.

- The $34.1 billion estimate is based on a $100 per pound price. The Arrowhead Report, in most of its calculations, uses a long-run contract price of $90 per pound. But the spot market price of uranium fell to a low of $46 per pound in October 2008. Industry commentators are projecting long-term contract prices in the $65 range, not the Arrowhead Report's $90 to $100 range.[8] See Figure 1. As will be discussed below, uranium prices, like all commodity prices, are volatile and projecting that a temporary peak price will remain in place indefinitely is quite misleading. The $90-$100 used in this calculation is no more legitimate than using the $136 value from July of 2007. The October 2008 price was only a third of that earlier peak value and only half the value used in the Arrowhead Report. Adjusting for the October 2008 value of uranium, the annual "value" produced would be $523 million per year, not $1.1 billion.

- Even the $523 million figure is simply the **gross *value*** of the uranium produced, ***not the economic value received by New Mexicans***. The production payroll associated with uranium mining and milling represented only 12 percent of the value of the uranium produced in 2002.[9] That is, less than an eighth of the value of the uranium would flow to workers in New Mexico. That would represent about $89 ***million*** per year, only about **thee-tenths of *one percent*** of the $34 ***billion*** dollar figure, and less than two-tenths of one percent of New Mexico's 2006 personal income.[10] Much of the total value of the uranium would flow out of state

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[8]See, for instance, ***Mining Weekly Online,*** April 4, 2008, http://www.miningweekly.com/article.php?a_id=129299 accessed August 28, 2008. Also see ***Ux Weekly,*** April 7, 2008, 22(14), which reported projections of a long-term bottom or equilibrium spot price in the $40-$60 range (p. 1). ***Ux Weekly*** also reported that most buyers and sellers of uranium (64 percent)did not believe that the long-term contract price as reported by various consulting firms was a good indication of future uranium prices (pp. 2-3). The ***Nuclear Review*** recently (July 2008) pointed out that since 1996 the long-term contract and spot market prices have tracked each other closely. The diverged in 2007 as spot market prices rose steeply to about $140 per pound while long-term contract prices leveled off in the $90-$100 range. As spot market prices tumbled down towards $60, contract prices continued at about $90 but then began to decline modestly too (Figure 1, p. 13). For all of these reasons we have emphasized the spot market prices as more indicative of the instability in uranium markets and current downward pressures on prices.

[9] 2002 Economic Census, Mining, Uranium-Radium-Vanadium Ore Mining 2002.

[10] The Arrowhead Report estimates that mine and mill worker income would represent 28 percent of the value of the uranium produced in New Mexico, over three times the data reported by the federal government for 2002. As will be discussed below, the higher Arrowhead number is tied to the use of labor productivity taken from mine and mill operations in the 1970s, over three decades ago. Technological

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June 10, 2005

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

E. Roy Hawkens, Presiding Officer
Dr. Richard F. Cole, Special Assistant
Dr. Robin Brett, Special Assistant

In the Matter of:	)	
HYDRO RESOURCES, INC. PO Box 777 Crownpoint, New Mexico 87313	)	Docket No. 40-8968-ML

DECLARATION OF MELINDA RONCA-BATTISTA

I, Melinda Ronca Battista, do hereby swear that the following is true to the best of my knowledge. I am qualified and competent to give this declaration, and the factual statements herein are true and correct to the best of my knowledge, information and belief. The opinions expressed herein are based on my best professional judgment.

1. My name is Melinda Ronca-Battista. I am a health physicist and Certified Quality Auditor and research associate with the Institute for Tribal Environmental Professionals ("ITEP") at Northern Arizona University in Flagstaff, Arizona. Since 2002, I have been assigned to ITEP's Tribal Air Monitoring Support ("TAMS") Center, which is physically located at the U.S. Environmental Protection Agency ("USEPA") Radiation and Indoor Environments National Laboratory ("R&IENL") in Las Vegas, Nevada. I reside at 16206 S. 26th St., Phoenix,

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Arizona, 85048.

2. I am giving this declaration on behalf of Eastern Navajo Diné Against Uranium Mining ("ENDAUM") and Southwest Research and Information Center ("SRIC") related to the licensing of Hydro Resources, Inc.'s ("HRI's") Crownpoint Uranium Project ("CUP"). Specifically, my testimony in this declaration addresses radioactive air emissions from HRI's proposed Church Rock Section 17 *in situ* leach ("ISL") uranium mine in Church Rock Chapter of the Navajo Nation. This the first time I have testified in this proceeding.

Professional Qualifications

3. My qualifications to make this declaration are described in my résumé, a copy of which is appended hereto as **Exhibit 1**. I have a bachelor of science degree in physics (1981) and a master of science degree in radiological health (1984), both from the University of Michigan. I also have received certification as an auditor from the American Society for Quality. I am a member of the Health Physics Society and the American Society for Quality.

4. Throughout by professional career, I have planned, supervised, conducted and interpreted a wide range of radiation assessments in various environmental media and situations. These include local and national studies of indoor radon, radioactive waste shipments, and contaminated sites. I have developed radiation monitoring devices and protocols for radiation monitoring. I have worked in academia, the private sector and in government with the USEPA's Office of Radiation and Indoor Air in Washington and USEPA's R&IENL in Las Vegas.

5. In my capacity as a research associate with ITEP, I instruct and train Native American professionals in quality assurance/quality control ("QA/QC") procedures and data

analysis, work with tribes to site, calibrate and verify operation of radiological and non-radiological air samplers, and develop analysis procedures and templates. I am assigned to the TAMS Center to work with staff members of both the TAMS Center and USEPA-R&IENL on a wide range of tribal assessment projects. For instance, I have worked with the Bishop Paiute Tribe on issues related to use of areas with potentially high radon concentrations and gamma emitters, with the Taos Pueblo on radioactive materials in air, with the Navajo Nation Superfund Office on survey procedures, quality control techniques and data interpretation, and with tribes all over the continent on air monitoring studies. These include study planning, instrumentation selection, data interpretation, and mitigation options. I have also worked with dozens of tribes in different parts of the country on air monitoring projects, including planning, data assessment, reporting, and interpretation.

6. My experience includes conducting gamma and alpha-emitter surveys of buildings and land. This includes gamma and alpha surveys of land and buildings to be released for public use, such as sites where radioactive sources (including neutron sources) were used, facilities using gaseous radionuclides, radioactive material processing and storage facilities, and open land. I have more than two decades of experience using hand-held radiation survey instruments, as well as laboratory instruments, for the purposes of scoping and final status surveys and the determination of compliance with U.S. Department of Defense, U.S. Nuclear Regulatory Commission ("USNRC" or "NRC"), and USEPA regulations and policies. I have designed studies to evaluate the effectiveness of radiation detection equipment, and conducted dozens of audits of QC procedures and records for users of hand-held gamma-detection instruments, gas proportional counters, liquid scintillation laboratory instruments, and thermoluminescent dosimeters.

7. I am thoroughly knowledgeable in applying the MARSSIM strategy to field radiological assessments, and as indicated in my résumé, I have applied the MARSSIM method in several site applications. The Multi-Agency Radiation Survey and Site Investigation Manual, or "MARSSIM", was developed over several years by USEPA, the U.S. Department of Energy ("DOE"), the Nuclear Regulatory Commission ("NRC") and other agencies to provide a nationally consistent, consensus approach to conducting radiation surveys and investigations at possibly contaminated sites, ensuring high levels of QA/QC in conducting surveys, and applying appropriate statistical methodologies to analyze survey data. A copy of the introduction to the manual is attached hereto as **Exhibit 2.** I discuss the purpose and use of the MARSSIM strategy later in this declaration.

8. As part of my duties with ITEP and TAMS Center, in the summer of 2003, I was asked by Church Rock Chapter of the Navajo Nation and the Navajo Nation Environmental Protection Agency ("NNEPA") to provide radiation assessment training and field services to a collaboration of agencies and organizations conducting environmental monitoring in residential areas of the Church Rock Chapter affected by past uranium mining and milling. Between October 27 and 30, 2003, I assisted the Church Rock Uranium Monitoring Project ("CRUMP") in conducting gamma radiation assessments along an approximately 10-mile stretch of State Route 566 from Church Rock Village on the south, past the Old Church Rock Mine, which is the site of HRI's proposed Section 17 ISL mine, past the abandoned United Nuclear Corporation ("UNC") uranium mill and mill tailings impoundment, and ending on Water Pond Road near the former UNC Northeast Church Rock Mine and the former Kerr-McGee Corporation Church

Rock Mine. A map showing CRUMP study areas and outlining the areas assessed is included as Slide 6 in a CRUMP slide presentation, attached hereto in relevant part as **Exhibit 3**.

9. Working with staff members of the NNEPA Superfund Program, the Navajo Nation Abandoned Mined Lands Reclamation Department ("NNAML"), USEPA's R&IENL, and SRIC, and employing MARSSIM strategies, I supervised and coordinated gamma radiation surveys conducted by a team of technicians using Ludlum Model 19 hand-held detectors. Photos of team members using these and other detectors are shown in Slides 7 and 8 of **Exhibit 3**. The QA/QC procedures I developed and used and the training I conducted for the surveyors are discussed later in this declaration. I worked with NNEPA-Superfund staff to develop and implement a common and consistent field assessment methodology that was consistent with the MARSSIM strategy and common industry practice for scoping surveys, and accompanied each survey team at least once during the project. I retrieved all data sheets from each surveyor and personally conducted data validation in accordance with pre-determined procedures (daily QC sheet updated and within limits, person received training, location, team, instrument and check source identified, and values legible and consistent between surveyors and instruments.) After verification, I transcribed each data point, and then rechecked 100% of all entries. Finally, I analyzed the data using Excel. In this declaration, I describe the results of these surveys and their implications for the licensing of HRI's proposed Section 17 mine.

10. Additional gamma radiation assessments for CRUMP were performed by USEPA-R&IENL technicians using the laboratory's "scanner van." The scanner van contains two 4" x 4" x 16" sodium-iodide detectors mounted inside a 2.5-ton delivery truck and records gamma rates every second while traveling at about 5 miles per hour along highways and roads.

Photos of the scanner van and its operators are provided in **Exhibit 3**, Slide 8; additional descriptions of the van's capabilities and results of its surveys are discussed later in this declaration. I accompanied the operators of the scanner van on one of the field assessment days in October 2003 and observed the protocols and continuous output. I reviewed the Standard Operating Procedures for the van, spreadsheets of gamma rate data generated by the van as it traveled along paved and unpaved roads in the Church Rock area, and quality control files for the scanner van during this assessment. In this declaration, I describe the results of the scanner van assessments *in the vicinity of and on the Section 17 site* outside of the fenced mine area, how the detectors on board the van were used to statistically characterize the frequency distribution of gamma rates in the different datasets, and the implications of the van's results for licensing of the proposed Section 17 ISL mines.

Licensing Materials and Literature Reviewed

11. In preparing this declaration, I reviewed relevant portions of the following documents and licensing materials. They are listed in chronological order from most recent to oldest:

U.S. Environmental Protection Agency. MARSSIM (Multi-Agency Radiation Survey & Site Investigation Manual), 2002. Available at www.epa.gov.radiation/marssim/.

Partial Initial Decision (Radioactive Air Emissions), USNRC Atomic Safety and Licensing Board, LBP-99-19 (49 NRC 421), May 13, 1999.

ENDAUM'S and SRIC's Response to HRI's and NRC Staff's Answers to LBP-99-15, Questions Concerning Radioactive Air Emissions, April 21, 1999 (hereinafter, "Intervenors April 21st Response").

ENDAUM'S and SRIC's Response to LBP-99-15, Questions Concerning Radioactive Air Emissions, April 7, 1999 (hereinafter, "Intervenors' April 7th Response").

Declaration of Bernd Franke, attached as Exhibit A to Intervenors' April 7th Response, April 6, 1999.

Affidavit of Richard J. Abitz, attached as Exhibit B to Intervenors' April 7th Response, April 7, 1999.

NRC Staff's Response to Intervenors' Presentation on Air Emissions Issues, Feb. 18, 1999 (hereinafter "NRC Staff Response").

Hydro Resources, Inc.'s Response to Eastern Navajo Diné Against Uranium Mining's and Southwest Research and Information Center's January 11, 1999 Brief Regarding Radioactive Air Emissions at the Crownpoint Project, Feb. 11, 1999 (hereinafter "HRI's 1999 Response").

Eastern Navajo Diné Against Uranium Mining's and Southwest Research and Information Center's Brief Regarding Radioactive Air Emissions at the Crownpoint Project, Jan. 11, 1999 (hereinafter "Intervenors Section 8 Air Brief").

Testimony of Bernd Franke, Attachment A to Intervenors Section 8 Air Brief, Jan. 6, 1999 (hereinafter "Franke 1999 Testimony").

Franke and Associates. Crownpoint Uranium Solution Mining Project: Review of Outdoor Radon Levels and External Gamma Radiation, Jan. 5, 1999; Exhibit 2 to Franke 1999 Testimony (hereinafter "Franke 1999 Report").

U.S. Nuclear Regulatory Commission, Source Materials License SUA-1508 (and Attachment A thereto), Hydro Resources, Inc., Crownpoint Uranium Project, January 5, 1998. NB 11, ACN 980116066 (hereinafter, "SUA-1508").

U.S. Nuclear Regulatory Commission, Safety Evaluation Report, Hydro Resources, Inc., License Application for Crownpoint Uranium Solution Mining Project, McKinley County, New Mexico. Washington, D.C., December 5, 1997. NB 10.4, ACN 9712310298 (hereinafter, "SER").

Hydro Resources, Inc. Crownpoint Uranium Project Consolidated Operations Plan, Revision 2.0. Albuquerque, New Mexico, August 15, 1997. NB 10.3, ACN 9708210179 (hereinafter, "COP Rev. 2").

U.S. Nuclear Regulatory Commission. *Final Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico*, NUREG-1508, BLM NM-010-93-02, BIA EIS-92-001. USNRC, Office of Nuclear Material Safety and Safeguards, in cooperation with U.S. Bureau of Land Management and U.S. Bureau of Indian Affairs, February 1997. NB 10, ACN 9703200270 (hereinafter, "FEIS").

U.S. Nuclear Regulatory Commission. *Draft Environmental Impact Statement to Construct and Operate the Crownpoint Uranium Solution Mining Project, Crownpoint, New Mexico*, NUREG-1508, October 1994 (ACN 9411160064 NB 7) (hereinafter "DEIS").

Hydro Resources, Inc. Churchrock Project Revised Environmental Report, March 16, 1993 (ACN 9304130421, NB 6.1) (hereinafter, "CRER" or "1993 Church Rock Environmental Report").

Buhl T, Millard J, Baggett D, Trevathan S. Radon and Radon Decay Product Concentrations in New Mexico's Uranium Mining and Milling District. Radiation Protection Bureau, New Mexico Environmental Improvement Division (Santa Fe, NM), March 1985 (hereinafter, "Buhl Study").

In addition to these documents and licensing materials, I have read and reviewed the declaration of Larry J. King (June 2, 2005), a Navajo rancher who resides on Section 17 directly east of the abandoned mining site on which HRI proposes to conduct ISL mining and the declaration of Bernd Franke (June 8, 2005).

Overall Conclusions

12. Based on my knowledge and training in health physics, my experience conducting radiation assessments, and my direct participation in the CRUMP gamma radiation surveys in the Church Rock area, I conclude that gamma radiation rates detected on both sides of State Route 566 and on parts of the King Ranch property directly east of the existing abandoned mining site on Section 17 follow a pattern consistent with anthropogenic causes. Data from hand-held instruments used in the survey clearly show that gamma rates near the road used by mining trucks leaving the Section 17 mine site (called the Old Church Rock Mine) are relatively high and decrease as distance from the road increases. Furthermore, we identified multiple areas on

Section 17 outside of the mine fence having gamma exposure rates as much as 16 times higher than found at the Church Rock Chapter House, about 6 miles south of Section 17, where no mining activities were conducted, but where roads were built and soil disturbed. The only source of material that would cause this statistically significant increase in the average gamma rates on Section 17 outside of the mine site fence and on portions of the King Ranch land is the material from the abandoned uranium mine on Section 17 which has blown, in the form of sand and dust, or been dropped by ore hauling activities near the road.

Expert Analysis

13. In the paragraphs that follow, I explain the methodologies and equipment that my colleagues and I used to conduct the October 2003 radiation assessments in Church Rock Chapter. I summarize the data gathered in those assessments, and compare measured radiation levels on the non-impacted background reference areas with gamma rates observed on and immediately outside of the Section 17 mine site. I also discuss the lack of documentation in the record that to determine if radiation levels on Site 17 have decreased as a result of purported remediation efforts conducted by HRI in 1994.

14. Application of the MARSSIM Strategy. The *full* MARSSIM process was not used in the CRUMP field surveys, but the MARSSIM *methodology* provided a framework for field survey design and implementation, data evaluation and comparison of survey results from different areas in Church Rock. From the MARSSIM Section 1.1:

> "MARSSIM provides a nationally consistent consensus approach to conducting radiation surveys and investigations at potentially contaminated sites. This approach should be both scientifically rigorous and flexible enough to be applied to a diversity of site cleanup conditions. MARSSIM's title includes the term 'survey' because it provides information

> on planning and conducting surveys, and includes the term 'site investigation' because the process outlined in the manual allows one to begin by investigating any site (*i.e.*, by gathering data or information) that may involve radioactive contamination."

Exhibit 2 at 1-1.

15. The terms "background reference area" and "impacted area" are defined by MARSSIM, and are used in this testimony. MARSSIM defines a background reference area to indicate "areas with similar physical, chemical, geological, radiological, and biological characteristics as the survey unit being evaluated, but where there is an extremely low probability of residual contamination." The MARSSIM defines "impacted" areas as those with a reasonable possibility of containing *residual radioactivity* in excess of natural background or fallout levels," where the term "impacted" refers to areas possibly affected by humans' radioactive-handling activities. During the surveys of the Church Rock area conducted in October 2003, the above definitions were used to classify areas for comparison.

16. "Background radiation" is also defined in the NRC Regulations. See, 10 CFR § 20.1003, cited verbatim in the Intervenors' Phase II Air Brief at 5. In adopting this definition, the Commission said background radiation should include "fallout from past nuclear accidents like Chernobyl, which contribute to background radiation and are not under the control of the licensee." See, 59 Federal Register 43200 (Aug. 22, 1994). "The Commission does not believe it is reasonable for licensees to be required to remediate material over which they have no control and *which is present at comparable levels in the environment both on and off of the site*" (emphasis added). As the results of the CRUMP radiation assessment will show, the differences in radiation levels between mining-impacted parts of Section 17 and "background reference areas" in Church Rock are not comparable.

17. Use of Gamma Radiation Levels as a Detection Tool. Gamma radiation emission rates are routinely used as an environmental and workplace assessment tool in the uranium industry because several decay products of natural uranium (U-238) and thorium and their decay products are strong gamma emitters, and because gamma detection equipment is rugged, fast, easy-to-use, and economical. Radium is a gamma-emitting radionuclide in the uranium and thorium decay series, and the Ra-226 concentration in soils is used as a cleanup standard for lands contaminated by the release of uranium mill tailings. See, e.g., 40 CFR 192.12(a)(1) and (2). Gamma radiation rates measured at one meter from the surface are useful as an indicator of relative concentrations of gamma-emitting material on or near the surface, and are widely used in the radiation assessment field.

18. Hand-held Detector Methods, QA/QC Procedures. The Ludlum-19 detectors used in the CRUMP assessment were loaned by the NNEPA Superfund Program and the USEPA R&IENL. At the start of the October 27-30, 2003 assessment, I verified and documented from calibration certificates and stickers that all of the detectors had had annual calibrations consistent with manufacturers' specifications prior to the field work in Church Rock. Several of the detectors were eliminated from use because they were out of calibration. I conducted an initial half-day training prior to any field measurements, reviewing the required method, documentation, and QC procedures. Every morning each device was checked against an assigned and documented Cs-137 check source to verify that it was operating within control limits, to measure background at the non-impacted background reference site of the Church Rock Chapter House yard, and to review the data gathered. The results of these daily checks were documented on forms designed for this study. I retained custody of all the instruments each evening and re-

verified their stable operation after the day's surveying was complete. A report on the hand-held instruments and QC procedures used for data gathering, transcription and validation is attached to this declaration as **Exhibit 4.**

19. As noted in the QC procedures outlined in **Exhibit 4**, gamma-rate data were checked for internal consistency in two ways. First, the team leader recorded the relative positions of the surveyors at each site. When the data were entered, the surveyors' field data sheets were compared with the positions of each surveyor on the team leader's notes, and data that were inconsistent in terms of location were not used. Second, the internal consistency of results was evaluated. In cases where adjacent results were inconsistent, i.e., when there was more than a 20 microroentgen per hour ("μR/hr") difference between results one meter apart, the data were not used.

20. Scanner Van Operation. USEPA-R&IENL's scanner van contains two 4" x 4" x 16" sodium-iodide detectors. One is mounted inside a collimated shield designed to scan through a window in the shield, and the second is unshielded. Gamma rates measured simultaneously by both detectors are integrated and recorded using a pulse height analyzer; latitude-longitude coordinates are recorded with each gamma measurement by a built-in GPS ("Global Positioning System") locator. Operated by at least two people, the van is capable of recording continuous gamma rates within 200 feet of the vehicle as the van travels at about 5 miles per hour. The scanner van is designed to produce data that show relative increases and decreases in gamma rates, rather than absolute values or gamma energy determinations.

21. Measurement and Analysis of Gamma Rates in Non-Impacted Background Reference Areas. The USEPA scanner van established two sets of "background reference"

gamma levels: (1) At and around the Church Rock Chapter House and in Church Rock Village just north of Interstate 40, and (2) in the Springstead Estates[1] area along State Route 566 about four miles north of Church Rock Village and two miles south of Section 17. See, **Exhibit 3**, Slide 6 for these locations. The hand-held survey team used these same areas and recorded results for both areas. These areas were chosen for background reference areas because they have similar physical, chemical, radiological, and biological characteristics as those areas on Section 17 outside of the security fence, and in the case of the Chapter House area, have not been affected by past uranium mining activities. The van traveled north on State Route 566, recording gamma rates for both the east and west sides of the highway. The operators set out flags at locations where the measurements were observed to be higher than levels recorded at the background reference locations. At each flag, the hand-held survey team determined a grid area, with points at one-meter intervals, between the road and the security fence or other obstruction, such as wash or cliff. Each hand-held survey at a flagged location was conducted using the standard procedure of walking at a slow pace (about 0.5 meter per second), holding the detector at approximately one meter from the surface and walking along the pre-determined grid line watching the instrument's display for changes in gamma rates, and pausing to record the results every one to two meters on data sheets.

22. Data Compilation and Analyses. After the conclusion of the assessments, I entered gamma-rate data recorded on the surveyors' data sheets into Excel spreadsheets, creating files for each segment of the study area surveyed. I entered comments on each spreadsheet to indicate the surveyors' names, record latitude-longitude coordinates taken by surveyors who had

[1] "Springstead Estates" is the name given to a 1,000-unit planned housing development in Township 16 North,

GPS instruments, and incorporate notes on the physical locations of the surveys. I then used standard statistical analyses techniques available in Excel to record the total number of measurements represented at each location, the mean and standard deviation for the recorded gamma rates, the three highest measurements, and the number of values in the top 10% of each data set. My December 2003 spreadsheets for the sites assessed by hand-held instruments in the immediate vicinity of Section 17 are attached hereto as **Exhibit 5**. Every data point on these spreadsheets includes a hidden comment containing supporting information on instrument serial numbers, surveyor's name, QC check sheet, and dates entered and verified.

23. Gamma-rate data generated by the scanner van and contained in a series of spreadsheets were sent to me by one of the van's operators, Mr. Roger Shura. He also provided QA/QC files for validation of the data. I have reviewed these data and QA/QC files in preparing this declaration. The files are very large due to the sheer magnitude of the data recorded by the scanner van, and I have chosen not to attach them to this declaration. A copy of Mr. Shura's e-mail message transmitting the files to me is attached hereto as **Exhibit 6,** and the data are mapped in **Exhibit 8.**

24. Statistical Analysis of Background Reference Area Gamma Rates. In addition to the statistical analyses of each hand-held data set generated in December 2003, I also conducted analyses of data collected by the scanner van around the Chapter House and Springstead Estates area. The results of those analyses are shown in **Exhibit 7**, which contains a graph of the data set and table of analyses. (I omitted the complete data set itself because it covers more than 10 pages of single-column spreadsheets.) The results show that mean background reference area

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Range 16 West, Section 30; it is identified as Study Area C on Slide 6 of **Exhibit 3**.

gamma rates were between 8 and 13 μR/hr (95% confidence interval) at the Church Rock Chapter House and 12 and 15 μR/hr (95% confidence interval) at Springstead. Based on these analyses, there is no statistical difference between the background reference areas' gamma emission rates. Therefore, I determined that background reference area gamma emission rates for the CRUMP study area range up to about 15 μR/hr.

25. I also conducted an analysis of the hand-held data collected around Section 17 to determine if there was a pattern shown by the gamma rates measured at various distances from State Route 566. This analysis covered three sets of data: (1) results 8 meters ("m") and closer to State Route 566, (2) results 9 m and farther from State Route 566, and (3) the data gathered from around the Church Rock Chapter House. The distance of 8 m was determined on-site, based on an evaluation of how far material had spread from the road. At points farther than 8 m from the road, the land looked relatively undisturbed and consistent with the soil type and surface morphology and vegetation at further distances.

26. Significant differences among the three data sets emerged from this analysis. First, the shapes of the frequency distributions of the Church Rock Chapter House and the >8 m from the road data sets are relatively normally shaped, with means, modes, and medians approximately the same. The skewness and kurtosis is consistent with normally distributed values, although the >8 m from the road data set shows a trend toward log-normality. The data from within 8 m of the road, however, show a strong trend toward log-normality, with a significant number of results (five percent of the total from this dataset) exceeding the mean plus twice the sample standard deviation. This type of distribution is not consistent with either of the background reference areas (see graph, **Exhibit 7**).

27. Two types of tests of significance between data sets were conducted, one parametric (the student's t-test) and one nonparametric (Wilcoxon Rank Sum test). Both types of evaluations showed significant differences between the means of the populations. The results are shown below in **Table 1**. They show clearly that the gamma rates found along the road are significantly higher than reference background measured either around the Church Rock Chapter House or at the Springstead area.

Table 1. Overview of Differences Between Datasets.

Location	Mean of the gamma scintillometer results, in relative μR/h	Confidence Interval (95%) for mean, μR/h	Times above Chapter House average background (11 μR/hr)
Church Rock Chapter House yard	11	7 – 14	-
Springstead Area	13	9 – 18	No statistically significant difference
Farther than 8 m from 566	23	20 – 25	2
Within 8 m of 566	36	32 – 41	3

28. Mapping the Data. Data generated by the scanner van and hand-held instruments were digitized and co-located on a base topographic map of the Section 17 area by Mr. Jerry Begay, a Geographic Information System technician with the NNEPA Superfund Program. Mr. Begay provided me a file containing a map that resulted from this combining of the two gamma radiation data sources, a copy of which is attached hereto as **Exhibit 8**. Green, yellow and red codes were used to indicate background, twice background, and greater than two times background for both the "Ludlum Data" and the "Scanner Van Data".[2] Data from the scanner van are shown in a series of nearly continuous colored dots along State Route 566, a dirt road

[2] It is important to recognize that the data are to be used for relative purposes only, not for absolute calculations of risk, but to indicate differences between data gathered from various locations.

that goes west from SR 566 on the south side of the Section 17 mine site, along Old Church Rock Mine Road, and on a dirt road that loops through the western part of the King Ranch area.[3] (These locations are labeled on the aerial map of the King Ranch and Section 17 mine site, attached as Exhibit 3 to the Larry J. King Declaration.) Data from the hand-held instruments appear as irregular blocks, reflecting the method used by the surveyors who walked the land.

29. Results of the Assessment. Data from the hand-held survey instruments are listed and analyzed as shown in **Exhibit 7**. The analyses show clear overlap between the distributions of the gamma emissions measured at the two reference locations (Church Rock Chapter House and the Springstead area). The distributions from the sites on the west side of SR 566 next to the mine site fence, on the dirt road south of the mine site, and at two locations on the King Ranch property, *inside* Mr. King's fenced grazing area exceeded the means and upper 95% confidence limits of the two background reference areas. Maximum gamma levels at the four sampling locations shown on the spreadsheets in **Exhibit 5** and the number of times they exceed the Chapter House background reference areas level are presented in **Table 2** below.

Table 2. Maximum Gamma Rates at Sampling Locations on Section 17.

Location	Mean at this Survey Unit of the Relative Gamma Exposure Rate (in µR/hr)	Maximum Relative Gamma Exposure Rate (in µR/hr)	Factor greater than background reference area (Chapter House) mean of 11 µR/hr
2-1 and 2-2	21	38	3.5
2-3 and 2-4	28	180	16.4
2-5	35	110	10.0
2-6	34	70	6.4

[3] For comparison, please also see Exhibit 3 of Mr. King's Declaration, an aerial map of the same area showing the locations of the Section 17 mine-water ponds, fence line, major roads, and the King homes.

30. Analyses of the Results. Material within Section 17, but outside security fences, emits gamma radiation rates at least 5 times higher than the average at a distance of more than 8 m from State Route 566,[4] at which distance there was a great reduction in material blown and thrown from road activities. Material within Section 17, but outside security fences, emits gamma radiation 16 times the mean measured on the background reference area of the Church Rock Chapter House (11 μR/h). Gamma radiation cannot be "blown by the wind." As shown on the photo in Slide 15 of **Exhibit 3**, the arid nature of the region, lack of stabilizing vegetation, and high directional winds move surficial material from west to east. This surficial material is from areas covered by the hand-held and scanner van gamma surveys. For Section 17, the nearest receptors are not hypothetical beings that may at some time live just outside of the plant fence, but rather the 13 members of Mr. King's extended family who live in three homes located about 1,400 feet east and downwind of Section 17.

31. Likely Continued Presence of Residual Radioactive Materials on Site 17. In his January 1999 report in support of ENDAUM's and SRIC's Section 8 Air Brief, Bernd Franke reproduced an isocontour map of gamma rates measured by HRI on the Section 17 property in July 1987. See, Intervenors' Section 8 Air Brief, Exhibit 2 at 21; attached as Exhibit L.2 to Intervenors' Phase II Air Brief. An inspection of that map shows that gamma radiation rates ranged from 25 μR/hr to 350 μR/hr on the west side of State Route 566 inside the Section 17 mine site restricted area. Background rates outside of the restricted area were shown on the map to range from 10 to 20 μR/hr — a range that on the lower end is consistent with the range of

[4] The maximum gamma rate, 180 μR/h in survey unit "2-3 and 2-4," divided by the average of 36 μR/h measured at distances greater than 8 m from 566.

background generated in the CRUMP assessment. Mr. Franke described how the gamma levels inside the mine site were high enough to produce doses to an individual with continuous exposure that would exceed NRC's 10 CFR Part 20 annual dose limit. Id. at 7.

32. In his April 6, 1999, declaration for ENDAUM and SRIC, Mr. Franke attached an August 31, 1994, letter from HRI to the New Mexico Mining Act Reclamation Bureau describing past reclamation activities on Section 17. See, Exhibit 5 of Frank Declaration, attached as Exhibit L to Intervenors' Phase II Air Brief. The letter stated in part, "All sludge has been removed from [five mine-water] ponds" located on the site, and that some areas of the site had been regraded. Id. at 1. HRI's letter did not indicate that the 1987 radiation levels shown in Fig. 2.9-1 of the CRER had been lessened, or provide any data or records to document that confirmatory radiation surveys were conducted to document a reduction in gamma rates.

33. Counsel for Intervenors provided me a copy of all correspondence and reports contained in the New Mexico Mining and Minerals Division ("NMMMD") file for the Church Rock Site 17 mine site. No evidence exists in this file that reclamation activities reduced gamma rates. For instance, there is no indication in these documents that radiation surveys were performed at any time after July 1987 to verify that gamma rates had decreased. It is standard practice to conduct post-remediation surveys to determine and document the success of remediation. Without the results of such surveys, it is impossible to determine if contaminated materials from the previous mining operation have been removed from the site.

34. Apparent Release of Radioactive Materials to Unrestricted Areas. The gamma radiation data collected by the scanner van and by individual surveyors using standard gamma radiation detection instruments and federally recommended surveying techniques clearly show

rates *outside of the Section 17 restricted area fence* to exceed baseline derived from the reference areas of the Church Rock Chapter House and land more than 8 m from State Route 566. The difference was statistically significant. For example, a Student's t-test of the probability that the means of the near-road and off-road data are the same showed a very unlikely probability of 4.23E-14. A Student's t-test of the probability that the means of the near-road and Church Rock background reference area are the same showed an even less probability of 3.74E-37.

35. The predominant wind directions at the site are from the southwest to the northeast and from the west to the east. There are no other possible sources of technologically enhanced gamma-emitters in the immediate vicinity of Section 17. Thus, I can only conclude that the high radiation levels detected by the CRUMP assessments are from residual radioactive materials dispersed from the Section 17 mine site. Since this site is now licensed by NRC, those residual materials are regulated under the Atomic Energy Act of 1954, as amended. As discussed by Mr. Franke in his 1999 testimonies, radiation from these materials must be included in the calculation of the TEDE for the proposed HRI Section 17 ISL mine because they are not included in the definition of background. Furthermore, the data presented here for Section 17 clearly show that the NRC's background criterion that radiation levels should be comparable on site and off site is not met by material on Section 17, just outside the security fence.

36. <u>Human "Receptors" Live on Section 17.</u> A key difference between the TEDE analysis for Section 8 in Phase I of this proceeding and the TEDE analysis for Section 17 is the fact that there are residents living on Section 17. As Mr. King sets forth clearly in his June 2, 2005, declaration, 13 people live in three homes on the King Ranch property, which is located about 1,400 feet due east of Section 17. Among these individuals are children as young as 7

years old. Exposure of these individuals to source material released from the *licensed* Section 17 site must be considered in the TEDE for the project.

37. HRI's License Application for Section 17 is Deficient. I concur with Mr. Franke's conclusion that HRI's license application for Section 17 is incomplete because critical information is missing, and as such, the NRC Staff should never have issued SUA-1508. Franke Declaration, ¶¶ 9-10, 30. As Mr. Franke points out, HRI did not analyze any groundwater sample from Section 17 for dissolved radon to estimate the radon source terms during ISL mining and post-mining restoration. HRI's use of dissolved radon levels from a portion of the Unit 1 site some 20 miles to the northeast of Section 17 to estimate radon source terms at both Section 8 and Section 17 was inappropriate because an accurate estimate of the dissolved radon level in the Section 17 process and restoration streams is crucial to calculating the TEDE. Id., ¶¶12-14. Furthermore, no radon-in-air measurements were made by HRI at its Church Rock site since 1987-1988, and those measurements were made at monitors on the eastern boundary of Section 8, not on or at the downwind boundary of Section 17. Id., ¶16. Given the absence of new and complete environmental data in HRI's application, it is my professional opinion that the application was incomplete and a license should not have been granted.

38. This concludes my testimony.

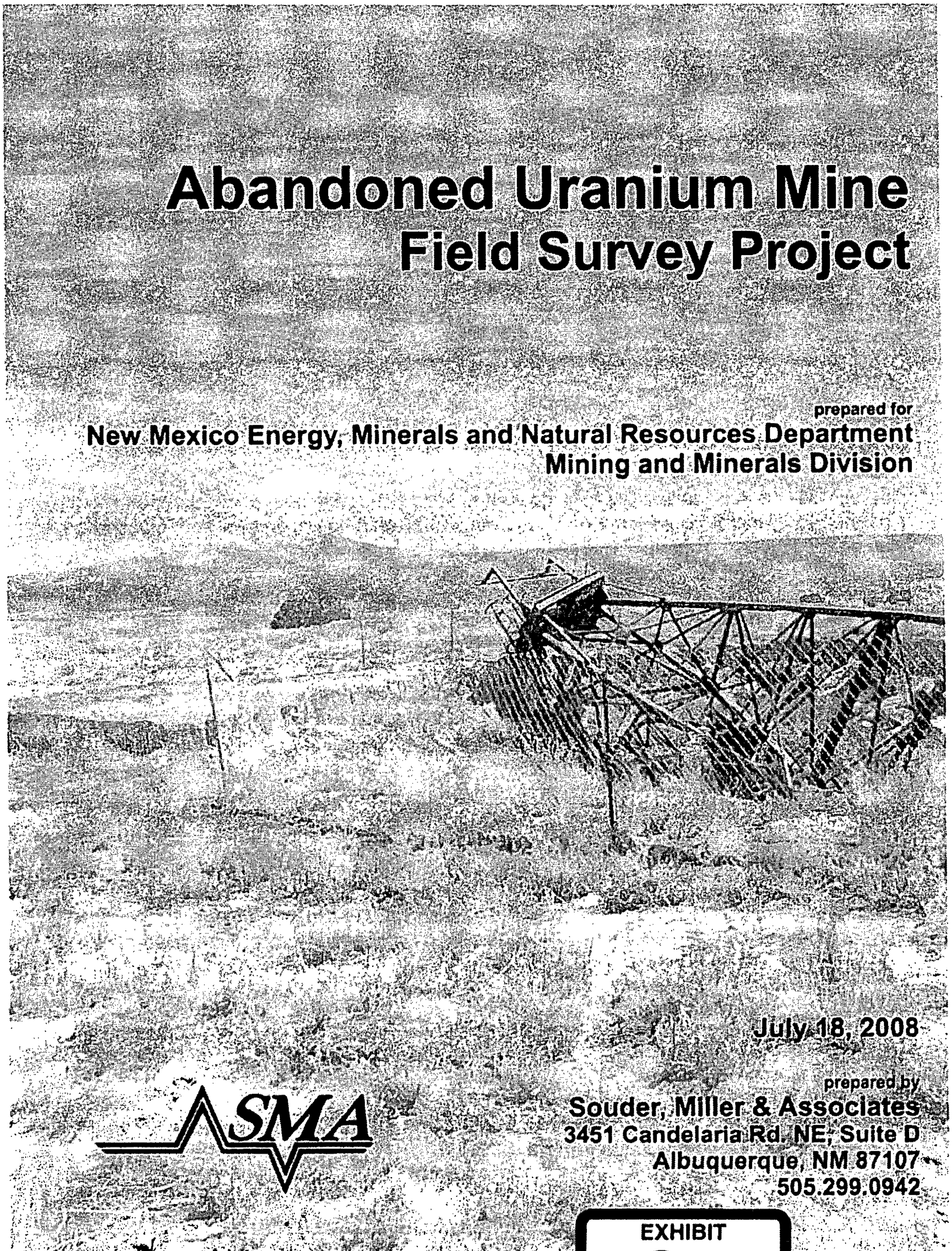
Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury, that the foregoing is true and correct to the best of my knowledge and belief.

Signed on the 10th day of June 2005.

M. Ronca-Battista

Melinda Ronca-Battista, MS

D



Abandoned Uranium Mine Field Survey Project

prepared for
New Mexico Energy, Minerals and Natural Resources Department
Mining and Minerals Division

July 18, 2008

prepared by
SMA
Souder, Miller & Associates
3451 Candelaria Rd. NE, Suite D
Albuquerque, NM 87107
505.299.0942

EXHIBIT
D

SMA

Souder, Miller & Associates ♦ 3451 Candelaria Road NE, Suite D
Albuquerque, NM 87107-1948 ♦ (505) 299-0942 ♦ (877) 299-0942 ♦ fax (505) 293-3430

July 21, 2008 #5417514

Ms. Karen W. Garcia, Chief
Mine Reclamation Bureau
Mining and Minerals Division
New Mexico Energy, Minerals & Natural Resources Department
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: Final Report - Abandoned Uranium Mine Field Survey Project

Dear Ms. Garcia:

Souder, Miller & Associates (SMA) is pleased to submit the attached report summarizing the Abandoned Uranium Mine Field Survey Project. The report has been modified in accordance with comments from your agency dated July 14 and July 16, 2008.

The complete report is being scanned, and CDs containing a pdf of the report will be forwarded to you, and put on SMA's FTP site for download. The geodatabase is enclosed on CDs. Additionally, it was placed on SMA's FTP site for download.

Souder, Miller & Associates appreciates the opportunity to complete this work. If you have questions or additional comments, please call me at the number above, on my cell at 505.220.6542, or email me at sam@soudermiller.com .

Sincerely,
SOUDER, MILLER & ASSOCIATES

Scott A. McKitrick, P.G.
Senior Scientist

Reid S. Allan, P.G.
Vice President/Principal Scientist

Encl.: Abandoned Uranium Mines Field Survey Project Report (three copies), GIS Database (one CD)

cc: Ms. Adela M. Durañ, Associate Attorney, Comeau, Maldegen, Templeman & Indall, LLP, P.O. Box 669, Santa Fe, NM 87504-0699

Executive Summary

Souder, Miller & Associates (SMA) completed a field investigation of 21 abandoned uranium mine sites between January 9 and April 17, 2008 as per the contract between SMA and Comeau, Maldegen, Templeman & Indall, LLP (Comeau) dated January 16, 2008. The sites were located primarily in Cibola and McKinley Counties, with several outliers in Sandoval County and Socorro County. Site information was collected in order to allow prioritization of sites for potential reclamation activities.

Information collected included existing mine features (pits, piles, shafts, adits, structures, etc.), a radiological survey, land use (human, grazing), vegetation, soils, topography, wildlife, and hydrology information. Locations were determined using a global positioning system (GPS) survey, with field information collected on field sheets and entered into the GPS data dictionary. Digital photos of site features were collected.

Information collected during the field investigation is summarized in this report, and is also compiled in a geospatial database. These two items are the primary deliverables of the study.

Introduction

This evaluation of 21 abandoned uranium mining sites (shown in Figures 1 through 4) was conducted pursuant to the contract between SMA and Comeau, and under the oversight of the Mining and Minerals Division (MMD) of the New Mexico Energy, Minerals and Natural Resources Department. Field work was completed in January through April, 2008. The goal of the mine evaluation is to provide preliminary data for MMD to rank the sites based on relative risk to human health and the environment. There are two primary deliverables for this study: this written summary report and a geospatial database of all site field data and other research.

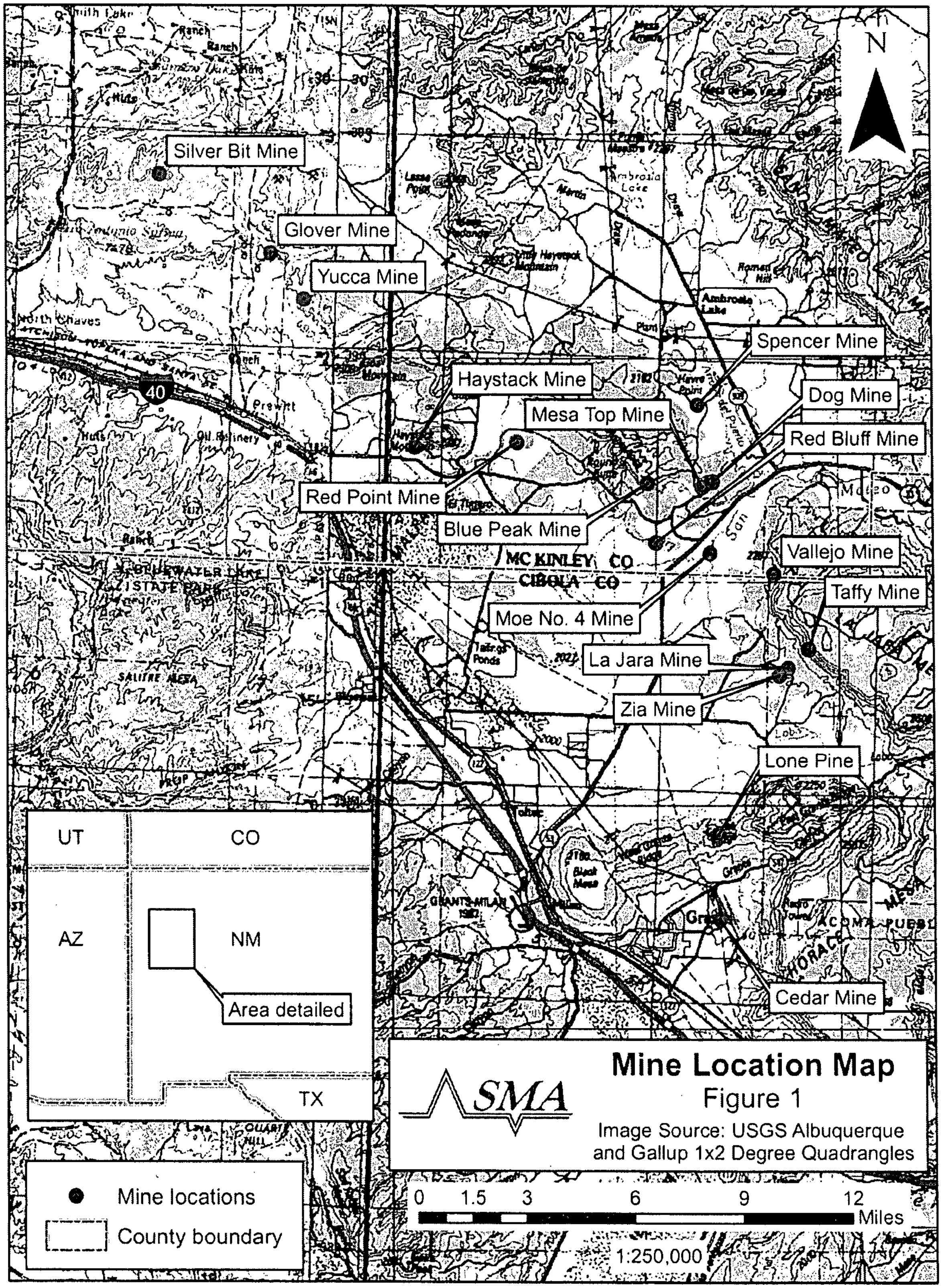
Areas of site disturbance ranged from less than one acre to tens of acres. Mine features observed included road cuts, shafts, adits, pits, ponds, and rock piles. Structures included headframes, loading structures, tanks, electrical components, steel structures, and others. Background radiation levels were generally between 10 and 20 μR/hour, with impacted readings as high as 1,800 μR/hour.

Scope of Services

SMA's scope of services included the following:

Health and Safety Plan

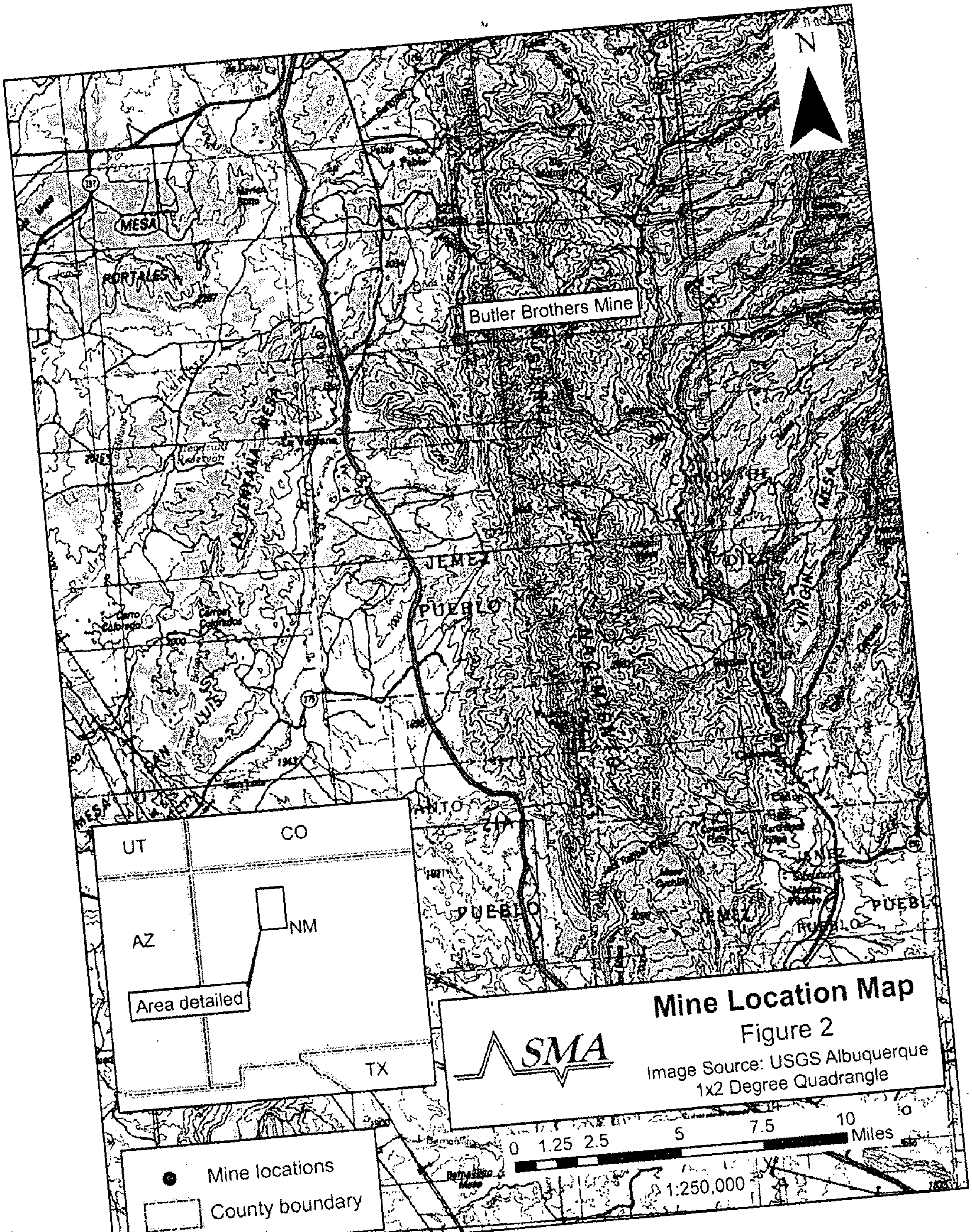
Prior to the commencement of field work, a field task-specific health and safety plan (HASP) was developed in accordance with applicable requirements (OSHA), the SMA Health and Safety program, and any applicable Agency safety requirements. A copy of the HASP is included in Appendix 1 to this report.

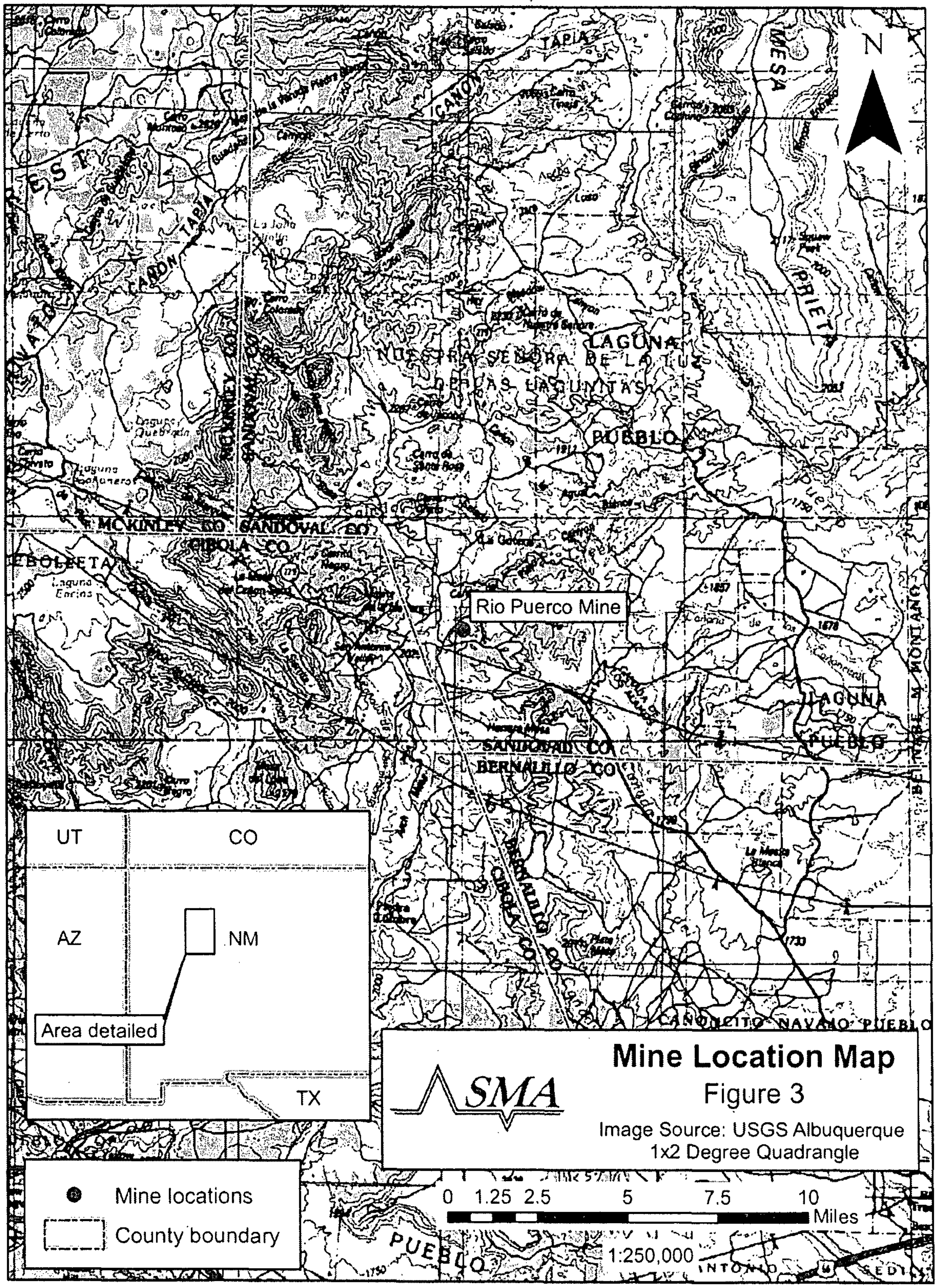


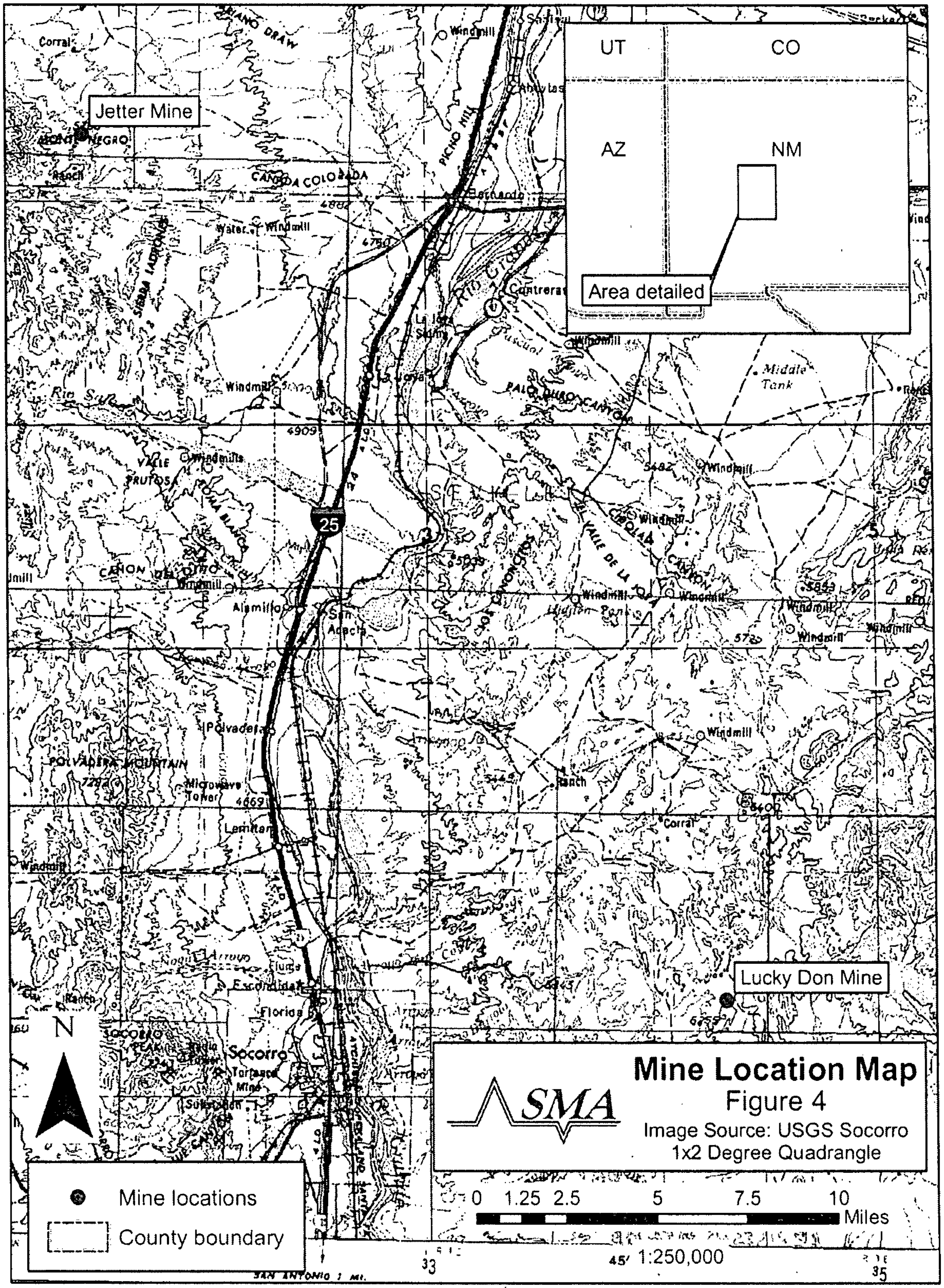
Mine Location Map

Figure 1

Image Source: USGS Albuquerque and Gallup 1x2 Degree Quadrangles


N
Butler Brothers Mine
UT
CO
AZ
NM
TX
Area detailed
Mine Location Map
Figure 2
SMA
Image Source: USGS Albuquerque
1x2 Degree Quadrangle
0 1.25 2.5 5 7.5 10
Miles
1:250,000
Mine locations
County boundary


N
Rio Puerco Mine
UT
CO
AZ
NM
TX
Area detailed
Mine Location Map
SMA
Figure 3
Image Source: USGS Albuquerque
1x2 Degree Quadrangle
Mine locations
County boundary
0 1.25 2.5 5 7.5 10
Miles
1:250,000
MCKINLEY CO
SANDOVAL CO
CIBOLA CO
SANDOVAL CO
BERNALILLO CO
LAGUNA
PUEBLO



Mine Location Map
Figure 4
Image Source: USGS Socorro 1x2 Degree Quadrangle

Agency Notification

SMA notified, where appropriate, State and Federal land management agencies prior to field visits to allow Agency staff to accompany SMA staff. SMA was able to give at least a two business days (48 hour) notice.

Field Inspections and Data Collection

SMA developed and submitted a standardized data collection form prior to the start of the field work activities. Copies of the completed data collection forms are included in with each site summary. Field data locations were collected using a Trimble GPS Pathfinder Pro XRS receiver with sub-meter accuracy and data logging capability. Radiological survey information was collected using a state-of-the-art Ludlum Model 19 Micro-R meter.

Data Collection Reporting

A total of 21 sites were evaluated. Two sites that were originally requested by MMD were not evaluated. The United Western site was determined to be on private land, and is therefore not included in the written summaries. The Westwater site was not evaluated due to lack of access to the site.

Written site summaries have been compiled and are included in this report. The site summaries include all data collected, as well as representative photos and site maps, and copies of field notes.

Data collected has been entered into a geospatial database compatible with ESRI ArcGIS, including attribute tables for all collected data and georeferenced digital photos. An electronic copy of the database has been submitted under separate cover.

Field Data Collection Methodology

SMA field staff collected the following information during field survey activities:

1) GPS survey of the entire site including:
    a. rock piles (type of rock, i.e. waste rock, ore stockpile, etc. not delineated)
    b. mine features
    c. adits
    d. shafts
    e. buildings
    f. perimeter of disturbed area
    g. perimeter of rock piles
    h. buildings

    SMA used a Trimble GPS Pathfinder Pro XRS receiver to locate and record data points.

    The extent of disturbance was not delineated at each mine. Numerous mines were made up of cuts into the side of mesas, thus disturbance was limited and topography did not allow field staff to walk the disturbance perimeter. The determination of the extent of the disturbance area at some mines was extremely subjective, and therefore not recorded.

2) Human activity: SMA documented any noted human activity, including vehicle tracks, paths, trash, etc. Additionally, SMA documented the nearest residence within a one mile search radius either in the field or through aerial photo review.

3) Photo documentation: Site photographs were collected using a digital camera. Characteristic photos are included in the site summaries. All photos obtained are included in the geospatial database.

4) Radiological survey: SMA used a Ludlum Model 19 Micro-R meter for radiological data collection. This meter is appropriate for the reconnaissance-level survey conducted, with a total range of 0-5,000 μR/hr.

   Where possible, SMA conducted the radiological survey on a regular grid. Several sites had topography which did not allow survey on a grid (specifically, sites which were cut into hillsides, that were too steep to access, or included steep-sided pits). These sites included Blue Peak, Haystack, Lone Pine, Lucky Don, Silver Bit, and Taffy.

   The initial step of the radiological survey at each site was to run two perpendicular lines of preliminary collection points across the widest portion of each site. Based on radiological readings collected, SMA then determined if the grid covered all areas of elevated radiological readings, and the appropriate grid spacing. The remainder of the grid was then surveyed. Radiological measurements were collected at each point at ground level and 4 feet from ground level. Where steep slopes did not allow access, field personnel collected readings where possible.

   "Background" radiation is generally considered by MMD to be the naturally occurring conditions, which have not been impacted by mining activities. At the sites, background radiation levels were collected in locations outside of obvious disturbance, or on the margin of disturbed areas in an up-wind direction. SMA did not conduct a statistical review of radiation data to confirm background values.

5) Vegetation at the site was described and included the following information:
   a. General life form description of vegetation, for example, if woody species, grasses, forbs, if native, exotic or weedy species. Percent coverage was estimated based on visual observation.
   b. Evidence of vegetation die off
   c. Evidence of grazing

6) Soils: Soil descriptions were collected using the applicable USDA Soil Survey and field evaluation where necessary.

7) Wildlife: Description of sighted or evidence of wildlife within the mine sites was collected and is included in the written summary and geospatial database.

8) Land use information collected included the following items:
   a. Grazing, cattle, sheep, etc
   b. Agricultural areas in proximity
   c. Identification of roads, corrals, or fences and evidence of use

9) Topographic features: Items noted were roads, water courses, terrain, and significant topographic features in the immediate area.

10) Hydrogeologic information: SMA conducted a search of the New Mexico Office of the State Engineer iWaters database for well records within a one-mile search radius of each site. Descriptions of well locations and depths to water are compiled in the written report. The geospatial database includes the iWaters database information.

Site Summaries

Site summaries, including site maps depicting features, and field notes, are included here.

Blue Peak Mine

1. Location/Land Status: The Blue Peak Mine (called Bobcat Mine in field notes) is located on BLM land within Section 24, T13N, R10W on the USGS Dos Lomas quadrangle. Physical access to this mine can be gained by traveling north from Milan, NM on NM 605 eleven miles to Haystack Road, then west approximately 1.5 miles from NM 605 on Haystack Road to a private gate on the north of road. The Blue Peak mine is approximately 1.2 miles north of Haystack Road and 0.8 miles NNW of a private residence. Legal access to this property was graciously provided by Mr. Robert Schmitt of 57 NM 509, Grants, NM 87020, phone (505) 287-2260.

2. Human Activity: The Blue Peak Mine is approximately 0.8 miles from the nearest residence.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 140 μR/hour and minimum of 50 μR/hour. Four-foot elevation maximum was 140 μR/hour and minimum was 36 μR/hour. As the site is a cut into a steep mesa, radiological readings outside the area of disturbance were not collected.

4. Mine Disturbance: The site consists of numerous road cuts along the contours of the mesa. The majority of these roads have been eroded away. The mine itself is composed of two benches cut into the mesa-side: one consisting of the main workings, the other of a load-out. The total disturbed area on site is an estimated 2 acres. Remains of the wooden load-out structure are the only evidence the site was a mine. Any evidence of mining along the high bench of main workings has been covered by slumping of the steep slope.

5. Plant Community: The surrounding area is characteristically mixed pinon-juniper and grass, including: 30% grass, 10% forbs, 20% shrubs, and 40% bare earth. The vegetation on site is primarily grasses (15%) with remaining ground bare.

6. Soils: Soils at the site are rock outcrop-Westmion-Skyvillage complex, 30 to 80 percent slopes. The soils column is generally as follows: 0 to 2 inches gravelly clay loam, 2 to 14 inches clay, 14 to 20 inches bedrock.

7. Wildlife: There was no wildlife sign directly observed on this site.

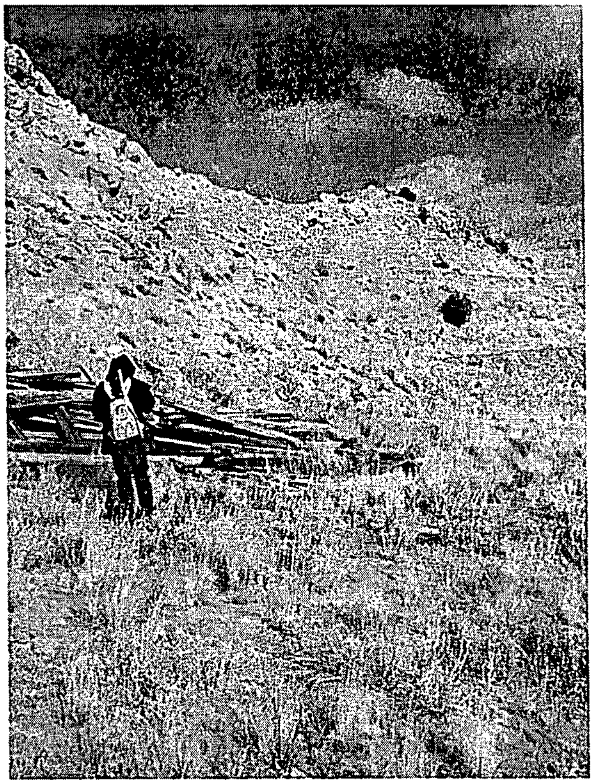
8. Land Use: Land use at this site consists of light to moderate grazing on pinon-juniper forest.

9. Off-Site Impacts: No off-site impacts were noted.

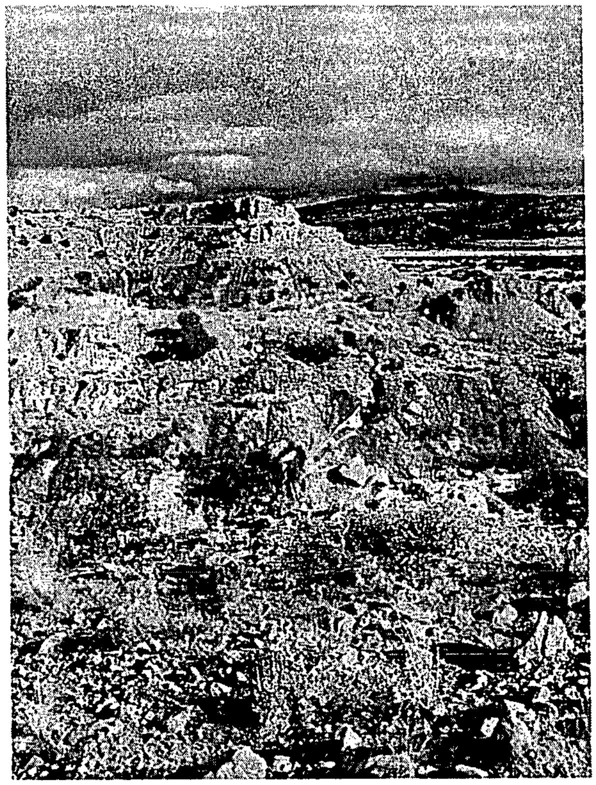
10. Topographic Features: The site is cut into the steep side of a mesa.

11. Hydrogeology: Based on a review of the New Mexico Office of the State Engineer (NMOSE) iWaters database, there are two well records on file for wells within one mile of the site. Only one of the wells has a recorded depth to water, which is 280 feet. This well is due south of the site approximately 0.7 miles.

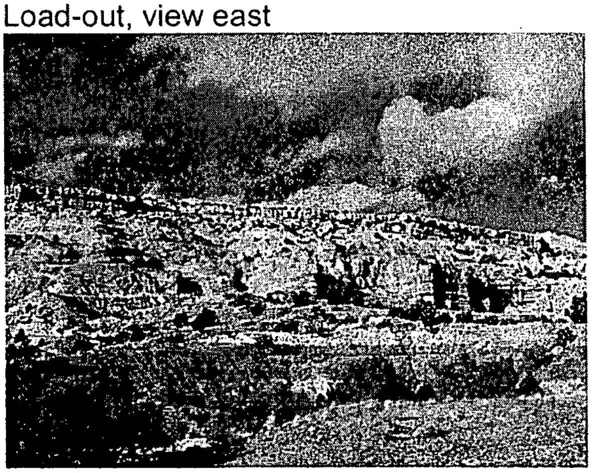
The nearest surface water drainage feature is approximately 0.6 miles to the southwest.



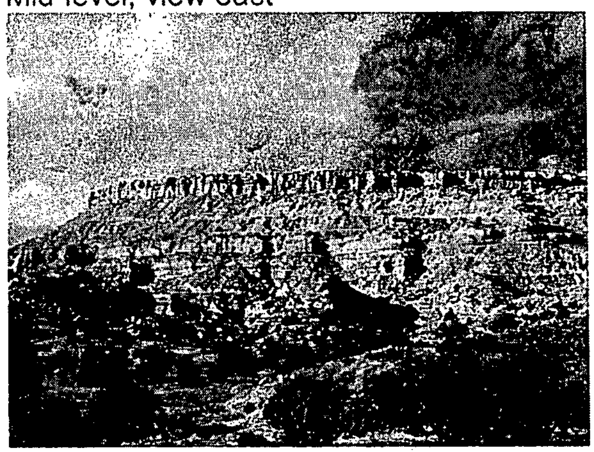
Load-out, view east



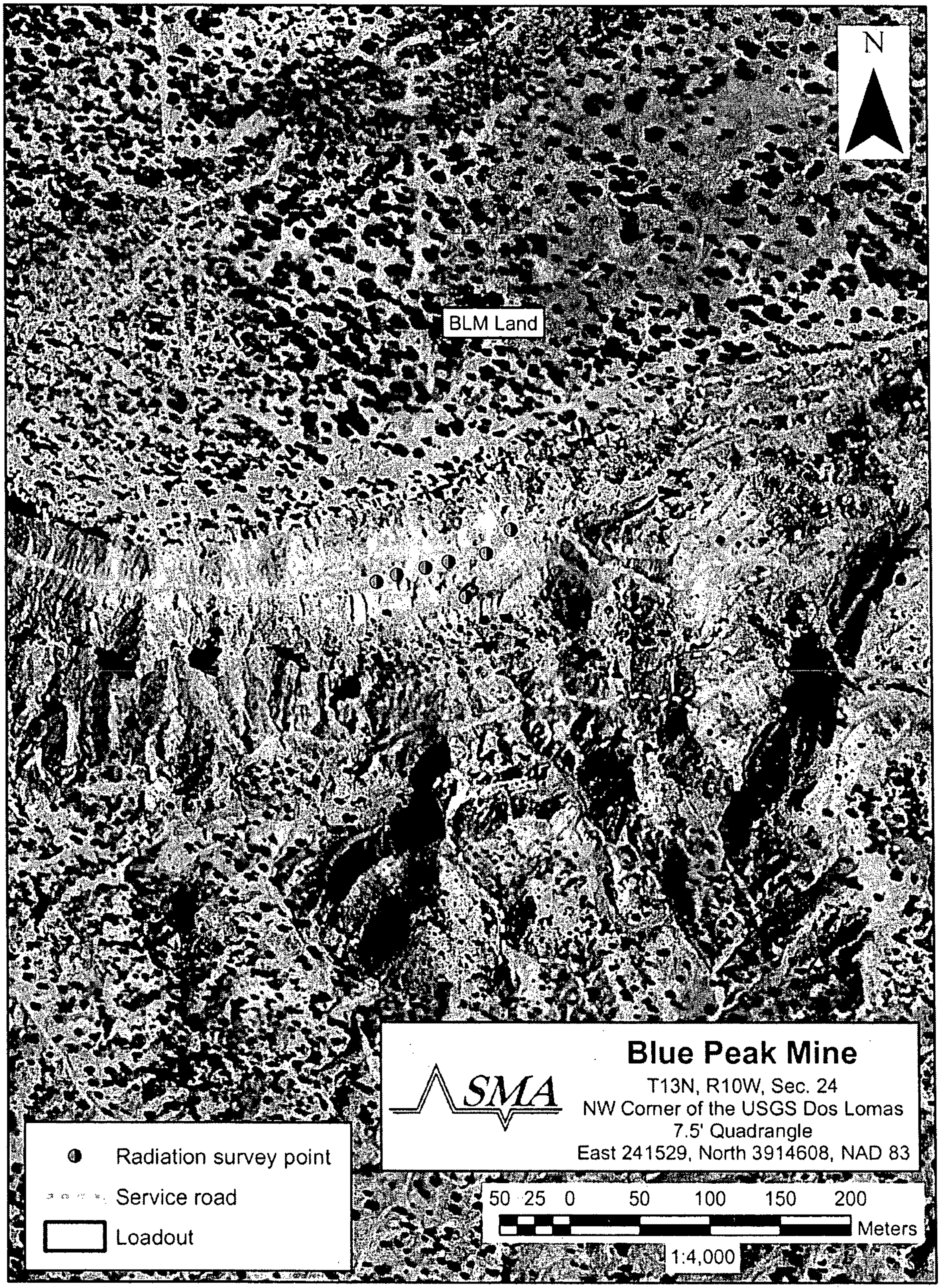
Mid-level, view east



Panorama of mine



View to West


N
BLM Land
Blue Peak Mine
SMA
T13N, R10W, Sec. 24
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 241529, North 3914608, NAD 83
Radiation survey point
Service road
Loadout
50 25 0 50 100 150 200
Meters
1:4,000

AUM Field Survey Data Sheet **Site** Bobcat

Date	Time On-Site	Time Off-Site	By
1/25/08			Baldwin Mertz
Weather Conditions:			

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features		roadcuts eroded		

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings	P3	Loadout - collapsed wooden structure	N/A	
Headframes				

AUM Field Survey Data Sheet Site ______________________________

Equipment				
Soils	GPS#	Description	Extent	Photo #
Vegetation	GPS#	Description	Extent	Photo #
Wildlife	GPS#	Description		Photo #
Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
Topographic Features (roads, water courses, etc.)	GPS#	Description		Photo #

SUBJECT AUM Sidsat PROJECT PAGE

CLIENT DATE 1/25/05 BY Schilder

CHECKED BY

GPS #	Description	µR/hr surface/waist
P3	Sidsat area	140 / 140
P4		
P5		
P6	workings	110 / 60
P7	"	80 / 50
P8	"	70 / 60
P9	"	80 / 70
P10	"	100 / 80
P11	"	50 / 30

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Butler Brothers Mine

1. Location/Land Status: The Butler Brothers Mine is located on BLM land within Section 23, T19N, R1W on the USGS La Ventana quadrangle (35.863833N, 106.902806W). The mine can be physically accessed by traveling south on Old NM 44 from Cuba 6.5 miles to San Miguel Road, east on San Miguel Road to the end of the pavement, then by foot approximately 3.5 miles SSE to the mine site. Legal access was graciously provided by verbal agreement of Mr. and Mrs. Miguel Montoya of 63 San Miguel Rd. Cuba, NM 87013, (575) 289-9160. The Butler Brothers Mine is located in a remote portion of Section 23 which has little access via roads. The most obvious and practical approach is from the south on Old 44 then east along ranch and jeep path directly to the mine; however, access via this route would require considerably more legal agreement than the path which was actually taken.

2. Human Activity: No residences or wells are located within a one-mile radius of the site. There is evidence of woodcutting in the area. Based on the limited scale, woodcutting is likely individuals collecting for home use.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 420 μR/hour and minimum of 8 μR/hour. Four-foot elevation maximum was 360 μR/hour and minimum was 8 μR/hour. Background readings were approximately 8 μR/hour.

4. Mine Disturbance: The mine consists of two open excavations into the ridge. The jeep path winds to the top of the excavation and ends. Erosion through the center of the lower workings has removed enough material to disguise the excavation as being no more than a road cut.

5. Plant Community: The area surrounding the mine is a diverse forest of pinon, juniper, ponderosa, and oak. Much of the area within the mine site and along the road is notably dense with pinon seedlings. On-site vegetation is made up of 5% grasses, 20% forbs, 20% shrubs, 20% trees, and 35% bare ground, with no noted non-native species.

6. Soils: Site soils are made up of weathered volcanic tuff with slopes of 10-30 percent. Soils are generally thin loam overlying silty clay, with bedrock at 12 to 24 inches.

7. Wildlife: Animal sign, most particularly deer, was abundant: fox, rabbit, coyote, horned lizard, and rodent were all directly observed.

8. Land Use: The land use of the area is moderate cattle grazing and wood cutting.

9. Off-Site Impacts: No off-site impacts were noted.

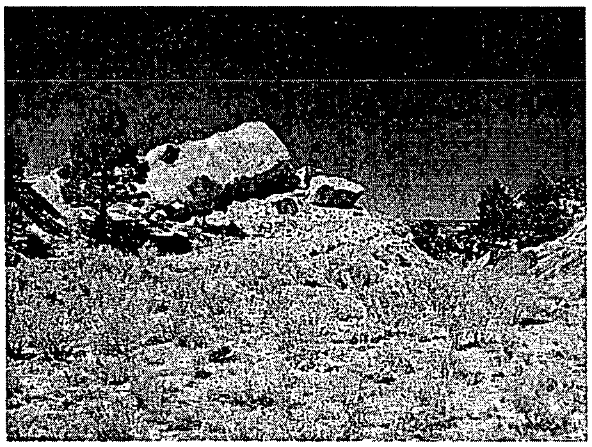
10. Topographic Features: The site is cut into the steep side of a mesa. Active erosion of the cut is present.

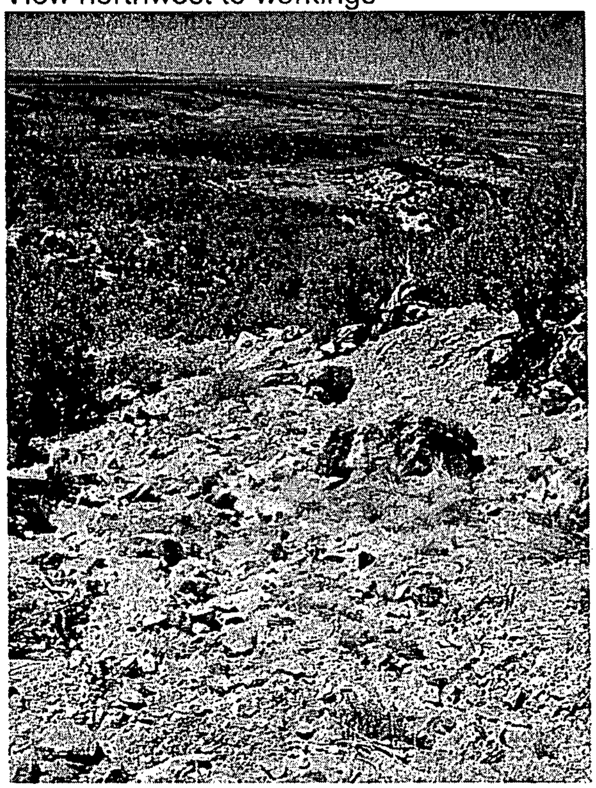
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no wells within a radius of one mile to the site. The nearest well records on file for wells near the site are approximately 1.5 miles away (total of two), to the northwest (depth to water 300 ft), and the south (depth to water 35 ft).

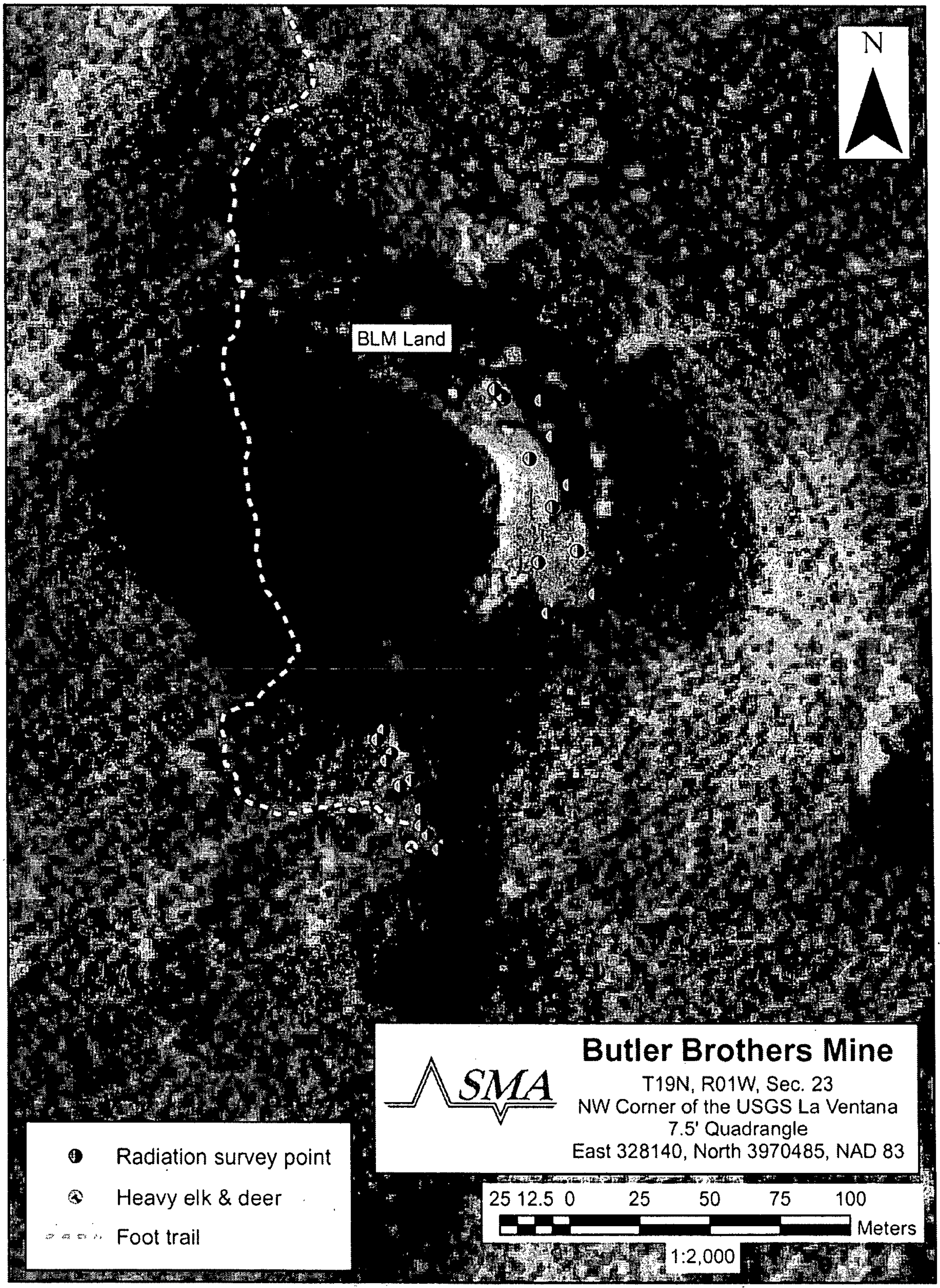
The nearest surface water drainage feature is approximately 0.2 miles to the south.


View northwest


View northwest to workings


View west of cut


View to West


N
BLM Land
Butler Brothers Mine
SMA
T19N, R01W, Sec. 23
NW Corner of the USGS La Ventana
7.5' Quadrangle
East 328140, North 3970485, NAD 83
Radiation survey point
Heavy elk & deer
Foot trail
25 12.5 0 25 50 75 100
Meters
1:2,000

Page ____ of ____

AUM Field Survey Data Sheet   Site Butler Brothers

Date	Time On-Site	Time Off-Site	By
4/14/08			Baldwin Mertz

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits		2 cuts -		
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features		- lower cut eroded.		

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet

Site Butler Brothers

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
	Veg-0	35% - bare 5% - grass 20% - tree 20% - shrub 20% - forbs		

Wildlife	GPS#	Description	Photo #
	wildlife 0	heavy elk, deer, coyote, fox, bear, Aberts Squirrle, etc	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
	Land - 0	No evidence of current use		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site AUM Butler Bros. 2008-4-14

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
BUTLER 1	Eastern-most extent of site	11	12
GØ	Rad. survey	11	12
G1	"	17	16
G2	"	12	14
G3	"	16	16
G4	"	14	13
G5	"	12	12
G6	"	10	12
G7	"	10	12
G8	"	15	12
G9	"	12	12
G10	"	20	14
WILDLIFE 0	Hab. ELK, DEER, COYOTE, FOX, BEAR ABERTS SQL., ETC...	—	—
VEG-0	35% BARE 20% SHRUB 5% GRASS 20% TREE 20% FORBE	—	—
LAND-0	OTHER - NO EVIDENCE OF CURRENT USE	—	—

AUM Field Survey Data Sheet Site Butler Bros. 2008-4-14

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G11/B1	Rad. survey cont'd	48	44
G12/B2	"	38	36
G13/B3	"	12	12
G14/B4	"	12	12
G15/B5	"	10	10
G16/B6	"	15	12
G17/B7	"	13	12
G18/B8	"	8	8
G19/B9	"	70	60
G20/B10	"	50	46
G21/B11	"	420	360
G22/B12	"	48	46
	P-DOP 6.75↑ @ 14:47		
	B# VALUES ARE LISTED IN GARMIN HANDHELD		

Butler Brothers Field data, from handheld Garmin GPS unit. 04-14-08.
Points collected by Brian Mertz & Bill Baldwin

Data Point	Lat.	Long.	Elev.
B1	35.86390	106.90359	7639
B2	35.86389	106.90358	7636
B3	35.86369	106.90347	7653
B4	35.86354	106.90338	7664
B5	35.86336	106.90343	7664
B6	35.86320	106.90339	7665
B7	35.86326	106.90321	7677
B8	35.86340	106.90327	7669
B9	35.86361	106.90331	7668
B10	35.86377	106.90338	7664
B11	35.86388	106.90343	7656

Cedar Mine

1. Location/Land Status: The Cedar Mine is located on BLM land within Section 20, T11N, R9W on the USGS Grants quadrangle (35.166602N, 107.805431W). Physical access to the mine can be gained by traveling east from Grants on East Roosevelt Ave. past the sand and gravel mining operation and onto the mesa.

2. Human Activity: The Cedar Mine is directly adjacent to an active sand and gravel mining operation operated by B-b Concrete. Trash (heavy equipment, air filters, etc.) has been discarded on-site. A buried gas pipeline crosses the site in a north-south direction. The nearest residence is approximately 1,000 feet to the east of the site.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 170 μR/hour and minimum of 3 μR/hour. Four-foot elevation maximum was 80 μR/hour and minimum was 7 μR/hour. Background radiation levels were approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of seven lateral exploratory cuts extending east-west an average of 1,200 feet. To the west of these cuts are two shallow pits (one approximately 180 ft. in diameter by 10 ft. deep maximum, noted as large pit in photo, the other approximately 75 ft. by 25 ft., 3 ft depth), as well as two rock piles associated with the east-west cuts on the east margin of the site. These piles are 340 and 460 feet long respectively, approximately 4 feet wide and approximately two feet thick. A pile approximately 35 feet in diameter and three feet thick exists on the east margin of the site, and a pile approximately 15 feet in diameter and 2 ft. thick is present in the center of the site.

Equipment remaining on-site includes an old truck, an engine, and what appears to be a powder box.

5. Plant Community: The surrounding vegetation is predominately grasses with the occasional juniper tree. The vegetation on site is characteristic of the surrounding area and consists of: 30% grasses, 40% forbs, 10% woody scrub, 1% non-native, and the remainder is bare earth.

6. Soils: Soils at the site are Penistaja fine sandy loam, a deep, well-drained loam, formed in wind-modified alluvium derived dominantly from sandstone.

7. Wildlife: There was no wildlife sign directly observed on this site except for rodent burrows and a possible badger hole.

8. Land Use: As discussed above, a sand and gravel operation abuts the site.

9. Off-Site Impacts: No off-site impacts were noted.

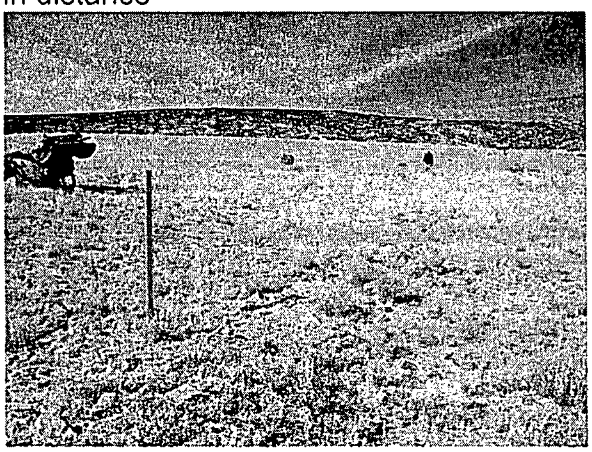
10. Topographic Features: The access road to the site is from the south. The site is flat-lying. No erosional features were noted.

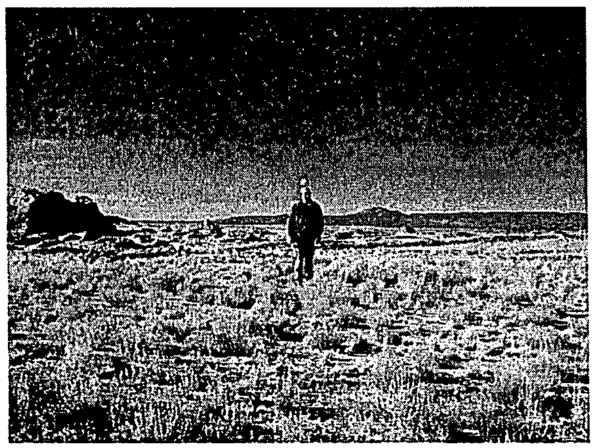
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are five well records within a radius of one mile of the site. Three of these wells have depth to water data on file, with depths to water of 94, 100 and 122 ft.

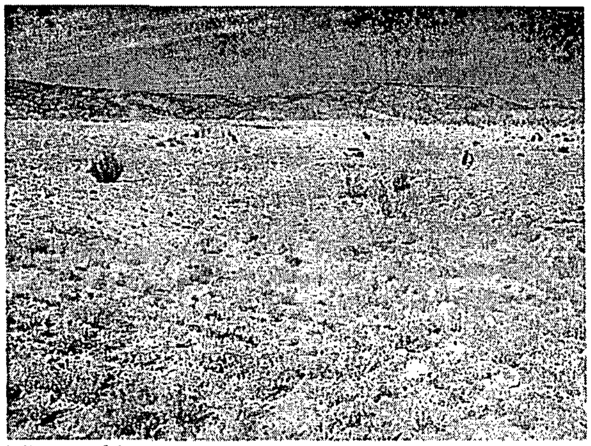
The nearest surface water drainage feature is approximately 0.5 miles to the southeast.

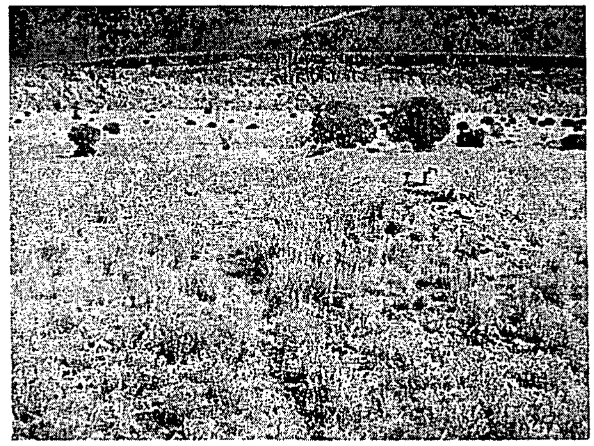

View west, pipeline marker, gravel pit in distance

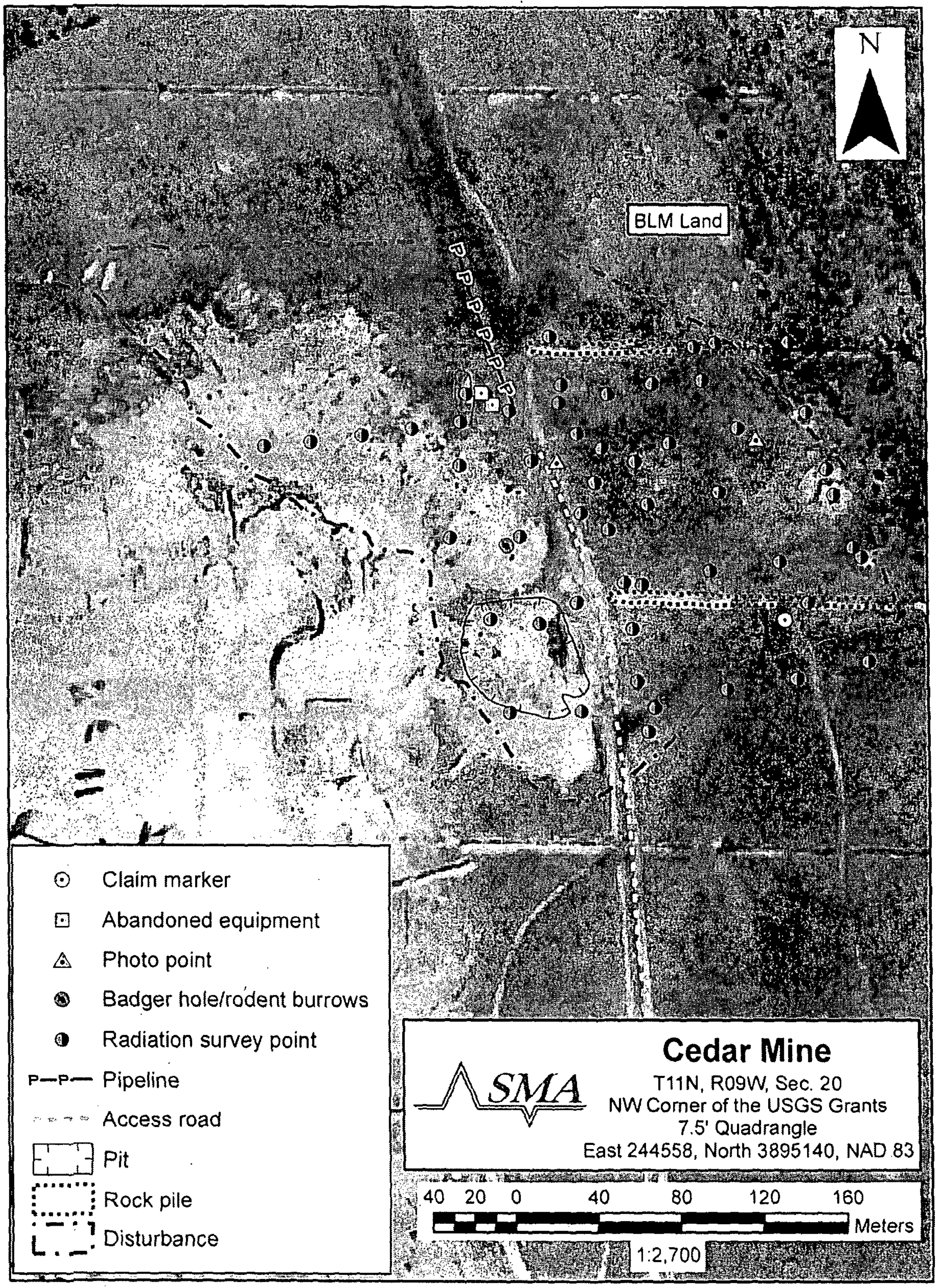

View north


View north, pipeline, old truck


View southwest to sand and gravel op.


View of large pit


E-W rock pile


N
BLM Land
Claim marker
Abandoned equipment
Photo point
Badger hole/rodent burrows
Radiation survey point
Pipeline
Access road
Pit
Rock pile
Disturbance
SMA
Cedar Mine
T11N, R09W, Sec. 20
NW Corner of the USGS Grants
7.5' Quadrangle
East 244558, North 3895140, NAD 83
40 20 0 40 80 120 160
Meters
1:2,700

AUM Field Survey Data Sheet

Site: Cedar

Page: ~~[illegible]~~ 1

Date	Time On-Site	Time Off-Site	By
2/12/00	835	1350	Toni Ross / Brian Mertz

Weather Conditions:
clear, sunny, calm

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits	29	suspected [illegible] [illegible] in center	5' Diam, 20' circum.	14
	37	large pit	70' diameter	20, 21, 22
	44	depression pit	3' deep	26
Waste Rock Dumps	23	sample cut bank E-W rock pile, [illegible] transects site	3'H x 400'	8, 9
	26	[illegible] pile 30 x 30' x 3'	30' x 30' x 3'	10
	33	[illegible] E-W [illegible] pile	3.5' [illegible] x [illegible]'	16, 17
~~Tailings~~	36	waste pile w/ [illegible]	.5 yd³	18
Trenches				
Roads	47	access road		26
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings	36	timber wall portion	6' x 4'	19
Headframes				

1032 lost PDOP - too high 6.78 photo #13
1018 - [illegible] surveyor [illegible] recommend wait out satellites

AUM Field Survey Data Sheet

Site CEDAR

Equipment	28 42 43	suspected powder box motor truck	2'x 3'	13 34 35
Soils	**GPS#**	**Description**	**Extent**	**Photo #**
Vegetation	**GPS#**	**Description**	**Extent**	**Photo #**
juniper-pinon	NA	view of site of surrounding trees		11
juniper	31	center of pit w/ powder box	7' diameter 2.5' H	14, 13
bull thistle	35, 41			18, 23
Wildlife	**GPS#**	**Description**		**Photo #**
[illegible] rodent holes	26	out waste pile		10, 12
rodent holes	27	pit w/ powder house		14
Human Activity (non-mining, w/in 0.5 mi of site)	**GPS#**	**Description**	**Extent**	**Photo #**
		gravel pit adj to west side of mine [illegible]		
		dump in [illegible] pit		20, 21, 22
transwestern	46	pipeline		27
Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	**GPS#**	**Description**	**Extent**	**Photo #**
	21	suspected claim marker		CEDAR 7
Nearby Residences / Wells (w/in 0.5 mi of site)	**GPS#**	**Description**	**Distance to Site**	**Photo #**
Topographic Features (roads, water courses, etc.)	**GPS#**	**Description**		**Photo #**

AUM Field Survey Data Sheet Site CODAC

AUM Field Survey Data Sheet Site ____

Radiological Survey 50' SCALE			
GPS#	Description	Reading Surface	Reading 4 feet
OFF SITE	EAST OF SITE FOR BACKGROUND	10uR/hr	8uR/hr
2	Geiger base pt for e-w x-sec	12uR/hr	10uR/hr
3	30' from base pt e-w x-sec	16uR/hr	16uR/hr
4	60' from base pt ew x-sec	8uR/hr	10uR/hr
5	90' from base pt. e-w x sect	8uR/hr	16uR/hr
6	130' from base pt e-w x sect	9uR/hr	9uR/hr
7	150' from base pt e-w x sect	10uR/hr	10uR/hr
8	180' from base pt e-w x sect	11uR/hr	11uR/hr
9	210' from base pt e-w x sect	15uR/hr	14uR/hr
10	240' from base pt ew x sect	16uR/hr	22uR/hr
11	270' from base pt e-w x sect.	10uR/hr	10uR/hr
12	base pt for N-S x sect	10uR/hr	10uR/hr

AUM Field Survey Data Sheet   Site CEDAR

AUM Field Survey Data Sheet   Site ____________

Radiological Survey	50 Scale		
GPS#	Description	Reading Surface	Reading 4 feet
13	30' from base pt N-S X sec	10uR/hr	8uR/hr
14	60' from base pt N-S X sec	12uR/hr	10uR/hr
15	90' from base pt N-S X sec	12uR/hr	11uR/hr
16	120' from base pt N-S X sec	11uR/hr	11uR/hr
17	150' from base pt N-S X sec	11uR/hr	11uR/hr
18	180' from base pt N-S X sec	13uR/hr	12uR/hr
19	210' from base pt N-S X sec	10uR/hr	10uR/hr
20	240' from base pt N-S X sec	8uR/hr	10uR/hr
25	WASTE PILE - CUT BANK AREA - NE [illegible] of strip of rocks	3uR/hr	7uR/hr
26	dirt waste pile photo 10	8uR/hr	7uR/hr
28	small pit at power box	13uR/hr	10uR/hr
34	waste pile from cut E-W	8uR/hr	8uR/hr

AUM Field Survey Data Sheet Site CEDAR

AUM Field Survey Data Sheet Site __________

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
34	west pile- rocks	250 scale 17uR/hr	250 scale 8uR/hr
40	hot spot in large pit	250 scale 8uR/hr	250 scale 4uR/hr
45	center of depression (44)	15uR/hr	12uR/hr
34		170	80
40		80	40
45		15	12

(6)

Mine I.D.: CEDAR

Plant Community Data

Date/Time:
Weather:
Observer:

Current Plant Community: P-J SAVANAH (Mostly Juniper oneseed)
Photo#
40% Forb (Snakeweed, Winterfat) 30% grass (B. gracilis) 10% Brush (4 wing saltbrush), 19% bare soil, 1% bull thistle (non native)

Other Species Present:
Photo #
Cholla, senecio

T&E Present: Y/N? NO
If yes, species?
Photo #

Noxious Weeds: Y/N? YES Bullthistle (1 plant)
If yes, species?
Photo #

Bare Spots? Y/N? yes 10% of cover
Number of spots/size
Photo #

Standing Dead? Y/N?
If yes, species? NO
Photo #

Photo Point GPS Coord. SEE PREVIOS
Photo #/Direction

Additional Notes:
Use back if necessary

AUM Field Survey Data Sheet Site AUM - Cedar 2008 - 3 - 6

Radiological Survey			
GPS#	Description photo - ✓	Reading Surface	Reading 4 feet
G0	Rad survey ✓	14	12
G1	"	12	10
G2	"	16	20
G3	"	16	13
G4	"	10	8
G6	" ✓	13	11
G7	" ✓	12	8
G8	"	14	7
G9	"	14	11
G10	"	11	10
G11	"	15	14
G12	" ✓	32	30
G13	" ✓	26	24
G14	"	40	40
G15	"	10	10

AUM Field Survey Data Sheet Site AUM - Cedar 2008-3-6

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G16	Rad. survey	12	10
G17	"	10	10
G18	" ✓	8	8
G19	" ✓	10	10
G20	"	10	10
G21	"	10	10
G22	"	14	12
G23	"	21	17
G24	" ✓	13	12
G25	" ✓	21	20
G26	"	19	17
G27	"	12	10
G28	"	10	10
G29	"	10	10
G30	" ✓	10	10

Dog Mine

1. Location/Land Status: The Dog Mine is located on BLM land within Section 20, T13N, R9W on the USGS Dos Lomas quadrangle, some 12 miles north of Milan, NM. Physical access to the mine can be gained by traveling north from Milan, NM on NM 605 eleven miles to Haystack Road, continuing north 0.8 miles on NM 605. West of the highway there is a stock tank and gate. Park at the gate and proceed on foot to the mine. Legal access to this property was graciously provided by Mr. Robert Schmitt of 57 NM 509, Grants, NM, 87020; phone: (505) 287-2260.

2. Human Activity: No obvious human activity besides historical mining was noted. No residences were noted within a one-mile radius of the site.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 1,800 μR/hour and minimum of 22 μR/hour. Four-foot elevation maximum was 1,000 μR/hour and minimum was 20 μR/hour. Background radiation levels are approximately 17 μR/hour.

4. Mine Disturbance: The mine consists of a 30 degree closed decline and wooden head frame striking SSW into underground workings. The site is strewn with numerous small rock piles (approximately 20) with an estimated total volume of 150 cubic-yards. On the northern extent of the site there are two large piles with an estimated total volume of 8,000 cubic-yards. The site is covered with various wastes: tools, derelict automobiles, and timbers.

5. Plant Community: The surrounding area is typical pinon/juniper forest with grasses. Vegetation on site includes: 20% trees, 20% forbs, 20% grass, and 40% bare earth.

6. Soils: Site soils are Celavar-Atarque complex, with 1 to 8 percent slopes, with 0-2 inches loam, 2-24 inches sandy clay loam, lithic bedrock at 20-40 inches.

7. Wildlife: The site contains scattered rodent dens, canid tracks, and deer scat.

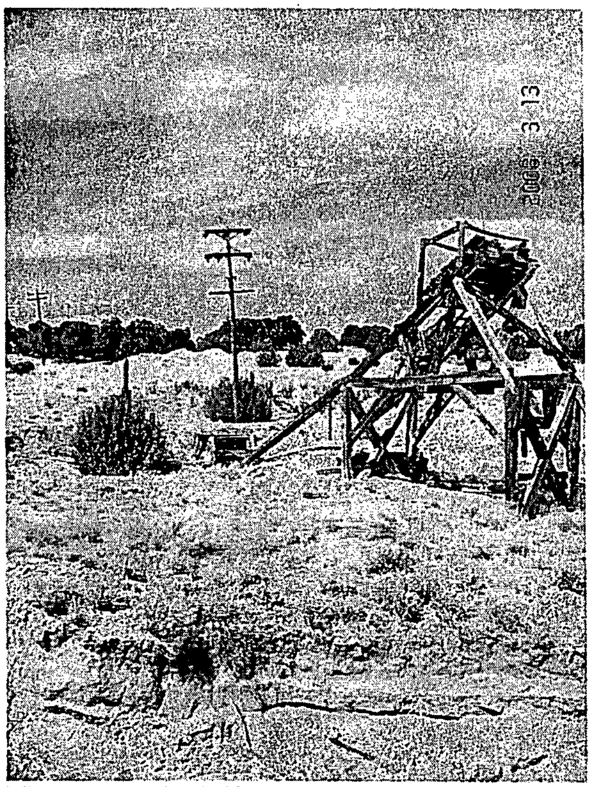
8. Land Use: Land use is currently limited grazing.

9. Off-Site Impacts: No off-site impacts were noted.

10. Topographic Features: The site is low rolling hills, with no notable erosional features.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are two well records within a radius of one mile of the site. Neither of these wells have depth to water data on file. The nearest well with depth to water data on file is approximately 1.5 miles to the southwest of the site, with depth to water recorded as 280 ft.

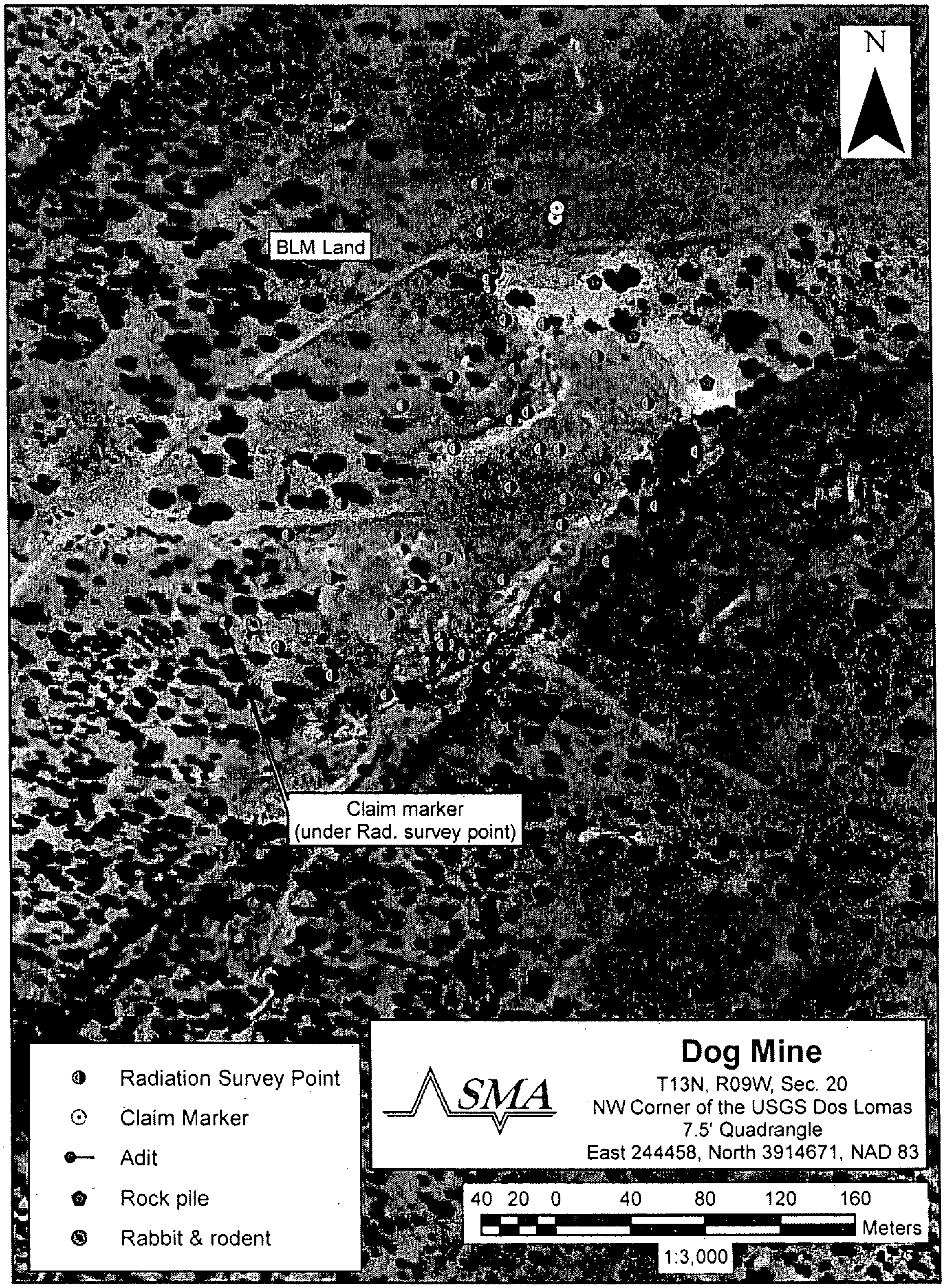
The nearest surface water drainage feature is approximately 0.3 miles to the southwest of the site.


View west, headframe and decline


View west at adit


View south at adit


Headframe and decline


N
BLM Land
Claim marker
(under Rad. survey point)
Radiation Survey Point
Claim Marker
Adit
Rock pile
Rabbit & rodent
SMA
Dog Mine
T13N, R09W, Sec. 20
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 244458, North 3914671, NAD 83
40 20 0 40 80 120 160
Meters
1:3,000

AUM Field Survey Data Sheet **Site** Mesa Top & (Dog)

Date	Time On-Site	Time Off-Site	By
01/24/08	1000 hrs	1340 hrs.	Brian Moore / Bill Baldwin

Weather Conditions: Clear, Sunny, approx 30°F, Slight Breeze

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts	01	Vertical shaft ~60' fenced w/wood collar	12' x 12'	
Adits | | |	16 37 39			
Pits N/A				
Waste Rock Dumps / STOCKPILE	12 42-45			
Tailings N/A				
Trenches N/A				
Roads overgrown Non-existant				
Erosional Features NONE EXTRAordinary				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings N/A				
Headframes 1	35	wooden		
Claim Marker	22	Possible claim marker		

AUM Field Survey Data Sheet

Site Mesa Top/Dry

Equipment				

Soils	GPS#	Description	Extent	Photo #
290 - Rockoutcrop - Westmion Skyvillage 305 - CELAVAR - MACQUE Complex		SEE USDA-NRCS ATTACHMENT		

Vegetation	GPS#	Description	Extent	Photo #
SEE ATTACHMENT				

Wildlife	GPS#	Description	Photo #
Scattered rodent dens Canid tracks (?) old Scattered deer pellets			

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
None Known				

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Limited grazing		on & off site		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
None Known				

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

Typical low, rolling hills.

AUM Field Survey Data Sheet Site Mesa Top

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
02	Rad. survey E to W	80	70
03	"	120	90
04	"	80	70
05	"	90	80
06	"	150	120
07	"	120	100
08	"	80	70
09	"	20	19
10	Vertical iron cylinder 1.5' dia. x 9' h	500	—
11	~~Stock pile~~ Rad S to N	110	90
12	Stock pile & framework	—	—
13	Rad. survey S to N	80	70

AUM Field Survey Data Sheet Site Mesa Top / Dog

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
14	Rad survey S to N	80	70
15	"	120	110
16	"	140	120
17	"	120	110
18	"	100	90
19	"	30	27
20	Old car pieces	24	20
21	~~Claim stake~~ hole	24	20
22	Claim stake	11	10
23	Claim stake	—	—
24	"	—	—
25	Vent shaft (pt gone)	—	—

AUM Field Survey Data Sheet Site Mesa TOP/Dog

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
26	Pad survey W to E	19	17
27	"	17	15
28	"	26	24
29	"	30	28
30	"	130	110
31	"	70	50
32	"	26	22
33	"	20	20
34	"	24	20
35	headframe	—	—
36	decline	800	800
37	decline	600	300
38	concrete pad	260	240
39	adit	46	42

AUM Field Survey Data Sheet Site Mesa Top/Dry

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
4o	drill hole 3"		

Mine I.D.: MesaTOP / DOG

Plant Community Data

Date/Time: 01/24/08
Weather: Sunny, Slight Breeze
Observer: B. MERTZ

Current Plant Community:
Photo# Pinyon-Juniper, open forest

30% Tree, 30% grasses, 20% Forb, 10% shrub, 10% bare ground

Other Species Present:
Photo # Four wing Saltbrush (Atriplex canescens)
Bluegramma (B. Gracilis)
Unknown grass (no inflorescence, color) NOT B. Gracilis
Broom Snakeweed (G. sarothrae)

Rabbitbrush
Chrysothamnus spp.

T&E Present: Y/N?
If yes, species? NO
Photo #

Noxious Weeds: Y/N?
If yes, species? NO
Photo #

Bare Spots? Y/N?
Number of spots/size yes, normal bare spots - between vegetation
Photo #

Standing Dead? Y/N?
If yes, species? NO
Photo #

Photo Point GPS Coord.
Photo #/Direction

Additional Notes:
Use back if necessary

AUM Field Survey Data Sheet Site AUM-Dog 2008-3-13

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G0	Rad. survey ✓	22	20
G1	"	60	50
G2	"	70	80
G3	"	70	80
G4	" ✓	80	80
G5	" ✓	44	40
G6	"	1800	1000
G7	"	90	90
G8	"	130	110
G9	" ✓	38	32
G10	" ✓	28	22
G11	"	80	70
G12	"	140	120
G13	"	260	220
G14	" ✓	28	24

AUM Field Survey Data Sheet Site Aum- Dog 2008 - 3 - 13

Radiological Survey

GPS#	Description		Reading Surface	Reading 4 feet
G15	Rod survey	✓	42	42
G16	"		280	260
G17	"		50	48
G18	"		200	180
G19	"	✓	180	170
G20	"	✓	180	170
G21	"		100	80
G22	"		240	220
G23	"		500	320
G24	"	✓	36	30
G25	"	✓	24	22
G26	"		90	90
G27	"		40	38
G28	"		44	42
G29	"	✓	22	20

~~Veg~~ Ø G: 30% bare 20% forb.
20% P&J 10% bare
20% grass

Glover Mine

1. Location/Land Status: The Glover Mine is located on BLM land within Section 20, T14N, R11W on the USGS Thoreau NE quadrangle, some 5.5 miles north of Prewitt, NM. Physical access to the mine can be gained by traveling north 5 miles on CR 19 from Prewitt, then east 1 mile on Red Cliffs Road, park and proceed cross country to the mine site.

2. Human Activity: An abandoned limestone quarry is located adjacent to the site to the north. Additionally, approximately 12 residences are located approximately 1,500 feet south of the site.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 140 μR/hour and minimum of 10 μR/hour. Four-foot elevation maximum was 80 μR/hour and minimum was 8 μR/hour. Background radiation level is approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of three shallow pits (dimensions 180ft by 70 ft., 100 ft. by 30 ft., and 80 by 40 ft., each a maximum of 6 ft. deep) and about 15 rock piles with an estimated total volume of 250 cubic-yards.

5. Plant Community: The surrounding area is typical mixture of pinon/ juniper and grasses. The vegetation on site includes: 40% grass, 20% trees, 20% forbs, 10% shrubs, and 10% bare earth.

6. Soils: Site soils are Todest fine sandy loam, with 2 to 8% slopes, 0 to 1 inch fine sandy loam, 1 to 14 inches sandy clay loam, 14 to 24 inches cobbly sandy clay loam, with limestone bedrock at 24 inches.

7. Wildlife: Wildlife sighted included a bald eagle south of the site, as well as rodent holes, elk prints, and rabbit scat.

8. Land Use: Land use is currently limited grazing.

9. Off-Site Impacts: No off-site impacts were noted.

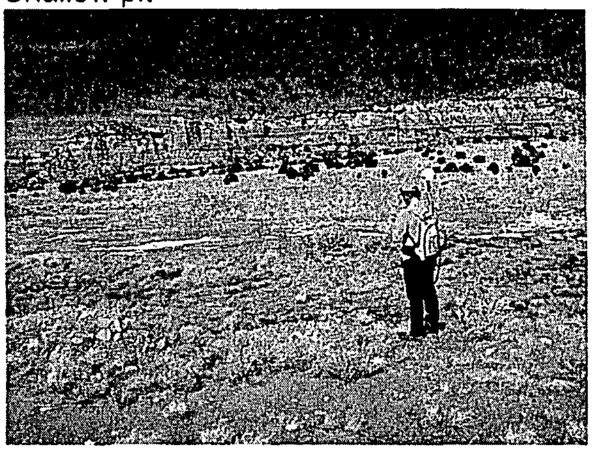
10. Topographic Features: The site is flat lying, with a cliff face adjacent to the south. No notable erosional features are present.

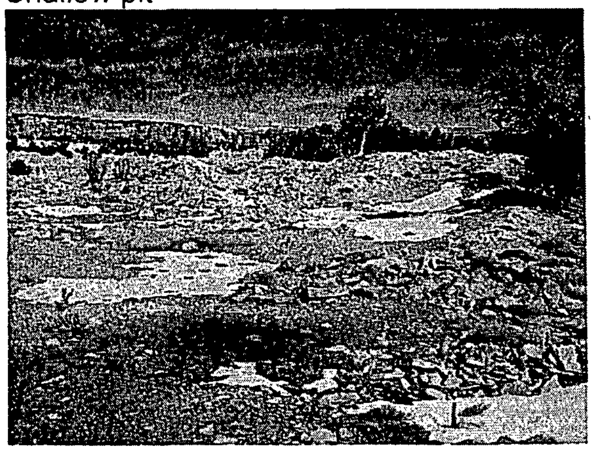
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are 15 well records within a radius of one mile of the site, primarily in the valley to the west and south of the site. Depth to water varies between 40 and 260 feet. The nearest well, approximately 0.3 miles to the southeast of the site, has a recorded depth to water of 80 feet.

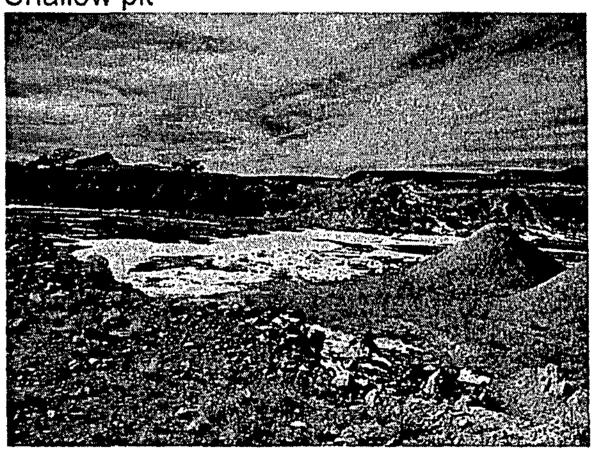
The nearest surface water drainage feature is approximately 0.5 miles to the southeast.

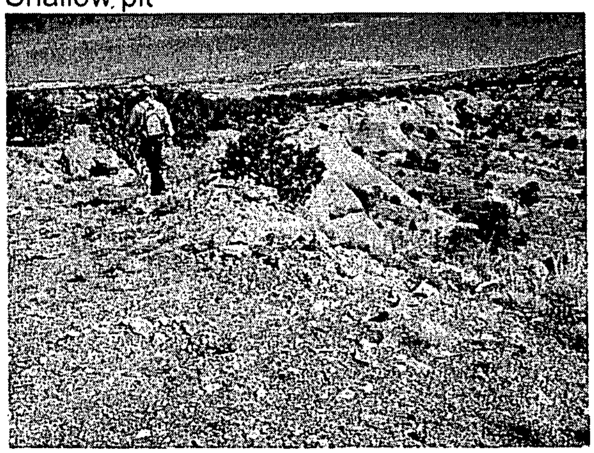

Shallow pit

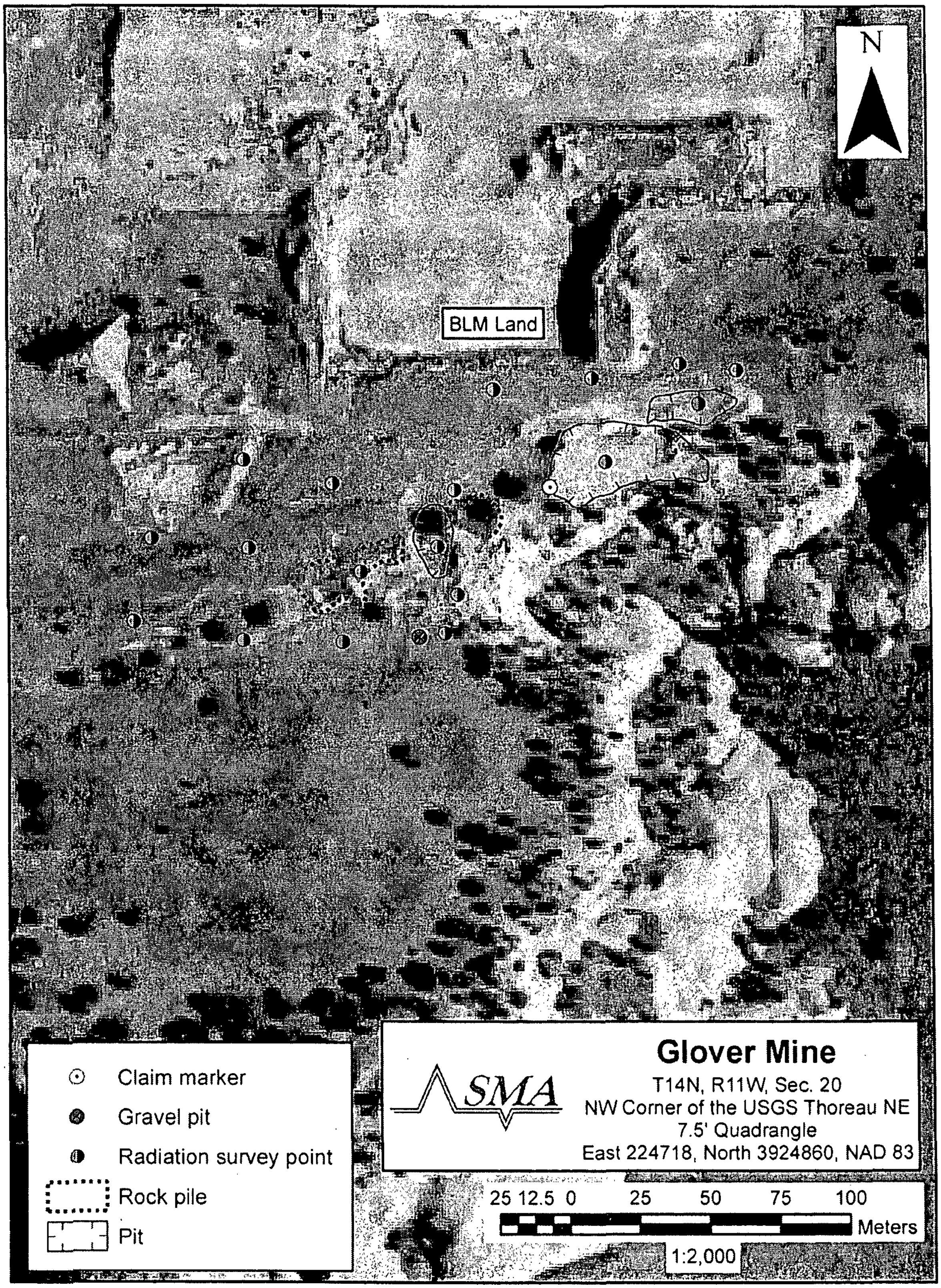

Shallow pit


Shallow pit


Shallow pit


Limestone quarry to north


Cliff to south of site


N
BLM Land
Claim marker
Gravel pit
Radiation survey point
Rock pile
Pit
SMA
Glover Mine
T14N, R11W, Sec. 20
NW Corner of the USGS Thoreau NE
7.5' Quadrangle
East 224718, North 3924860, NAD 83
25 12.5 0 25 50 75 100
Meters
1:2,000

AUM Field Survey Data Sheet Site GLOVER

Date	Time On-Site	Time Off-Site	By
2/13/08	1234		Tami Ross Brian Mertz

Weather Conditions: clear sunny, windy, muddy, patches of snow
perimeter not clearly defined due to interference from rock quarry

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts		N/A		
Adits		N/A		
Pits	1 7	rocky pit large pit, muddy	30'/6' deep	1 6-8
Waste Rock Dumps	2 4	rock piles rock ridges		2 3
~~Tailings~~ Pits Cont	9	small pit/marsh		9
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings		N/A		
Headframes		N/A		

Garmin make: 6

5

AUM Field Survey Data Sheet Site GLOVER

Equipment				
		N/A		

Soils	GPS#	Description	Extent	Photo #
376 - Todest Fine Sandy Loam				

Vegetation	GPS#	Description	Extent	Photo #
SEE ATTACHED				

Wildlife	GPS#	Description	Photo #
		- BALD EAGLE - Flying over offsite 400m South of site - Rodent holes scattered - Elk prints noticed off site to south - Rabbit Pellets	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
	11	limestone rock quarry		10 11

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Abandoned limestone quarry to North of site - Large		Extensive - adjacent to site Light grazing (old)		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
Appx 12 Trailers		Houses 670m to South of site	670 m	

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #
	5	cliff face	4

AUM Field Survey Data Sheet Site GLOVER

AUM Field Survey Data Sheet Site Glover

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
3	center of rock pit	250 scale 14uR/hr	250 scale 6uR/hr
4	center of pile	50 scale 26uR/hr	50 scale 24uR/hr
8	center of muddy big pit	250 scale 10uR/hr	250 scale 8uR/hr
10	center of small pit/trench	50 scale 20uR/hr	50 scale 20uR/hr
3		140 ~~90~~	~~30~~ 60
4		26 ~~26~~	~~22~~ 24
8		100	80
10		20	20

Mine I.D.: GLOVER

Plant Community Data

5 to 7 of 7
veg soil survey info.

Date/Time: 02/13/08
Weather: Sunny, warm
Observer: B. M. / T. Coe

Current Plant Community:
Photo# P-J Forest - Large Pinyon, One seed Juniper
40% grass, 20% forb, 20% tree, 10% shrub, 10% bare spots (scattered)

Other Species Present:
Photo # Winterfat, Blue grama, ~~[illegible]~~, Kochia, Russian thistle, Artemesia spp, Spineless horsebrush, Chrysothamnus spp., Indian Ricegrass.

T&E Present: Y/N?
If yes, species? NO
Photo #

Noxious Weeds: Y/N?
If yes, species? NO
Photo #

Bare Spots? Y/N?
Number of spots/size yes, scattered - appear normal occurrence.
Photo #

Standing Dead? Y/N?
If yes, species? NO
Photo #

Photo Point GPS Coord.
Photo #/Direction

Additional Notes:
Use back if necessary

AUM Field Survey Data Sheet Site AUM-Clever 2008-3-6

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G0	baseline rad.	24	20
G1	Rad. survey ✓	30	28
G2	"	34	30
G3	"	34	30
G4	"	~~40~~ 18	~~36~~ 16
G5	"	16	14
G6	" ✓	18	14
G7	" ✓	14	13
G8	"	14	13
G9	" ✓	12	12
G10	" ✓	24	22
G11	"	12	12
G12	"	13	9
G13	" ✓	12	10
G14	" ✓	10	8
G15	"	13	11
G16	"	10	8
G17	" ✓	30	22

AUM Field Survey Data Sheet Site AUM- Glover 2008-3-6

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
Veg Ø	40% grass 40% bare 10% tree 10% forbs	—	—
	no visible grazing; adjacent	—	—
	non-uranium mining.		

Haystack No. 2 Mine

1. Location/Land Status: The Haystack No. 2 Mine is located on BLM and private land in Section 13, T13N, R11W on the Bluewater, NM quadrangle, approximately 7 miles north of interstate 25.

2. Human Activity: Several residences are present approximately 900 feet east of the eastern portion of the site which is located on BLM land.

3. Radiological Survey: The radiological survey was inadvertently conducted in the area of the pit on the western portion of the site, located on private land. Radiological survey results were as follows: ground surface maximum of 90 μR/hour and minimum of 10 μR/hour. Four-foot elevation maximum was 60 μR/hour and minimum was 9 μR/hour. Background radiation level is approximately 10 μR/hour. No radiation levels were collected on the angle of repose pile located on BLM land in the eastern portion of the site due to the steep nature of the pile.

4. Mine Disturbance: The mine consists of two pits on private land, dimensions approximately 350 ft. by 250 ft. by 18 ft. deep, and 150 ft. by 60 ft. by 4 ft. deep. In the center of the site on BLM land, material has been pushed off a bench at angle of repose. The rock pile is approximately 350 ft. by 1,000 ft.

5. Plant Community: Vegetation on site includes: 20% trees, 20% forbs, and 60% bare earth.

6. Soils: Site soils are Todest fine sandy loam, with 2 to 8% slopes, 0 to 14 inch sandy clay loam, 14 to 24 inches cobbly sandy clay loam.

7. Wildlife: An owl nest was noted north of the site.

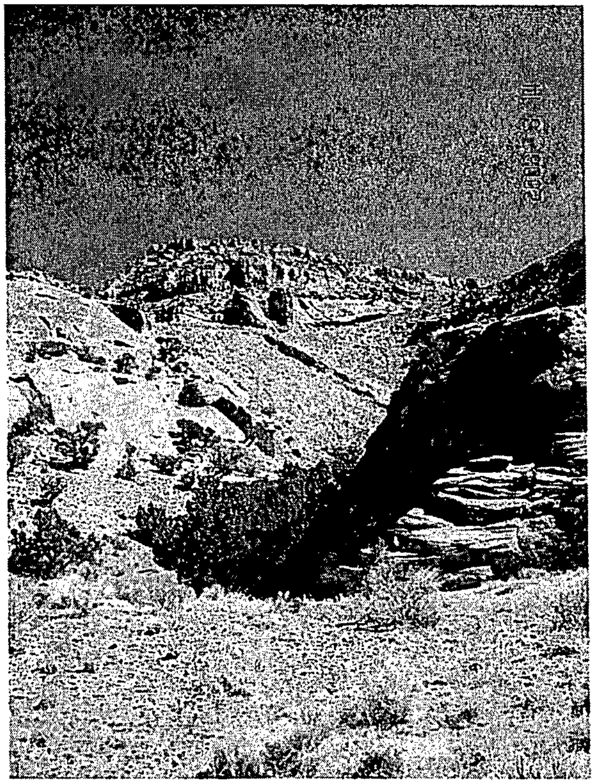
8. Land Use: Land use is limited sheep grazing.

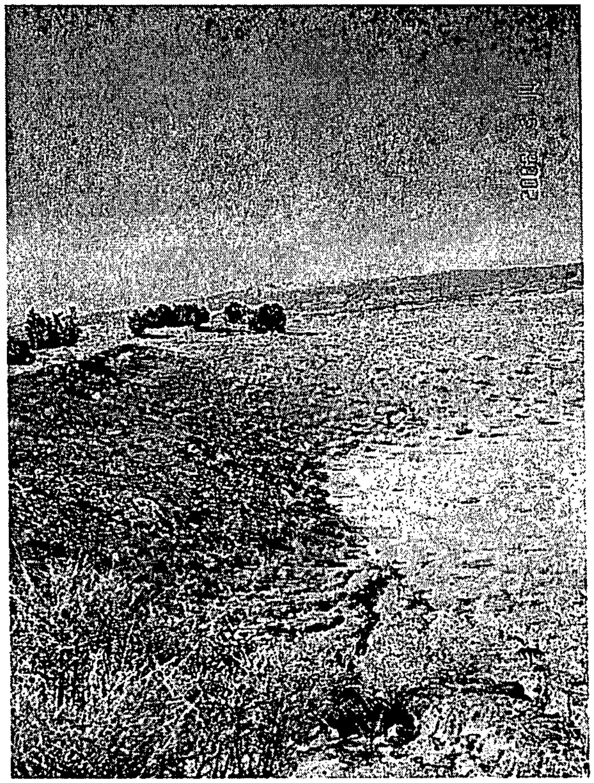
9. Off-Site Impacts: No off-site impacts were noted.

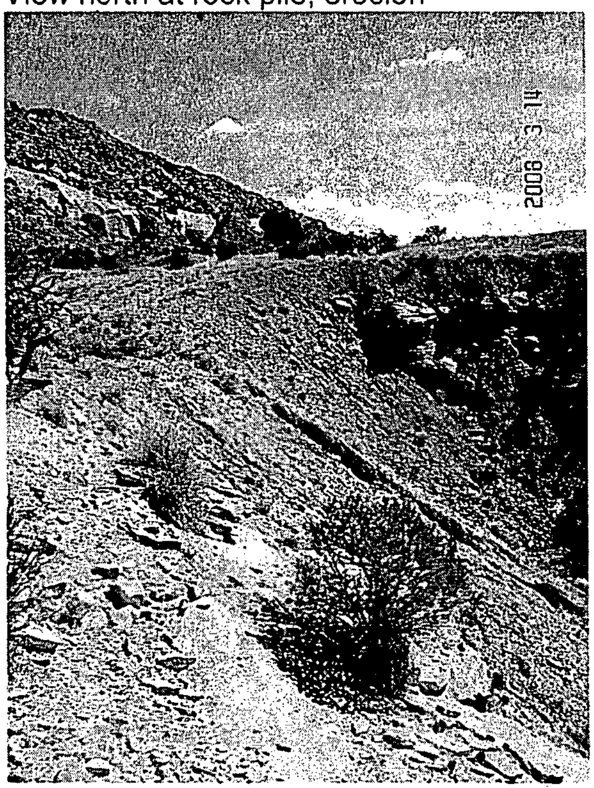
10. Topographic Features: The site is cut into a mesa side, with rock pushed off a cliff. The rock pushed off the bench has been locally eroded.

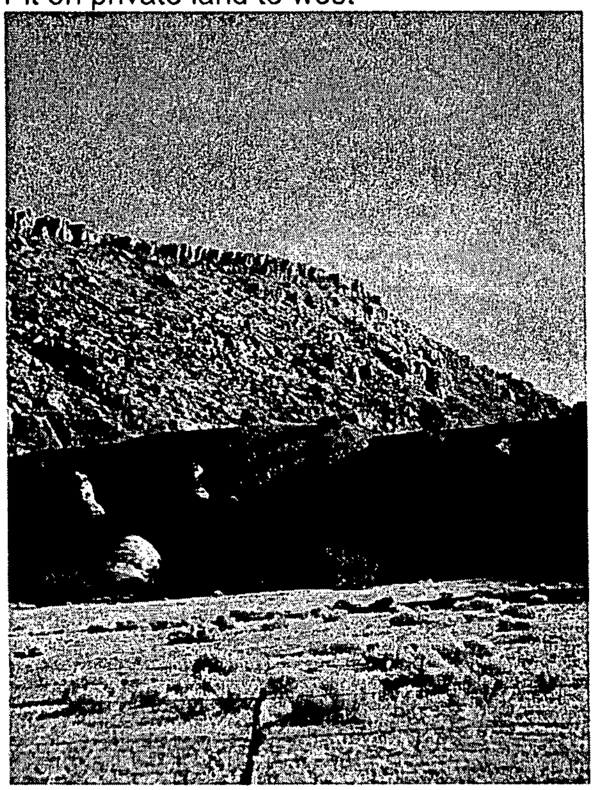
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest recorded well to the site is approximately 2.5 miles to the southwest had a recorded depth to water of 160 feet. It is likely that the residences closer to the site have domestic supply wells that are not registered with the NMOSE.

The nearest surface water drainage feature is approximately one tenth of a mile to the south of the site.

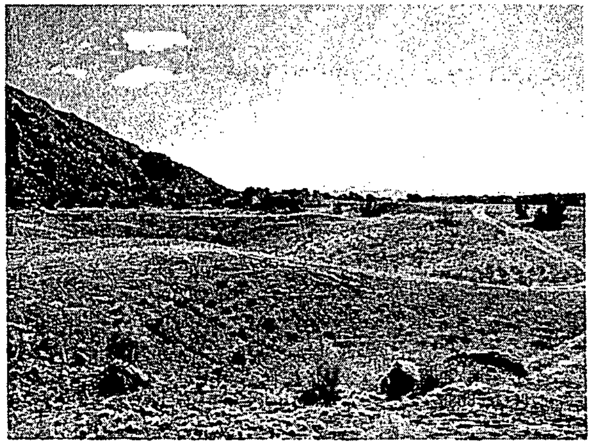

View north at rock pile, erosion

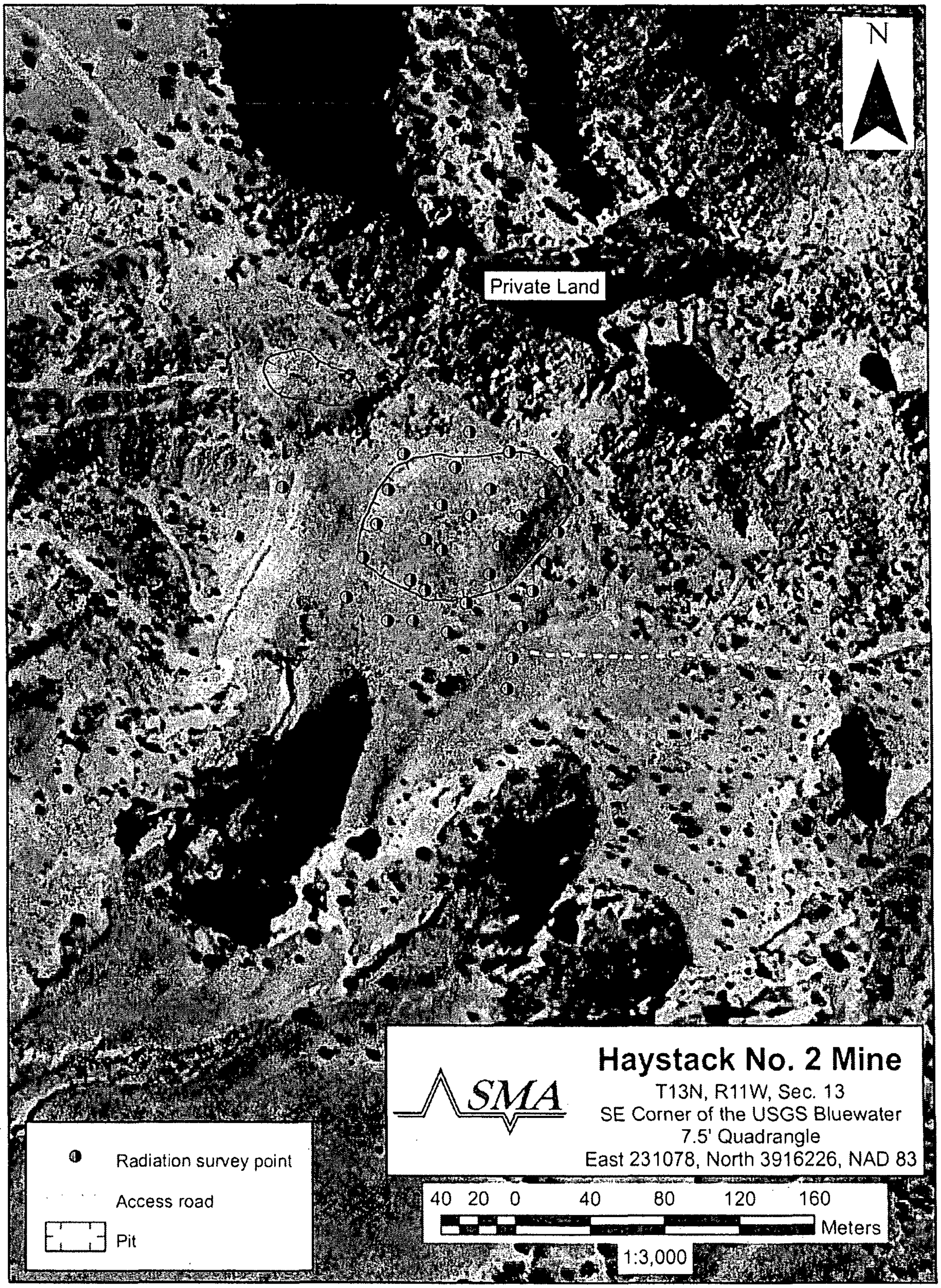

Pit on private land to west

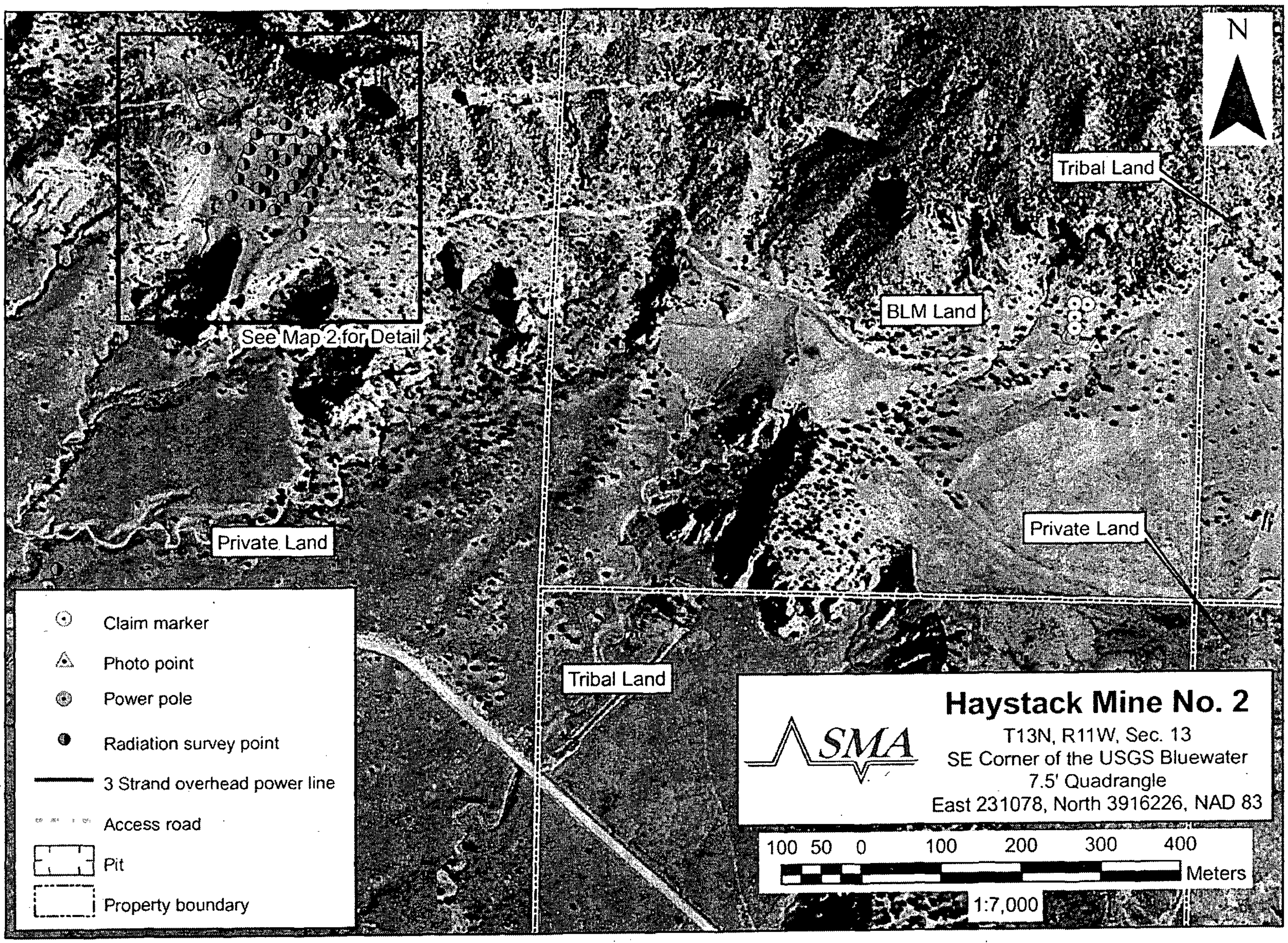

View east across rock pushed off bench


View of rock pushed off bench


View to east toward homes


View to east at pit


N
Private Land
Haystack No. 2 Mine
SMA
T13N, R11W, Sec. 13
SE Corner of the USGS Bluewater
7.5' Quadrangle
East 231078, North 3916226, NAD 83
Radiation survey point
Access road
Pit
40 20 0 40 80 120 160
Meters
1:3,000


N
Tribal Land
BLM Land
See Map 2 for Detail
Private Land
Private Land
Tribal Land
Claim marker
Photo point
Power pole
Radiation survey point
3 Strand overhead power line
Access road
Pit
Property boundary
Haystack Mine No. 2
SMA
T13N, R11W, Sec. 13
SE Corner of the USGS Bluewater
7.5' Quadrangle
East 231078, North 3916226, NAD 83
100 50 0 100 200 300 400
Meters
1:7,000

Page ____ of ____

AUM Field Survey Data Sheet

Site Haystack

Date	Time On-Site	Time Off-Site	By
03/14/08	0700 hrs.	1030 hrs.	B. Mertz B. Baldwin

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps		pushed off bench		
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet

Site ________________________________

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
SEE ATTACHMENT				

Wildlife	GPS#	Description	Photo #
		Rabbits, Rodent dens. Misc. Songbirds - none appear to be T/E, Seem to be common sparrow, finches, etc. Evidence of "white wash" feces on cliff face but no visual ID of species. Suspect raptor	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Housing		appx 1/2 mile to NNW Boundry of property to west. Scattered trailers. w/In 1 mile in all directions		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Grazing		Light on site. Evidence of moderate grazing of surrounding properties		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
SEE Human Activity				

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

Mine I.D.: Haystack

Plant Community Data

Date/Time: 03/14/08
Weather: Clear, windy, cool
Observer: B. Mertz & B. Baldwin

Current Plant Community:
Photo#

Other Species Present:
Photo #

T&E Present: Y/N?
If yes, species? N/A
Photo #

Noxious Weeds: Y/N?
If yes, species? N/A
Photo #

Bare Spots? Y/N? yes, but comparable to surrounding offsite except for road.
Number of spots/size
Photo #

Standing Dead? Y/N?
If yes, species? None exceptional
Photo #

Photo Point GPS Coord.
Photo #/Direction

Additional Notes:
Use back if necessary

AUM Field Survey Data Sheet   Site AUM- Haystack (#?) 2008-3-14

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G-Ø	Baseline	9	9
PT. GENRC.	Mine center. No visible signs		
	of disturbance. Several houses (3+)		
	~300m E from GPS pt.		
LAND Ø	40% bare 20% forb. 20% grass 20% P & J		
RD-Ø	Access road; dirt unmaintained,		
	E to W		
G-1	Rad. survey	90	60
G2	"	20	18
G3	"	14	12
G4	"	12	12
G5	"	12	12
G6	"	12	10
G7	"	10	10
G8	"	10	10

AUM Field Survey Data Sheet Site AUM Haystack 2008-3-14

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G9	Rad. survey ✓	10	10
G10	〃	12	10
G11	〃	12	10
G12	〃	15	12
G13	〃	21	19
G14	〃 ✓	14	13
G15	〃 ✓	16	15
G16	〃	18	15
G17	〃	25	22
G18	〃	12	12
G19	〃	10	10
G20	〃 ✓	9	9
G21	〃 ✓	12	12
G22	〃	12	12
G23	〃	12	12

AUM Field Survey Data Sheet Site Anny-Haystack 2008-3-14

Radiological Survey				
GPS#	Description		Reading Surface	Reading 4 feet
G24	Rad. survey		23	20
G25	"		10	10
G26	"	✓	20	18
G27	"	✓	18	16
G28	"		20	16
G29	"		12	10
G30	"		10	10
G31	"	✓	12	10
~~G32~~	~~"~~	✓		
OTHER	overview photo	✓	10	10
PITØ	Area of pit			

Jeter Mine

1. Location/Land Status: The Jeter Mine is located on BLM land within Section 35, T3N, R2W on the USGS Ladron Peak quadrangle (35.554314N, 108.49826W), some 25 miles NNW of Socorro, NM. Physical access can be gained by traveling south 2 miles on Old Hwy. 85, west 9 miles on CR 12, then about 12 miles southwest on an undesignated road until reaching the end of the road at a stock tank. The mine is about 0.3 miles west of the stock tank, accessible by foot.

2. Human Activity: As noted a stock tank is located approximately 0.3 miles from the site, along with a corral. Cattle grazing is prevalent.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 320 μR/hour and minimum of 22 μR/hour. Four-foot elevation maximum was 280 μR/hour and minimum was 18 μR/hour. Background radiation levels are less than 10 μR/hour.

4. Mine Disturbance: The mine is characterized by a large pit disturbance striking WSW/ENE for approximately 350 feet, excavated to a depth of about 45 feet, and between two small hills of volcanic conglomerate. The mine site covers an estimated 25 acres. A decline (30 degree) along the strike of the pit has collapsed, as has the head-frame in the SW corner of the pit. There is a concrete pad (approximately 10 ft. by 15 ft.) on the bench above the decline.

5. Plant Community: The surrounding area is typical pinon/juniper scrub with mixed grasses. Vegetation on site includes: 10% woody scrub, 20% grasses, 10% forbs, 10% trees and 50% bare earth.

6. Soils: Site soils are Cascajo very gravelly sandy loam with 15 to 30 percent slopes, 0 to 60 inches very gravelly sandy loam.

7. Wildlife: Evidence present of jackrabbit, rodent. Owl noted on-site.

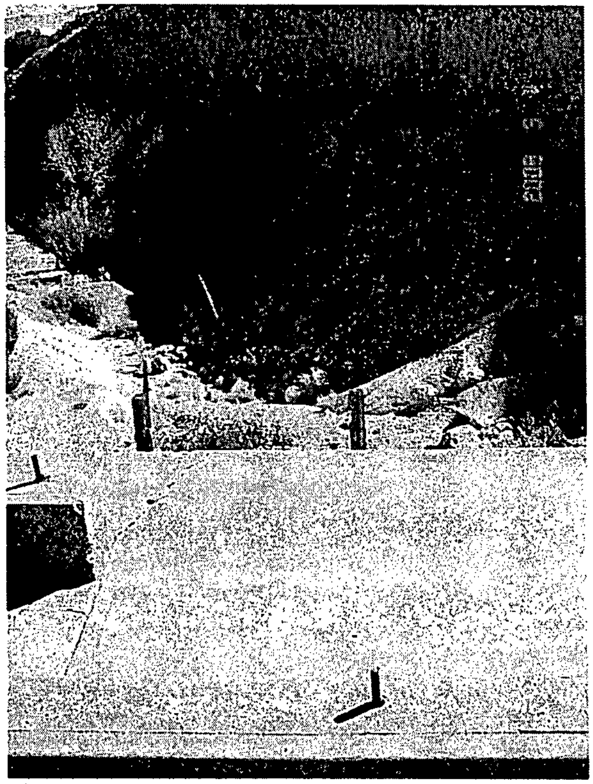
8. Land Use: Land use at the mine includes moderate to heavy cattle grazing.

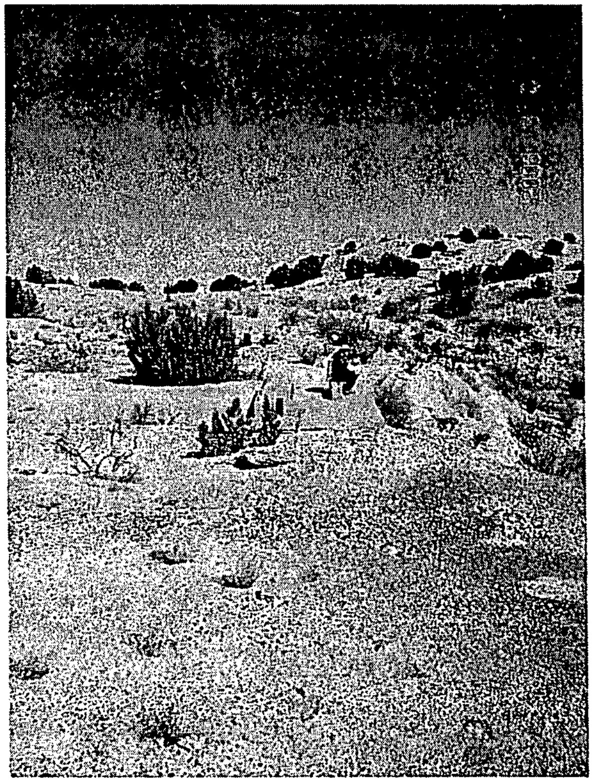
9. Off-Site Impacts: Two drainages that leave site have evidence of elevated radiation levels (approximately 45 μR/hour). The drainages flow to the east, away from the well noted near the property (see Hydrogeology section below).

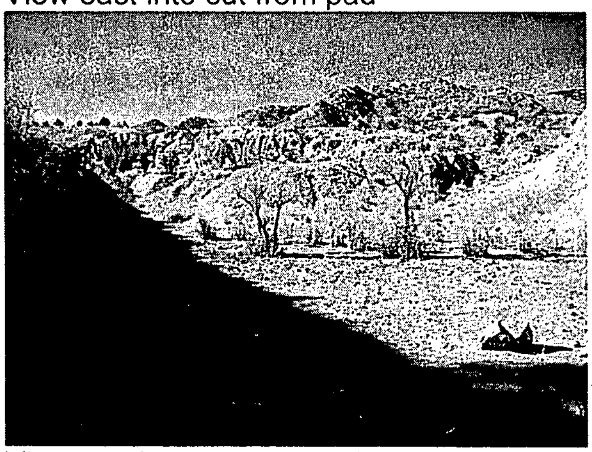
10. Topographic Features: The site is cut into a gravel terrace, and is made up of gently rolling hills. No major erosional features were noted.

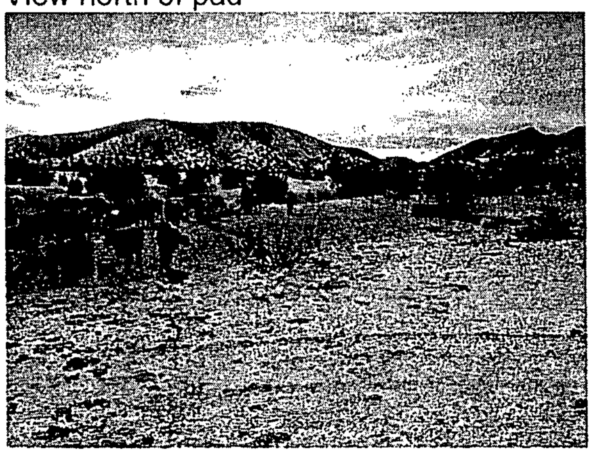
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there is one well record within a one mile search radius. The well, located approximately one-half mile to the

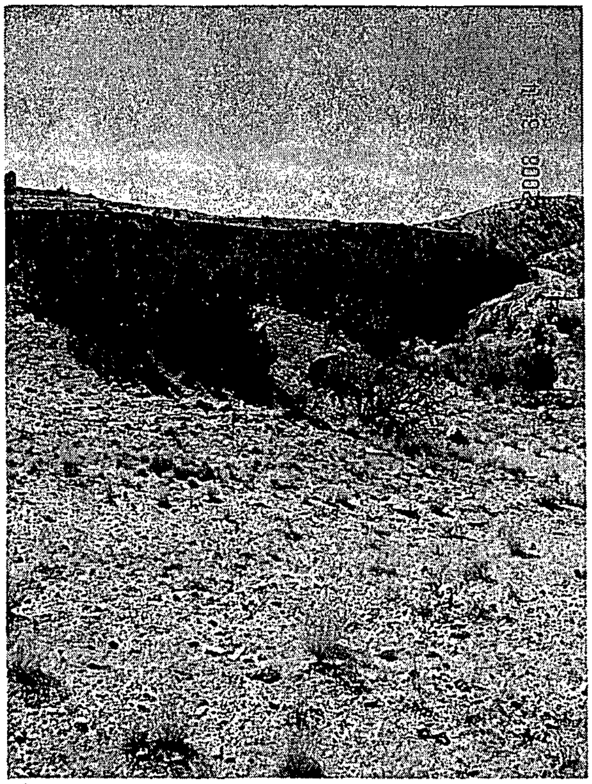
west, has no recorded depth to water. Two wells are recorded approximately 4 miles to the east, with depths to water of 206 and 325 feet recorded.
There are two surface water drainage features that leave the site to the east.


View east into cut from pad


View north of pad

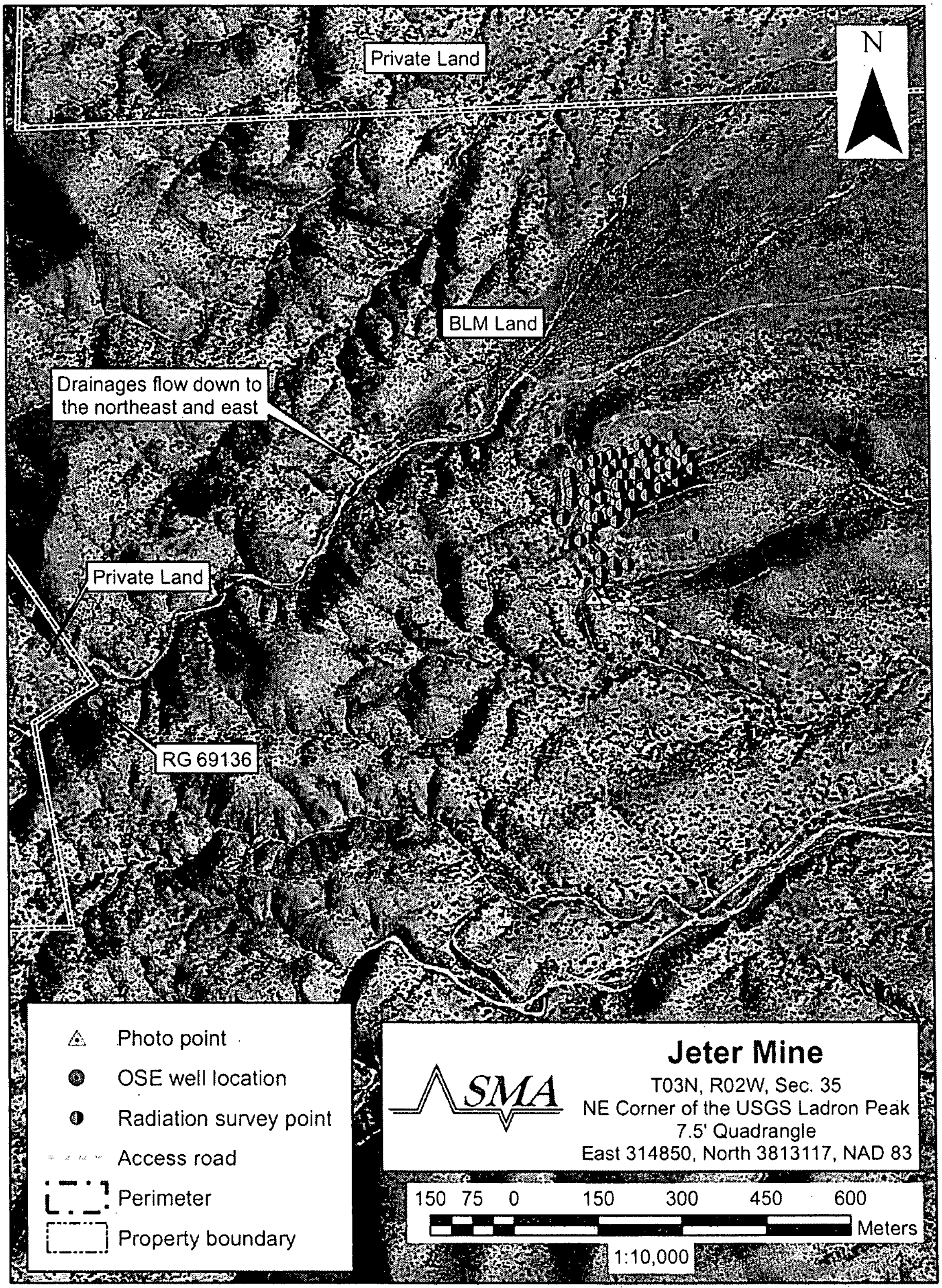

View southwest in cut at decline


Stock tank, cattle (no evidence of well)



View southeast at cut

View south at pile



N
Private Land
BLM Land
Drainages flow down to
the northeast and east
Private Land
RG 69136
Photo point
OSE well location
Radiation survey point
Access road
Perimeter
Property boundary
SMA
Jeter Mine
T03N, R02W, Sec. 35
NE Corner of the USGS Ladron Peak
7.5' Quadrangle
East 314850, North 3813117, NAD 83
150 75 0 150 300 450 600
Meters
1:10,000

①

AUM Field Survey Data Sheet

Site NMS00023 (JETTER)

Date	Time On-Site	Time Off-Site	By
01/10/08	~~1030~~ 1045	1340	Brian & Bill

Weather Conditions: Sunny, Cool ≈ 50°F wind 0-3mph

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts N/A				
Adits N/A				
Pits N/A				
Waste Rock Dumps				
Tailings N/A				
Trenches N/A				
Roads SEE GPS DATA				
Erosional Features N/A				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings None				
Headframes NONE				
Equipment NONE				

AUM Field Survey Data Sheet Site ______

Soils	GPS#	Description	Extent	Photo #
Sandy-loam Desert Pavement SEE ATTACHMENT		Small amount of moisture		

Vegetation	GPS#	Description	Extent	Photo #
See Attachment				

Wildlife	GPS#	Description	Photo #
Jackrabbit, rodent dens, Crow		Saw Jackrabbit & crow on site rodent dens scattered throughout	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Corrals to east of site about 1800 ft.		Corrals & water tank w/ cattle loafing inside and next to. Well maint. road leading to corrals		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Grazing, hiking (Limited use)		Evidence of high intensity grazing on & off site		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
STOCK tank 1800 ft to east of site @ corrals	29	Corrals w/ STOCK TANK	~ 1800' Ft	

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #
Access Road	28	Not very passable - Park @ corrals East of mine and walk up road directly to site	

AUM Field Survey Data Sheet Site NMS00023 JETTER (LADRONE)

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
2	ORIGIN, SOUTH ROAD ENTRANCE	24	22
3	(SW) WASTE PILE	36	32
4	BOTTOM BENCH (SW)	34	32
5	BOTTOM BENCH (SE)	34	30
6	MIDDLE BENCH (SE)	30	26
7	MIDDLE BENCH (S)	70	60
8	MIDDLE BENCH (SW) BASE OF MAIN WASTE PILE	110	100
9	TOP BENCH MAIN WORKINGS	—	—
—	(SW) ACCESS ROAD	28	28
10	WASTE PILE (SW)	28	28
~~11~~	~~WASTE PILE (W)~~ ID ~~12~~ 11	~~32~~	~~32~~
~~12~~ 11	WASTE PILE (W) DIVIDED BY ACCESS ROAD	34	34
12	STORAGE PILE	240	200
13	STAGING AREA (NE)	44	38
14	STAGING AREA (SE)	110	100

15	FOUNDATION	18	22
16	BENEATH FOUNDATION (CONVEYOR?)	320	280
17	PIT BTM./BASE OF HIGH WALL (W)	100	120
18	PIT BTM/BASE OF HIGH WALL (S)	110	120
19	PIT BTM/BASE OF HIGH WALL (E)	80	80
20	WASTE PILE (E) UPPER	140	100
21	WASTE PILE (E) LOWER	28	26
22	TOP OF HIGH WALL (E)	26	24
23	TOP OF HIGH WALL (S)	24	22
24	TOP OF HIGH WALL (W)	28	24
25	TOP BENCH (SE)	22	20

NOTE: Two washes leaving mine site to East are 3-4x high than background (≈ 45 micro u)

Mine I.D.:

Plant Community Data

(5)

Date/Time:
Weather:
Observer:

Current Plant Community: Pinyon-Juniper Forest
Photo#

Other Species Present: Broom Snakeweed, englman pricklypear, Cholla
Photo # ~~Rage~~

T&E Present: Y/N? NO
If yes, species?
Photo #

Noxious Weeds: Y/N? NO
If yes, species?
Photo #

Bare Spots? Y/N? ~~NO~~ yes, Bottom of pit where water collects - Soil has become
Number of spots/size / gladed. Appx 1/4 acre
Photo #

Standing Dead? Y/N? yes, but due to natural causes - natural mortality
If yes, species?
Photo # NOTE: Some spp. deciduous

Photo Point GPS Coord.
Photo #/Direction N-E-W-S

Additional Notes: Very little herbaceous spp. what little there is has been
Use back if necessary grazed to soil level

AUM Field Survey Data Sheet Site AUM Jetter 2008-3-4

Radiological Survey				
GPS#	Description	photo ☑	Reading Surface	Reading 4 feet
G0	Rad. survey	✓	40	40
G1	"	✓	24	26
G2	"		60	50
G3	"		120	110
G4	"		32	38
G5	"	✓	22	22
G6	"		28	26
G7	"		28	28
G8	"		22	20
G9	"	✓	22	20
G10	"	✓	32	26
G11	"		24	22
G12	"		36	32
G13	"		34	32
G14	"	✓	24	23

AUM Field Survey Data Sheet Site AUM - Jetter 2008-3-4

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad. Survey ✓	24	23
G16	"	32	28
G17	"	60	46
G18	"	60	48
G19	" ✓	24	26
G20	" ✓	26	28
G21	"	48	48
G22	"	34	32
G23	"	24	22
G24	" ✓	22	18
G25	" ✓	22	18
G26	"	24	28
G27	"	26	30
G28	"	48	42
G29	" ✓	32	28

AUM Field Survey Data Sheet Site AUM Jetter 2008-3-4

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G30	Rad. Survey ✓	60	60
G31	"	40	40
G32	"	40	38
G33	"	28	24
G34	" ✓	24	21
G35	" ✓	30	28
G36	"	30	28
G37	"	70	46
G38	"	60	60
G39	" ✓	34	32
DECL0	decline 30% ✓		
G40	Rad. Svy. ✓	36	32
G41	"	44	42
G42	"	38	36
G43	"	60	50
G44	" ✓	28	26

AUM Field Survey Data Sheet Site NMS00023 JETTER (LADRONE)

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
2	ORIGIN, SOUTH ROAD ENTRANCE	24	22
3	(SW) WASTE PILE	36	32
4	BOTTOM BENCH (SW)	34	32
5	BOTTOM BENCH (SE)	34	30
6	MIDDLE BENCH (SE)	30	26
7	MIDDLE BENCH (S)	70	60
8	MIDDLE BENCH (SW) BASE OF MAIN WASTE PILE	110	100
9	TOP BENCH MAIN WORKINGS	—	—
—	(SW) ACCESS ROAD	28	28
10	WASTE PILE (SW)	28	28
~~11~~	~~WASTE PILE (W) 10 & ~~11~~ 11~~	~~32~~	~~32~~
~~12~~ 11	WASTE PILE (W) DIVIDED BY ACCESS ROAD	34	34
12	STORAGE PILE	240	200
13	STAGING AREA (NE)	44	38
14	STAGING AREA (SE)	110	100

15	FOUNDATION	18	22
16	BENEATH FOUNDATION (CONVEYOR?)	320	280
17	PIT BTM./BASE OF HIGH WALL (W)	100	120
18	PIT BTM/BASE OF HIGH WALL (S)	110	120
19	PIT BTM/BASE OF HIGH WALL (E)	80	80
20	WASTE PILE (E) UPPER	140	100
21	WASTE PILE (E) LOWER	28	26
22	TOP OF HIGH WALL (E)	26	24
23	TOP OF HIGH WALL (S)	24	22
24	TOP OF HIGH WALL (W)	28	24
25	TOP BENCH (SE)	22	20

NOTE: Two washes leaving mine site to East are 3-4x high than background (≈ 45 micro u)

La Jara Mine

1. Location/Land Status: La Jara Mine is located on U.S. Forest Service land within Section 15, T12N, R9W, NMPM on the USGS Dos Lomas quadrangle (35.267651N, 107.773729W) some 9 miles NE of Grants, NM. Physical access to the mine can be gained by traveling 8 miles east from Grants on Lobo Canyon Road, turn left and travel NW approximately 4.5 miles on USFS 450, then 2.5 miles north on undesignated access road to the mine. Conditions on USFS 450 can be dangerous, therefore SMA recommends checking with Chuck Hagerman at the USFS station in Grants before traveling this area.

2. Human Activity: No evidence of human activity beyond historical mining was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 40 μR/hour and minimum of 9 μR/hour. Four-foot elevation maximum was 32 μR/hour and minimum was 7 μR/hour. Background radiation levels are approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of one open excavation 75 ft by 125 ft, maximum depth approximately 6 ft. Numerous rock piles exist, approximately 20. Dimensions of each range from 20 to 30 ft. in diameter, thicknesses of 6 to 8 feet., estimated total volume 1,200 cubic-yards. The total area of the mine site is an estimated at 2 acres.

5. Plant Community: The surrounding area is typical pinon/juniper forest with mixed grasses. The vegetation on site consists of the following: 10% trees, 10% woody scrub, 10% forbs, 20% grasses, and 50% bare earth.

6. Soils: Site soils are gravels with sands (desert pavement), minor silts and clays, slopes of 0-5 percent, 0-2 inches loam (locally present), 2-24 inches sandy gravels.

7. Wildlife: There were no wildlife signs observed on this site.

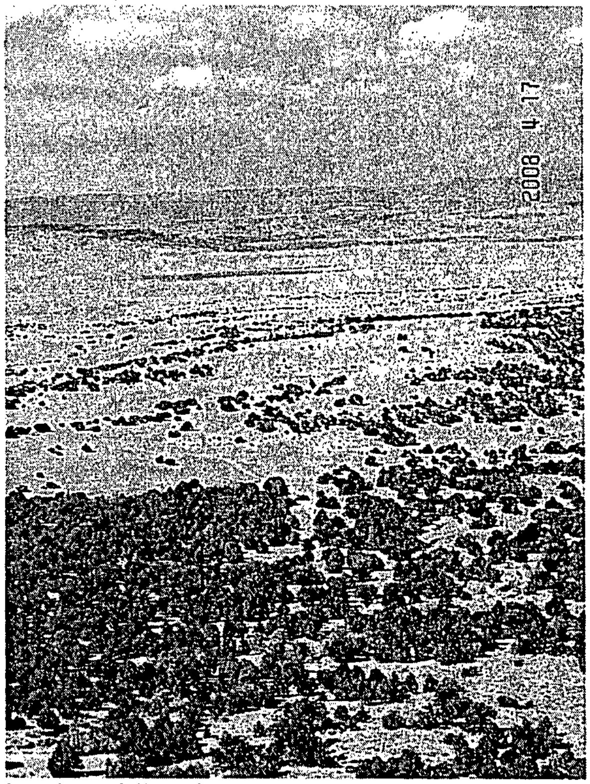
8. Land Use: Land use at the mine is light to moderate grazing.

9. Off-Site Impacts: No off-site impacts were noted.

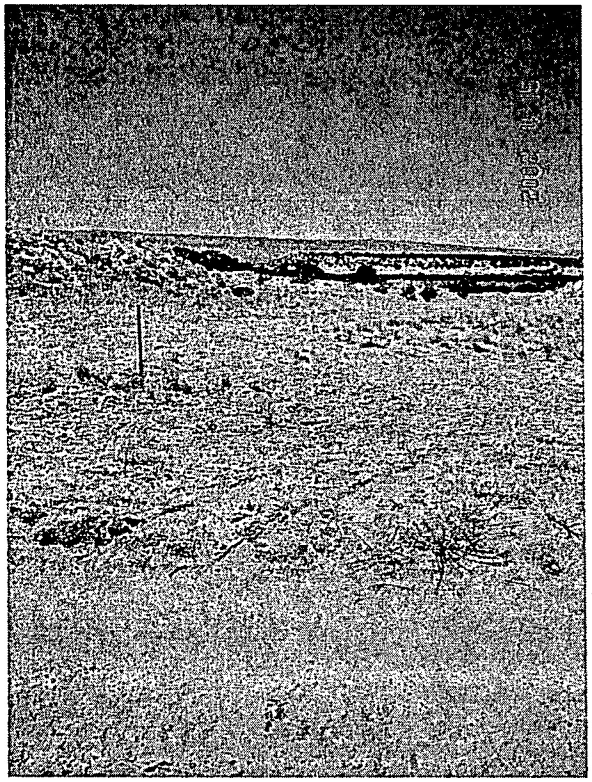
10. Topographic Features: The site is relatively flat-lying. No major erosional features were noted.

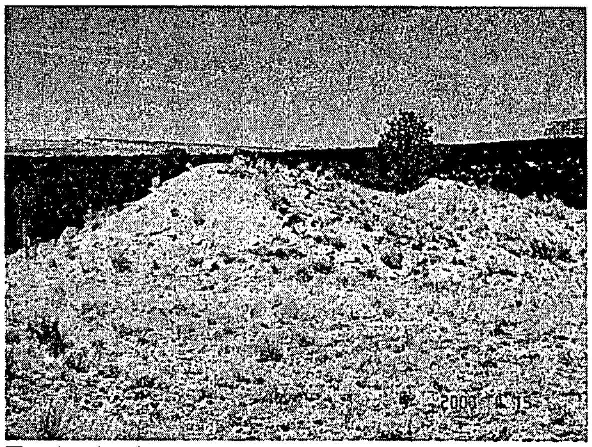
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest well to the site with a recorded depth to water is approximately 2.3 miles to the south, with a depth to water of 70 feet.

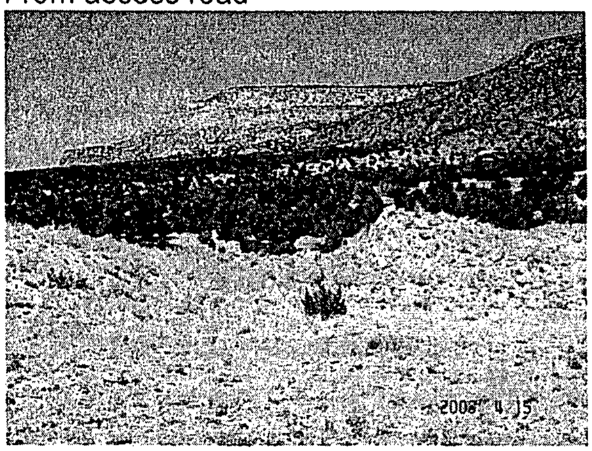
The nearest surface water drainage feature is approximately 0.3 miles west of the site.

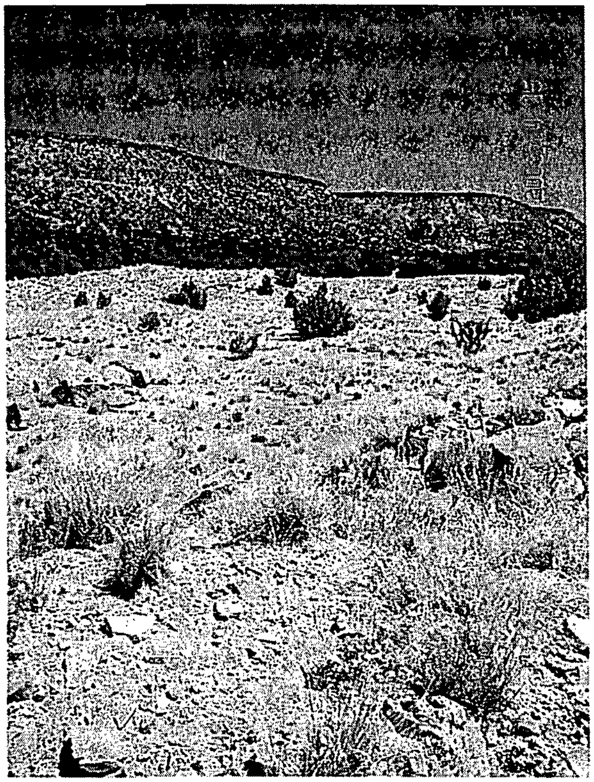


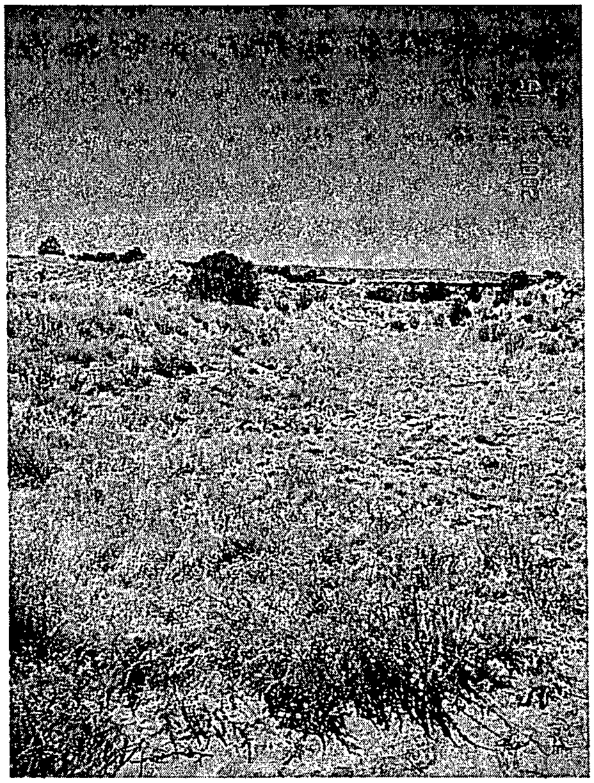
La Jara Mine from above


From access road


Typical pile


Piles, overgrown


View to East


View to West


N
US Forest Service Land
La Jara Mine
SMA
T12N, R09W, Sec. 15
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 247733, North 3906348, NAD 83
Radiation survey point
Pit
Disturbance
40 20 0 40 80 120 160
Meters
1:3,000

AUM Field Survey Data Sheet Site La Tara

Date	Time On-Site	Time Off-Site	By
4/15/08			Baldwin Mertz

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits	G-20	~~75~~ pit	75'x 125'x6'	
Waste Rock Dumps		numerous	6@ 8'x30'diam 15@6'x 20'diam	
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet

Site La Jara

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		10% Trees 10% woody scrub 10% forbs 50% bare 20% grasses		

Wildlife	GPS#	Description	Photo #
		none	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		light/mod grazing		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site La Jara 2008-4-15

Radiological Survey				
GPS#	Description		Reading Surface	Reading 4 feet
G0	Rad. survey	✓	10	8
G1	"		11	8
G2	"		13	10
G3	"		10	7
G4	"	✓	11	8
G5	"	✓	11	8
G6	"		13	10
G7	"		22	15
G8	"		40	32
G9	"	✓	14	11
G10	"	✓	9	13
G11	"		15	13
G12	"		12	10
G13	"		11	8
G14	"	✓	9	7

AUM Field Survey Data Sheet Site La Jara 2008-4-15

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad. survey ✓	9	7
G16	"	13	10
G17	" ✓	18	15
G18	"	15	13
G19	"	10	10
G20	Partial Pit ✓	13	10
	Waste piles:		
	6 x (8'h x 30' dia. = 5,700 ft^3)		
	15 x (6'h x 20' dia. = 1,900 ft^3)		
	≅ 62,700 ft^3 ~~~ 7,600 ft^3~~		
	of waste piles		

Lone Pine Mine

1. Location/Land Status: The Lone Pine Mine is located on BLM land within Section 8, T11N, R9W on the USGS Grants quadrangle, some 3 miles north of Grants, NM. Physical access to the mine can be gained by traveling 8 miles east from Grants on Lobo Canyon Road, northwest approximately 2.5 miles on USFS 450, then 1 mile southwest on an undesignated access road to the end of the road, and overland via foot to the mine site. Conditions on USFS 450 can be dangerous (snow or mud), therefore SMA recommends checking with Chuck Hagerman at the USFS station in Grants before traveling this area.

2. Human Activity: No evidence of human activity beyond historical mining was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 70 μR/hour and minimum of 9 μR/hour. Four-foot elevation maximum was 23 μR/hour and minimum was 8 μR/hour. Background radiation levels are approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of two lateral cuts of an estimated 2 acres into the northern side of Grants Ridge. The upper cut has a wooden load-out structure which served the lower cut. The loadout structure is approximately 15 ft. square by 25 feet tall. The mine is only revealed as separate from the various road cuts by the presence of the load-out structure. Erosion has obscured any remains of an access road.

5. Plant Community: The area surrounding the mine is typical pinon/juniper scrub. The vegetation on site consists of the following: 40% grass, 10% woody scrub, 30% forbs, 5% trees, and the remainder bare earth.

6. Soils: Site soils are Rock outcrop-Vessilla-Mion complex, 3 to 55 percent slopes, 0 to 2 inches sandy loam, 2 to 11 inches silty clay, 11 to 19 inches bedrock.

7. Wildlife: There were numerous signs of wildlife on the site including the direct observation of a raptor, deer (4), and coyote (audible).

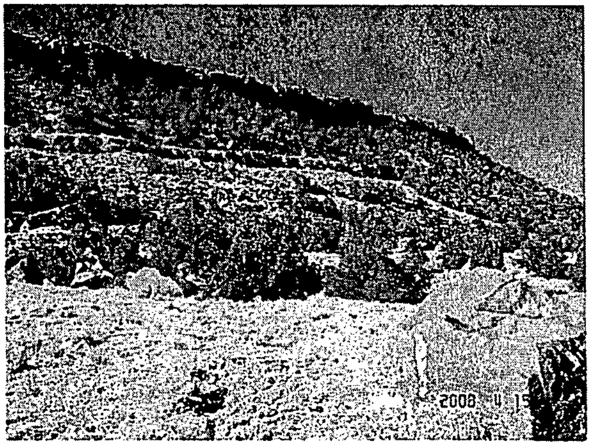
8. Land Use: Land use at the mine includes light grazing off-site (none noted on-site).

9. Off-Site Impacts: No off-site impacts were noted.

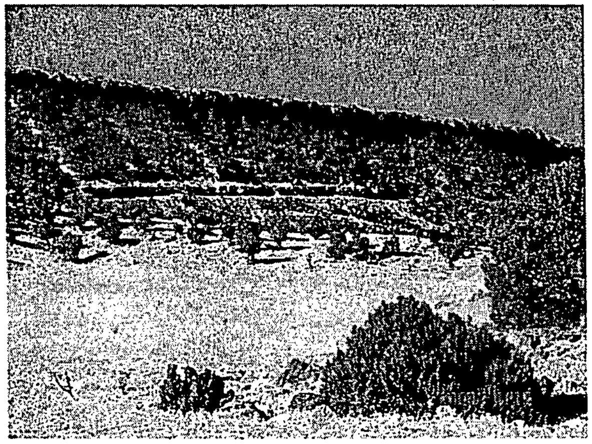
10. Topographic Features: The site is cut into the side of a mesa. Erosion of the cut and access roads is present.

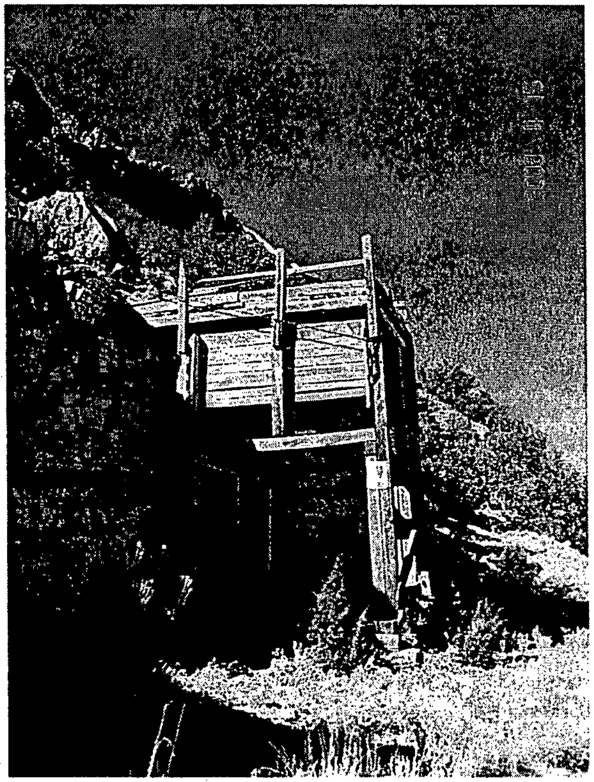
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest well to the site with a recorded depth to water is approximately 1.3 miles to the east, with a depth to water of 115 feet.

The nearest surface water drainage feature is approximately 0.2 miles north of the site.



View south to mine


View south to mine


Mine load-out

N
BLM Land
Lone Pine Mine
SMA
T11N, R09W, Sec. 8
NE Corner of the USGS Grants
7.5' Quadrangle
East 244592, North 3898892, NAD 83
Unknown raptor
Radiation survey point
Access road
40 20 0 40 80 120 160
Meters
1:3,000

AUM Field Survey Data Sheet

Site Love Pine

Date	Time On-Site	Time Off-Site	By
4/15/08			Baldwin Merte

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads		Dirt - not maintained - 2 cuts		
Erosional Features		- cuts & access road eroded		

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings	60	loadout	15'x15' x 25'	✓
Headframes				

AUM Field Survey Data Sheet Site Lone Pine

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		40% grass 30% forbs 10% shrubs 5% trees 15% bare		

Wildlife	GPS#	Description	Photo #
		- possible buteo (raptor)	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		light grazing off-site		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site Lone Pine 2008-4-15

Radiological Survey			
GPS#	Description 1-photo	Reading Surface	Reading 4 feet
G∅	Rad. survey (loadout ✓)	14	16
G1	"	10	10
G2	"	10	10
G3	"	10	10
G4	"	10	10
G5	"	12	10
G6	"	13	10
G7	"	10	10
G8	"	10	10
G9	"	13	11
G10	"	12	12
G11	"	12	12
G12	"	10	10
G13	"	70	23
G14	"	10	10

AUM Field Survey Data Sheet Site Lone Pine 2008-4-15

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad survey	12	10
G16	"	10	10
G17	"	9	8
G18	"	12	11
G19	"	11	8
G20	"	9	8
G21	"	10	10
G22	"	13	13
G23	"	13	12
G24	"	12	11

Lucky Don Mine

1. Location/Land Status: The Lucky Don Mine is on BLM land in Section 35, T2S, R2E on the USGS Bustos Well quadrangle. Access to the site via the BLM Back Country Bi-Way and Loma de las Canas was not possible. Access was gained by traveling the BLM Back Country Bi-Way until its intersection with US 380. From US 380, travel north approximately 7 miles until reaching the end of WSMR P Route 5, then travel by foot approximately 1.2 miles to the mine.

2. Human Activity: No evidence of human activity beyond historical mining was noted.

3. Radiological Survey: The radiological survey consisted of four transects: three rectangular, arrayed along the main workings, and one circumference around entire working slope. Radiological survey results were as follows: ground surface maximum of 320 μR/hour and minimum of 11 μR/hour. Four-foot elevation maximum was 180 μR/hour and minimum was 0 μR/hour. Background radiation levels are approximately 14 μR/hour.

4. Mine Disturbance: The Lucky Don Mine is characterized by mine workings cut into the hillside of volcanic conglomerate approximately 60 feet above the arroyo. There is a large wooden load-out structure (15 ft. wide by 40 ft. tall) on the northwest face of the slope. This area contained the highest radiological readings at 320 μR/hour at the surface. Other structures include a small powder box and a small tool shed. Striking into the slope of the main workings are two small adits: the eastern-most is approximately 12 ft. x 14 ft. x 10 ft. deep, and the western is approximately 6 ft. x 10 ft. x 8 ft. deep.

5. Plant Community: The surrounding area is characteristic chaparral with grasses, yucca, Spanish sword, ocotillo, cacti, and sporadic juniper trees. The vegetation on-site is all but non-existent: 10% grasses, 10% forbs, and 80% bare earth.

6. Soils: Site soils are Tanbark-rock outcrop, 35 to 80 percent slopes, 0 to 2 inches fine sandy loam, 2 to 14 inches Gypsiferous material, 14 to 60 inches bedrock.

7. Wildlife: There were numerous signs of wildlife observed in the area, including: pronghorn, deer, wild horse, fox, coyote, bear, rabbit, lizards, and numerous rodents.

8. Land Use: Land use at the mine includes light grazing.

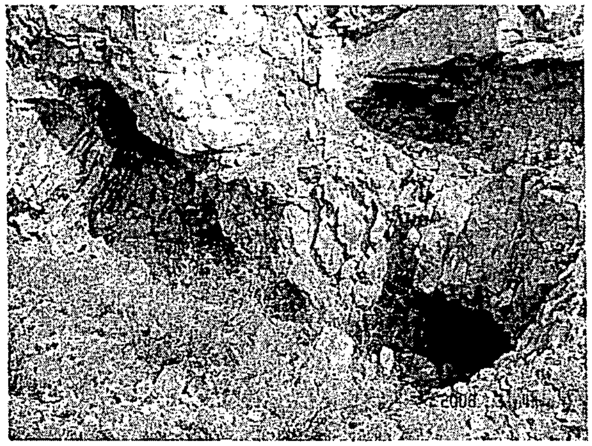
9. Off-Site Impacts: No off-site impacts were noted.

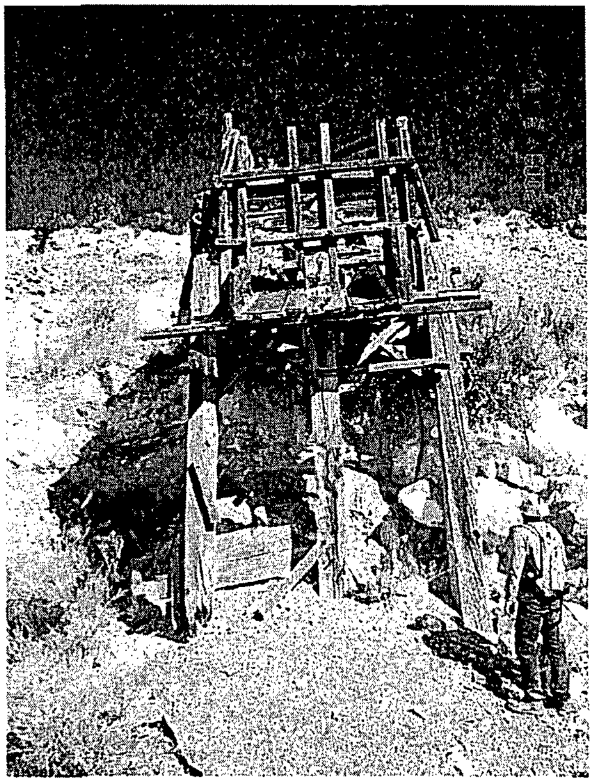
10. Topographic Features: The site is cut into the side of a hill. No major erosional features were noted.

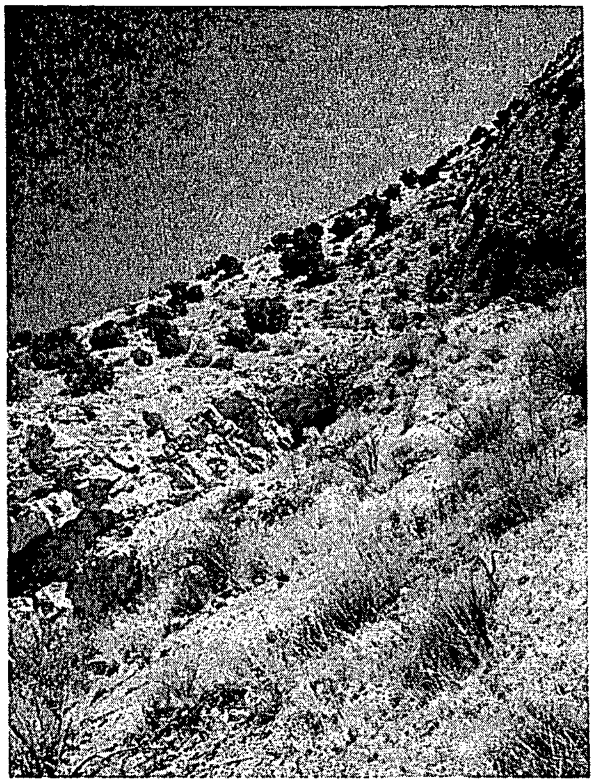
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest well to the site with a recorded depth to water is approximately 3 miles to the southeast, with a depth to water of 170 feet.

The nearest surface water drainage feature is approximately one-tenth of a mile north of the site.

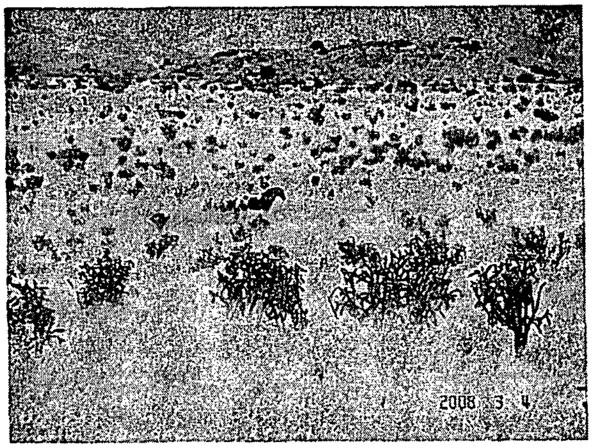

View east across cut


View south into adit

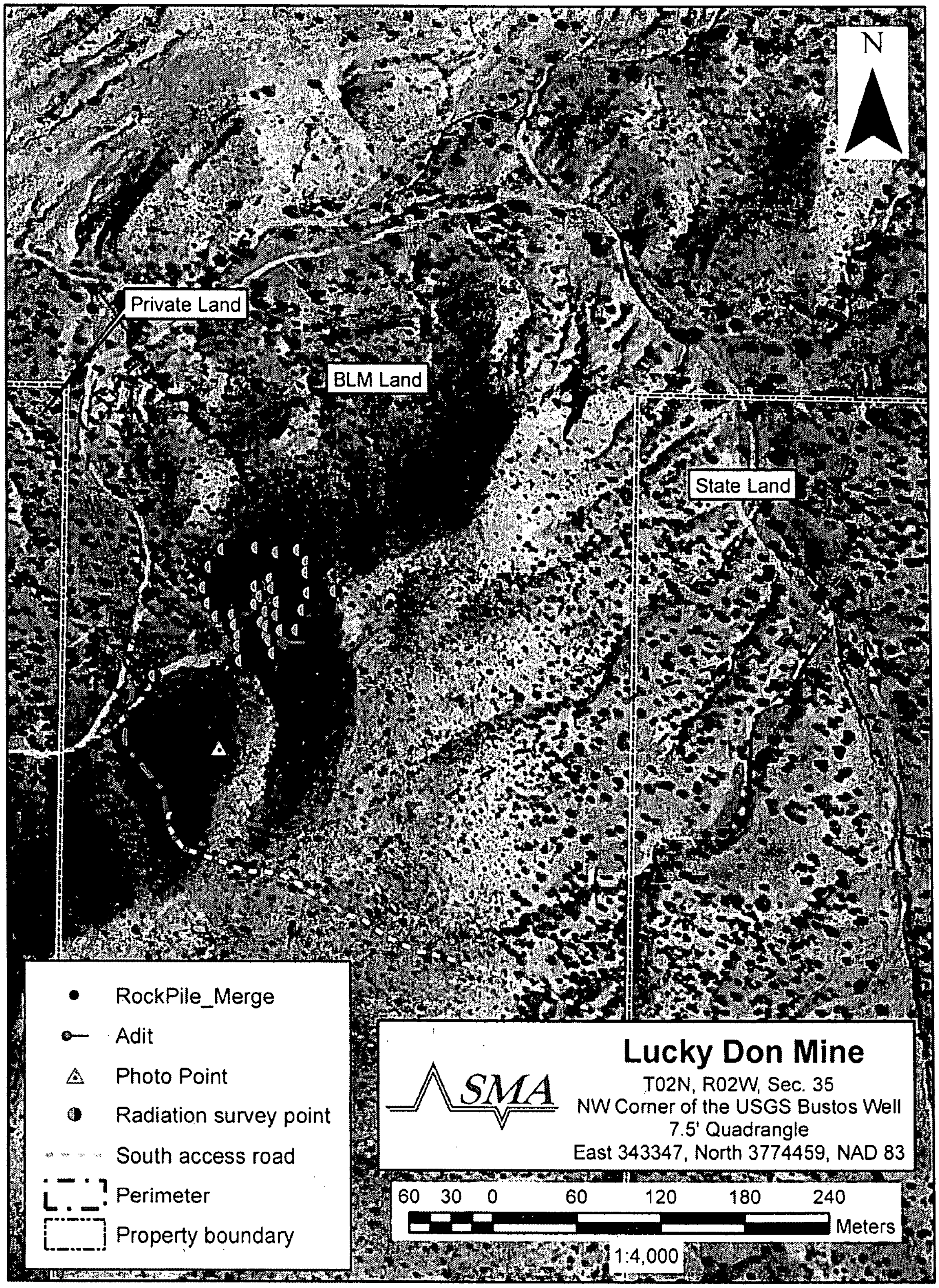

Loading chute


Adit

View east to loading chute



Wild horse


N
Private Land
BLM Land
State Land
RockPile_Merge
Adit
Photo Point
Radiation survey point
South access road
Perimeter
Property boundary
Lucky Don Mine
SMA
T02N, R02W, Sec. 35
NW Corner of the USGS Bustos Well
7.5' Quadrangle
East 343347, North 3774459, NAD 83
60 30 0 60 120 180 240
Meters
1:4,000

AUM Field Survey Data Sheet Site NMS00142 Lucky Don (Socorro)

Date	Time On-Site	Time Off-Site	By
01/09/08	1420		Brian / Bill

Weather Conditions: Sunny ~ 50° F wind 0-5 mph

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits		1) 12'x14'x10' deep 2) 6'x10'x8' deep		
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings		loadout	15' x 40' tall	
Headframes				
Equipment				

N 3774381 E 343189

AUM Field Survey Data Sheet

Site NMS0 0142 Lucky Don

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		chaparral 10% grasses 10% forbs 80% bare		

Wildlife	GPS#	Description	Photo #
		antelope, deer, wild horse, fox, coyote (sign), bear, rabbit, lizards, rodents	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		light grazing		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site NM500142

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
2	Base of tailings	40 mR	
4	" "	28	
5	" "	28	
6	" "	17	
7	" "	17	
8	" "	32	28 µR/hr.
9	" "	19	17
10	working level	16	13
11	shaft workings	11	11
12	"	14	11
13	"	11	11
14	"	21	19
15	"	18	13
16	"	22	26
17	"	19	24

18	WORKING LEVEL TOP WASTE	90	110
19	WKG. LEVEL TOP OF LOADER	95	100
20	WKG. LEVEL, TOP OF WASTE PILE	170	110
21	WKG. LEVEL, TOP OF WASTE PILE	90	70
22	WKG. LEVEL, BASE OF WALL	70	40
23	"	28	30
24	" (ADIT)	32	34
25	" (ADIT)	48	130
26	"	100	110
27	" (ADIT)	24	24

AUM Field Survey Data Sheet Site NMS0Ø142 Lucky Don

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
2	Base of tailings	40 mu	
4	" "	28	
5	" "	28	
6	" "	17	
7	" "	17	
8	" "	32	28 μR/hr.
9	" "	19	17
10	working level	16	13
11	above workings	11	11
12	"	14	11
13	"	11	11
14	"	21	19
15	"	18	23
16	"	22	26
17	"	19	24

Lucky Don Pg. 2

18	WORKING LEVEL, TOP WASTE	90	110
19	WKG. LEVEL, TOP OF LOADER	95	100
20	WKG. LEVEL, TOP OF WASTE PILE	170	110
21	WKG. LEVEL, TOP OF WASTE PILE	90	70
22	WKG. LEVEL, BASE OF WALL	70	80
23	"	28	30
24	" (ADIT)	32	34
25	" (ADIT)	48	130
26	"	100	110
27	" (ADIT)	24	24

AUM Field Survey Data Sheet Site AUM Lucky Don 2008-3-4

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
	Loadout ✓		
G0	Rad survey background ✓	14	14
G1	Rad survey ✓	140	130
G2	"	90	100
G3	"	80	80
G4	"	250	110
G5	" ✓	40	36
G6	" ✓	110	100
G7	"	130	120
G8	"	320	180
G9	"	60	50
G10	" ✓	80	60
G11	" ✓	28	26
G12	"	110	70
G13	"	28	26
G14	"	48	48
G15	" ✓	22	22

ADIT 0

Page 2 of 2

AUM Field Survey Data Sheet Site Aum Lucky Don 2008-3-4

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
ADIT 0	Adit ✓	—	—
LOAD 1	Loadout top	—	—

Mesa Top Mine

1. Location/Land Status: The Mesa Top Mine is located on BLM land within Section 20, T13N, R9W on the USGS Dos Lomas quadrangle, some 12 miles north of Milan, NM. Physical access to the mine can be gained by traveling north from Milan, NM on NM 605 eleven miles to Haystack Road, continue north 0.8 miles on NM 605. West of the highway at this point there is a stock tank and gate, from which access to the mine is possible by foot approximately one mile away. Legal access to this property was graciously provided by Mr. Robert Schmitt of 57 NM 509, Grants, NM 87020; phone: (505) 287-2260.

2. Human Activity: No obvious human activity besides historical mining was noted. No residences were noted within a one-mile radius of the site.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 460 μR/hour and minimum of 20 μR/hour. Four-foot elevation maximum was 440 μR/hour and minimum was 18 μR/hour. Background radiation levels are approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of two vertical shafts, three concrete structure pads, a fallen wooden head frame, and numerous rock piles (approximately 120) with an estimated volume of 1,500 to 2,000 cubic-yards.

5. Plant Community: The surrounding area is characteristic pinon-juniper forest. The vegetation on site consists of the following: 30% grasses, 20% forbs, 10% shrubs, 30% trees, and 10% bare earth.

6. Soils: Soils at the site are Celavar-Atarque complex, which are well drained loamy soils with slopes of 1 to 8%. Bedrock is shallow, at depths of 20 to 40 inches.

7. Wildlife: There were numerous signs of wildlife on site, including: deer, fox, rabbit, and rodents.

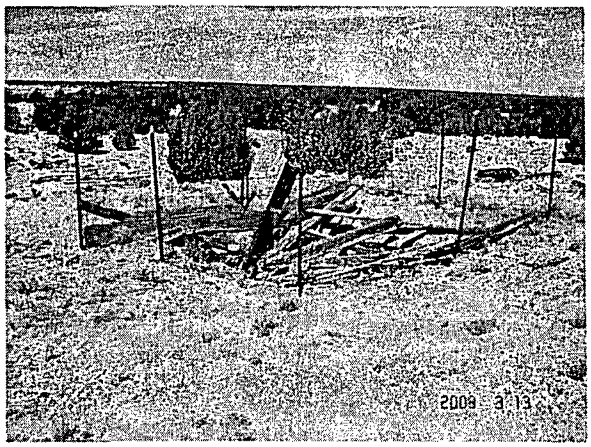
8. Land Use: Land use is currently limited grazing.

9. Off-Site Impacts: No off-site impacts were noted.

10. Topographic Features: The site is low rolling hills, with no notable erosional features.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, there is one well record within a one mile search radius, which does not have a recorded depth to water. It is located approximately 0.6 miles to the west. The nearest well to the site with a recorded depth to water is approximately 1.2 miles to the southeast, with a depth to water of 280 feet.

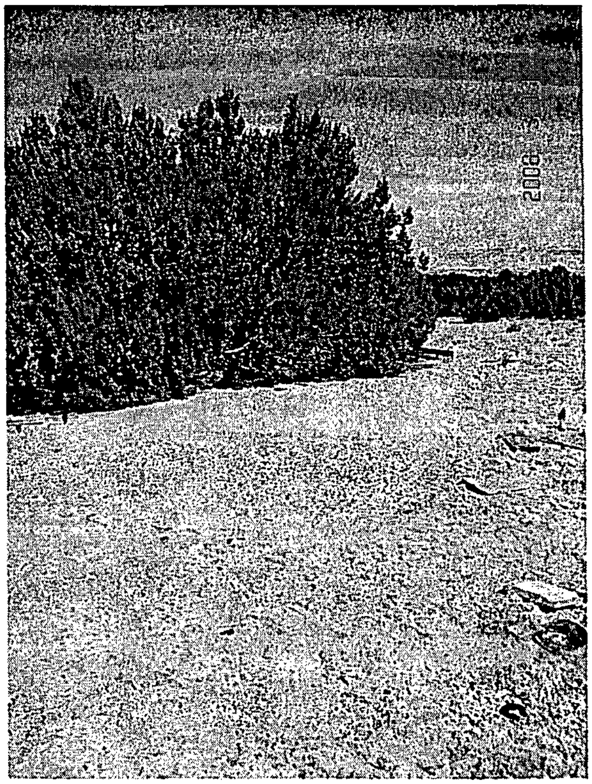
The nearest surface water drainage feature is approximately 0.3 miles to the southwest of the site.



Shaft

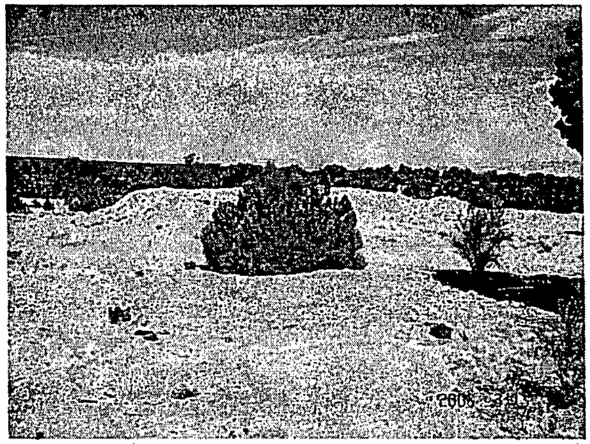
Vent shaft

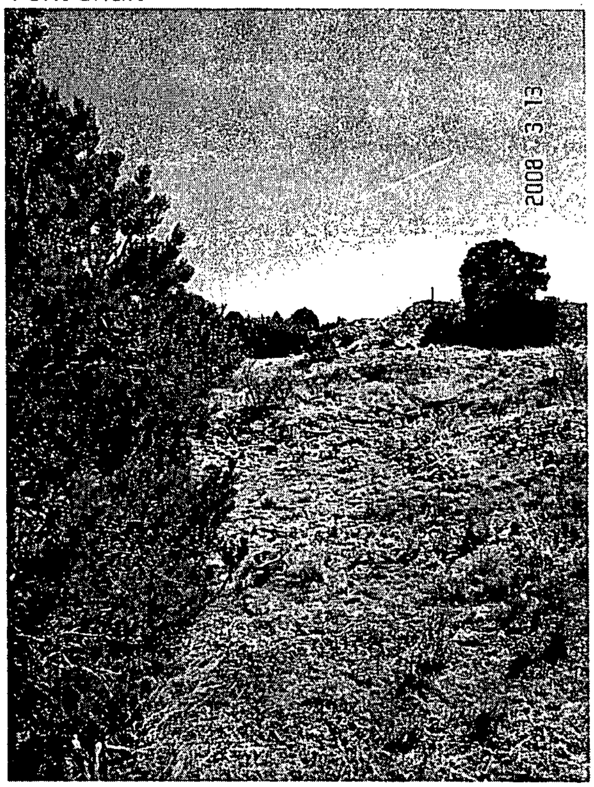

Vent shaft



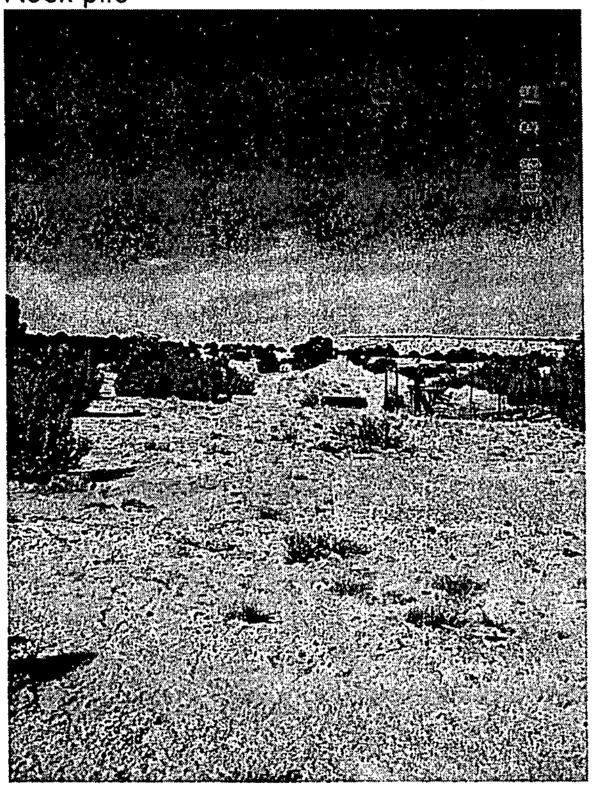
Concrete foundation/structure pad

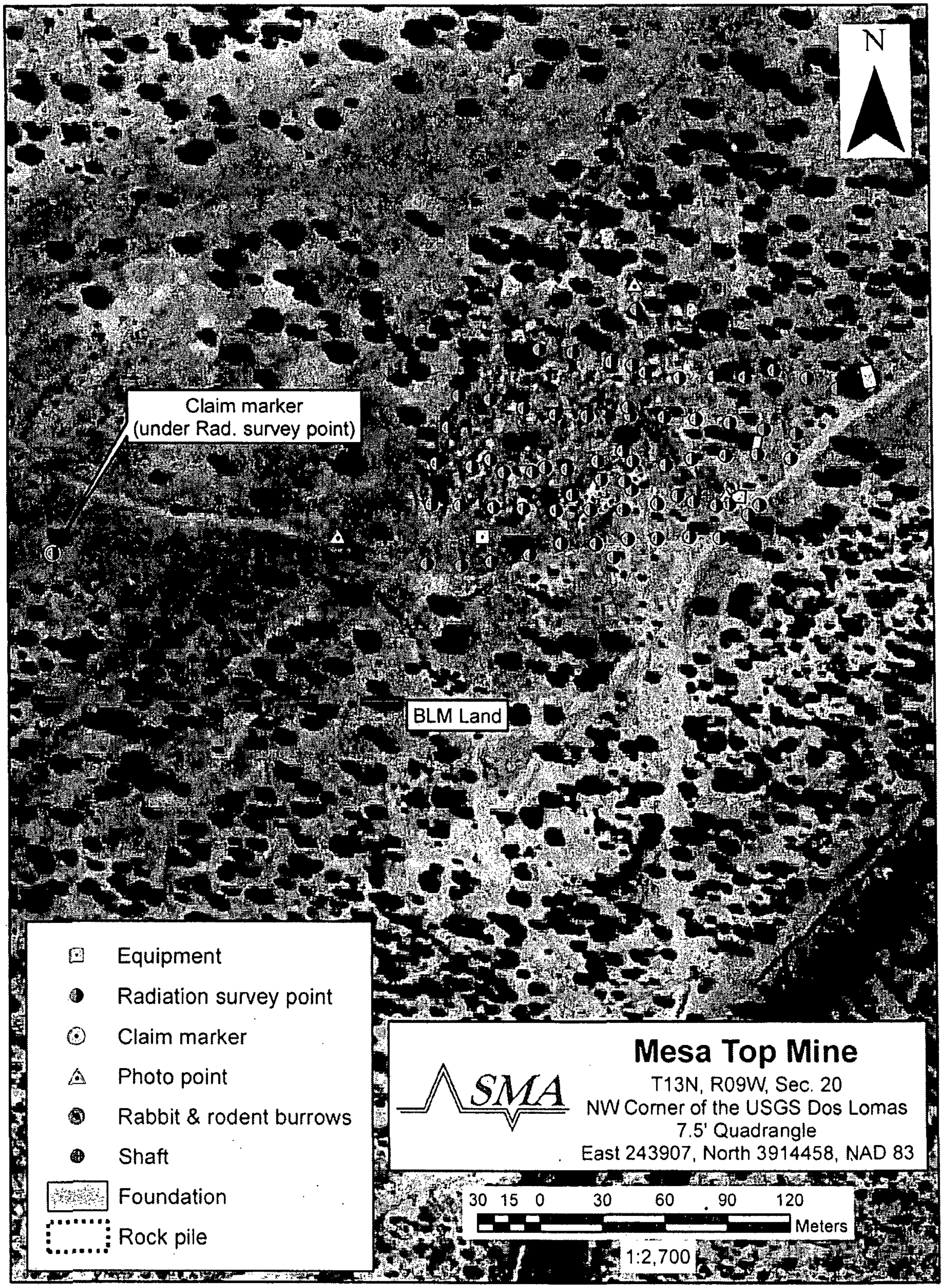

Vent shaft


Rock pile



View west - pile


View west – pad, shaft, pile


N
Claim marker
(under Rad. survey point)
BLM Land
Equipment
Radiation survey point
Claim marker
Photo point
Rabbit & rodent burrows
Shaft
Foundation
Rock pile
SMA
Mesa Top Mine
T13N, R09W, Sec. 20
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 243907, North 3914458, NAD 83
30 15 0 30 60 90 120
Meters
1:2,700

AUM Field Survey Data Sheet Site Pikes Top / Dog

Date	Time On-Site	Time Off-Site	By
01/24/08	1000 hrs	1340 hrs	Brian Hoover / Bill Brown

Weather Conditions: Clear, Sunny, appx 30°F, Slight Breeze

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts	01	Vertical shaft ~60' fenced w/wood collar	12' x 12'	
Adits / / /	16 37 39			
Pits N/A				
Waste Rock Dumps / Stockpile	12 42-45			
Tailings N/A				
Trenches N/A				
Roads overgrown Non-existent				
Erosional Features None extraordinary				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings N/A				
Headframes 1	35	Wooden		
Claim Marker	22	Possible claim marker		

AUM Field Survey Data Sheet Site Mesa I&II

Equipment				

Soils	GPS#	Description	Extent	Photo #
290 - Rock outcrop - Westrain Sky Village 305 - CELAVAR - ATARQUE Complex		SEE USDA-NRCS ATTACHMENT		

Vegetation	GPS#	Description	Extent	Photo #
SEE ATTACHMENT				

Wildlife	GPS#	Description	Photo #
Scattered rodent dens Canid tracks (?) old Scattered deer pellets			

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
None Known				

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Limited grazing		on & offsite		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
None Known				

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

Typical low, rolling hills.

AUM Field Survey Data Sheet Site Mesa Top

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
02	Rad. survey E to W	50	70
03	"	120	90
04	"	80	70
05	"	90	80
06	"	150	120
07	"	120	100
08	"	80	70
09	"	20	19
10	Vertical iron cylinder 1.5 dia. x 4'h	500	—
11	~~Stock pile~~ Rad S to N	110	90
12	Stock pile & framework	—	—
13	Rad. survey S to N	80	70

AUM Field Survey Data Sheet Site Mesa Top / Dog

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
14	Rad survey S to N	80	70
15	"	120	110
16	"	140	120
17	"	120	110
18	"	100	90
19	"	30	27
20	Old car pieces	24	20
21	~~claim stake~~ hole	24	20
22	Claim stake	11	10
23	Claim stake	—	—
24	"	—	—
25	Vent shaft (pit gone)	—	—

AUM Field Survey Data Sheet Site Mesa Top/Dog

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
26	Rad survey W to E	19	17
27	"	17	15
28	"	26	24
29	"	30	28
30	"	130	110
31	"	70	50
32	"	26	22
33	"	20	20
34	"	24	20
35	headframe	–	–
36	decline	800	800
37	decline	600	900
38	concrete pad	260	240
39	adit	46	42

AUM Field Survey Data Sheet Site Mesa Top/Dog

AUM Field Survey Data Sheet Site

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
4u	drill hole 3"		

Mine I.D.: Mesatop / Dog

Plant Community Data

Date/Time: 01/24/08
Weather: Sunny, slight Breeze
Observer: B. Meetz

Current Plant Community:
Photo# Pinyon-Juniper, open forest
30% Tree, 30% grasses, 20% Forb, 10% shrub, 10% bare ground

Other Species Present:
Photo # Four wing Saltbrush (Atriplex canescens)
Blue grama (B. Gracilis)
Unknown grass (no inflorescence, culm) not B. gracilis
Broom Snakeweed (G. sarothrae)
Rabbitbrush Chrysothamnus spp.

T&E Present: Y/N?
If yes, species? NO
Photo #

Noxious Weeds: Y/N?
If yes, species? NO
Photo #

Bare Spots? Y/N?
Number of spots/size yes, normal bare spots - between vegetation
Photo #

Standing Dead? Y/N?
If yes, species? NO
Photo #

Photo Point GPS Coord.
Photo #/Direction

Additional Notes:
Use back if necessary

AUM Field Survey Data Sheet Site AUM-Dog 2008-3-13

Radiological Survey

GPS#	Description		Reading Surface	Reading 4 feet
G∅	Rad. survey	✓	22	20
G1	"		60	50
G2	"		70	80
G3	"		70	80
G4	"	✓	80	80
G5	"	✓	44	40
G6	"		1800	1000
G7	"		90	90
G8	"		130	110
G9	"	✓	38	32
G10	"	✓	28	22
G11	"		80	70
G12	"		140	120
G13	"		260	220
G14	"	✓	28	24

AUM Field Survey Data Sheet   Site AUM- Dog 2008 - 3 - 13

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad survey ✓	42	42
G16	〃	280	260
G17	〃	50	48
G18	〃	200	180
G19	〃 ✓	180	170
G20	〃 ✓	180	170
G21	〃	100	80
G22	〃	240	220
G23	〃	500	320
G24	〃 ✓	36	30
G25	〃 ✓	24	22
G26	〃	90	90
G27	〃	40	38
G28	〃	44	42
G29	〃 ✓	22	20

VEG: 30% bare 20% forb.
20% P&J 10% bare
20% grass

Moe No. 4 Mine

1. Location/Land Status: The Moe No.4 Mine is located on land owned by the New Mexico State Land Office within Section 32, T13N, R9W on the USGS Dos Lomas quadrangle (35.313011N, 107.813102W) and is surrounded by private properties. Physical access to the mine can be gained by traveling north 12 miles from Milan, NM on NM 605. The Moe No. 4 mine is to the east of the highway and visible from the road. Legal access was graciously provided by Mr. Robert Schmitt of 57 NM 509, Grants, NM 87020; phone: (505) 287-2260.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 1,100 μR/hour and minimum of 12 μR/hour. Four-foot elevation maximum was 1,000 μR/hour and minimum was 14 μR/hour. The ground surface at the headframe displayed readings of 1,100 μR/hour. Background radiation level is approximately 15 μR/hour.

4. Mine Disturbance: Moe No. 4 is a small underground mine situated on approximately 3 acres which immediately adjoins an arroyo (ephemeral stream). The mine consists of a 30-degree decline striking north into a collapsed working of approximately 10,000 square-feet by 12 feet deep. The site includes approximately 45 small rock piles having an estimated total volume of approximately 400 cubic-yards.

There is a foundation, loading dock and tank located approximately 2,000 feet from the site, where the access road leaves NM 605.

5. Plant Community: The surrounding area is characteristic chaparral: 40% grasses, 5% bare ground, 10% scrub, 40% forbs, and 5% bare.

6. Soils: Soils at the site are Penistaja-Tintero complex, with 1 to 10 percent slopes, 0 to 3 inches sandy loam, 3 to 19 inches sandy clay loam.

7. Wildlife: There were numerous signs of rabbit and coyote observed on site, but no other wildlife or sign was observed.

8. Land Use: The land use is light to moderate grazing.

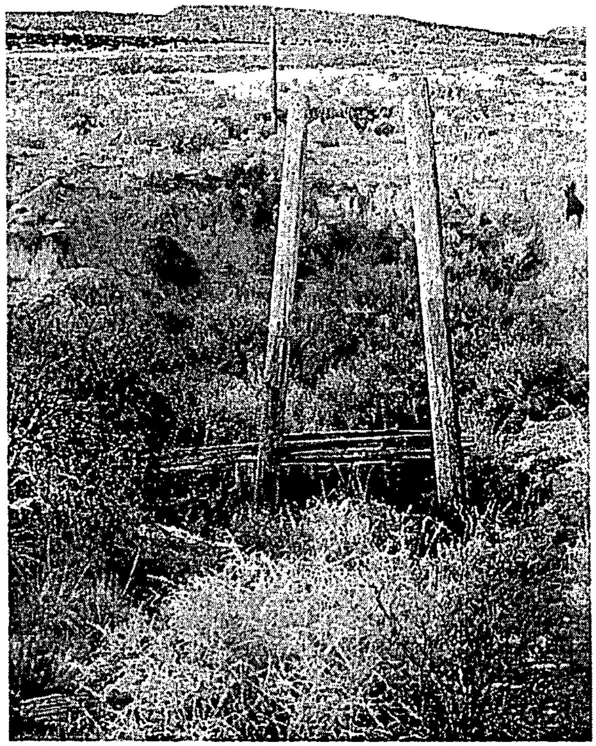
9. Off-Site Impacts: No off-site impacts were noted.

10. Topographic Features: The site is flat, and bounded on the northwest by an arroyo. The site displays no notable erosional features.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, there is one well record within a one mile search radius. It is located approximately 800 feet to the north of the site, with a recorded depth to water of 30 ft.

The nearest surface water drainage feature is adjacent to the site to the northwest.

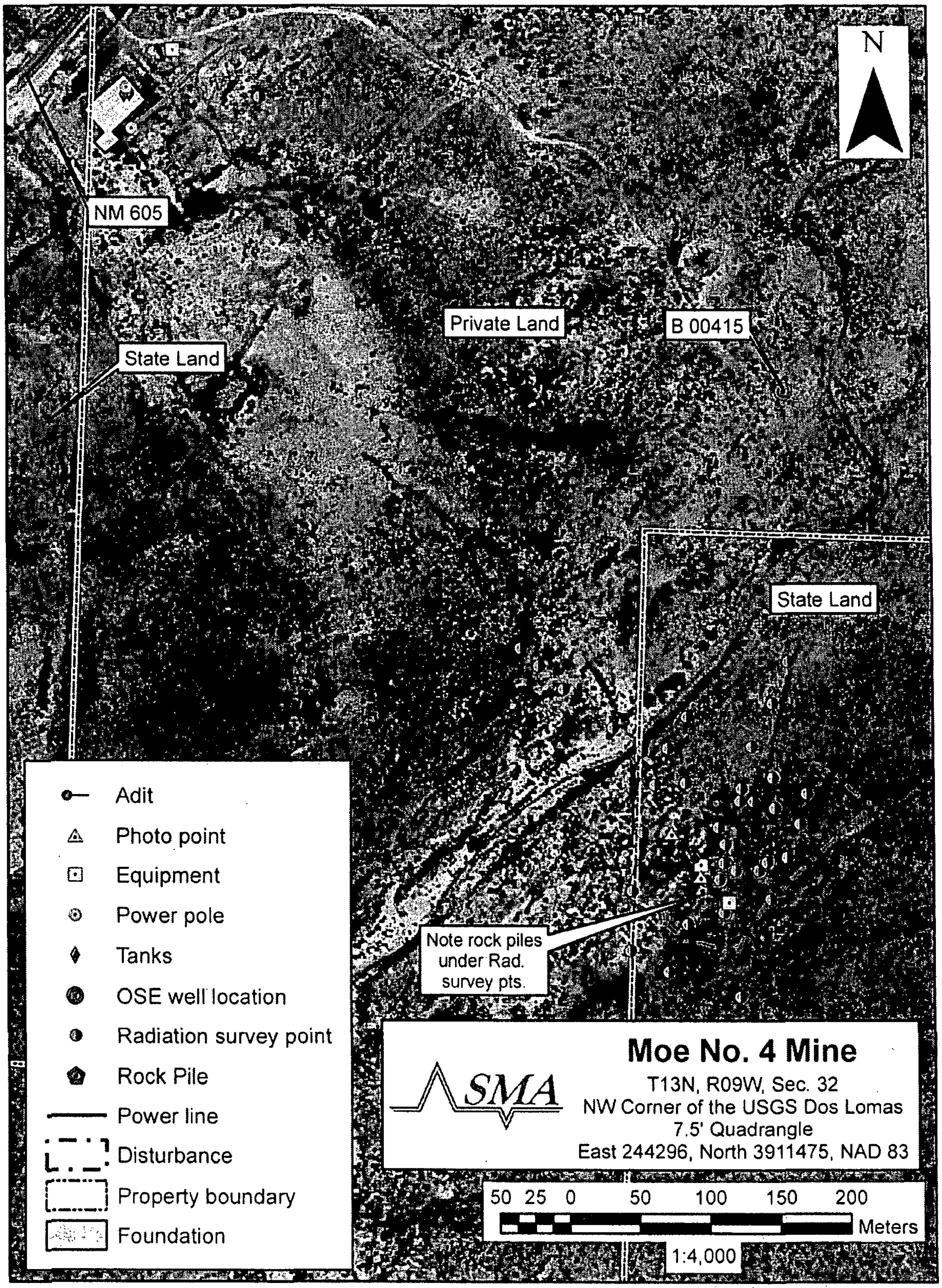
Headframe, view to north



Decline (adj. to headframe), view to north

Decline, view to south

Rock piles, view to northeast


N
NM 605
Private Land
B 00415
State Land
State Land
Note rock piles under Rad. survey pts.
Adit
Photo point
Equipment
Power pole
Tanks
OSE well location
Radiation survey point
Rock Pile
Power line
Disturbance
Property boundary
Foundation
SMA
Moe No. 4 Mine
T13N, R09W, Sec. 32
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 244296, North 3911475, NAD 83
50 25 0 50 100 150 200
Meters
1:4,000

AUM Field Survey Data Sheet **Site** Vallejo # Mon. No. 4

Date	Time On-Site	Time Off-Site	By
01/23/06	1015 hrs		B. [illegible] B. Baldwin

Weather Conditions: Sunny, wind [illegible], cloudless sky ≈ 40°F

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				#1
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads		Suggested road alignment [illegible] 2-Track from SE [illegible] to [illegible] end of site [illegible] [illegible]	2-Track	
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet

Site V

Equipment				
[illegible] N/A [illegible]		No visible [illegible] structures		

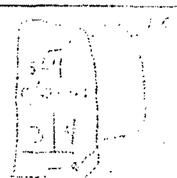
Soils	GPS#	Description	Extent	Photo #
Sandy-Loam		Surrounding sandstone cliffs - reddish-brown	Predominant	

Vegetation	GPS#	Description	Extent	Photo #
P-J Forest [illegible] grasses Sparse [illegible] saltbrush		200-300 lbs/acre grasses production. Predom. juniper (one seed) some pinyon. [illegible] sparse	Some P-J mortality but seems to be natural. Grass prod. high compared to adjacent areas	

Wildlife	GPS#	Description	Photo #
[illegible] rabbit, coyote tracks, [illegible] rabbit, deer tracks in [illegible], [illegible] rodents			

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Bob Schmidt land lessee N/A [illegible]				

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Grazing - Evidence of cattle tracks/feces.				

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
[illegible] N/A				

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

[illegible] of cliff [illegible] appear to be natural [illegible] features due to steep terrain of surrounding cliffs. Some patchy snow on N. face slopes and in canyon bottom. [illegible] of [illegible] on steep slopes. Appears to be naturally reclaimed - Advise no further action

Mine I.D.: Moe#4 / Vallejo

Plant Community Data

Date/Time: 01/23/08
Weather: Sunny, Wind Ø mph, appx 40°F
Observer: BCM

Current Plant Community:

Photo# P-J Forest - open (Both)
Vallejo = Canyon lands type 10% tree, 50% bare ground, 30% forb/shrub, 10% grasses
Moe#4 = light, open P-J (sparse) - more grasslands. 40% grass, 40% forb, 10% shrub, 5% tree, 5% bare ground

Other Species Present:

Photo # Pinyon, One Seed juniper, Spineless horsebrush, Sand Sage, Winterfat (Sporobolus spp.?)
blue gramma, Snakeweed

T&E Present: Y/N?

If yes, species?
Photo # NO

Noxious Weeds: Y/N?

If yes, species?
Photo # NO

Bare Spots? Y/N?

Number of spots/size YES, Normal
Photo #

Standing Dead? Y/N?

If yes, species? ~~NO, Unusual~~ None Unusual
Photo #

Photo Point GPS Coord.

Photo #/Direction

Additional Notes:

Use back if necessary

AUM Field Survey Data Sheet Site Moe #4

AUM Field Survey Data Sheet Site Moe #4

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
01	Rad. survey N to E	24	22
02	"	25	23
03	"	22	22
04	"	22	22
05	"	16	11
06	"	19	18
07	"	19	18
08	"	19	18
09	Rad. survey N to S	15	14
10	"	17	14
11	"	17	13
12	"	22	20

AUM Field Survey Data Sheet Site Moe #4 / Vallejo

AUM Field Survey Data Sheet Site Moe #4

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
13	"	25	23
14	Adit (decline) working caved-in	—	—
15	headframe	1,100	1,000
16	tailings @ headframe	1,100	1,000
17	wastepile (overburden) 15m(h) x 4m(b)	32	30
18	tailings 1m(h) X 3m(b)	360	300
19	tailings/overburden 1m(h) x 3m(b)	50	50
20	tailings 1m(h) X 3m(b)	120	60
21	" "	600	600
22	" "	600	600
23	loading ramp @ highway	60	32

AUM Field Survey Data Sheet Site AUM - Mol No.4 2008-3-5

Radiological Survey			
GPS#	Description photo ✓	Reading Surface	Reading 4 feet
ARC 0	Power drop to former structure	—	—
ARC 1	Power line	—	—
ARC 2	Power line at line pole	—	—
~~G~~ Waste 0	Waste pile ~ 1 m^3	320	90
G0	Rad. survey baseline pt. ✓	12	14
G1	"	16	14
G2	"	20	16
G3	"	22	20
G4	"	42	30
G5	" ✓	800	600
G6	" ✓	32	30
G7	"	70	110
G8	"	42	60
G9	"	22	22
G10	"	18	14
G11	" ✓	14	14

AUM Field Survey Data Sheet Site AUM - Moe No. 4 2008-3-5

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G12	pad survey ✓	18	14
G13	"	18	14
G14	"	22	20
G15	"	140	70
G16	"	20	18
G17	" ✓	18	16
PHOTO-0	headframe looking N into collapsed		
	workings		
PHOTO-1	looking E into collapsed		
	workings		
FENCE 0	S to N barbwire fence		
	meandering along arroyo		
PHOTO 2	Vegetative survey 40% bare, 30% grass, 20% scrub,		
	10% forbs		

Red Bluff Mine No. 1

1. Location/Land Status: The Red Bluff Mine is located on land owned by the New Mexico State Land Office, as well as private land, within Sections 30, 31, and 36, T13N, R10W on the USGS Dos Lomas quadrangle, some 10 miles north of Milan, NM. Physical access to the mine can be gained by traveling north from Milan, NM on NM 605 eleven miles to Haystack Road, west approximately 0.5 miles to a locked gate on the south side of the road, then via foot 0.3 miles south to the mine site.

2. Human Activity: No evidence of human activity was noted. There is a structure to the east of NM 605 approximately one mile east of the site.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 36 μR/hour and minimum of 10 μR/hour. Four-foot elevation maximum was 34 μR/hour and minimum was 10 μR/hour. Background radiation level is approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of an open excavation approximately 500 ft. by 200 ft. by 8 ft. deep. There are approximately 50 rock piles due north the excavation with an estimated volume of 1,500 cubic yards. These piles are on private land. The site is also marked by several excavations which may or may not be associated with the uranium mine. The largest of these excavations is inside the arroyo north of the mine site and covers an area of approximately 25 acres. This excavation is also on private land. Additional data was not collected on features on private land.

5. Plant Community: The surrounding area is characteristically mixed pinon-juniper and grass, including: 30% grass, 10% forbs, 20% shrub, and 40% bare earth. The vegetation on site is completely bare within the excavation and 30% overgrown on the rock piles.

6. Soils: Soils at the site are Rock outcrop-Vessilla complex with, 35 to 70 percent slopes, 0 to 5 inches fine sandy loam, 5 to 60 inches unweathered bedrock

7. Wildlife: No signs of wildlife were noted.

8. Land Use: Land use is light to moderate grazing.

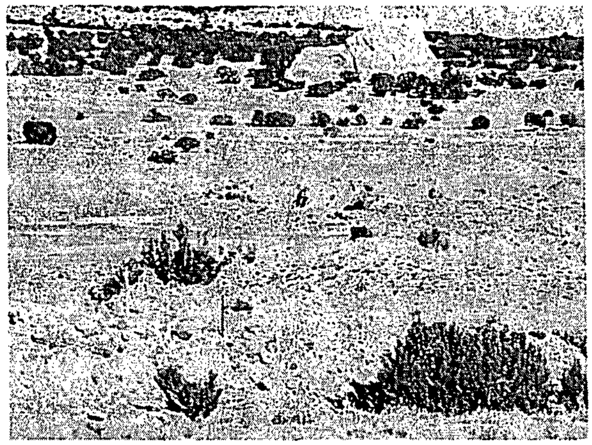
9. Off-Site Impacts: No off-site impacts were noted.

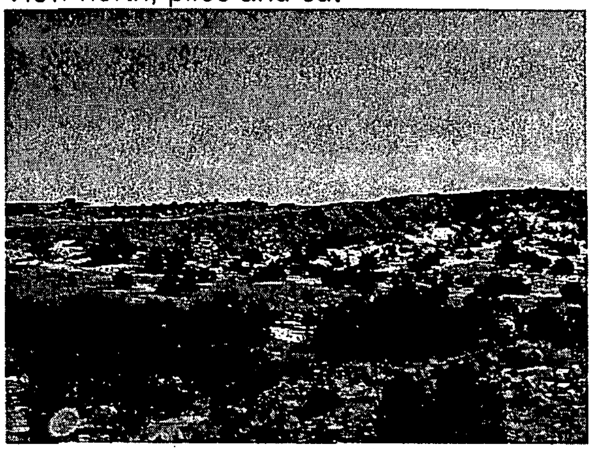
10. Topographic Features: The site is on top of a mesa, with the mesa slope to the south. The site displays no notable erosional features.

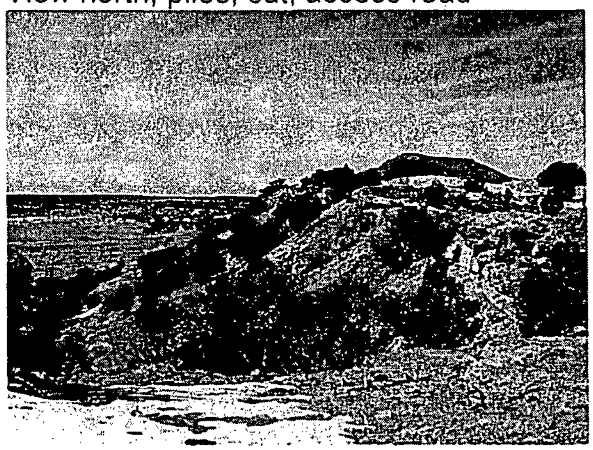
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are three well records within a one mile search radius. Of these records, two have depth to water recorded. Both wells, located approximately 0.8 miles to the northeast and 0.9 miles to the north, have depth to water recorded at 280 feet. The third well is located approximately 0.7 miles northwest of the site.

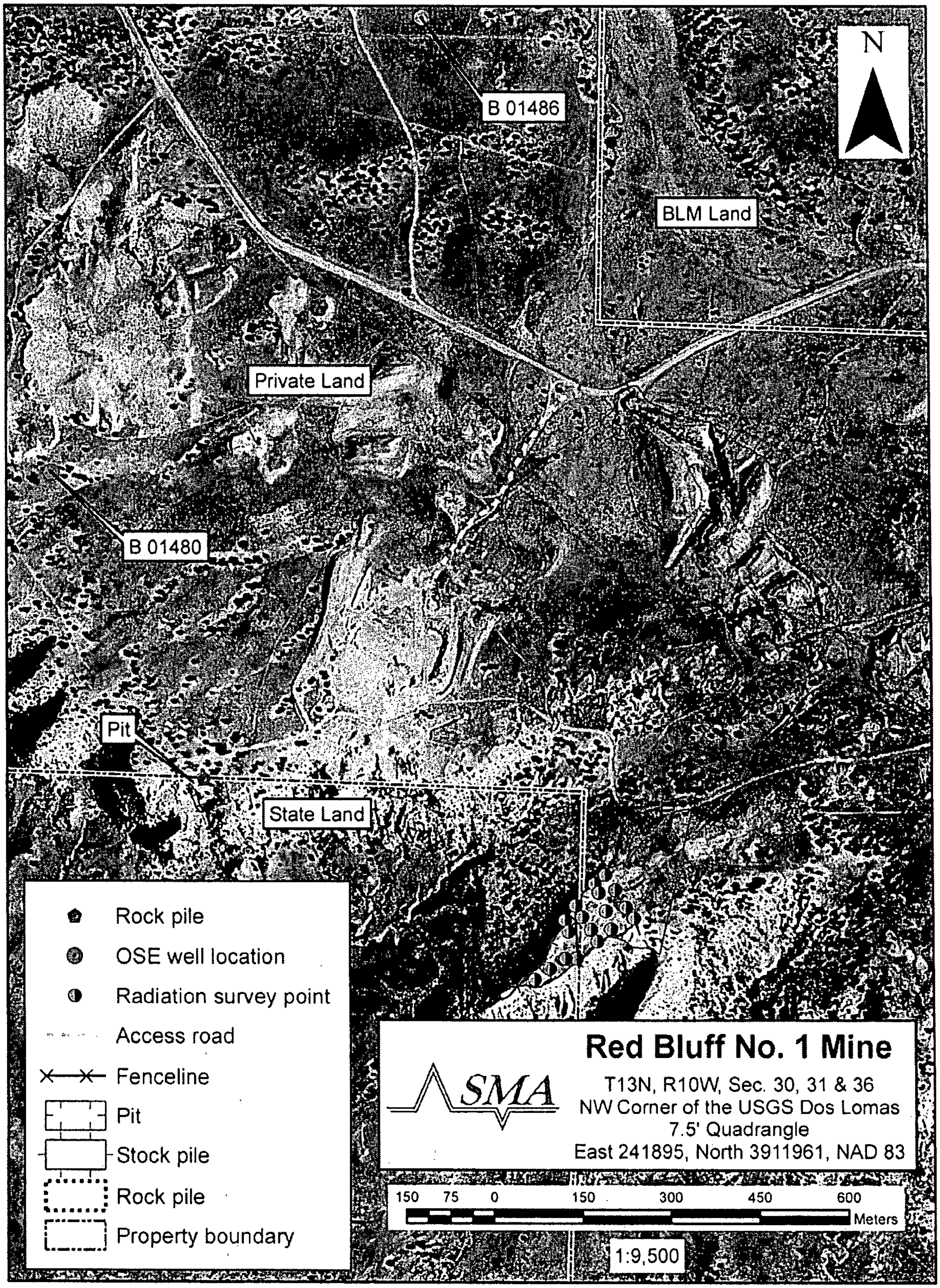
The nearest surface water drainage feature is approximately 0.9 miles south of the site, below the mesa on which the site sits.


View north, piles and cut


View north, piles, cut, access road


View east at primary disturbance


Overall view



N
B 01486
BLM Land
Private Land
B 01480
Pit
State Land
Rock pile
OSE well location
Radiation survey point
Access road
Fenceline
Pit
Stock pile
Rock pile
Property boundary
Red Bluff No. 1 Mine
SMA
T13N, R10W, Sec. 30, 31 & 36
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 241895, North 3911961, NAD 83
150 75 0 150 300 450 600
Meters
1:9,500

AUM Field Survey Data Sheet **Site** Red Bluff No. 1 (second visit)

Date 21 Dec	Time On-Site 8:35am	Time Off-Site 10:21	By Tim Ross & Brian Mintz
Weather Conditions: clear, cool, patchy snow			

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet **Site** ______________________________

AUM Field Survey Data Sheet **Site** ______________________________

Radiological Survey Scale @ 50			
GPS#	Description	Reading Surface	Reading 4 feet
on site	entrance or gate	15 uR/hr	15 uR/hr
1	Photo pt. 30, end of GPS guide (confirm location by NHD given info) NHD 27 WAY PT PER PREV	15 uR/hr	12 uR/hr
2	Geiger waypoint	" "	" "
3	suspect mill? junk pile? hoppers, conveyer belt, drums, tires	15 uR/hr	13 uR/hr
4	rock quarry	12 uR/hr	10 uR/hr

SUBJECT Red Bluff Mine PROJECT PAGE

CLIENT DATE BY

CHECKED BY

P1 SE Disturbance. Bladed limestone w/ waste rock pushed over contour edge. ~3/4 acre

P2 SW Disturbance. Bladed limestone w/ waste rock pushed over contour edge. ~3/10 acre

P4 S Disturbance. Bladed limestone w/ waste rock pushed over contour edge ~1 acre

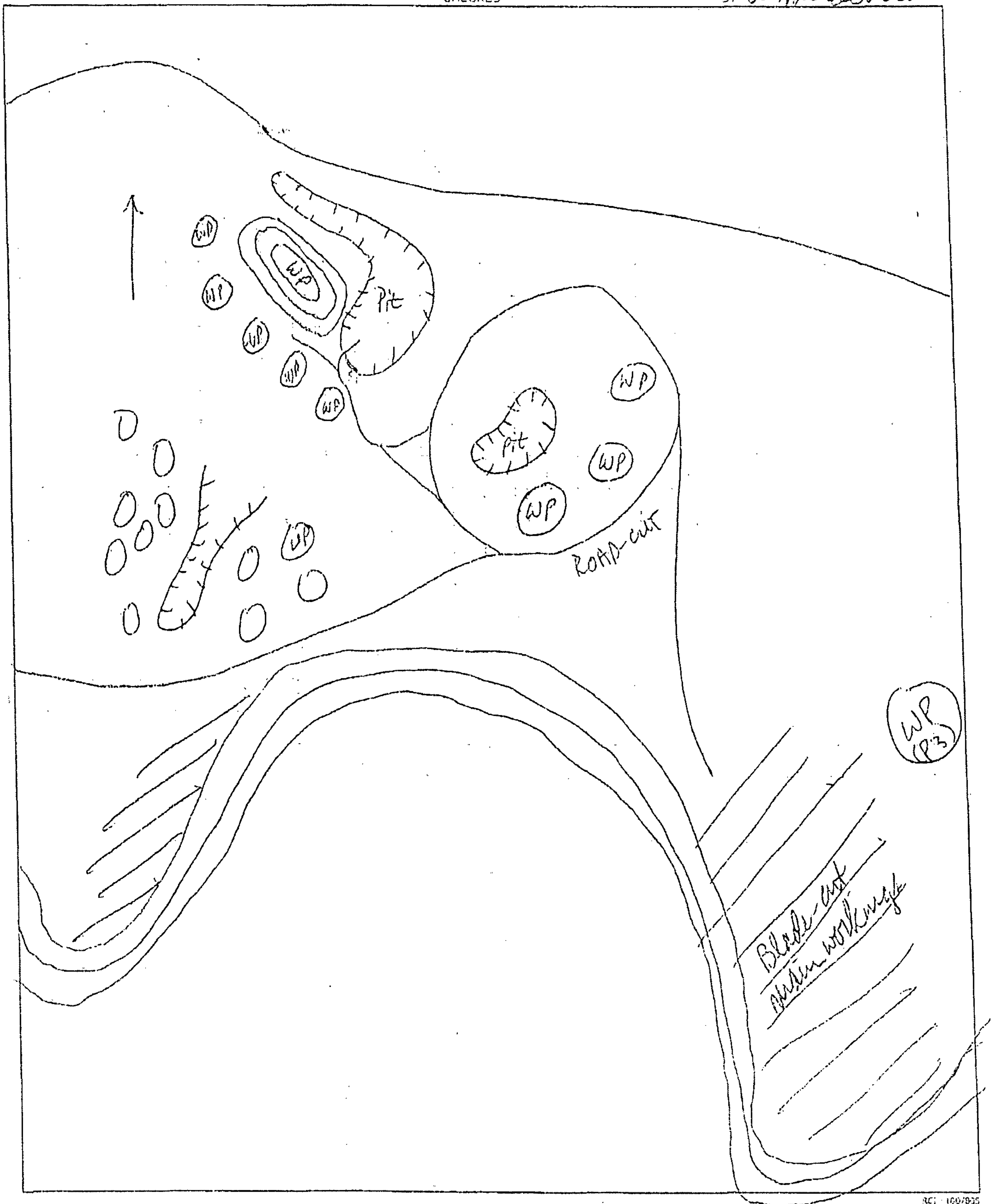
P3 Waste pile ~18 m^3

Storage, loading, &/or exploration
~70 piles ~15 m^3

SUBJECT Red Bluff Mine PROJECT PAGE

CLIENT DATE BY

CHECKED BY W. Baldwin



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AUM Field Survey Data Sheet Site AUM - Red Bluff 2008-3-5

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G0	Rad. survey ✓	12	10
G1	"	18	16
G2	"	36	34
G3	" ✓	26	24
G4	" ✓	16	14
G5	"	36	30
G6	"	24	22
G7	" ✓	12	12
G8	" ✓	14	12
G9	"	26	20
G10	"	14	12
G11	" ✓	30	28
G12	" ✓	24	20
G13	"	12	12
G14	" ✓	12	12
G15	" ✓	10	10
G16	" ✓	12	10

AUM Field Survey Data Sheet Site AUM - Red Bluff 2008-3-5

Radiological Survey			
GPS#	Description photo - ✓	Reading Surface	Reading 4 feet
G17	Rad. survey ✓	12	12
FENCE-Ø	Temporary fence ✓	–	–

Red Point Mine

1. Location/Land Status: The Red Point Mine is located on land owned by the New Mexico State Land Office, within Section 16, T13N, R10W on the USGS Bluewater quadrangle, some 12 miles north of Milan, NM. Physical access to the mine can be gained by traveling north from Milan, NM on NM 605 eleven miles to Haystack Road, west approximately 7 miles on Haystack Road, and travel on foot approximately one mile north to the mine.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 420 μR/hour and minimum of 12 μR/hour. Four-foot elevation maximum was 200 μR/hour and minimum was 12 μR/hour. Background radiation level is approximately 12 μR/hour.

4. Mine Disturbance: The Red Point mine consists chiefly of an open pit excavation approximately 100 ft. by 70 ft. by 8 ft. deep on the center of the approximately 10 acre site. There are numerous rock piles (approximately 30) with a total estimated volume of 250 cubic yards. Three fenced areas (each approximately 15 ft. square) are present on-site, which may be backfilled shafts.

5. Plant Community: The surrounding area is typical mixture of pinon-juniper and grasses. Vegetation onsite includes: 30% grass, 20% trees, 10% forbs, and 40% bare earth.

6. Soils: Soils at the site are Rock outcrop-Vessilla complex with, 35 to 70 percent slopes, 0 to 5 inches fine sandy loam, 5 to 60 inches unweathered bedrock.

7. Wildlife: There were no signs of wildlife observed on this site.

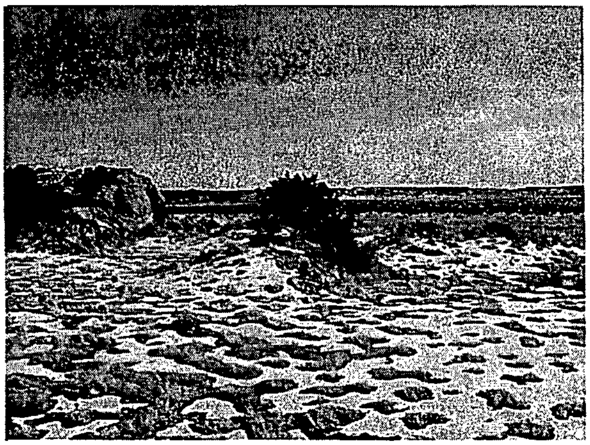
8. Land Use: Land use is light to moderate grazing.

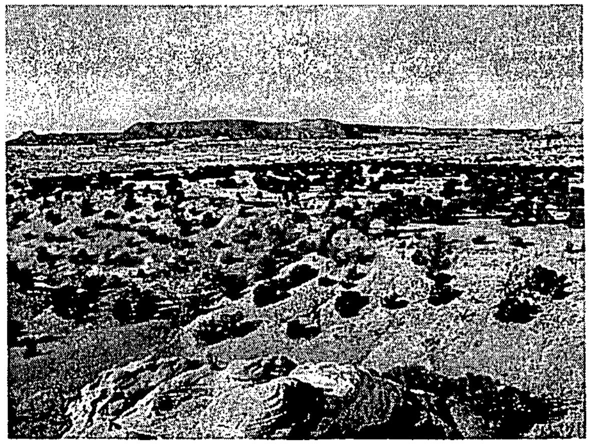
9. Off-Site Impacts: No off-site impacts were noted.

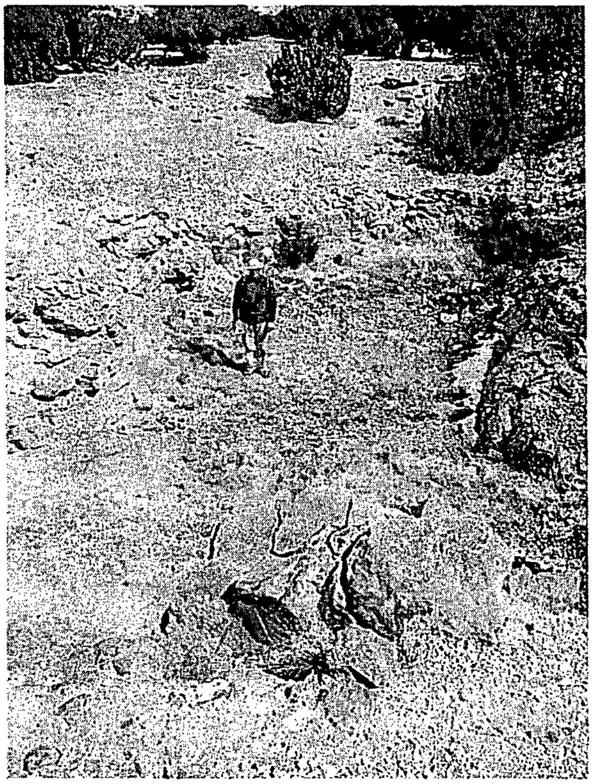
10. Topographic Features: The site is on top of a mesa, with the mesa slope to the south. The site displays no notable erosional features.

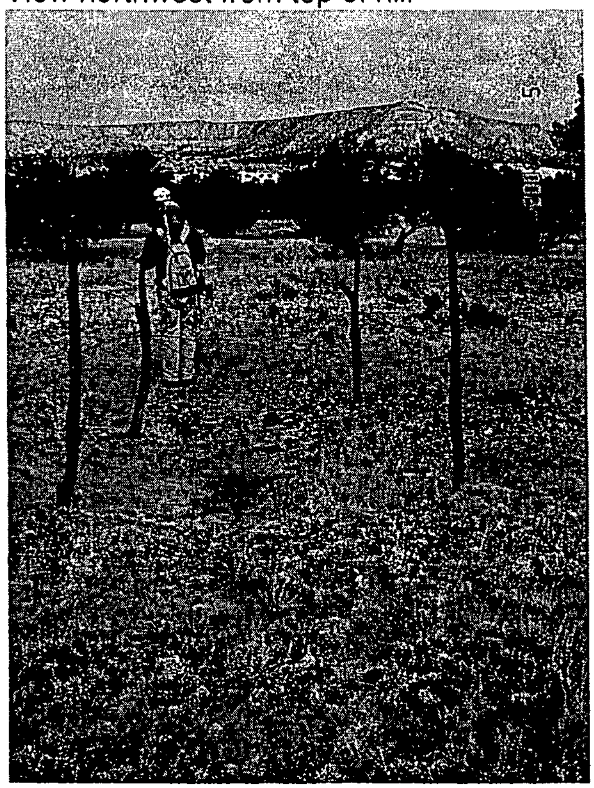
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest well with a depth to water recorded is approximately 3 miles to the north, and has a depth to water of 660 ft.

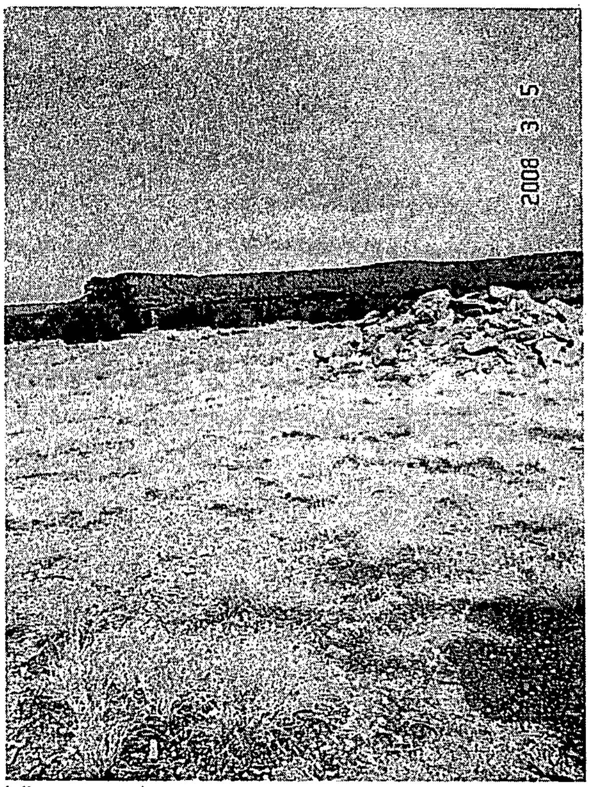
The nearest surface water drainage feature is approximately 0.3 miles to the west of the site.


View south


View northwest from top of hill


View east into pit

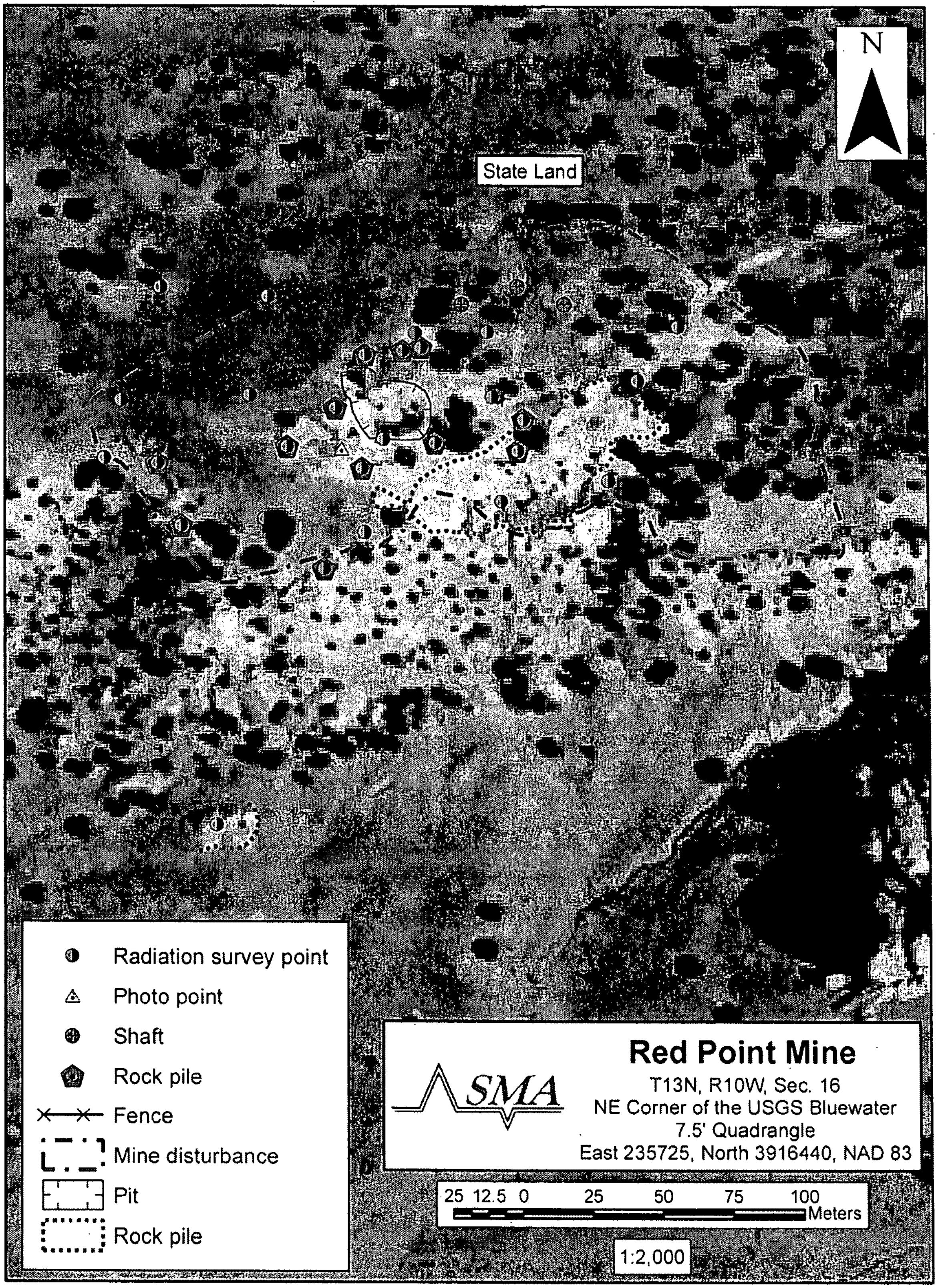

Possible shaft



View southwest

View south from center of site


Possible shaft


N
State Land
Radiation survey point
Photo point
Shaft
Rock pile
Fence
Mine disturbance
Pit
Rock pile
SMA
Red Point Mine
T13N, R10W, Sec. 16
NE Corner of the USGS Bluewater
7.5' Quadrangle
East 235725, North 3916440, NAD 83
25 12.5 0 25 50 75 100
Meters
1:2,000

Page ____ of ____

AUM Field Survey Data Sheet   Site Red Point

Date	Time On-Site	Time Off-Site	By
3/5/08			Baldwin Mertz

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts	Shaft # " 1 " 2 " 3	possible backfilled shafts (areas fenced)	15'x15'	
Adits				
Pits	63	pit		
Waste Rock Dumps		30 piles - small		
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

Page ____ of ____

AUM Field Survey Data Sheet   Site Red Point

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		30% grass 20% trees 10% forbs 40% bare		

Wildlife	GPS#	Description	Photo #
		none	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		- light to mod grazing		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet   Site AUM - Red. Point   2008-3-5

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
WASTE Ø	Waste pile S of main workings	14	14
G0	Card survey ✓	20	18
G1	"	22	20
G2	" ✓	26	22
G3	" ✓	20	18
G4	"	22	20
G5	" ✓	22	20
G6	" ✓	28	24
G7	" ~~✓~~	32	26
G8	Pit " ✓	—	—
G9	" ✓	30	26
G10	" ✓	26	22
G11	"	28	24
G12	" ✓	160	160
G13	" ✓	44	30
G14	" ~~✓~~	12	12
G15	" ✓	14	12

AUM Field Survey Data Sheet Site AUM - Red Point 2008-3-5

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
SHAFT Ø	Possible vert. shaft (fenced) ✓	—	—
SHAFT 1	" ✓	—	—
SHAFT 2	" ✓	—	—
	Veg. survey		
	30% grass 20% trees 10% forb. 40% bare ✓		
SHAFT 3	Possible vert. shaft (fenced) ✓		

SUBJECT Red Point PROJECT PAGE 1 of 2

CLIENT DATE BY

CHECKED BY

	Surface	Waist
Waste pile 1	110 µR/hr	60 µR/hr
photo		
Waste pile 2	60	50
photo		
waste pile 3	180	80
photo		
waste pile 4	14	12
photo		
waste pile 5	15	12
wp 6	420	200
wp 7	20	15
wp 8	15	15
pit	280	90
wp 9	74	12
wp 10	160	90
wp 11	40	50
wp 12	36	20

SUBJECT Red Point PROJECT PAGE 2 of 2

CLIENT DATE BY

CHECKED BY

	Surface	waist
13 SE Mitti(pits/piles)	360	80

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Rio Puerco Mine

1. Location/Land Status: The Rio Puerco Mine is located on BLM land within Section 18, T12N, R3W on USGS La Gotera quadrangle (35.271444N, 107.198028W). Physical access to the mine is gained by taking Canoncito School Road north from US I-40 approximately eight miles, bear right at the school, continue north on Canoncito School Road seventeen miles bearing westward throughout, turn right (north) onto Laguna Indian Service Road, travel two miles NE past a stock tank and on to the mesa to reach the site.

2. Human Activity: Fresh tire tracks indicate recent human access to the site.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 600 μR/hour and minimum of 14 μR/hour. Four-foot elevation maximum was 420 μR/hour and minimum was 12 μR/hour. Background radiation level is approximately 14 μR/hour.

4. Mine Disturbance: The Rio Puerco Mine is without question the most extensive site surveyed during the course of this investigation, covering an area of approximately 12 acres. The mine consists of a vertical shaft of unknown depth, adjoined by a 15,000 square foot steel structure containing lifts for the head frame (the head frame is no longer present), offices, showers, service bays, and equipment storage areas. Immediately east of the large building there is a second building, approximately 2,400 square feet, containing a 100+kW generator. North of the generator building there is an area which formerly contained electrical infrastructure; this impound contains three electric transformers. Oil from the transformers has leaked or been dumped onto the concrete pad and surrounding soils (possible PCB contamination). To the west of the main building there is a 1,200 square-foot Quonset hut equipment service building, a 25,000-gallon water tank, and three small utility sheds. Fire hydrants are present onsite, indicating the presence of a water distribution system likely fed by a nearby well (see Hydrogeology section below). Approximately 100 ft. east of the main building there are three petroleum storage tanks of various volumes: one 9,000 gallon and two 6,000 gallon. To the south southeast of the main building is a very large, enclosed, propane tank of unknown volume. 1,000 feet SSW of the main building there are three ponds (total dimensions 280 x 380 feet, approximately 750,000 gallon capacity) and a small (600 square-foot) chemical mixing shed. The site is open to foot and vehicle traffic as there is no longer a complete fence around the property.

5. Plant Community: The surrounding area is moderately grazed grassland with sparse clusters of pinon-juniper forest and ponderosa pine. Site vegetation is composed of 40% grass, 10% forbs, 5% shrubs, 5% trees, and 40% bare ground.

6. Soils: Soils at the site are Zia-Skyvillage Rock outcrop complex, with 5 to 40 percent slopes, 0 to 60 inches sandy loam.

7. Wildlife: When approaching the mine, a small herd of elk numbering approximately one dozen animals was observed. The ridge upon which the mine is located is covered with various other animal sign including fox scat and tracks, coyote scat and tracks, rabbit tracks and remains, and several bird remains (raptor kills).

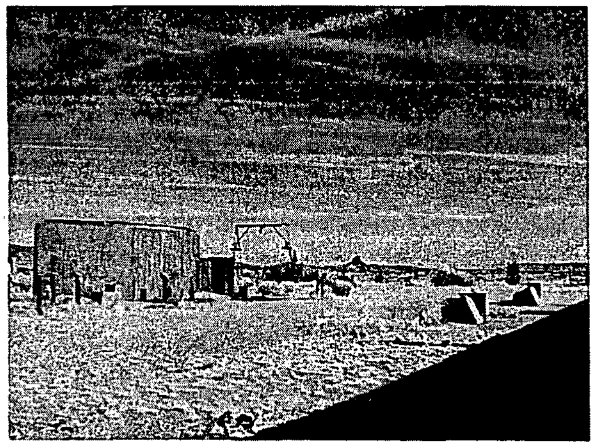
8. Land Use: Land use is light to moderate grazing.

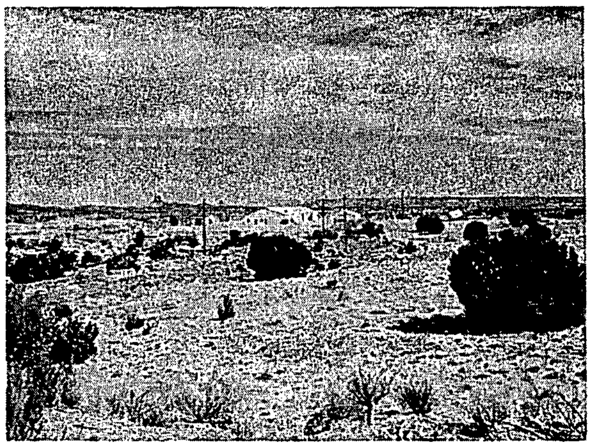
9. Off-Site Impacts: No off-site impacts were noted.

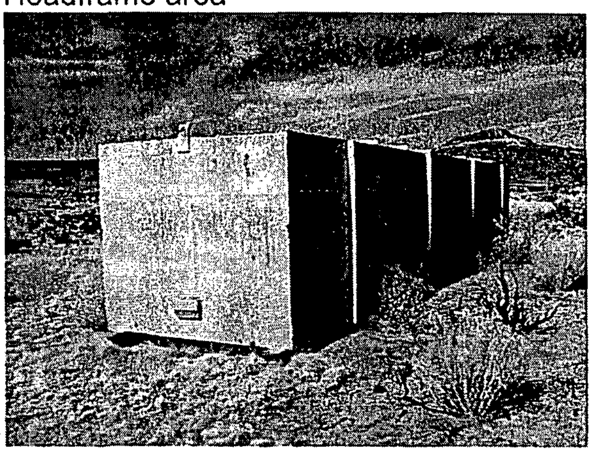
10. Topographic Features: The site is flat-lying, with no notable erosional features.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are two well records within a one mile search radius. One of these wells, located approximately one-half of a mile to the west of the site, does not have a recorded depth to water. The other well, located on the western margin of the site, has a recorded depth to water of 200 ft.

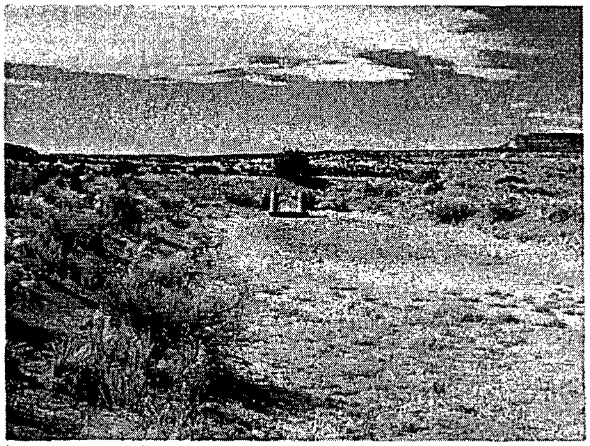
The nearest surface water drainage feature is approximately one-tenth of a mile to the northwest of the site.

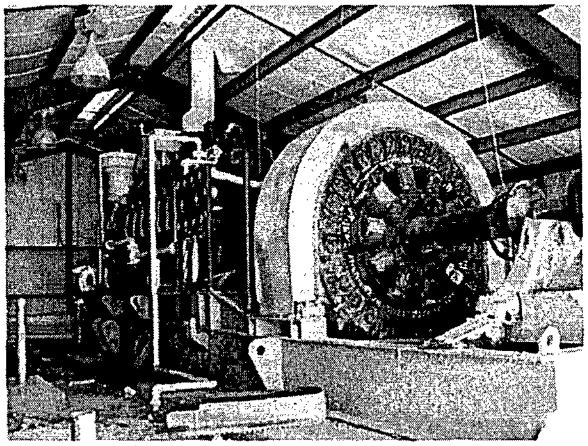

Headframe area

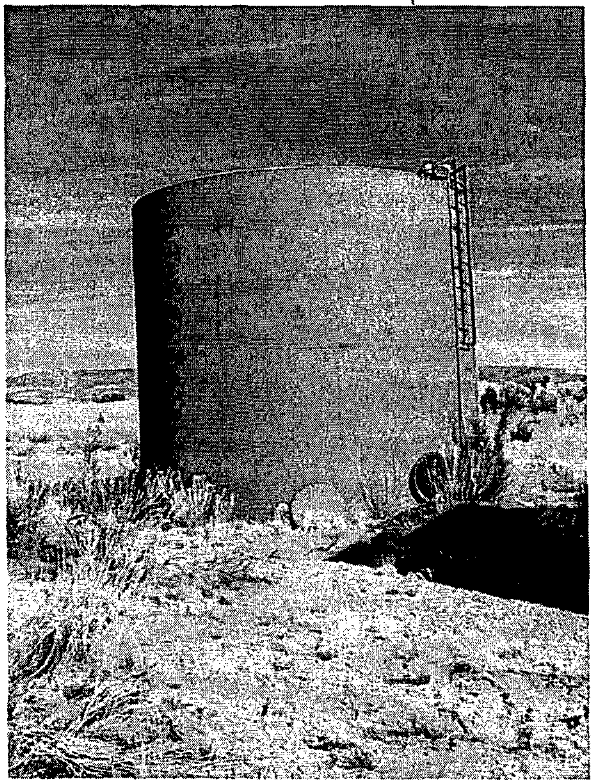

Site view

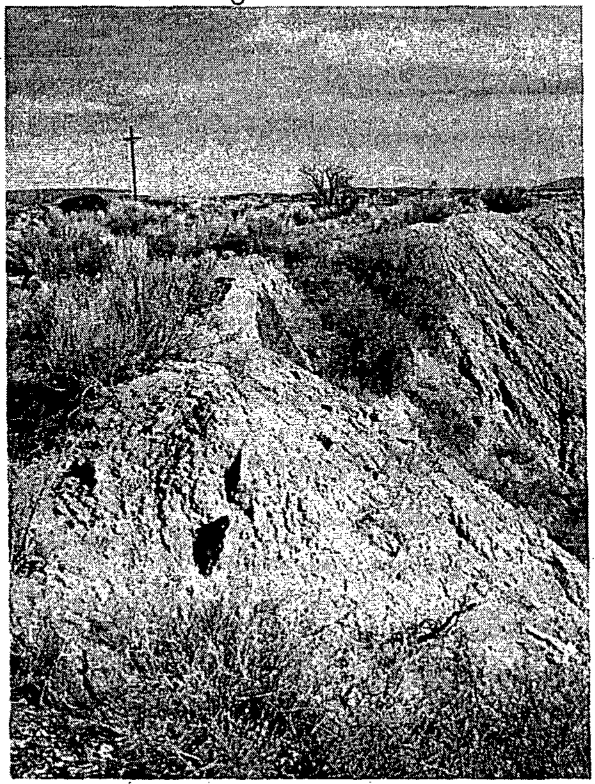

Storage containers

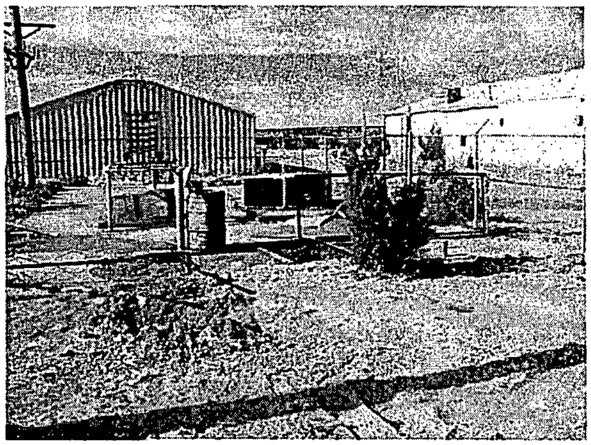

Pump station

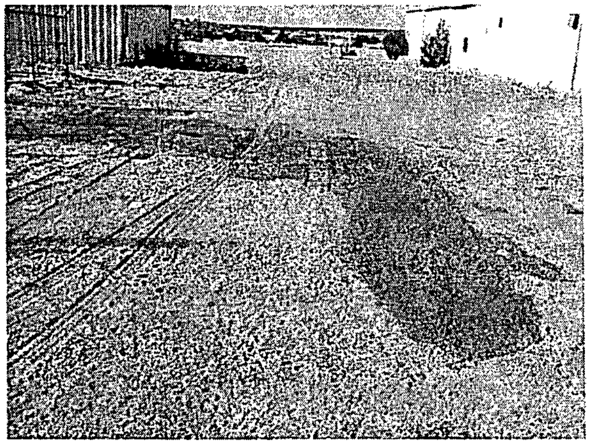

View south into eastern-most pond

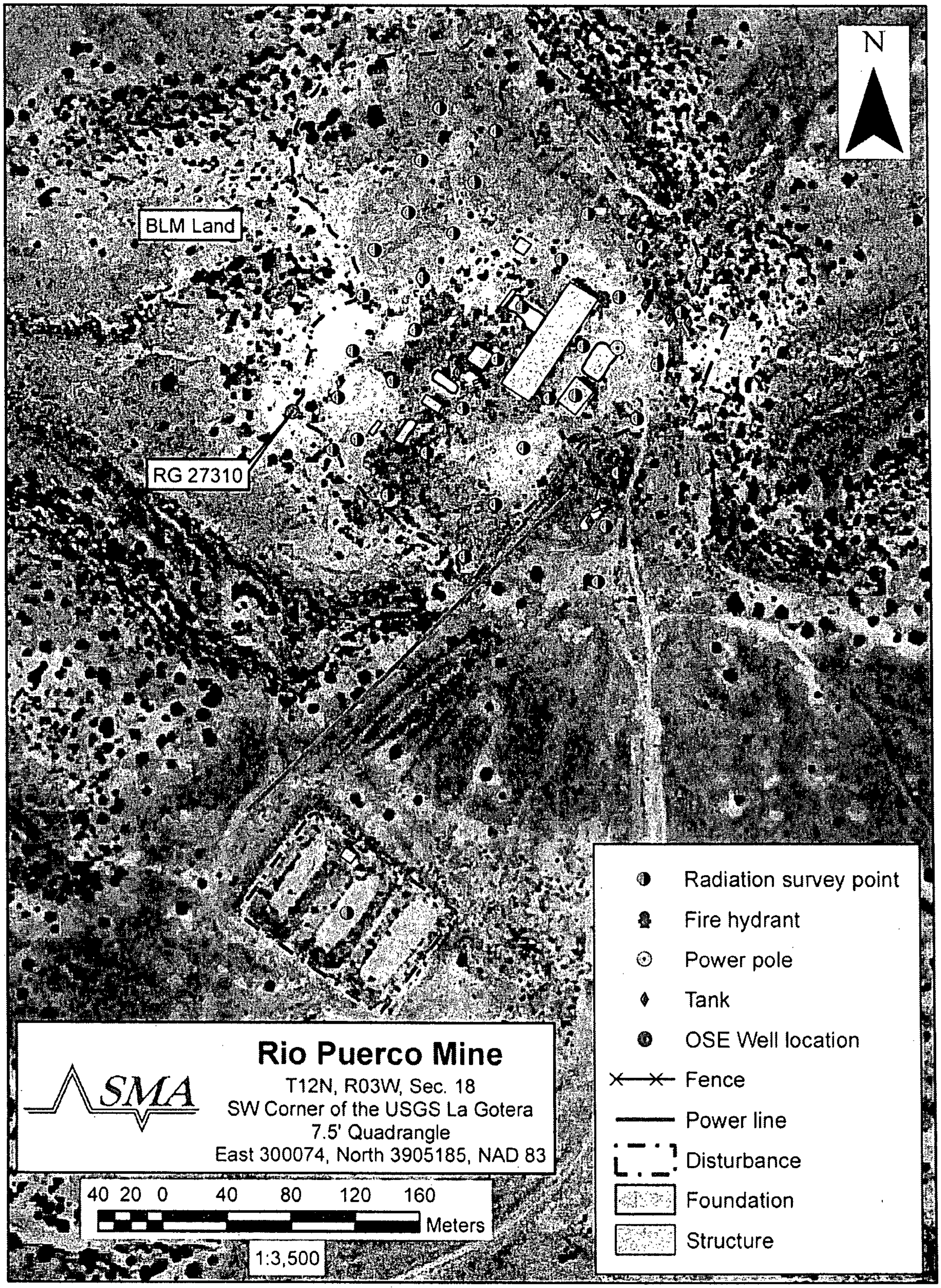

Interior of building


Water tank


Rock piles


Electrical yard with transformer oil spill


Transformer oil spill, recent tire tracks


N
BLM Land
RG 27310
Radiation survey point
Fire hydrant
Power pole
Tank
OSE Well location
Fence
Power line
Disturbance
Foundation
Structure
Rio Puerco Mine
SMA
T12N, R03W, Sec. 18
SW Corner of the USGS La Gotera
7.5' Quadrangle
East 300074, North 3905185, NAD 83
40 20 0 40 80 120 160
Meters
1:3,500

Page ____ of ____

AUM Field Survey Data Sheet   Site Rio Puerco

Date	Time On-Site	Time Off-Site	By
03/20/08	0815 hrs.	1100 hrs	B. MERTZ B. BALDWIN

Weather Conditions:
Sunny, wind calm-Breezy, temp. mod-cool.

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings		numerous		
Headframes		1		

3 ponds

Page ____ of ____

AUM Field Survey Data Sheet Site ______________________

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
SEE ATTACHED				

Wildlife	GPS#	Description	Photo #
Rabbits, rodents. ELK offsite		Observed Jack rabbits (2x) feces evident. Rodent feces inside buildings. Observed appx 10 head of elk on way to site - mostly cow, one with calf. About 3 miles to SW of site.	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
NO Housing nearby Propane tank.		very large tank on site		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
GRAZING OHV		Grazing light on site - Heavier offsite esp. to North. Noticed Pickup/ATV tracks on site.		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
Windmill / Tank		To north appx 1/2 mile Corrals / Tanks to SW appx 1 mile		

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site AUM-Rio Puerco 2008-3-20

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
DISTRB Ø	Area around buildings and waste piles ✓	—	—
Found Ø	Power distribution yard. Several transformers w/ spilled oil; ✓	—	—
"	possible PCB contaminated soils. ✓	—	—
STRUC Ø	House air and power generation 4 cyl CAT compressor & 16 cyl. ✓	—	—
"	generator (locomotive scale) ✓	17	17
~~Bench~~ Ø ARC	Fire hydrant	—	—
STRUC-1	Main building; consists of offices, showers headframe lifts, etc. ✓✓✓		
STRUC-3	Quonset-hut ✓		
STRUC-4	headframe ✓		
ARC-1	Fire hydrant		
STRUC-5	Pump house ✓		
TANK-0	16 x 16' ✓		
STRUC-6	Unknown 1/4" plate steel structure ventilated w/ two locked doors. ✓		
FOUND-2	unknown		
STRUC-7	Multi-celled tank and pump structure. ✓		

AUM Field Survey Data Sheet Site AUM - Rio Puerco 2008 - 3 - 20

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
GØ	Rad. survey start SW corner	16	19
G1	Rad. survey cont'd.	24	24
G2	"	100	100
G3	"	600	360
G4	"	600	360
G5	"	600	420
G6	"	150	140
G7	"	80	100
G8	" ✓	130	120
G9	"	120	120
G10	"	440	360
G11	"	200	180
G12	"	120	80
G13	"	22	18
G14	" ✓	20	20

AUM Field Survey Data Sheet Site AUM - Rio Puerco 2008 - 3 - 20

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad. survey cont'd ✓	14	14
G16	"	17	15
G17	"	26	23
G18	"	32	30
G19	"	32	26
G20	"	42	40
G21	" ✓	90	80
G22	" ✓	46	42
G23	"	21	16
G24	"	25	20
G25	"	19	19
G26	"	16	15
G27	"	16	15
G28	" ✓	14	13

AUM Field Survey Data Sheet Site AUM - Rio Puerco 2008-3-20

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G29	Rad. survey cont'd ✓	32	30
G30	"	40	36
G31	"	25	21
G32	"	19	16
G33	"	17	15
G34	"	14	12
G36	" ✓	17	15
~~G37~~	~~"~~		
~~ARC~~			
TANK ~~0~~	Propane tank ✓		
ARC 0	power line between genst. & ponds		
DISTURB 1	ponds (3) ✓	130	130
STRUC 8	shed adjacent ponds ✓		
Pit 0	trash ✓		

Silver Bit Mine

1. Location/Land Status: The Silver Bit Mine is located on BLM land within Section 10, T14N, R12W on the USGS Thoreau NE quadrangle (35.459278N, 108.087639W) some 7 miles NNW of Prewitt, NM. Physical access to the mine can be gained by traveling 6.5 miles north from Prewitt on CR 19 to a gate on west side of road at the end of the pavement. Legal access was graciously provided by Buddy Elkins of Grants, NM, phone (505) 285-6500.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 160 μR/hour and minimum of 24 μR/hour. Four-foot elevation maximum was 160 μR/hour and minimum was 21 μR/hour. Background radiation levels are likely less than 20 μR/hour.

4. Mine Disturbance: The mine consists of underground workings just beneath the mesa top, cut into the hill side. There are two adits associated with this mine: one approximately 4 feet by 8 feet by 4 feet deep, the other approximately 4 feet by 8 feet, framed, of unknown depth.

5. Plant Community: The surrounding area is typical pinon juniper forest with sparse grass. The vegetation on site is 20% pinon/juniper, 20% woody scrub, 10% forbs, and 50% bare ground.

6. Soils: Soils at the site are Rock outcrop-Westmion-Skyvillage complex, with 30 to 80 percent slopes, 0 to 2 inches gravelly clay loam, 2 to 14 inches clay, 14 to 20 inches bedrock.

7. Wildlife: There were no wildlife signs observed on this site.

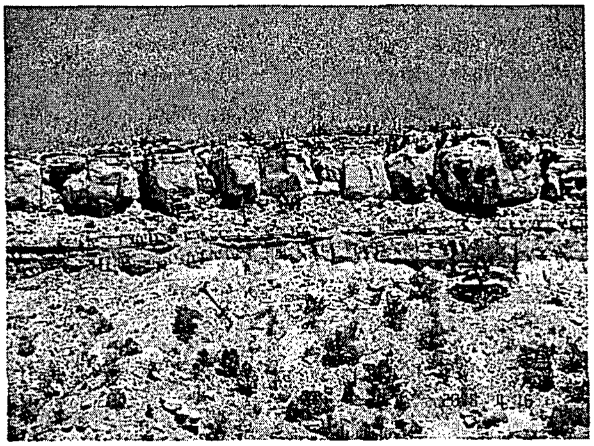
8. Land Use: Land use is light to moderate grazing.

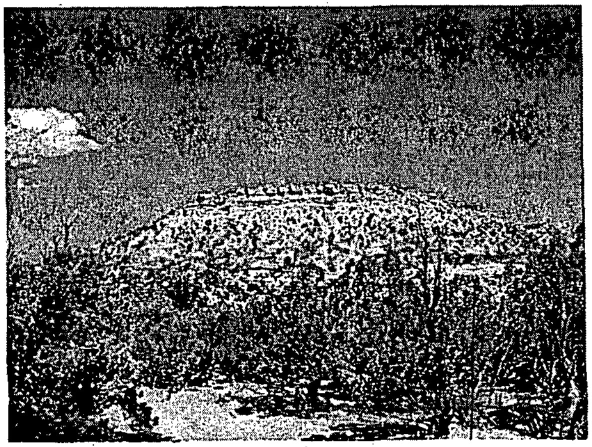
9. Off-Site Impacts: No off-site impacts were noted.

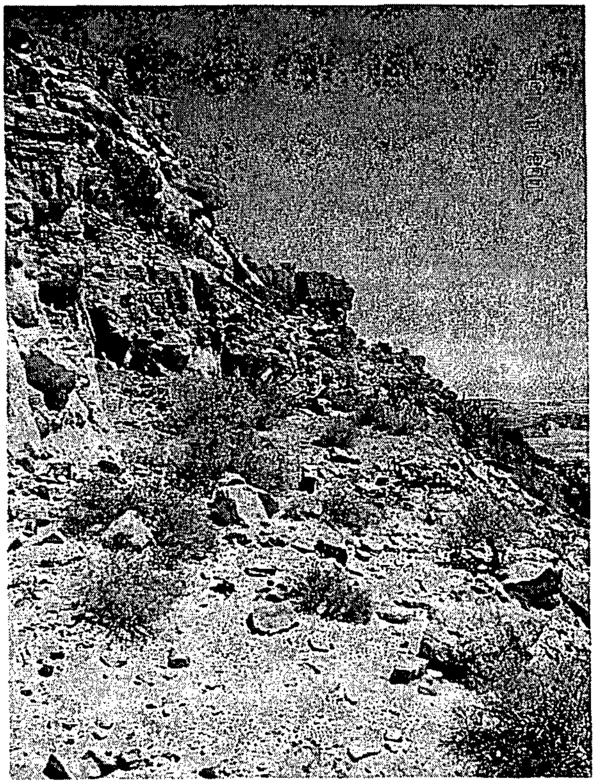
10. Topographic Features: The site is cut into the side of a mesa. The access road to the site shows heavy erosion.

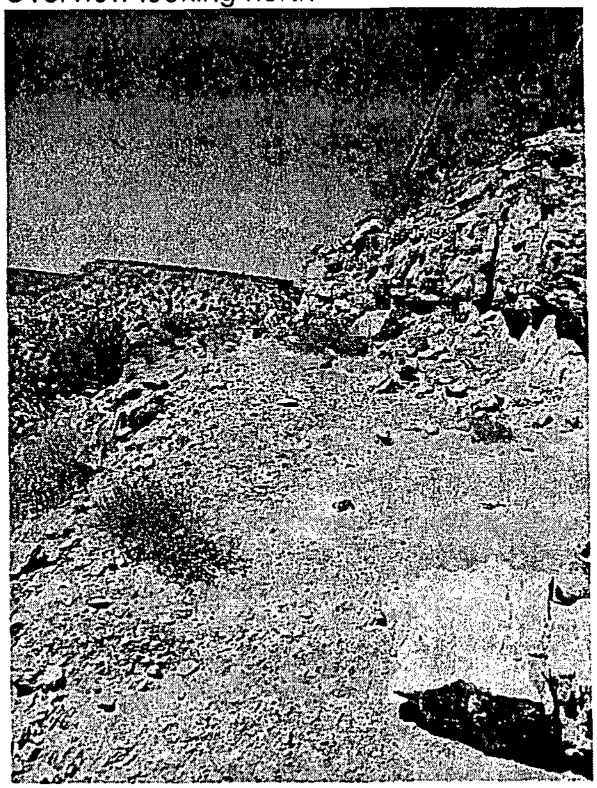
11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest well with a recorded depth to water is approximately 2.2 miles to the south, with a depth to water of 55 ft.

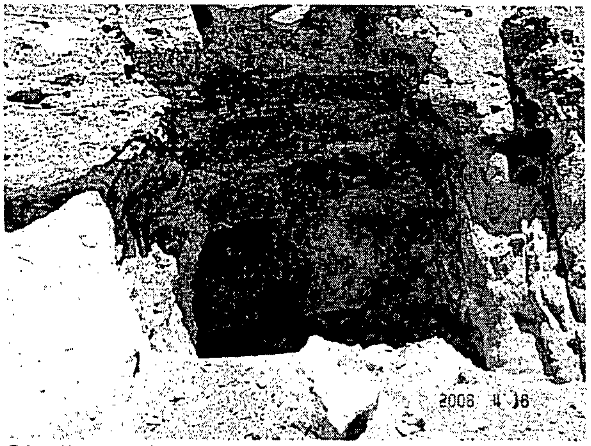
The nearest surface water drainage feature is approximately 0.2 miles to the west of the site.

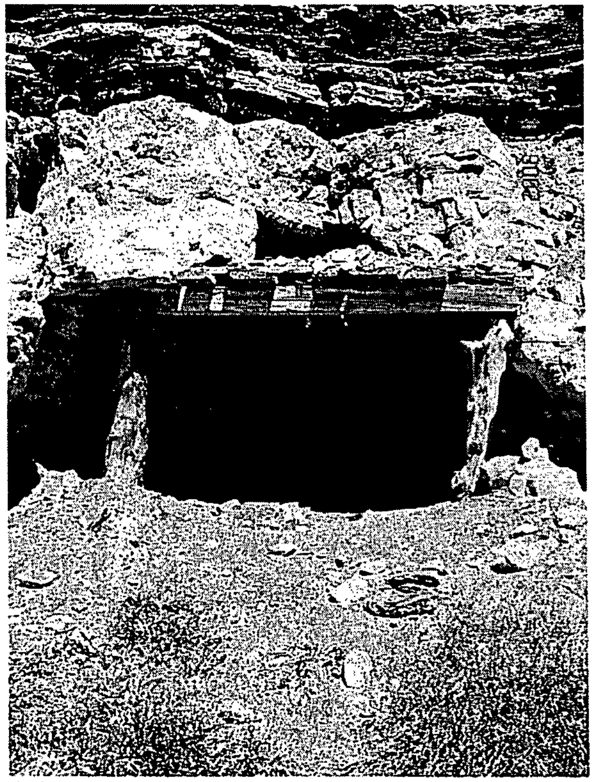

View north

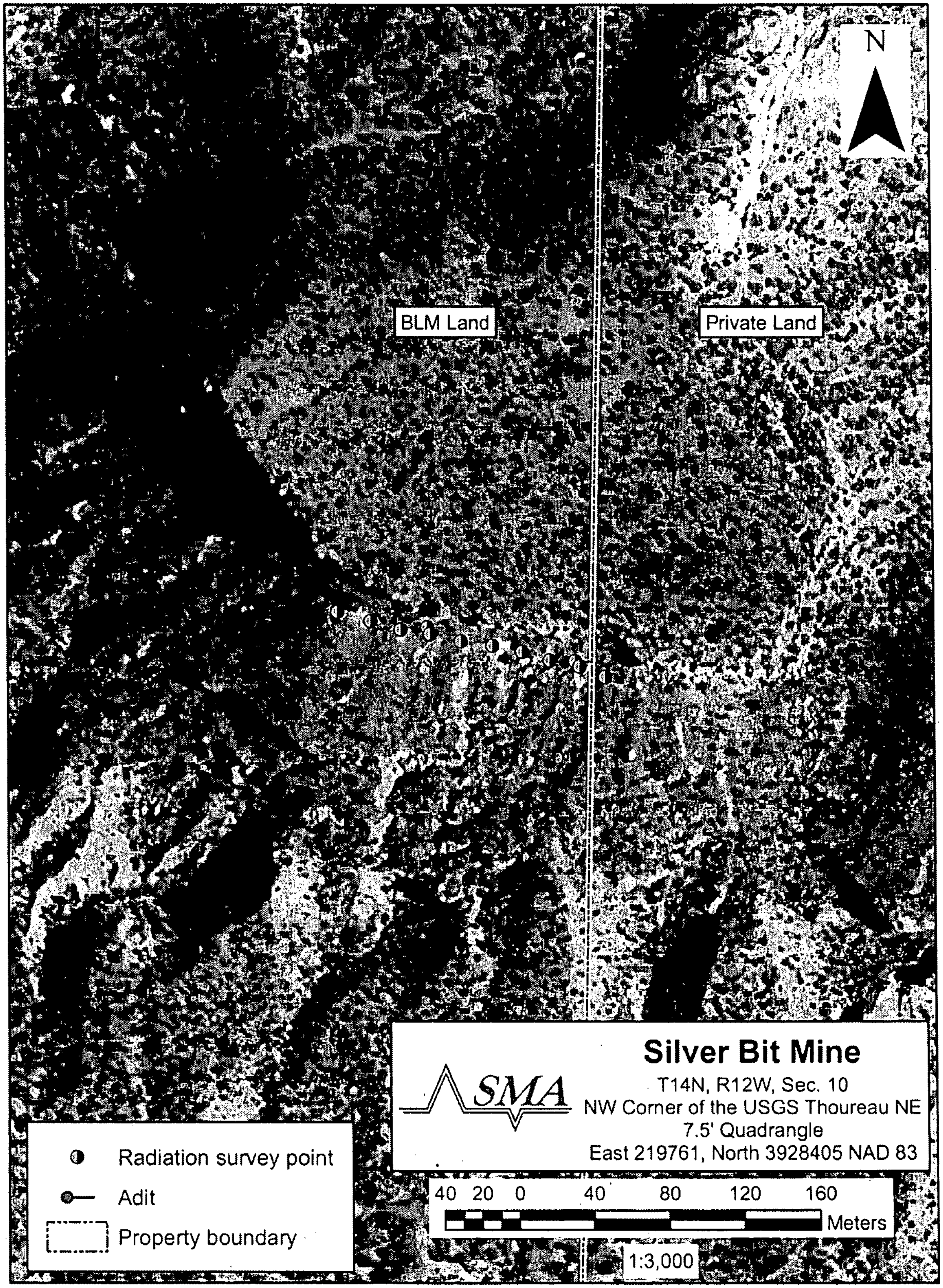

Overview looking north


View east across cut


View west across cut


Shallow adit


Adit


N
BLM Land
Private Land
Silver Bit Mine
SMA
T14N, R12W, Sec. 10
NW Corner of the USGS Thoureau NE
7.5' Quadrangle
East 219761, North 3928405 NAD 83
Radiation survey point
Adit
Property boundary
40 20 0 40 80 120 160
Meters
1:3,000

Page ____ of ____

AUM Field Survey Data Sheet   Site Silver B,7

Date	Time On-Site	Time Off-Site	By
4/16/08			Mertz Baldwin

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits	1 1	~~4'x~~ timber framed part. collapsed ~~4'x8~~ shallow	4' x 8' 4' x 8' x 4' deep	
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features		- access road heavily eroded.		

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet

Site Silver Bit

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		20% p/j 20% scrub 10% forbs 50% bare		

Wildlife	GPS#	Description	Photo #
		none	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		N/A		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		lt-mod grazing		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site Silver Bit 2008-4-16

Radiological Survey			
GPS#	Description √ - photo	Reading Surface	Reading 4 feet
ADIT Ø	4'x8' Adit. framing partially collapsed. √	160 µR/hr	160
ADIT 1	4'x8'x4' false start	42	40
G0	Rad. survey	42	48
G1	"	60	48
G2	"	48	42
G3	"	40	38
G4	"	34	30
G5	"	30	28
G6	"	90	70
G7	"	24	21
G8	"	~~16~~ 32	~~13~~ 26 *
G9	"	32	28

* Read from wrong scale.

Spencer Mine

1. Location/Land Status: The Spencer Mine is located on BLM land within Section 8, T13N, R9W on the USGS Dos Lomas quadrangle (35.372637N, 107.819975W), approximately 15 miles north of Grants, NM. It is approximately three-quarters of a mile south of the BHP-Billiton Ambrosia Lake millsite. Physical access to the mine can be gained by traveling north 14 miles on NM 605, then west 3 miles on Ambrosia Lake Road, park at the gate on south side of road and travel on foot 0.5 miles south to the mine site. Legal access to the mine was graciously provided by Mr. Robert Schmitt of 57 NM 509, Grants, NM, 87020; phone: (505) 287-2260.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 320 μR/hour and minimum of 20 μR/hour. Four-foot elevation maximum was 280 μR/hour and minimum was 20 μR/hour. Background radiation level is approximately 20 μR/hour.

4. Mine Disturbance: The mine consists of collapsed underground workings of approximately 100 by 160 ft. by 8 ft. deep with a large iron head frame fallen into the pit. The area around the collapsed workings is strewn with about 20 rock piles with a total volume of approximately 200 cubic yards. There is a fence enclosing the collapsed workings which has been compromised by further collapse. Equipment at the site includes a utility pole at the north side of the site, and a telephone junction box on the southern portion of the site.

5. Plant Community: The area surrounding the mine is characteristic chaparral. The vegetation on the mine site is 5% bare ground, 5% grass, 20% woody scrub, and 70% forbs.

6. Soils: Soils at the site are Penistaja-Tintero complex, with 1 to 10 percent slopes, 0 to 3 inches sandy loam, 3 to 19 inches sandy clay loam.

7. Wildlife: A single raptor was noted at the site.

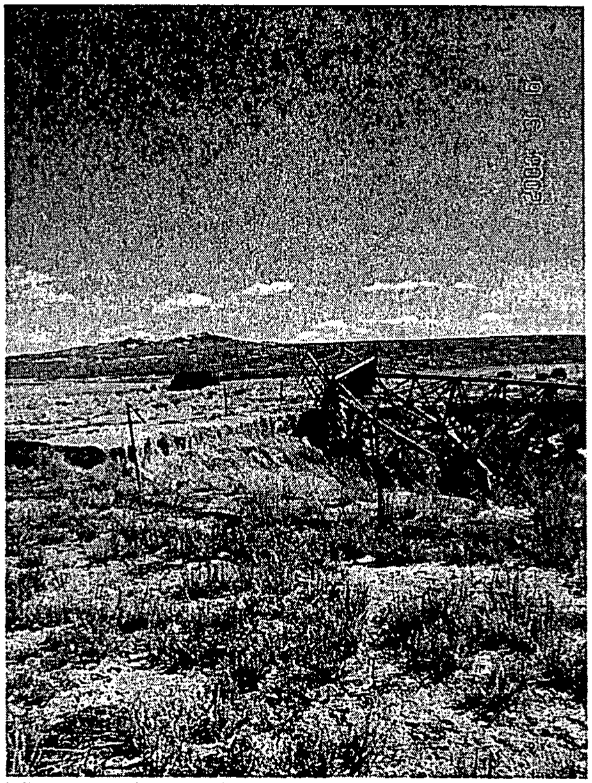
8. Land Use: The land use of the area is light to moderate grazing.

9. Off-Site Impacts: No off-site impacts were noted, however, an arroyo flanked by piles cuts across the site. Radiation levels of 60 μR/hour at both surface and four foot elevation were noted in this feature.

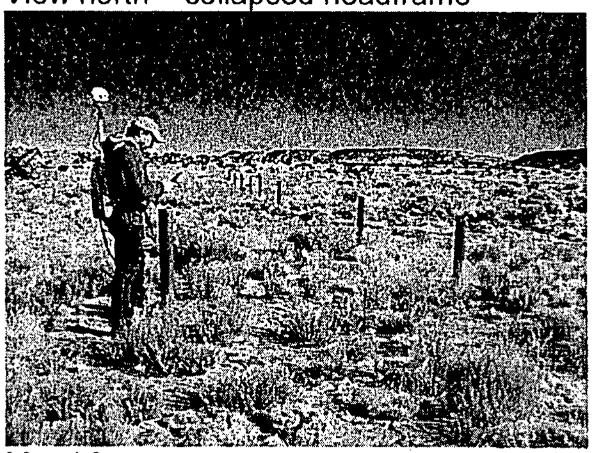
10. Topographic Features: The site is flat-lying, with an arroyo to the east.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are no well records within a one mile search radius. The nearest well with a recorded depth to water is approximately 2.8 miles to the southeast, with a depth to water of 80 ft. Numerous groundwater monitoring wells are associated with the Ambrosia Lake Mill to the north and east of the site.

The nearest surface water drainage feature is adjacent to the site to the east.


View north – collapsed headframe

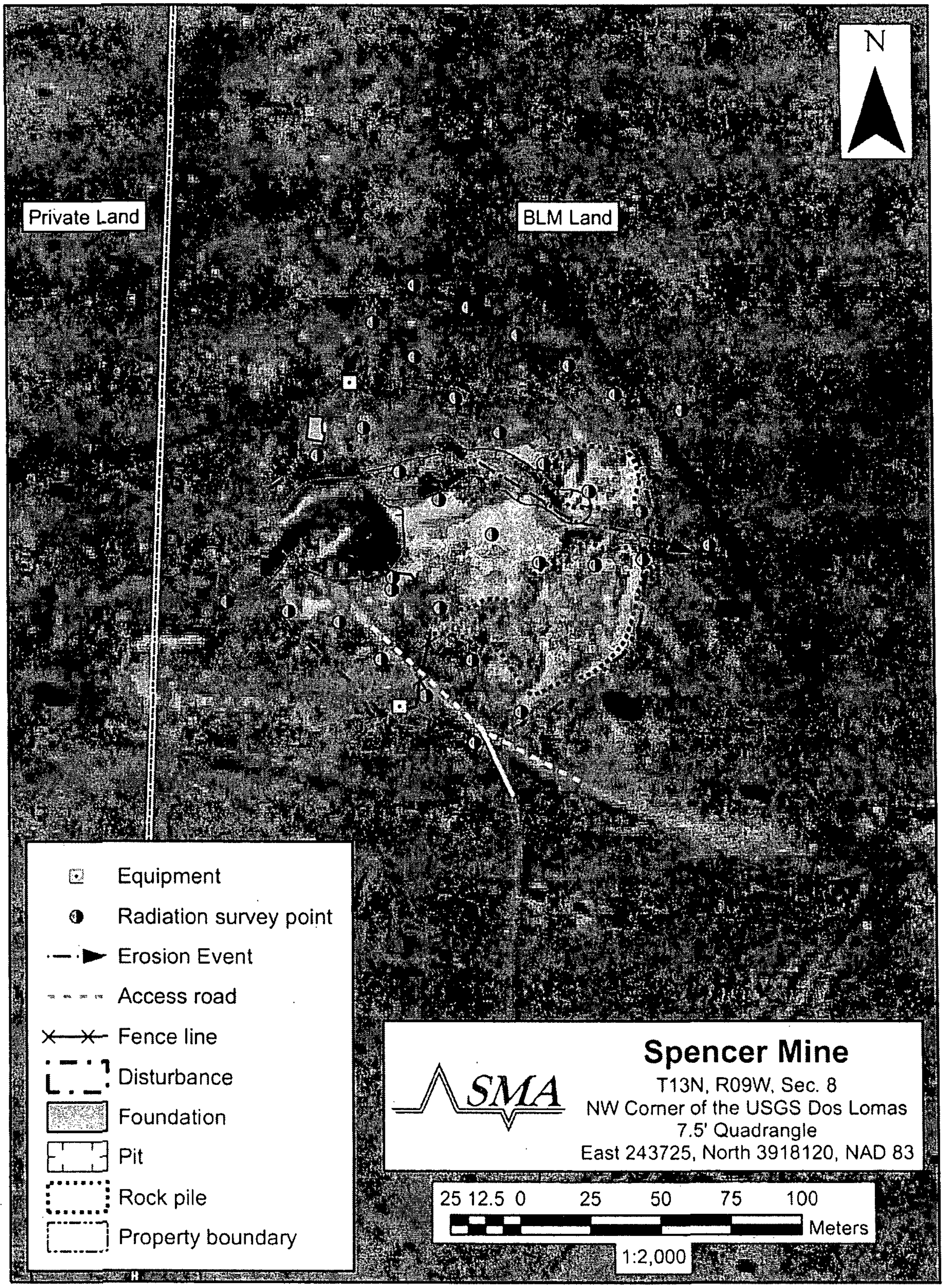

Pit with headframe


Metal fence posts


View to west, arroyo cutting site, adj. piles


Pile with raptor


Pad, arroyo, erosion through site



N
Private Land
BLM Land
Equipment
Radiation survey point
Erosion Event
Access road
Fence line
Disturbance
Foundation
Pit
Rock pile
Property boundary
Spencer Mine
SMA
T13N, R09W, Sec. 8
NW Corner of the USGS Dos Lomas
7.5' Quadrangle
East 243725, North 3918120, NAD 83
25 12.5 0 25 50 75 100
Meters
1:2,000

AUM Field Survey Data Sheet **Site** SPENCER

Date	Time On-Site	Time Off-Site	By
2/13/08	8:30	9:51	Tami Ross, Brian Meitz

Weather Conditions: clear, cool, sunny, ground frozen, some snow patches

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts	8	hole, filled in w/ brush, skeletons (animals) shaft with [illegible] offset for safety	20'	21
Adits				
Pits	2	pit to shaft, extensive erosion evident [illegible]		2-10
Waste Rock Dumps	7 11	large waste pile waste pile	8' H [illegible] ? 12' H	4, 15, 16 22
Tailings N/A				
Trenches N/A				
Roads	9	Service Road		
Erosional Features	10	arroyo thru waste piles towards shaft		11-20

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings	12	foundation	15' x 30'	23
Headframes	4	[illegible] [illegible] w/ 40' offset for safety; [illegible]	60' long	11

AUM Field Survey Data Sheet

Site SPENCER

Equipment	5 6 13	telephone junction box metal posts utility pole		12 13 [illegible]
Soils	**GPS#**	**Description**	**Extent**	**Photo #**
265 - Uranium Mined Land 205 - Penistaja - Tintero Complex				
Vegetation	**GPS#**	**Description**	**Extent**	**Photo #**
See Attachment				

Wildlife	**GPS#**	**Description**	**Photo #**
		Red TAIL HAWK on nearby tree Deer pellets (1 pile) Large amount of coyote sign	1

Human Activity (non-mining, w/in 0.5 mi of site)	**GPS#**	**Description**	**Extent**	**Photo #**
		None KNOWN		
Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	**GPS#**	**Description**	**Extent**	**Photo #**
		Grazing - Heavy		
Nearby Residences / Wells (w/in 0.5 mi of site)	**GPS#**	**Description**	**Distance to Site**	**Photo #**
		N/A		

Topographic Features (roads, water courses, etc.)	**GPS#**	**Description**	**Photo #**

AUM Field Survey Data Sheet Site SPENCER

AUM Field Survey Data Sheet Site [illegible]

Radiological Survey [illegible]			
GPS#	Description	Reading Surface	Reading 4 feet
OFF SITE	BACKGROUND	500 scale 28uR/hr	28uR/hr
3	east side of shaft/headframe was shot w/ unshd at 30' for safety reasons per HASP	500 scale 20uR/hr	500 scale 30uR/hr
8	radiation not shot directly for safety max surface readings on 500 scale @ 30uR/hr		
10	general beam from shaft thru waste piles, (polyline	250 scale 32uR/hr	20uR/hr

Mine I.D.: Spencer

Plant Community Data

Date/Time: 02/13/09
Weather: Sunny
Observer: BCM

Current Plant Community:
Photo# open savannah - PJ Forest located appx 1/4 mile
70% Forb, 20% shrub, 5% grass, 5% bare spot one juniper (one seed) just off site

Other Species Present:
Photo # Blue gramma, snakeweed, Four wing Saltbush, ~~[illegible]~~ sand sage, WINTERFAT
Spineless horsebrush, Galleta(?)

T&E Present: Y/N?
If yes, species? NO
Photo #

Noxious Weeds: Y/N?
If yes, species? NO
Photo #

Bare Spots? Y/N?
Number of spots/size Yes, occassional
Photo #

Standing Dead? Y/N?
If yes, species? NO
Photo #

Photo Point GPS Coord.
Photo #/Direction

Additional Notes:
Use back if necessary

AUM Field Survey Data Sheet Site AUM Spencer 2008-3-6

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G0	Rad. survey ✓	39	42
G1	"	50	50
G2	"	44	48
G3	"	32	30
G4	"	24	24
G5	" ✓	20	20
G6	" ✓	30	30
G7	"	32	30
G8	"	48	50
G9	"	160	140
G10	"	100	100
G11	"	80	80
G12	" ✓	70	60
G13	" ✓	140	140
G14	"	150	130

B. Schmit
287 - 2277

AUM Field Survey Data Sheet Site AUM - Spencer 2008-3-6

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad. survey	150	150
G16	"	320	280
G17	"	300	280
G18	"	30	30
G19	"	32	30
G20	"	36	30
G21	"	230	220
G22	"	80	70
G23	"	44	44
G24	"	44	50
G25	"	42	40
G26	"	24	25
G27	"	32	~~80~~ 40
G28	"	100	100
G29	"	170	140
G30	"	[illegible]	
[illegible] 0	"	60	60

Taffy Mine

1. Location/Land Status: The Taffy Mine is located on U.S. Forest Service land within Section 15, T12N, R9W on the USGS Dos Lomas quadrangle (35.279833N, 107.759389W) approximately 9.5 miles northeast of Grants, NM. Physical access to the mine can be gained by traveling 8 miles east from Grants on Lobo Canyon Road, northwest (left) approximately 4.5 miles on USFS 450, then 3 miles north on an undesignated access road. The mine is then reached on foot approximately 0.8 miles. Conditions on USFS450 can be dangerous, therefore SMA recommends checking with Chuck Hagerman at the USFS station in Grants before traveling this area.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 38 μR/hour and minimum of 9 μR/hour. Four-foot elevation maximum was 44 μR/hour and minimum was 7 μR/hour. Background radiation level is approximately 20 μR/hour.

4. Mine Disturbance: The mine consists of two lateral cuts into the side of the mesa. There is little evidence of the mine remaining as most of the site and the road leading to the site has been extensively eroded. The mine site is marked by several horizontal borings into green sediments, remains of an unknown iron structure, and a single 55 gallon drum.

5. Plant Community: The vegetation on site consists of 40% bare ground, 10% woody scrub, 20% forbs, and 20% grass.

6. Soils: Site soils are silty sands with 0-5 percent slope, 0-4 inches loam, 4-12 inches silty sands with minor gravels, and rhyolitic/andesitic bedrocks at 12-60 inches.

7. Wildlife: There were signs of elk, deer, various rodents, and fox observed on site.

8. Land Use: The land use in this area is dominated by light to moderate grazing and wood cutting.

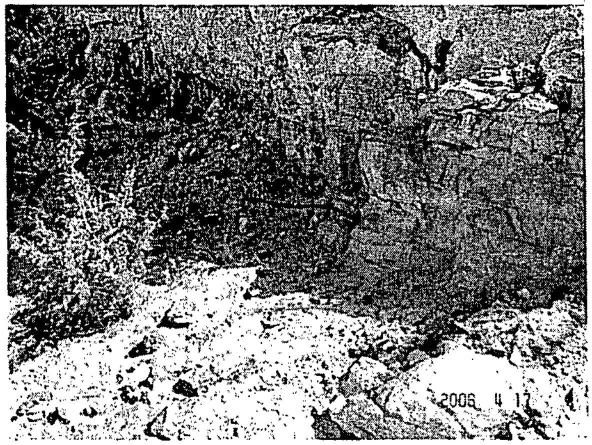
9. Off-Site Impacts: No off-site impacts were noted, however, the cut and associated roads show extensive erosion.

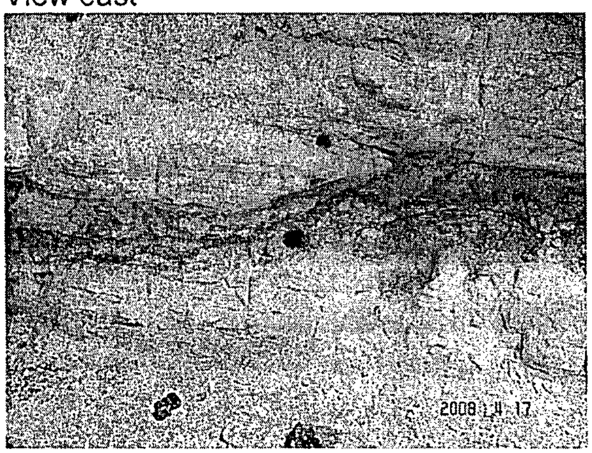
10. Topographic Features: The site is cut into the side of a mesa.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, the nearest wells to the site are approximately 1.5 miles away. The nearest well with depth to water listed in the database is approximately 3.5 miles southeast of the mine. This well has depth to water of 120 feet.

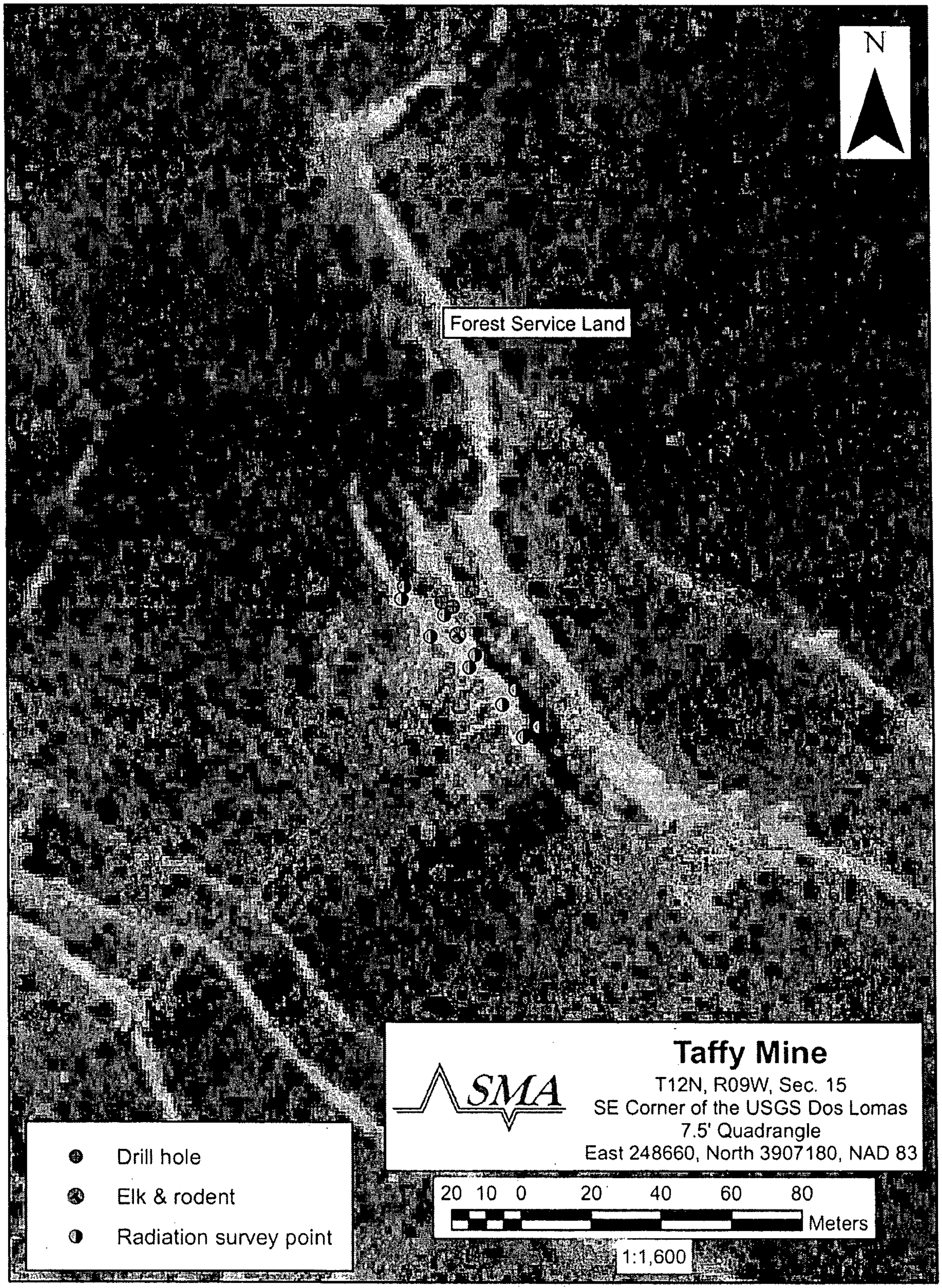
The nearest surface water drainage feature is approximately one-tenth of a mile to the west of the site.


View east


Former structure (?)


Horizontal 4" borings


Trash



N
Forest Service Land
Taffy Mine
SMA
T12N, R09W, Sec. 15
SE Corner of the USGS Dos Lomas
7.5' Quadrangle
East 248660, North 3907180, NAD 83
Drill hole
Elk & rodent
Radiation survey point
20 10 0 20 40 60 80
Meters
1:1,600

Page ____ of ____

AUM Field Survey Data Sheet Site Taffy

Date	Time On-Site	Time Off-Site	By
4/17/08			Merts Baldwin

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads				
Erosional Features		cuts heavily eroded - 2 horiz boreholes		

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet   Site Tatty

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		20% grass 20% forbs 10% shrubs 10% trees 40% - bare		

Wildlife	GPS#	Description	Photo #
		elk, deer, rodents, fox	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		none		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		lt-mod grazing woodcutting		

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site Jeffy 2008-4-17

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G0	Pad survey	38	44
G1	"	32	28
G2	"	19	15
G3	"	16	14
G4	"	18	16
G5	"	16	14
G6	"	14	11
G7	"	10	8
G8	"	9	7
G9	"	13	16

Vallejo Mine

1. Location/Land Status: The Vallejo Mine is located on U.S. Forest Service land within Sections 34, T12N, R9W of the USGS Dos Lomas quadrangle (35.305562N, 107.780334W) some 11.5 miles north-northeast of Grants, NM. The mine can be accessed by traveling north 12 miles on NM 650, then 2 miles east on a jeep trail, then approximately 0.3 miles by foot to the mine site. Legal access to the mine was graciously provided by Mr. Robert Schmitt of 57 NM 509, Grants, NM, 87020; phone: (505) 287-2260.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 240 μR/hour and minimum of 12 μR/hour. Four-foot elevation maximum was 180 μR/hour and minimum was 12 μR/hour. Background radiation level is approximately 12 μR/hour.

4. Mine Disturbance: There is no obvious sign of mine workings on this site. The only signs of any activity at this location are a small level area of approximately 10,000 square feet and a collapsed wooden foot bridge across the arroyo bounding the southern extent of the level area. According to Chuck Hagerman with the USFS at Grants, the mine was reclaimed sometime in the late 1980's.

5. Plant Community: The surrounding area is a diverse assembly of pinon, juniper, ponderosa and oak canyon forest. Vegetation on site consist of 50% bare ground, 15% woody scrub, 15% forbs, 10% grass, and 10% pinon/juniper.

6. Soils: Site soils are 0-2 inches loam, 2-24 inches silty sands with minor clays, and bedrock at 24-60 inches.

7. Wildlife: There were signs of deer, rabbit, coyote, and other rodents on site.

8. Land Use: The land use in this area is light grazing.

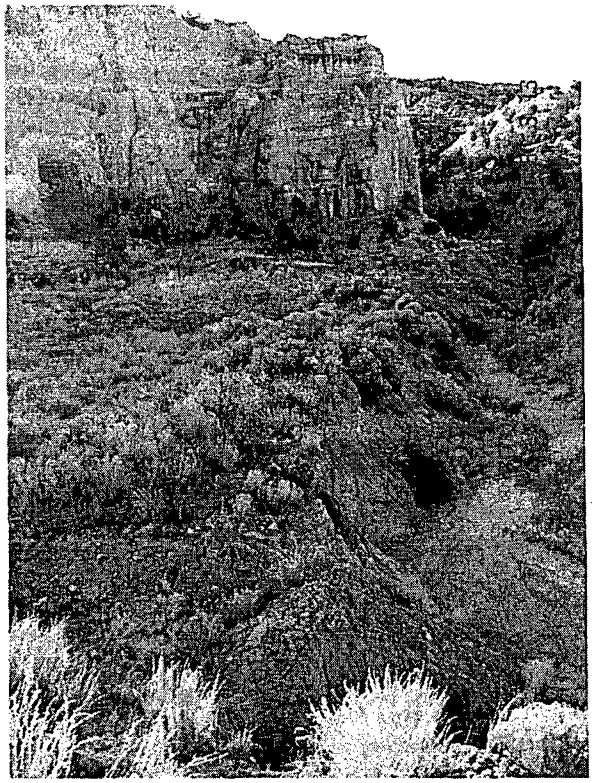
9. Off-Site Impacts: The site is adjacent to arroyos on the north and east margins. Radiation levels adjacent to the arroyo are as high as 190 μR/hour at ground level. Radiation levels in the arroyo on the north edge of the site are 36 μR/hour at ground level.

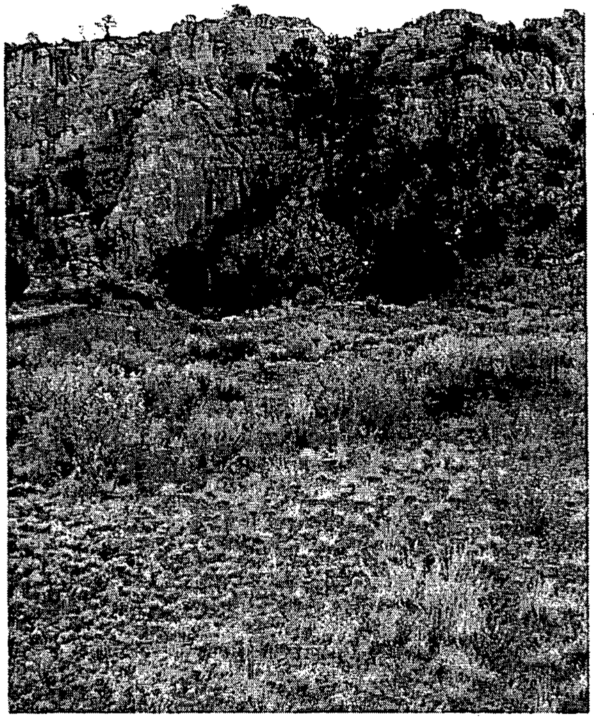
10. Topographic Features: The site abuts steep sandstone cliffs to the east, and is adjacent to arroyos on the north and west.

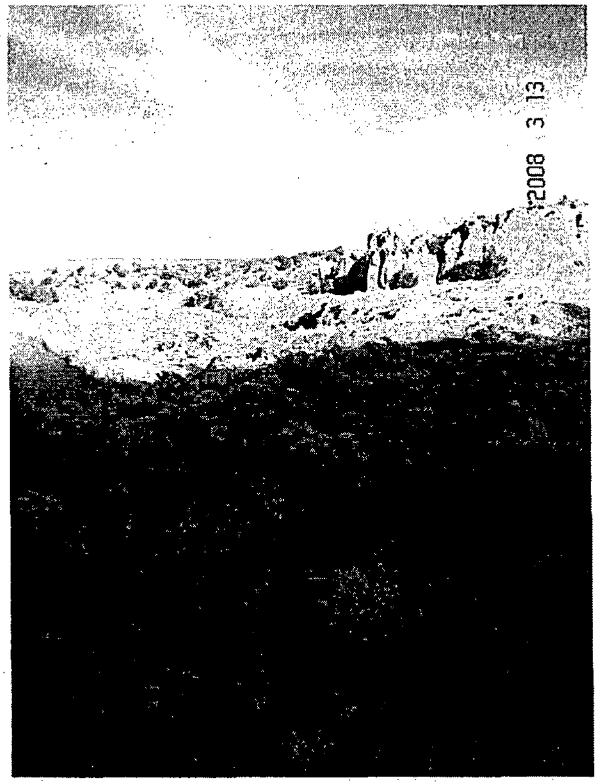
11. Hydrogeology: Based on a review of the NMOSE iWaters database, the nearest wells to the site are approximately 1.9 miles to the northwest, and depth to water in this well is reported to be 30 feet.

The nearest surface water drainage features are adjacent to the site on the north and west.

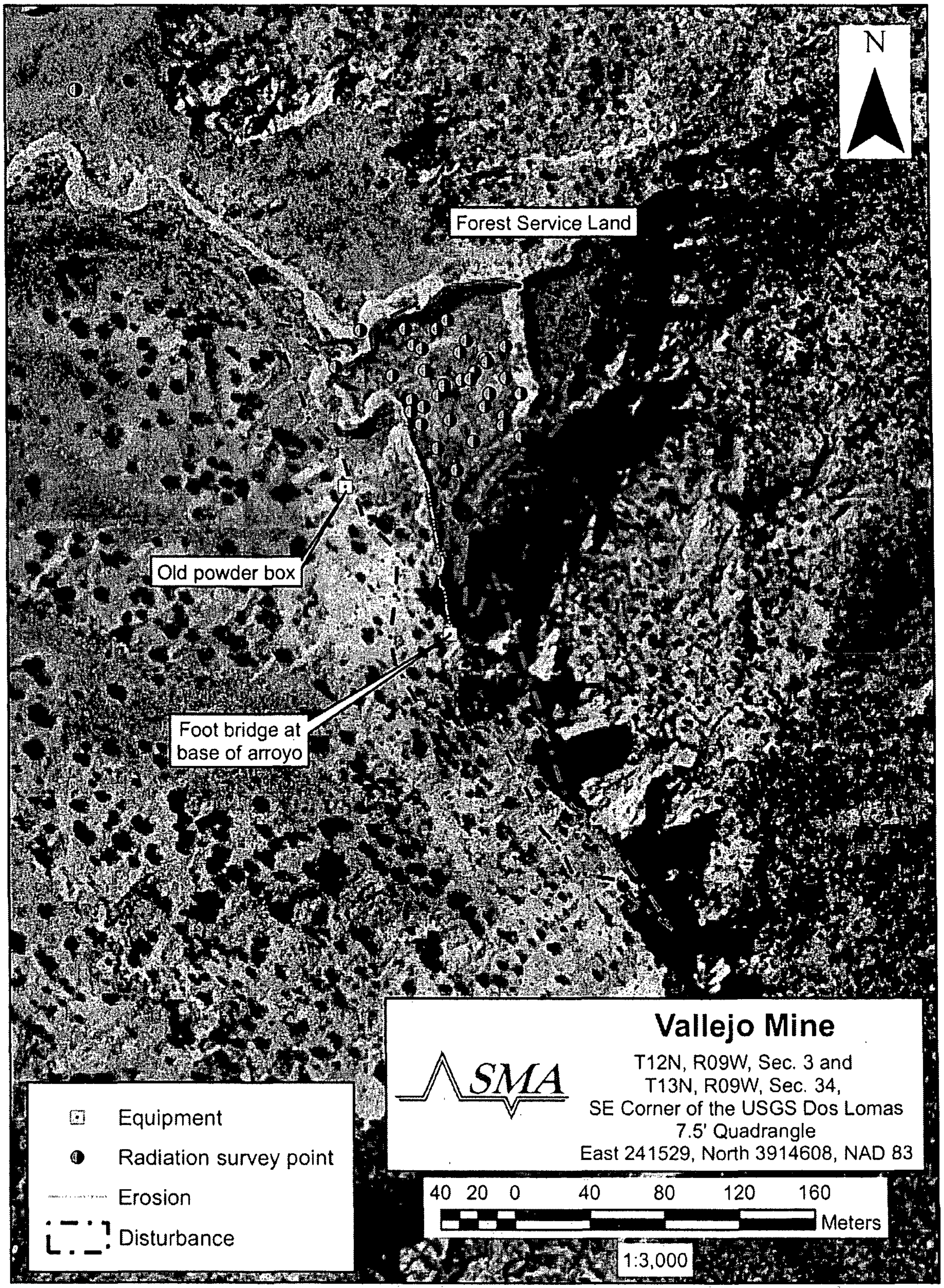
Overview


View east


View east



View west


N
Forest Service Land
Old powder box
Foot bridge at
base of arroyo
Vallejo Mine
SMA
T12N, R09W, Sec. 3 and
T13N, R09W, Sec. 34,
SE Corner of the USGS Dos Lomas
7.5' Quadrangle
East 241529, North 3914608, NAD 83
Equipment
Radiation survey point
Erosion
Disturbance
40 20 0 40 80 120 160
Meters
1:3,000

Page ____ of ____

AUM Field Survey Data Sheet

Site Valley [illegible] Mine No. 4

Date	Time On-Site	Time Off-Site	By
01/5/05	1015 hrs		B. Metz B. Baldwin

Weather Conditions: Sunny, wind 6 mph, cloudless sky ≈ 40°F

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				#1
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches				
Roads [illegible]		Suspected road - [illegible] 2-Track from SR 6[illegible] to ¼ mile of site [illegible] [illegible]	2-TRACK	
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet

Site V

Equipment [illegible]		[illegible]		

Soils	GPS#	Description	Extent	Photo #
[illegible]		[illegible]	[illegible]	

Vegetation	GPS#	Description	Extent	Photo #
[illegible] saltbush		[illegible]	[illegible] to be natural. [illegible] compared to [illegible]	[illegible]

Wildlife	GPS#	Description	Photo #
[illegible], coyote [illegible], [illegible] rabbit, deer tracks [illegible], [illegible], [illegible] rodents			

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
Bob Schmidt land lease. [illegible] [illegible]				

Land Use (grazing, agricultural, roads, etc., w/in 0 5 mi of site)	GPS#	Description	Extent	Photo #
[illegible] cattle [illegible] / [illegible]				

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #
[illegible]		3 | 4		

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

[illegible] cliffs. Some [illegible] [illegible] naturally [illegible]

Mine I.D.: Mod #4 ; Vallejo

Plant Community Data

Date/Time: 01/23/03
Weather: Sunny, Wind 0 mph, appx 40°F
Observer: BCM

Current Plant Community:

Photo# P-J Forest - open (Both)
Vallejo = Canyon lands type 10% tree, 50% bare ground, 30% Forb/shrub, 10% grasses
Mod #4 = light, open P-J (sparse) - more grasslands. 40% grass, 40% Forb, 10% shrub, 5% tree, 5% bare ground

Other Species Present:

Photo # Pinyon, One Seed juniper, Spineless horsebrush, Sand Sage, Winterfat (Sporobolus spp.?)
blue gramma, snakeweed

T&E Present: Y/N?

If yes, species?
Photo #
NO

Noxious Weeds: Y/N?

If yes, species?
Photo #
NO

Bare Spots? Y/N?

Number of spots/size YES, Normal
Photo #

Standing Dead? Y/N?

If yes, species? ~~NO~~ None Unusual
Photo #

Photo Point GPS Coord.

Photo #/Direction

Additional Notes:

Use back if necessary

AUM Field Survey Data Sheet   Site Vallejo

[illegible] down a canyon - not Very susp to erosion because of (washes, [illegible] [illegible] Pile of	visible from SR 605 - This is typical canyon land. terrain. Suspect underground [illegible] [illegible] Sandstone rubble may cover		

AUM Field Survey Data Sheet   Site Vallejo

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
03	Rad. cross-section of pit N to E	30 µR/hr.	35
04	"	35	30
05	"	15	20
06	"	60	110
07	"	12	15
08	"	30	28
09	" N to S	12	14
10	"	20	20
11	"	20	30
12	"	240	160
13	"	22	20
14	" edge of arroyo	140	160
~~15~~ 16	foot bridge 50' below fall	15	15
~~16~~ 17	powder box	1	10

AUM Field Survey Data Sheet Site AUM-Vallejos 2008-3-13

Radiological Survey

GPS#	Description		Reading Surface	Reading 4 feet
G0	baseline reading		12	9
G1	Rad. survey	✓	18	22
G2	"		18	20
G3	"		22	30
G4	"		16	16
G5	"	✓	14	14
G6	"	✓	60	60
G7	"		17	21
G8	"		17	19
G9	"		18	17
G10	"	✓	31	29
G11	"	✓	18	20
G12	"		180	180
G13	"		28	42
G14	"		44	48

08:00 We were provided access by Bob Schmit (ph. 505-287-2266).

AUM Field Survey Data Sheet Site Aum-Vallejos 2008-3-13

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad survey ✓	110	80
G16	" ✓	16	14
G17	"	140	70
G18	"	190	140
G19	"	70	70
G20	" ✓	14	12
~~VEG~~-0	30% bare 20% woody shrub 20% forb 20% grass 10% PJ		
LANDU-0	light grazing		
G21	Rad survey (Arroyo) ✓	42	38
G22	"	36	32
G23?	"	14	12

Yucca Mine

1. Location/Land Status: The Yucca Mine is located on BLM land within Section 28, T14N, R11W on the USGS Thoreau NE quadrangle (35.413778N, 108.01425W). Physical access to the mine can be gained by traveling north 5 miles on CR 19 from Prewitt, then east on Red Cliffs Road until reaching the locked gate, park and proceed southeast via foot across country to the mine site. Legal access was graciously provided by Jim and Ingrid Grace of 2784 US Route 7, Pitts Ford, VT 05763, ph: (802) 483-9500.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 220 μR/hour and minimum of 9 μR/hour. Four-foot elevation maximum was 160 μR/hour and minimum was 10 μR/hour. Background radiation level is approximately 10 μR/hour.

4. Mine Disturbance: The mine consists of numerous (approximately 60) rock piles strewn across approximately 4 acres of pinon & juniper forest. The majority of these rock piles have become overgrown with native vegetation, particularly grasses and forbs with the occasional small tree. The estimated total volume of these rock piles is 1,500 cubic yards.

5. Plant Community: The surrounding area is characterized by pinon & juniper forest with interstitial grasses. The mine site is typical of the surrounding area and is largely overgrown by the same vegetation. The vegetation consists of 40% grasses, 20% forbs, 20% trees, 10% shrub, and 10% bare earth.

6. Soils: Soils at the site are Todest-Shadilto complex, with 2 to 8 percent slopes, 0 to 3 inches fine sandy loam, 3 to 18 inches sandy clay loam, 18 to 25 inches loam, 25 to 60 inches bedrock.

7. Wildlife: Wildlife sign observed onsite include: coyote and fox tracks, deer, elk, rabbit, and numerous rodents.

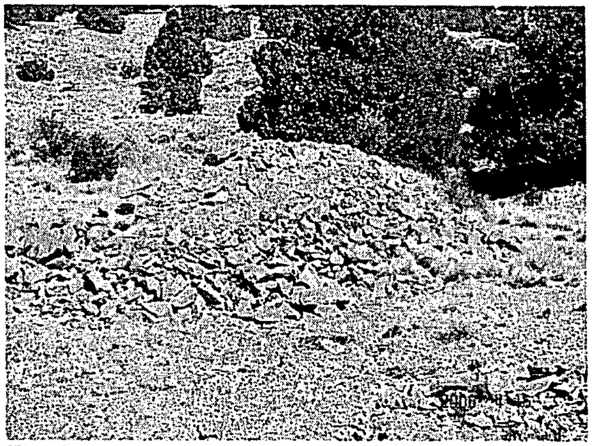
8. Land Use: No evidence of current land use was present (including grazing).

9. Off-Site Impacts: No off-site impacts were noted.

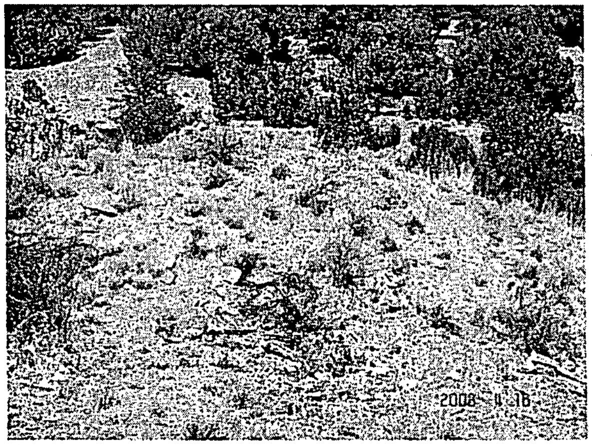
10. Topographic Features: The site is on top of a mesa, with a steep cliff face to the west. A shallow drainage flows north from the site. There is no evidence of erosion into this feature.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, there are three well records within a one mile radius search distance. Two of these wells have depth to water records. The first, located approximately 0.9 miles northwest of the site, has a depth to water of 260 ft. The second, located approximately 0.9 miles to the west of the site, has a depth to water of 230 ft.

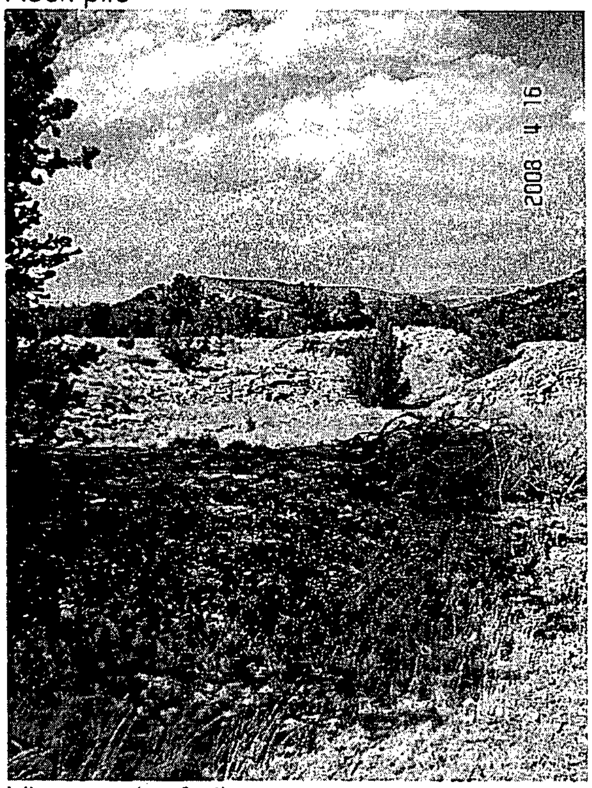
The nearest surface water drainage feature is approximately 1 mile north of the site.



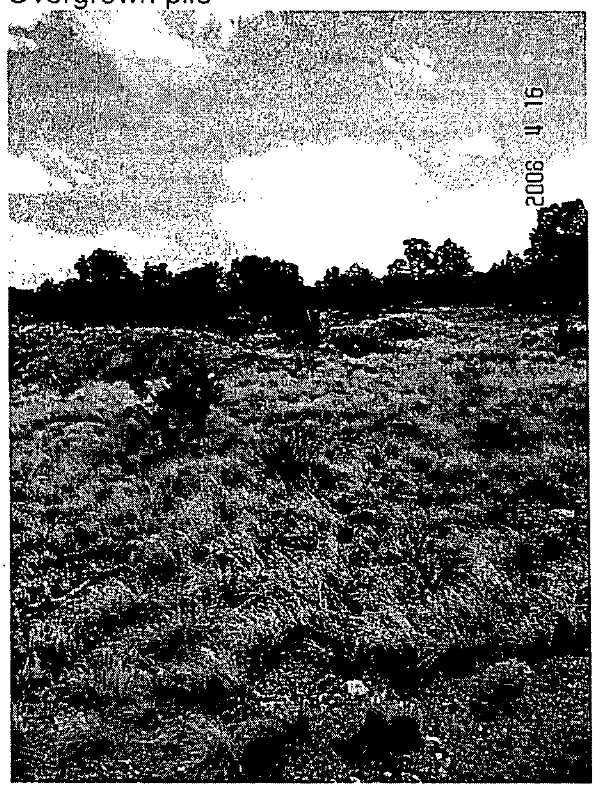
Rock pile



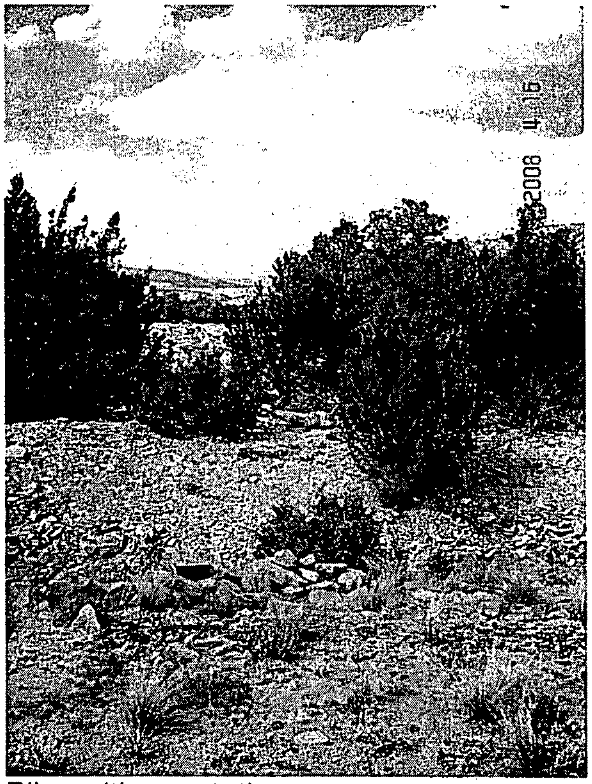
Overgrown pile



View north of piles

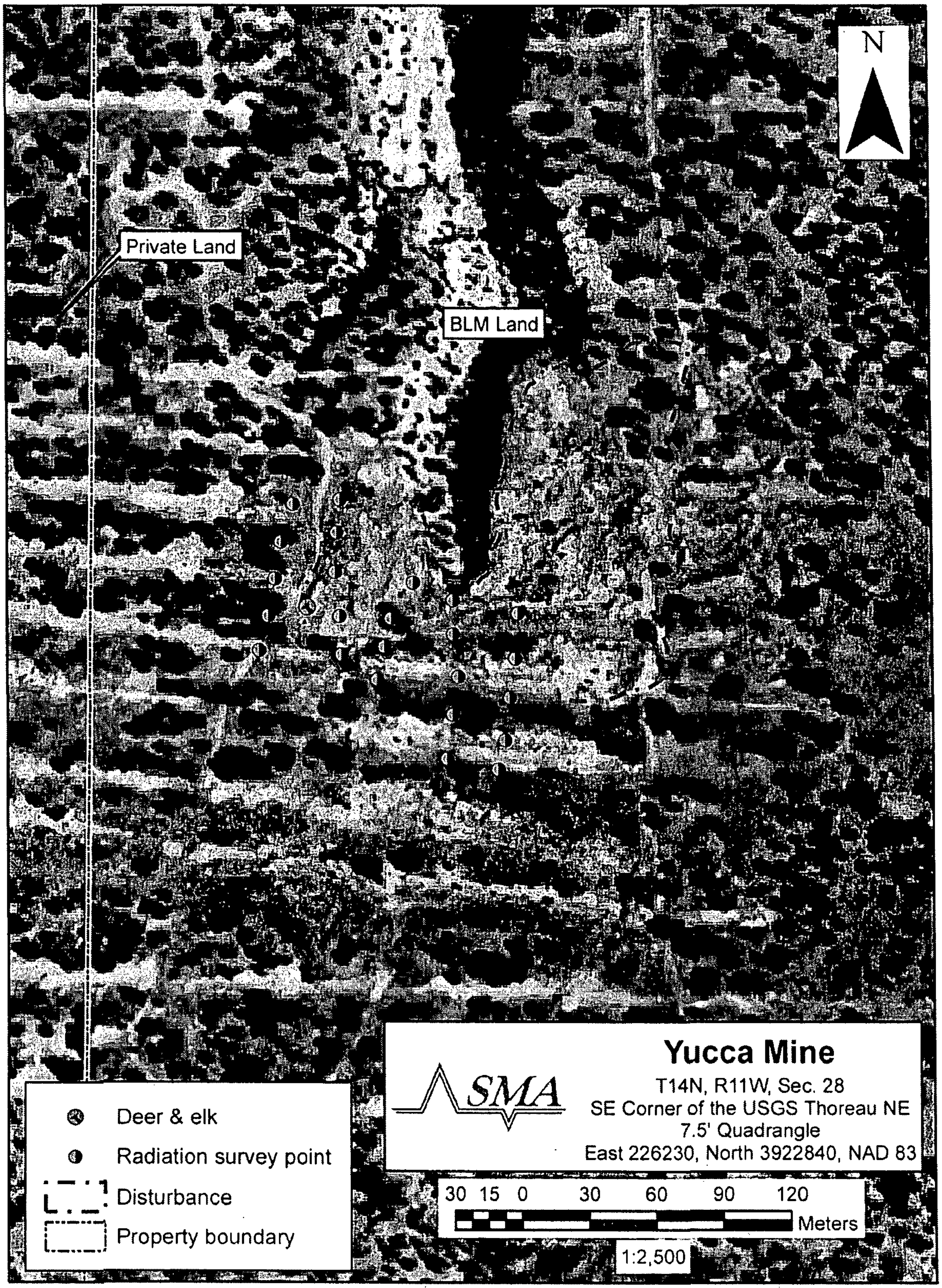


Overgrown piles



Piles with vegetation

View south


N
Private Land
BLM Land
Yucca Mine
SMA
T14N, R11W, Sec. 28
SE Corner of the USGS Thoreau NE
7.5' Quadrangle
East 226230, North 3922840, NAD 83
Deer & elk
Radiation survey point
Disturbance
Property boundary
30 15 0 30 60 90 120
Meters
1:2,500

Page ____ of ____

AUM Field Survey Data Sheet Site Yucca

Date	Time On-Site	Time Off-Site	By
4/16/08			Baldwin Mertz

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits				
Pits				
Waste Rock Dumps				
Tailings				
Trenches		1 cut - numerous in surrounding area	100'x25'x7' (D)	
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet   Site ____________________

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		40% grass 20% forbs 20% trees 10% shrub 10% bare		

Wildlife	GPS#	Description	Photo #
		deer & elk	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet Site Yucca 2008-4-16

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G∅	Rad. Survey ✓	24 µR/hr	24
G1		19	16
G2		21	17
G3		16	16
G4	✓	17	15
G5	✓	18	14
G6		21	16
G7		34	38
G8		220	160
G9	✓	21	16
G10	✓	23	23
G11		50	44
G12		50	46
G13	✓	140	90
G14	✓	28	24

AUM Field Survey Data Sheet Site Yucca 2008-4-16

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G15		34	30
G16		14	11
G17		14	11
G18	✓	13	10
	40% Grasses 20% Forbs 20% Trees 10% Shrub 10% Bare		
G19	✓	12	10
G20		9	11
G21		14	12
G22		17	16
G23	✓	17	14

Zia Mine

1. Location/Land Status: The Zia Mine is located on U.S. Forest Service land within Section 15, T12N, R9W on the USGS Dos Lomas quadrangle (35.265222N, 107.776944W) some 9 miles northeast of Grants, NM. Physical access to the mine can be gained by traveling 8 miles east from Grants on Lobo Canyon Road, northwest (left) approximately 4.5 miles on USFS 450, then 2.5 miles north on an undesignated access road to the mine. Conditions on USFS 450 can be dangerous, therefore SMA recommends checking with Chuck Hagerman at the USFS station in Grants before traveling this area.

2. Human Activity: No evidence of human activity was noted.

3. Radiological Survey: Radiological survey results were as follows: ground surface maximum of 140 μR/hour and minimum of 12 μR/hour. Four-foot elevation maximum was 140 μR/hour and minimum was 10 μR/hour. Background radiation level is approximately 10 μR/hour.

4. Mine Disturbance: The mine itself consists of two moderate sized excavations: the first approximately 285 ft. by 100 ft by 6 feet deep, with a small trench extending to the west on the northwest edge of the site, and the second approximately 120 ft. by 300 ft. by a maximum of 25 feet deep in the center of the site. There are numerous (approximately 100) rock piles on site with a total volume of approximately 1,500 cubic yards. In the south high wall of the deeper pit there is a small adit approximately 3 ft. high by 8 ft. wide by 15 ft. deep. On the southwestern edge of the site there is an abandoned road grader.

5. Plant Community: The surrounding area is characteristic pinon-juniper scrub with moderately grazed grasses. Area consists of approximately 20% trees, 10% shrubs, 10% forbs, 30% grass, and 30% bare ground.

6. Soils: Soils at the site are sands and minor silty clays, slopes of 0-5 percent, 0-2 inches loam, 2-24 inches sandy gravels, bedrock at 24-48 inches.

7. Wildlife: No wildlife or wildlife signs were observed.

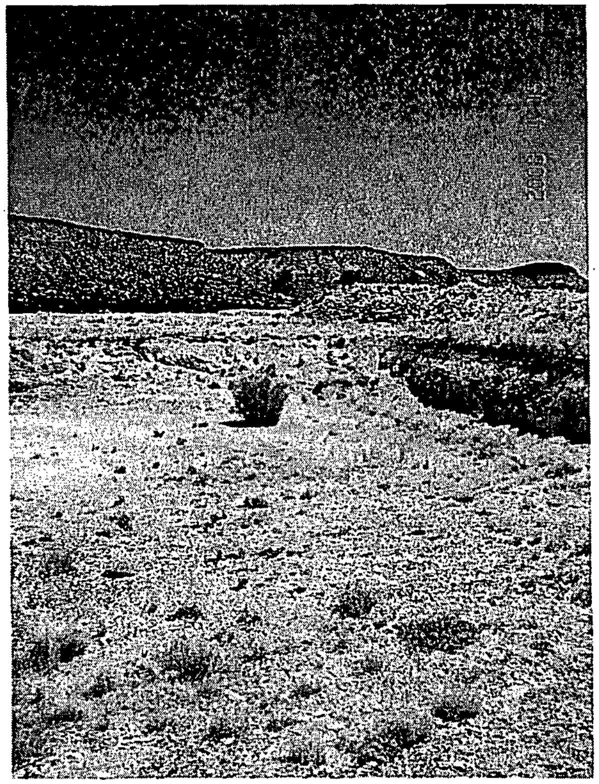
8. Land Use: No evidence of current land use was present (including grazing).

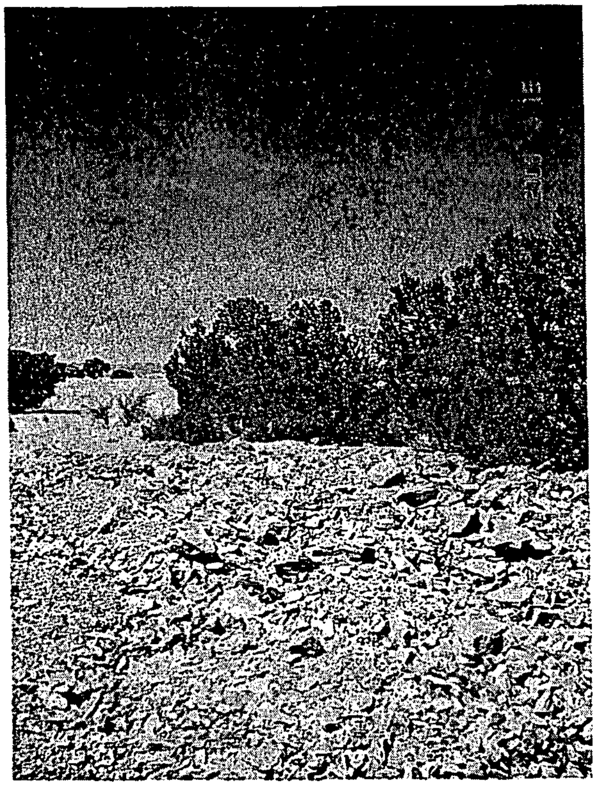
9. Off-Site Impacts: No off-site impacts were noted.

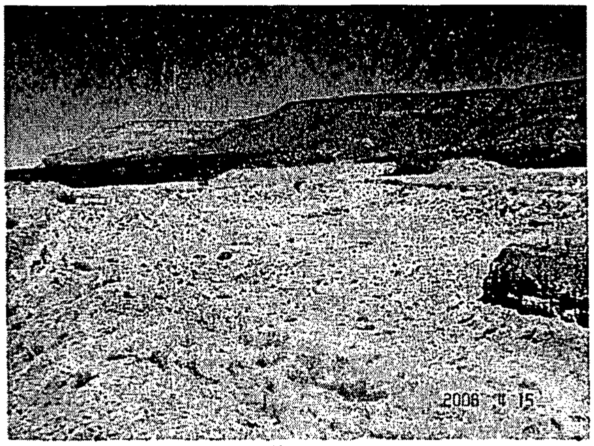
10. Topographic Features: The site is on top of a mesa, and is flat lying. Steep mesa faces are present to the west and east of the site.

11. Hydrogeology: Based on a review of the NMOSE iWaters database, the nearest well to the site is to the south approximately 2 miles. Depth to groundwater in this well is reported to be 70 feet.

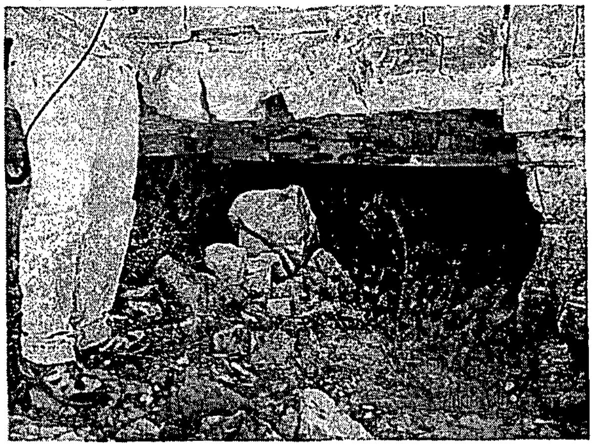
The nearest surface water drainage feature is approximately one-tenth of a mile north of the site.

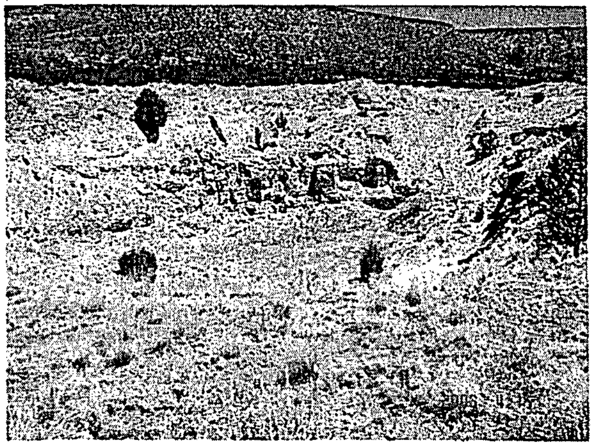

View east


View west

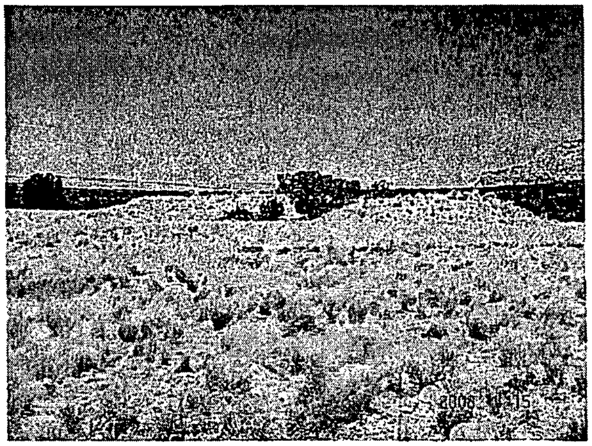


View north into shallow pit

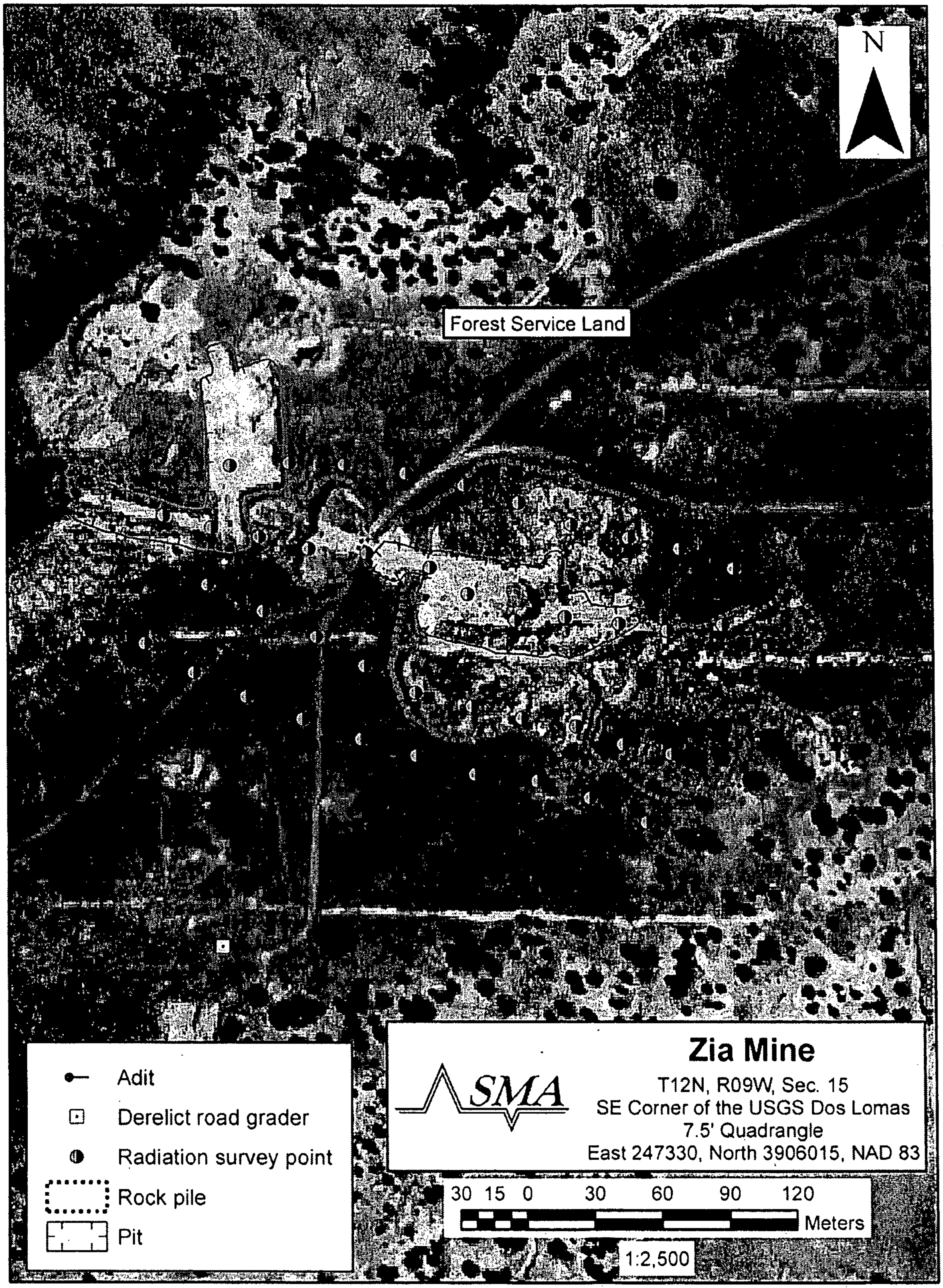

Adit



Main pit, view north



View northwest


N
Forest Service Land
Adit
Derelict road grader
Radiation survey point
Rock pile
Pit
Zia Mine
SMA
T12N, R09W, Sec. 15
SE Corner of the USGS Dos Lomas
7.5' Quadrangle
East 247330, North 3906015, NAD 83
30 15 0 30 60 90 120
Meters
1:2,500

AUM Field Survey Data Sheet **Site** Zia Mine

Date	Time On-Site	Time Off-Site	By
4/15/08			Baldwin Mertz

Weather Conditions:

Disturbances	GPS#	Description	Dim/Area/Volume	Photo #'s
Shafts				
Adits	Adit Ø	3'h x 9'w x 15'd		
Pits	Pit Ø Pit 1	295' x 100' x 6'd 120' x 300' x 25'd		
Waste Rock Dumps		numerous		
Tailings				
Trenches				
Roads				
Erosional Features				

Structures / Equipment	GPS#	Description	Dimensions	Photo #
Buildings				
Headframes				

AUM Field Survey Data Sheet Site Zia

Equipment				

Soils	GPS#	Description	Extent	Photo #

Vegetation	GPS#	Description	Extent	Photo #
		20% trees 10% shrubs 10% forbs 30% grass 30% bare		

Wildlife	GPS#	Description	Photo #
		none	

Human Activity (non-mining, w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #
		none		

Land Use (grazing, agricultural, roads, etc., w/in 0.5 mi of site)	GPS#	Description	Extent	Photo #

Nearby Residences / Wells (w/in 0.5 mi of site)	GPS#	Description	Distance to Site	Photo #

Topographic Features (roads, water courses, etc.)	GPS#	Description	Photo #

AUM Field Survey Data Sheet   Site Zia 2008-4-15

Radiological Survey

GPS#	Description	Reading Surface	Reading 4 feet
G0	Rad. survey ✓	12	10
G1	"	15	13
G2	"	12	12
G3	"	12	12
G4	"	15	12
G5	"	16	14
G6	"	16	13
G7	"	17	14
G8	"	18	14
G9	" ✓	23	17
G10	" ✓	130	110
G11	"	110	100
G12	"	24	22
G13	"	70	50
G14	"	32	30

AUM Field Survey Data Sheet Site Zia 2008-4-15

Radiological Survey			
GPS#	Description	Reading Surface	Reading 4 feet
G15	Rad. survey	40	36
G16	"	15	13
G17	"	17	15
G18	"	14	11
G19	" ✓	13	11
G20	" ✓	15	15
G21	"	25	22
G22	"	90	50
G23	"	38	22
G24	"	23	14
G25	"	36	34
G26	"	60	48
ADIT Ø	3' h x 8' w x 15' d	—	—
G27	Rad. survey cont'd	42	40
G28	"	24	21

AUM Field Survey Data Sheet Site Zia 2008-4-15

Radiological Survey

GPS#	Description		Reading Surface	Reading 4 feet
G29	Rad. survey cont'd		24	22
G30	"		32	26
G31	"	✓	44	40
G32	"	✓	20	17
G33	"		18	15
G34	"		32	26
G35	"		60	50
G36	"		34	34
G37	"		50	46
G38	"		21	16
G39	"		140	140
G40	"		100	90
G41	"	✓	14	12
PIT Ø	6 ft deep pit x approx 30,000 ft²	✓	—	—
PIT 1	~~30~~ 20 ft deep pit x approx 20,000 ft²	✓	—	—

AUM Field Survey Data Sheet Site Zia 2008-4-15

Radiological Survey

GPS#	Description		Reading Surface	Reading 4 feet
WASTE PILE Ø	Large 6ft+ high waste pile	✓	—	—
WASTE PILE 1	"	✓	—	—
WASTE PILE 2	"	✓	—	—
WASTE PILE 3	Large 6ft high waste pile around the pit	✓	—	—
	derelict equipment	✓	—	—

Appendix 1

Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

Location:

Abandoned Uranium Mines
Cibola, McKinley, Socorro, and Sandoval Counties
New Mexico

PREPARED FOR:

Comeau, Maldegen, Templeman & Indall, LLP

Coronado Building
141 E. Palace Avenue
PO Box 699
Santa Fe, New Mexico 87504-0669

PREPARED BY:
Souder, Miller & Associates
612 East Murray Drive
Farmington, New Mexico
(505) 327-5667

DATE: January 8, 2008

The purpose of the Health and Safety Plan (HASP) is to identify health and safety risks associated with performing site survey tasks at 23 abandoned uranium mines located throughout Cibola, Sandoval, Socorro, and McKinley Counties, New Mexico.

I. PROJECT INFORMATION

PROJECT NAME: Abandoned Uranium Mine Survey

PROJECT TEAM LEADER: Scott McKitrick Phone: (505) 299-0942

PROJECT MANAGER: Tami Ross Phone: (505) 325-5667

FIELD TEAM: Brian Mertz and Bill Baldwin

FEDERAL AGENCIES: Bureau of Land Management (BLM); United States Forest Service (USFS)

STATE AGENCIES: State Land Office (SLO); Mining Reclamation Bureau-Mining and Minerals Division (MMD), New Mexico Environment Department (NMED)

II. SITE DESCRIPTION

PROJECT DATE(S): January 8 - February 8, 2008

PROJECT LOCATION(S): Abandoned Uranium Mines throughout Cibola, McKinley, Sandoval, and Soccoro Counties, New Mexico

HAZARDS: Potential hazards in the areas include; radiation exposure; confined spaces; climatic conditions; rough terrain; poor road conditions and biological hazards.

AREA AFFECTED: All abandoned uranium mine sites being surveyed for the purpose of this project.

III. DESCRIPTION OF POTENTIAL HAZARDS

Radiation-NORM

Naturally Occurring Radioactive Material (NORM) are being measured as a part of the field survey. Alpha, beta and gamma particles are the types of radioactive particles that one may be exposed to. Exposure to alpha and beta particles are generally through inhalation and ingestion. Gamma rays can pass directly through the body and shielding and distance are the only effective methods of limiting gamma ray exposure. The annual occupational dose limit is five (5) Rems. Acute doses less than 25 Rems show no clinical effects. Nausea and fatigue occur over 100 rems.

contain sufficient poison to warrant medical attention. Rattlesnakes are present and have been observed on the site. Do not touch spiders or snakes if they are discovered. If bitten, the injury site should be iced pending paramedic arrival or transport to an emergency treatment facility. There are diseases that can be transmitted by insect and animal bites. Examples are Rocky Mountain spotted fever and Lyme disease (ticks); rabies (mainly dogs, skunks, and foxes); and malaria and equine encephalitis (mosquitoes). The greatest hazard and most common cause of fatalities from animal bites, particularly bees, wasps, and spiders, are from a sensitivity reaction. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous systems, which also can result in death. Anyone assigned to the project that is allergic will be required to carry a prescribed treatment kit, and first aid personnel are to be told who is allergic. All stings or bites will be taken seriously. Anyone stung or bitten will be required to stop work while that person is observed for signs of severe swelling, shortness of breath, nausea, or shock. If there is any doubt, medical attention will be obtained.

The most dangerous toxic effects from plants are caused by the ingestion of nuts, fruits, or leaves. Consequently, personnel are prohibited from eating any fruits, nuts, or other plant material that grows on the site. More frequent but less dangerous hazards to site personnel are certain plants, including poison ivy, poison oak, and poison sumac that produce adverse effects from direct contact. The usual effect is dermatitis (inflammation of the skin). Thoroughly cleaning the skin with soap and water after contact will reduce effects. Sleeves and gloves should be worn by sensitive individuals.

Bloodborne pathogens are pathogenic microorganisms that may be present in human blood (and other body fluids) and can cause disease in humans. These pathogens include, but are not limited to, HBV and HIV.

OSHA requires compliance with 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens Standard, where as a condition of employment, there is known or potential exposure to bloodborne pathogens. A source of occupational exposure may occur when an employee gives first aid or cardiopulmonary resuscitation (CPR) to an individual who has infectious blood. The occupational exposure occurs when potentially infectious materials come in contact with the employee's eyes, mucous membranes, or non-intact skin through cuts and abrasions while administering first aid or CPR. Additional sources of exposure are contact with glassware, needles, sharp objects, or other materials that have been involved in injuries to personnel resulting in contamination with blood or related body fluids.

PHONE LIST:

AMBULANCE	911
POLICE, FIRE & RESCUE	911
STATE POLICE	Socorro (505) 835-0741
	Albuquerque/Grants (505) 841-9256
POISON CONTROL	1-800-362-0101
CHEMTREC	1-800-424-8802

First aid and emergency fire equipment will be available in SMA's vehicles.

Emergency Procedures

The following standard emergency procedures will be used by on site personnel. The Site Safety Officer shall be notified of any on site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Upon notification of an injury, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of remaining personnel, operations may continue. If the injury increases the risk to others, the personnel will be directed to return to the designated home office.

In any case, the appropriate first aid will be initiated and necessary follow-up as stated above.

Fire / Explosion:

Upon notification of a fire or explosion on site, the designated emergency signal shall be sounded and all site personnel assembled at a location determined prior to commencement of field work. The fire department shall be alerted and all personnel moved to a safe distance from the involved area. *Fire extinguishers shall be used with discretion to minimize the risk of fire and explosion that would result in injuries.*

In all situations, when an on site emergency results in evacuation personnel shall not reenter until:

1. The hazards have been reassessed.
2. The conditions resulting in the emergency have been corrected.
3. The Site Safety Plan has been reviewed.

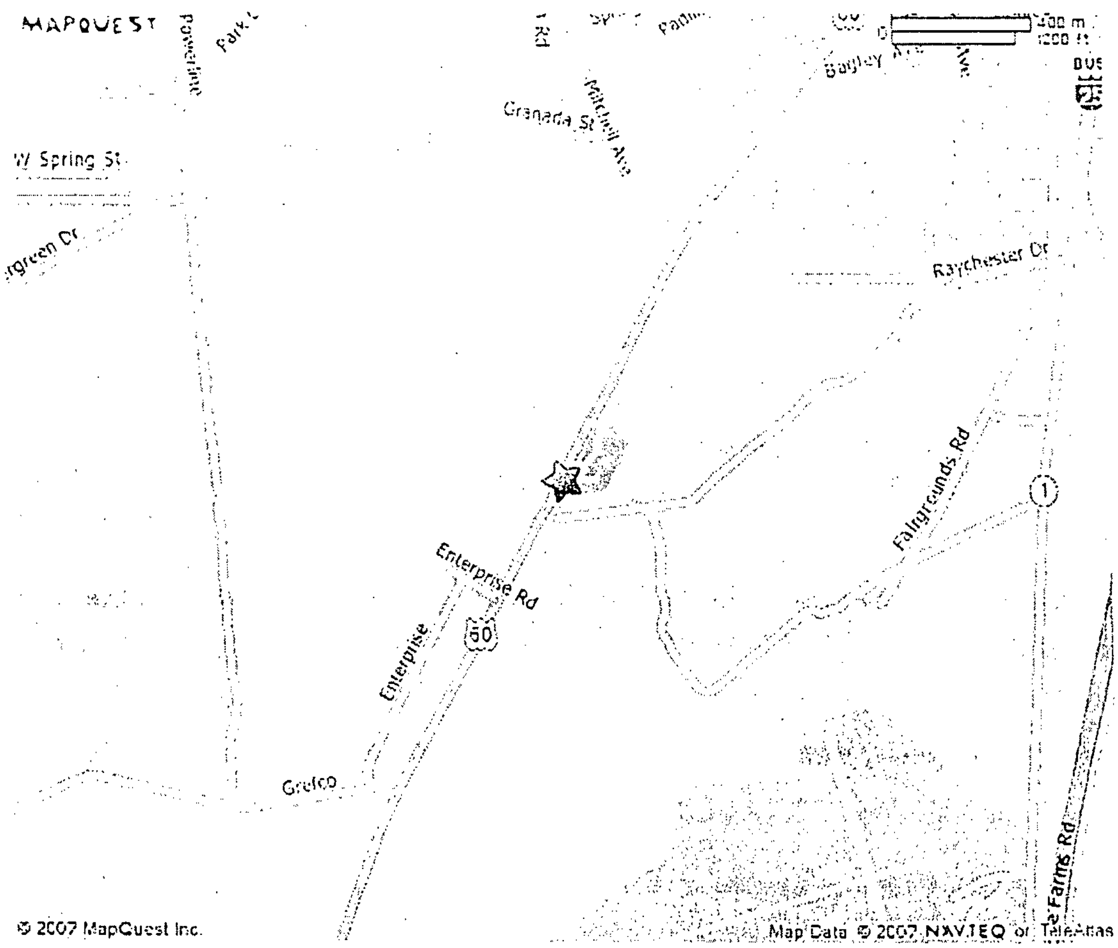


Figure 1: Socorro, New Mexico Hospital Location.

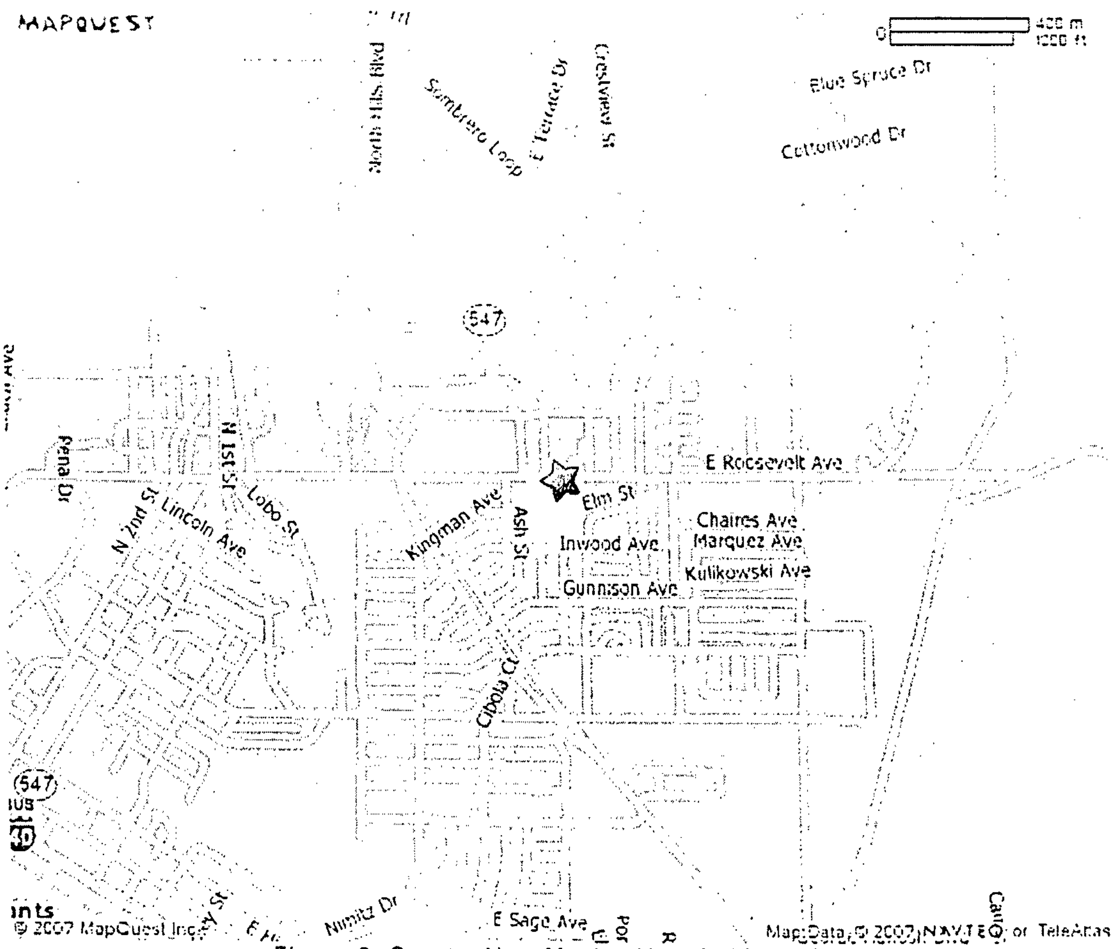


Figure 3: Grants, New Mexico Hospital Location.

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02.27.07; rev. 01.16.08, 06.17.08, 06.23.08, 08.15.08, 10.14.08

URANIUM EXPOSURE AND PUBLIC HEALTH IN NEW MEXICO AND THE NAVAJO NATION: A LITERATURE SUMMARY

Compiled by Chris Shuey, MPH
Southwest Research and Information Center
P.O. Box 4524, Albuquerque, NM 87196
505-262-1862 • 505-262-1864 (fax) • sric.chris@earthlink.net

I. Occupational Exposures and Health Effects

- **Navajo Uranium Miners.** Risk of lung cancer among male Navajo uranium miners was 28 times higher than in Navajo men who never mined, and two-thirds of all new lung cancer cases in Navajo men between 1969 and 1993 was attributable to a single exposure — underground uranium mining.[1] Through 1990, death rates among Navajo uranium miners were 3.3 times greater than the U.S. average for lung cancer and 2.5 times greater for pneumoconioses and silicosis.[2] Smoking does NOT account for the large increased risk of lung cancer in Navajo men who were uranium miners.[3] The root cause was the miners' exposure to in-mine radon and radon progeny: "The causal association between exposure to radon progeny and lung cancer has been firmly established".[4] Of an estimated 5,000 Navajo uranium workers, 500-600 had died by 1990 and another 500-600 were expected to have died by 2000.[5] Vital status for these workers has not been updated since the early 1990s.

- **All Uranium Miners.** That underground miners of uranium and uranium-containing ores suffer mortality from lung diseases, including lung cancer, at rates significantly greater than the general population was first documented in studies of European miners from the late 16th Century through the first half of the 20th Century.[6] The U.S. Public Health Service first documented high levels of radon and radon progeny in underground uranium mines on the Colorado Plateau in the early-1950s.[7] A decade later, a series of studies confirmed an excess of radiation-induced lung cancers among white Colorado Plateau underground miners.[8] In 1968, the federal government adopted the first in-mine radon exposure standard (4 Working Level Months [WLM] per year), requiring companies to install ventilation systems and provide workers with respiratory protection starting in 1971.[9] Compliance and record-keeping were not uniform or complete, and in 1980, a federal agency tracking uranium miners concluded that the 4 WLM/yr standard "does not provide an adequate degree of protection for underground miners."[10] No changes in the standard have been made since then, and no formal follow up of the health of post-1971 uranium workers has ever been conducted. A workers advocacy group is conducting an informal survey of Post-1971 uranium workers, and through May 2008, had collected more than 1,550 surveys.[11]

- **Uranium Millworkers.** A series of federal studies of mortality among uranium millworkers beginning in 1973 and continuing through 2004[12] has shown progressively increased mortality risks as the millers population has aged. The health of more than 2,000 millers who worked between 1940 and 1972 has been followed since 1952. The most recent evaluation, published in 2004, examined mortality among nearly 1,500 men who worked at seven different uranium mills and who *never* were miners, and confirmed previous findings of an excess mortality risk from non-malignant lung diseases,[13] lung cancer, blood cancers,[14] and chronic kidney disease. However, the risk of death from these diseases was not higher among workers who were employed for the greatest number of years. As a result, while the study found an increased risk for various causes of death among millers, it was unable to show conclusively that these deaths resulted from working in the mills. No studies have included millworkers after 1972.

II. Population Health Studies

- **Uranium Toxicity.** Six population-based studies conducted between 1980 and 1998 consistently found that chronic ingestion of uranium is associated with adverse changes in kidney function.[15] The lowest level of adverse chemical toxicity to the kidney observed in these studies was 14 micrograms per liter (ug/l) in water. Collectively, these studies served as the basis for USEPA's adoption of the national drinking water standard for uranium of 30 ug/l in 2000. Recognition of uranium's nephrotoxicity also

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led to a three-fold *decrease* in the state's groundwater protection standard for uranium in 2003[16].

- **Community Health Studies.** Despite more than 50 years of uranium development on the Navajo Nation, no *comprehensive* public health study has ever been conducted in uranium-mining communities.[17] The federally funded **DiNEH Project** is an ongoing cross-sectional study examining the relationship of high rates of kidney disease in the Eastern Navajo Agency to exposure to uranium and other heavy metals in the environment. Preliminary results of the study indicate that the percentages of self-reported chronic kidney disease, diabetes, high blood pressure and autoimmune diseases are higher in Navajo communities with higher numbers of uranium mines.[18] Initial exposure modeling indicates that environmental exposures, including living within 0.8 kilometer of a uranium mine site and coming in contact with uranium wastes, are significant predictors of kidney disease/diabetes.[19]

- **Navajo Neuropathy.** Progressive neurological deterioration of the hands and arms of two Navajo sisters (two of 37 cases) was attributed to their exposures as fetuses and newborns to uranium mine wastes and consumption of mine water; genetic predisposition or causes were ruled out in these cases.[20] Most people with Navajo neuropathy died of liver failure and other complications in their late teens or early 20s, and the number of cases declined to zero after closure of abandoned open pit uranium mines by the early 1990s.[21]

- **Birth Defects.** Rates of birth defects in babies born to Navajo women living in uranium mining areas in New Mexico and Arizona between 1964 and 1981 were 2 to 8 times the national averages, depending on the type of defect.[22] An association between uranium exposure and birth defects may be significant when the mothers' and fathers' exposures are combined.[23]

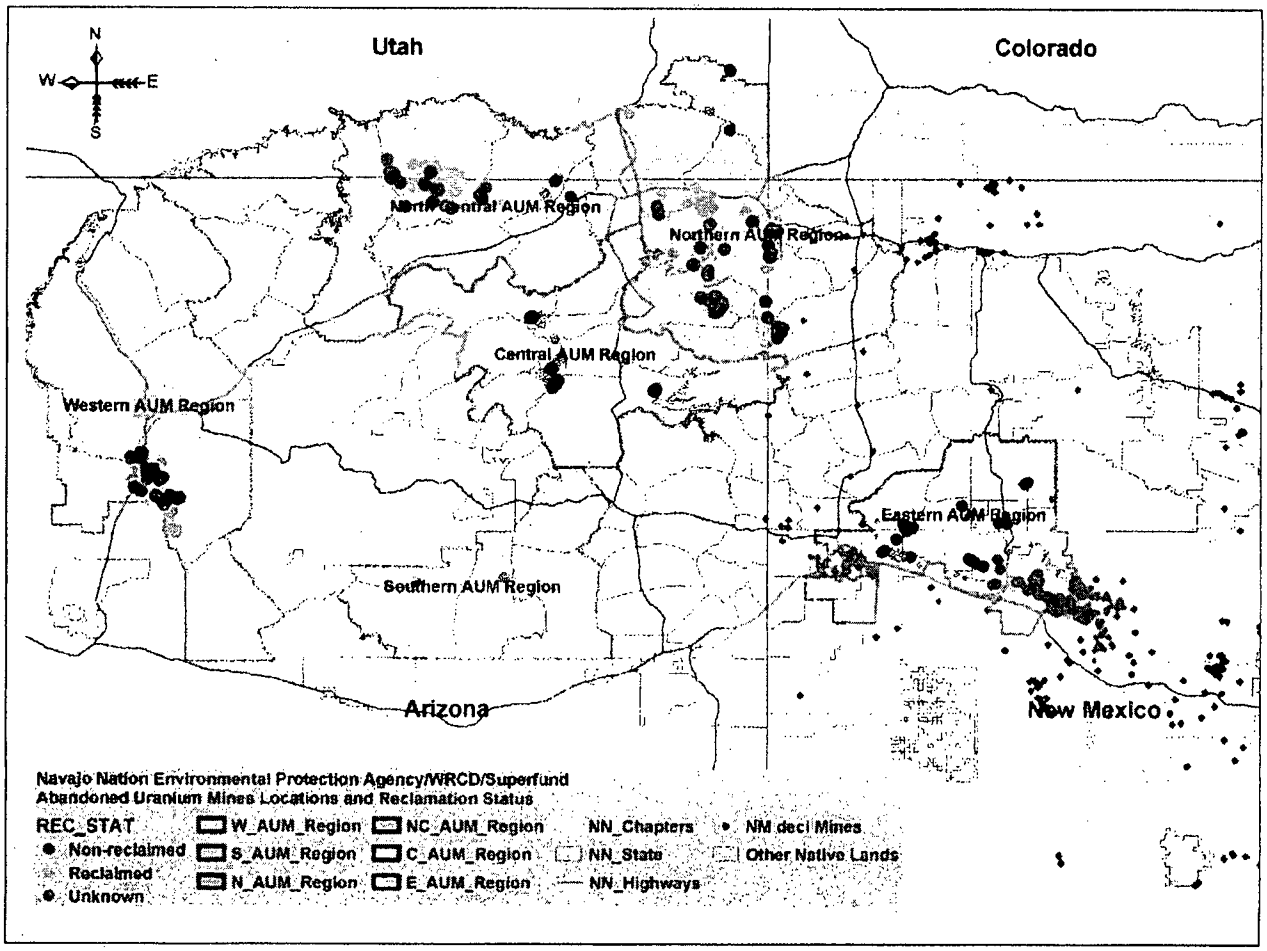
III. Ecological and Environmental Studies in New Mexico and the Navajo Nation

- **Churchrock Spill.** The July 16, 1979, uranium mill tailings spill at the United Nuclear Corporation Church Rock, N.M., tailings disposal facility was the largest release of radioactive wastes, by volume, in U.S. history, and ranked second only to the Chernobyl reactor accident in 1986 in total curies of radiation released to the environment. Yet this event received significantly less national media coverage than the March 1979 Three Mile Island nuclear reactor accident, which released less than a third of the radiation released in the Church Rock accident.[24]

- **Animal Studies.** Livestock that grazed in uranium mining areas of the Grants Mineral Belt were found to have significantly higher levels of uranium and radium in their muscles and organs than livestock not raised in uranium mining areas, according to a series of studies done in the 1980s to assess the effects of the July 1979 Church Rock uranium mill tailings spill and nearly 20 years of chronic mine-water discharges to the Puerco River system.[25]

- **Navajo Abandoned Mines.** More than 1,200 abandoned uranium mines have been documented on the Navajo Nation,[26] and of those, as many as 500 may need environmental restoration costing hundreds of millions of dollars.[27] (***See map below.***) More than 100 abandoned uranium mines have been documented in 17 chapters of the Eastern Agency of the Navajo Nation in New Mexico.[28] Two of those mines sandwich a Navajo community where nearly 6,000 cubic yards of radium- and uranium-contaminated soils were removed from around six homes by USEPA in Spring 2007.[29] USEPA and other federal agencies have developed a 5-year plan to investigate and clean up of high-risk uranium mine and waste sites, contaminated structures and polluted water wells as a result of Congressional inquiries.[30]

- **Waste Volumes.** The New Mexico Bureau of Geology documented 123 abandoned uranium mines in Cibola County, 358 in McKinley County and 109 in Sandoval County.[31] About half of those mines were developed and operated in the Grants Mineral Belt between 1950 and the early-1990s, generating 38 million tons of ore by 1970, and roughly an equivalent volume thereafter.[32] About a third of that total was taken from the Jackpile Mine on Laguna Pueblo, once the largest open-pit mine in the world.[33] Seven uranium mills were operated in the state between 1947 and 1995, generating more than 90 million tons of radioactive tailings, all of which have been subject to reclamation pursuant to federal regulations.[34] Each of these mills and tailings disposal sites caused extensive groundwater contamination by radium, uranium, various trace metals and dissolved solids. One estimate is that 1.2 million acre-feet of groundwater (or enough to fill Elephant Butte Reservoir *more than twice*) have been contaminated in the Ambrosia Lake-Milan area from historic mine and mill discharges, and less than two-tenths of 1 percent has been treated to reduce contaminant levels.[35]



N
W
E
S
Utah
Colorado
North Central AUM Region
Northern AUM Region
Central AUM Region
Western AUM Region
Eastern AUM Region
Southern AUM Region
Arizona
New Mexico
Navajo Nation Environmental Protection Agency/WRCD/Superfund
Abandoned Uranium Mines Locations and Reclamation Status
REC_STAT
Non-reclaimed
Reclaimed
Unknown
W_AUM_Region
S_AUM_Region
N_AUM_Region
NC_AUM_Region
C_AUM_Region
E_AUM_Region
NN_Chapters
NN_State
NN_Highways
NM deci Mines
Other Native Lands

CITATIONS

[1] **Gilliland FD, Hunt WC, Pardilla M, Key CR.** Uranium mining and lung cancer among Navajo men in New Mexico and Arizona, 1969 to 1993. *Journal of Occupational and Environmental Medicine*; 42(3):278-83, March 2000.

[2] **Roscoe RJ, Deddens JA, Salvan A, Schnorr TM.** Mortality among Navajo uranium miners. *American Journal of Public Health*; 85(4):535-40, April 1995.

[3] **Gilliland, et al., 2000**; see, also, **Samet JM, Kutvirt DM, Waxweiler RJ, Key CR.** Uranium mining and lung cancer in Navajo men. *New England Journal of Medicine*; 310(23):1481-4, June 7, 1984; **Gottlieb LS, Husen LA.** Lung Cancer Among Navajo Uranium Miners. *Chest.*; 81(4):449-452, April 1982; **Wagoner JK, Archer VE, Gillam JD.** Mortality of American Indian Uranium Miners. Proceedings XI International Cancer Congress (Bucalossi P, Veronesi U, Cascinelli N, eds.), 3:102-107; *Excerpta Medica International Congress Services* No. 351, 1975.

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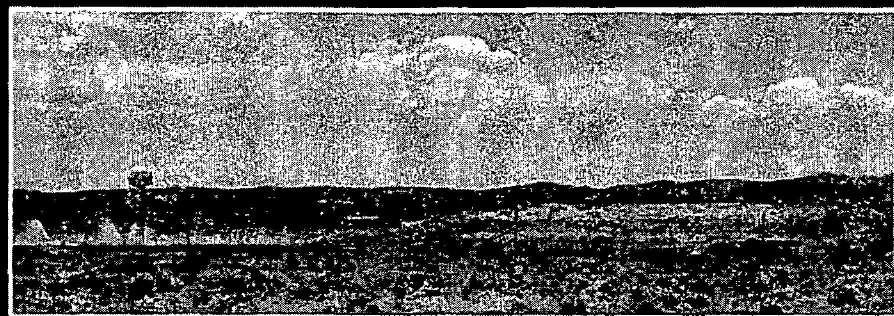
Grants Mineral Belt Uranium Mining and Milling

Identified Environmental Effects on Groundwater



Presented by the Bluewater Valley Downstream Alliance

EXHIBIT

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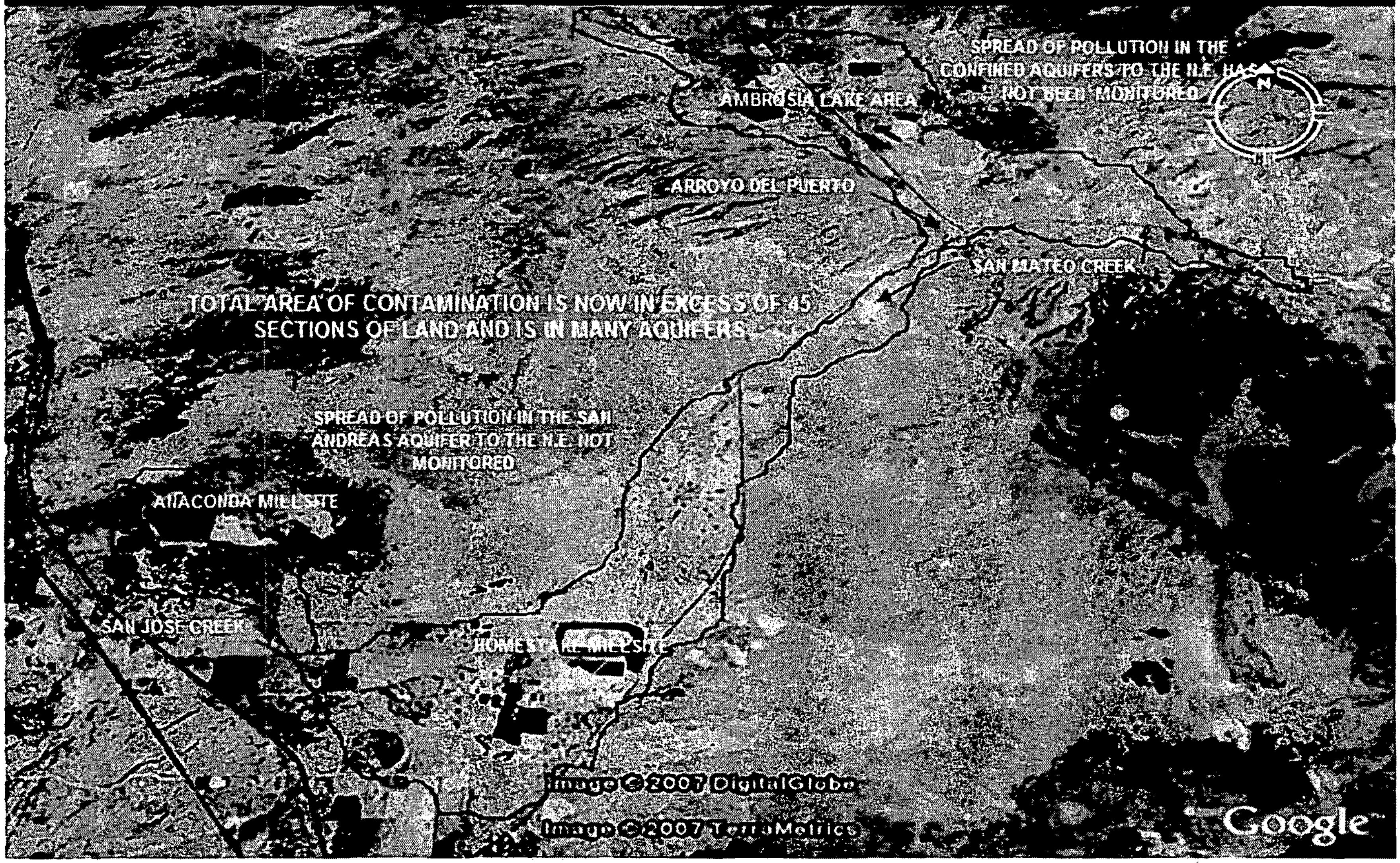
Contamination: Extent & Costs

- Currently – 60 sections in the community north of Milan, NM to Ambrosia Lake, NM
- Over 1,203,200 acre feet of contaminated water lost to domestic/agricultural use
- $1,203,200,000 loss (@ $1,000/acre foot)

Total Area of Contamination



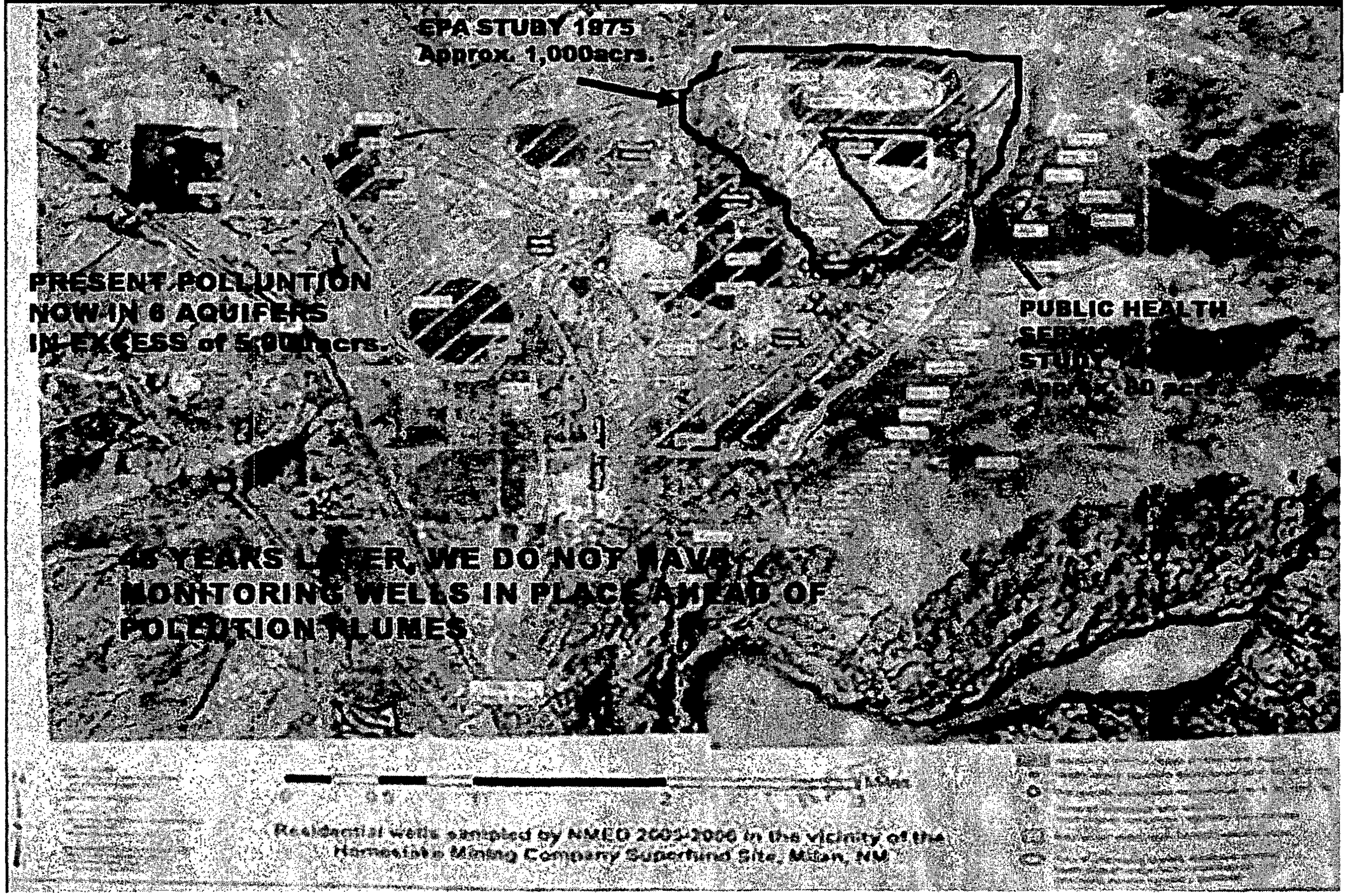
Total Area of Contamination

- 60 square miles.

- Impacting water users in the Ambrosia Lake area, along the Arroyo del Puerto and San Mateo Creek drainages , and residential users south and west of the Homestake mill.

Direction of travel/spread of contamination

(Note that, in general, direction of travel mimics surface flow) Homestake Site



1975 EPA impact study

- ❑ High water ridge, created by injection system, pushed western plume of contamination west and south into the Pleasant Valley and Valle Verde subdivisions and toward Milan village limits.

- ❑ Pollution is now in the Alluvial, four Chinle aquifers and is appearing in the San Andreas aquifer, the main aquifer for Milan and Grants, New Mexico.

- ❑ All of these aquifers must be cleaned back to usable drinking water quality.

- ❑ **Monitor wells must be installed ahead of the pollution plumes to establish background data and protect municipal water supplies.**

05/06 Area of Contamination

- Area contaminated has increased dramatically
- This is happening in spite of what the NRC considers adequate reclamation efforts
- NRC's inadequate regulation has been allowed by NMED and USEPA

Chemistry of tailings seepage

- The following slide gives the history of the Mill Sump showing what seeps out of the tailings into the alluvial.
- Aquifers impacted by tailings seepage were once usable for domestic purposes.

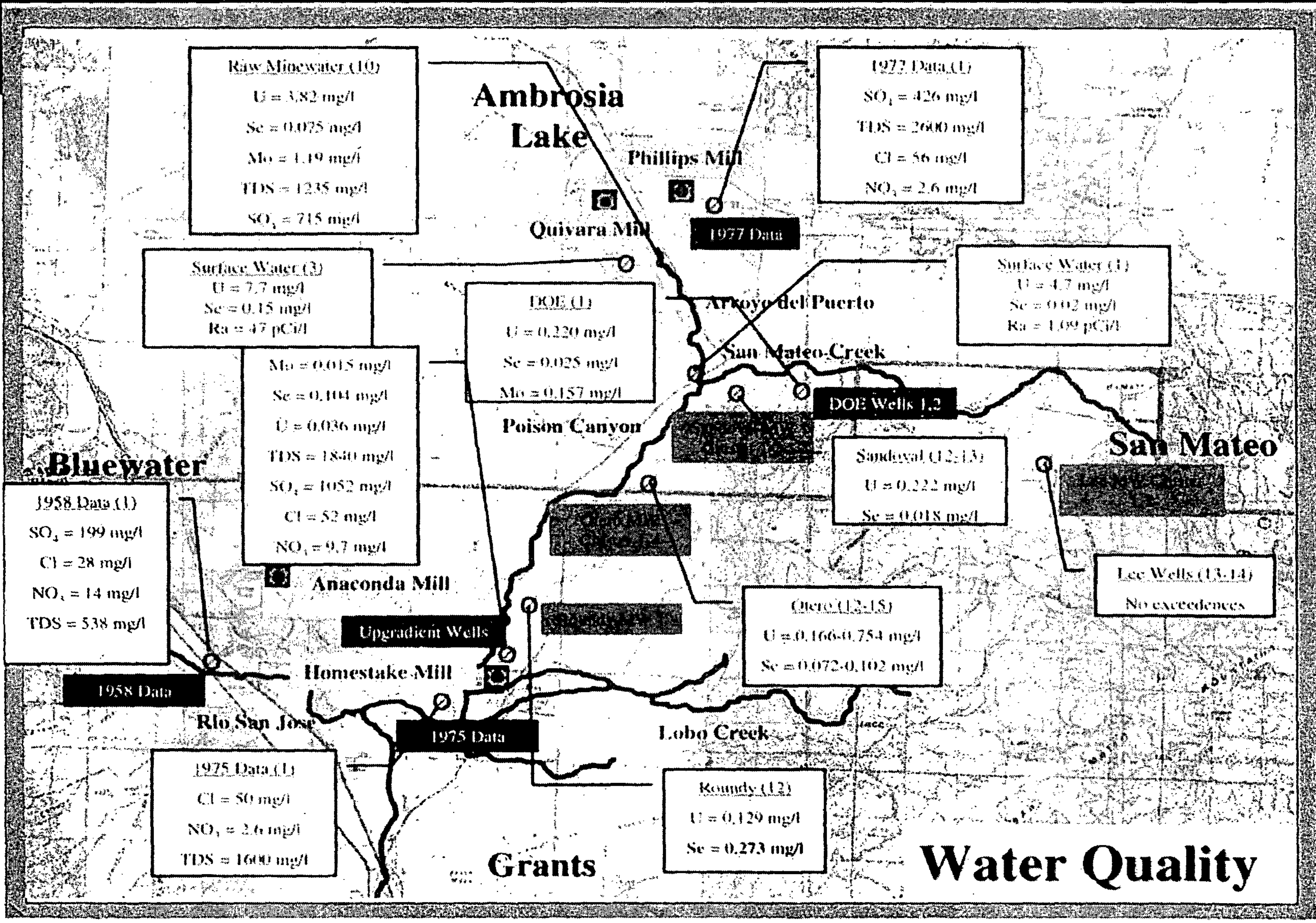
Table 2-E
UN-HP Mill-Sump For Tailing Pond Water Drainage

	Units	10/26/77	11/16/78	11/06/79	Current EPA Drinking Water Standards
TSS	mg/l	32	52	44	--
TDS	mg/l	17,035	20,710	25,400	500
pH	mg/l	10.12		10.32	6.5-8.5
Arsenic	mg/l	2.86	7.192	5.02	0.010
Barium	mg/l	.10	.051	.10	2.0
Selenium	mg/l	51.18	31.160	27.88	0.05
Molybdenum	mg/l	72.0	105.201	104.5	0.05*HA
Sodium	mg/l	6141.0	8464.0	9292.0	250*HA
Chloride	mg/l	793.2	1014.1	1418.0	250
Sulfate	mg/l	5531.6	8346.0	8411.5	250
Cadmium	mg/l		10.0	60.0	0.005
Nitrate	mg/l		22.42	10.72	10.0
Zinc	mg/l		.100	.250	5.0
Aluminum	mg/l			.250	0.05 to 0.2
Lead	mg/l		.005	.007	0.015
Uranium	mg/l	44.0	52.8	4.17	0.03
Radium-226	pCi/l	58±4	90.0±1	56±17	5

Chemistry of mine water discharges

- The following slide shows the contaminants that were being released from Ambrosia Lake from 1950 to the 1980s

Water Quality – EPA 1975



Technical Note: ORP/LV -75 - 4 EPA-1975 cont.

Samples of San Mateo Creek Above and Below Confluence of Arroyo Del Puerto

From p. 51, para. 3		ABOVE CONFLUENCE (in San Mateo Creek)	BELOW CONFLUENCE
TDS	Mg/L	700	2000
Ammonia	Mg/L	0.05	0.22
Nitrite + Nitrate	Mg/L	Less than 1.0	24

From p. 53		ABOVE	BELOW
Radium	pCi/l	0.05-0.11-0.14	0.31-0.30

Contaminated Groundwater Collected and Removed through 2005: ONLY 12,826 acre-feet

Table 2

Ground Water Collected and Constituents Removed
(Reproduced from Hydro-Engineering 2006)

YEAR	SOURCE	TOTAL VOLUME PUMPED (GAL)	SULFATE (SO4) CONC. (MG/L)	SULFATE (SO4) AMT. (LB)	URANIUM (U) CONC. (MG/L)	URANIUM (U) AMT. (LB)	MOLYBDENUM (MO) CONC. (MG/L)	MOLYBDENUM (MO) AMT. (LB)	SELENIUM (SE) CONC. (MG/L)	SELENIUM (SE) AMT. (LB)
1978	G.W.	27670033	5200	1200620	35	8081	40	9236	2	462
1979	G.W.	46371629	5200	2012095	35	13543	40	15478	2	774
2004	G.W.	154422720	2272	2931913	11.3	14633	16.6	21386	0.79	1017
2004	TOE	26720928	8007	1787722	31.9	7115	67.6	15102	2.78	622
2004	TAILS	44745696	6360	2377848	23.1	8637	60.9	22769	0.20	75
2005	G.W.	130810679	2478	2705346	11.8	12883	15.5	16922	0.59	644
2005	TOE	20704320	8228	1421784	43.5	7517	87.5	15120	2.63	454
2005	TAILS	45685786	4389	1673497	18.7	7130	56.3	21467	0.18	69
SUM G.W.		3,802,954,938		138,498,130		868,988		1,015,176		55,728
SUM TOE		179,594,419		15,993,167		62,637		141,293		2,727
SUM TAILS		197,552,158		12,172,162		47,387		122,935		311
COMBINED SUM		4,180,101,515		166,663,459		979,012		1,279,405		58,765

NOTE: Average concentrations for 1978 to 1991 were used in calculating the quantities of constituents removed.
Concentrations from the collection wells have gradually decreased from 1978 through 1991.
G.W. = Ground water; TOE = Toe drains on edge of tailings; TAILS = Large tailings collection wells

562,563 Acre Feet still needs remediation

- Current efforts are completely inadequate
- Disposal capacity must be increased by 40 times over existing capacity
  - New Evap Pond 3, at 27 acres, is grossly undersized

Water Discharge - Grants Area

- Data from 4 of 5 uranium **mills** in the Grants area shows **60,825** acre feet of contaminated water has seeped into various aquifers from unlined tailings ponds.

- Data are not yet available for Anaconda's disposal well into the Yeso & San Andreas Aquifers or from the Phillips-UNC **mill** in Ambrosia Lake.

- Mine water discharge from **mines** in the Ambrosia Lake area has been in excess of **514,389 acre-feet** of contaminated water into surface drainage.

Waters Lost (conservative estimate)

- At least 1,203,200 acre feet of water no longer usable for domestic purposes
- X $1,000/acre foot
- = $1,203,200,000 loss to New Mexico residents

Property Taken

- We bought property with wells, so we would have water for domestic and agricultural purposes.
- The wells are unusable for either and now our property has been significantly devalued.
- How would you feel if everything you worked your life to build was made valueless.

Missing Background Data

- To clean up, companies need a target
- Unfortunately, no background water quality levels set prior to operations
- Now background has been set using contaminated sources
- Illogical, unfair to New Mexico, and against regulatory guidelines

HMC Original Groundwater Quality Compliance Levels v. New ALCs

		Original Groundwater Compliance Levels		New Alternate Concentration Levels—ACLs				
Constituent		NRC (License SUA-1471) Ground Water Protection Standards	NMED (DP-200) Ground Water Cleanup Levels	Alluvial Aquifer	"Mixing Zone" Aquifer	Upper Chinle Aquifer	Middle Chinle Aquifer	Lower Chinle Aquifer
Uranium	mg/l	0.04*	5.0	0.16	0.18	.09	0.07	0.02
Selenium	mg/l	0.10*	0.12*	0.32	0.14	0.06	0.07	0.32
Molybdenum	mg/l	0.03*	1.0 (Irrigation)	N/A	N/A	N/A	N/A	N/A
Vanadium	mg/l	0.02*	N/A	--	--	--	--	--
Chromium	mg/l	0.06*	0.05	--	--	--	--	--
Radium-226 & Radium-228	pCi/l	5.0	30.0	--	--	--	--	--
Thorium-230	pCi/l	0.30*	N/A	--	--	--	--	--
Sulfate	mg/l	N/A	976*	1500	1750	914	857	2000
Chloride	mg/l	N/A	250	N/A	N/A	412	250	634
TDS	mg/l	N/A	1770*	2734	3140	2010	560	4140
Nitrate	mg/l	N/A	12.4*	12	15	N/A	N/A	N/A

* Established based on Site specific ground water background concentrations established after pollution occured

Solving the Problem

Regional approach to water contamination needed in Ambrosia Lake-Milan area:

- **INCLUDE THE UPSTREAM POLLUTERS**
- **ANACONDA MILLSITE**
- **AMBROSIA LAKE MINES AND MILLS**

Solving the Problem

1. Federal legislation to reclassify uranium milling and tailings discharges as "pollutants" not "byproduct materials" so Clean Water Act and the UMTRCA can be enforced.

2. Fund the NMED adequately to identify the impact of the previous uranium activities on this area of New Mexico.

3. NMED & EPA should establish field offices in Grants to accomplish a complete review and monitor the uranium industry.

Solving the Problem-cont.

4. Identify alluvial waters– size, quantity, location, flow rate, channeling,

5. Establish adequate monitoring well system to study the existing pollution and monitor the remediation. **To date monitoring wells are non-existing or are inadequate.**

Solving the Problem-cont.

6. Design & implement a remediation program to clean these waters back to pre-existing usable aquifers.

7. Establish a monitoring well system in aquifers ahead of the known pollution plumes.

8. At a minimum, the four tailings piles, two each at the Homestake and Anaconda sites, should be moved to below grade, lined ponds, that are not located above an alluvial or shallow aquifer.

Solving the Problem-cont.

- Without removal to lined ponds, continued drainage of pollutants will continue

- CLEAN – UP BEFORE START – UP

Preventing Future Problems

1. Establish regulations that will require any water discharged into the waters of New Mexico to meet "Drinking Water Standards."

2. All mine waste and mill tailings will be placed in below surface –grade, lined ponds, with a "french drain" to collect & treat water before discharge. Groundwater at least 200-300 feet below the bottom of the pond and no ground faults

Preventing Future Problems

3. Establish adequate background monitoring sites and obtain sufficient background data for water, air, soils, geology, etc. to allow for proper project monitoring thru and after the life of the project.

4. Publish and distribute annual reports of the monitoring data to allow the public input and understanding.

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IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
VICTORIA DIVISION

GOLIAD COUNTY, TEXAS; CRAIG AND LUANN DUDERSTADT, *Plaintiffs*,	§ § §	
v.	§ §	CIVIL ACTION NO. 6:08-cv-00018
URANIUM ENERGY CORP., *Defendant*.	§ §	

PLAINTIFFS' THIRD AMENDED COMPLAINT

COMES NOW, Goliad County, Texas, and Craig and LuAnn Duderstadt ("Duderstadts"), Plaintiffs herein, and complain of Uranium Energy Corp., Defendant.

I. INTRODUCTION AND SUMMARY OF THE CASE

1. This is a case about groundwater contamination in the northern portion of Goliad County, Texas.

2. Goliad County possesses an underground aquifer that is suitable for and used for drinking water purposes as well as for livestock and wildlife.

3. Throughout Goliad County, there is extensive reliance on these groundwater resources.

4. Goliad County's economic future is directly tied to the availability and quality of this groundwater.

5. Uranium Energy Corp. ("UEC") has been undertaking uranium exploration activity near Weser, Texas, east of U.S. Highway 183.

6. Uranium exploration is regulated by the Texas Railroad Commission ("TRRC") whereas in situ solution mining of uranium is regulated by the Texas Commission on Environmental Quality ("TCEQ").

EXHIBIT
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7. UEC began drilling exploration boreholes around May of 2006.

8. On March 26, 2007, the Texas Railroad Commission issued UEC a Notice of Violation of 16 T.A.C. § 11.138(4)(A) for failing to properly re-topsoil 74 boreholes and for failing to properly plug multiple boreholes after samples were taken.

9. On two separate occasions within one year of the Notice of Violation, residents of Goliad County discovered additional boreholes improperly left open by UEC similarly in violation of 16 T.A.C. § 11.138(4)(A).

10. Each borehole left open to the land surface exposes the Evangeline Aquifer to contamination by means of storm water flowing overland and entering the borehole, taking with it particulates and radiation-containing material and other debris left near the surface by UEC.

11. This pattern of disregard for these plugging requirements converted exploration boreholes drilled by UEC into injection wells emplacing fluids in the subsurface.

12. UEC does not possess a permit for this emplacement of such fluids into an injection well.

13. 42 U.S.C. § 300j-8 authorizes "any person [to] commence a civil action on his own behalf against any person ... who is alleged to be in violation of any requirement prescribed by or under this subchapter."

14. On February 27, 2008, Plaintiff, Goliad County issued a Notice of Intent to file a citizen suit alleging a violation of the SDWA by UEC.

15. On March 17, 2008, Plaintiffs, Craig and LuAnn Duderstadt issued a Supplemental Notice of Intent to file a citizen suit alleging a violation of the SDWA by UEC. By that letter, Craig and LuAnn Duderstadt joined Goliad County in notifying UEC of its intent to file suit under the citizen suit provision of the SDWA.

16. On July 2, 2008, Plaintiffs Goliad County, Texas, and Craig and LuAnn Duderstadt issued formal notice to the Texas Office of the Attorney General of Plaintiffs' intent to sue for violations of the SDWA pursuant to 42 U.S.C. § 300j-8(a)(1). Such notice is required for actions under the Safe Drinking Water Act ("SDWA"). 42 U.S.C. § 300j-8(b)(1)(A)(iii).

17. Specifically, Goliad County, alleges in this lawsuit that UEC violated 40 C.F.R. §§ 144.11 and 144.12.

18. 40 C.F.R. § 144.11 explicitly states, "any underground injection, except into a well authorized by rule or except as authorized by permit issued under the UIC program, is prohibited."

19. The emplacement of fluids through each borehole by UEC is also a direct violation of 40 C.F.R. § 144.12, which states "no owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if presence of that contaminant may cause a violation of any primary drinking water regulation under 40 C.F.R. part 142 or may otherwise adversely affect the health of persons."

20. After the initiation of uranium exploration activities by UEC, a number of the water wells within or adjacent to the UEC exploration area became contaminated including two on the Duderstadt property that became impossible to use for drinking water purposes.

21. This lawsuit further complains that Uranium Energy Company (UEC) created a condition of nuisance by causing contamination of a portion of the underground aquifer of Goliad County near Weser, Texas east of U.S. Highway 183.

22. This lawsuit also complains that UEC violated the rules of the TRRC associated with exploration for uranium and that these violations are directly related to this groundwater contamination, creating a condition of nuisance per se.

At the time of the filing of this litigation, a permit application filed by UEC is pending before the TCEQ to allow UEC to conduct in situ solution mining operations to remove uranium from the subsurface of Goliad County.

23. In situ solution mining for uranium is regulated as a Class III injection well under the program developed by the State of Texas to implement the federal Safe Drinking Water Act. 30 T.A.C. § 331.11(2)(B).

24. Under the rules of the United States Environmental Protection Agency ("EPA") and the TCEQ, no Class III permit may be issued if such a permit would endanger an Underground Source of Drinking Water. 40 C.F.R. § 144.1(g); 30 T.A.C. § 331.5(a).

25. If, however, the underground aquifer were not suitable for or used for drinking water purposes, a Class III permit could be obtained if the aquifer were "exempted" from the protections of the Safe Drinking Water Act. 40 C.F.R. § 144.7(b); 30 T.A.C. § 331.13.

26. Under the SDWA, a process exists to exempt a portion of an aquifer or a USDW. 40 C.F.R. § 144.7(b).

27. This litigation also alleges that UEC collected so-called "baseline" groundwater samples of the Evangeline Aquifer after they had commenced exploration activities and after they had generated the contamination complained of in this litigation.

28. Plaintiffs are concerned UEC intends to submit these groundwater samples to both the TCEQ and EPA as "evidence" that the aquifer at the uranium mining site is unsuitable

for drinking water purposes, supporting the "exemption" of this portion of the Evangeline Aquifer from the protection of the Safe Drinking Water Act.

29. The aquifer exemption process is an independent evaluation separate from the in situ solution mining application filed with the TCEQ.

30. This lawsuit seeks a declaration and/or a remedy that UEC cannot create a nuisance condition by violating mining rules of the TRRC and the Safe Drinking Water Act and thereby contaminate an aquifer, and then enjoy the fruits of that action by seeking to exempt the otherwise drinkable water from the protections of the Safe Drinking Water Act.

31. Similarly, under the rules of the EPA, an applicant must submit a plan for aquifer clean-up and monitoring after completion of in situ mining that demonstrates adequate protection of surrounding underground sources of drinking water. 40 C.F.R. § 147.3011(a)(1).

32. This plan requires the concentrations in the aquifer must "be set as close as is feasible to the original conditions." 40 C.F.R.§ 147.3011(a)(2).

33. Plaintiffs are concerned UEC intends to submit the same groundwater samples taken after exploration was conducted to the TCEQ for purposes of establishing the "original conditions" of the aquifer with lower water quality.

34. Similar to seeking a remedy for the manipulation of the aquifer exemption process, this lawsuit also seeks a declaration and/or a remedy that UEC cannot create a nuisance condition by violating mining rules, the Safe Drinking Water Act and contaminating an aquifer and then enjoy the fruits of that action by deceitfully lowering the standard for restoration of the Evangeline Aquifer.

II. JURISDICTION

35. This court has jurisdiction of citizen suits filed under the citizen suit provision of the Safe Drinking Water Act by virtue of 28 U.S.C. §1331, actions arising under the Constitution, laws, or treaties of the United States.

36. Plaintiffs have issued the necessary notices of the intent to sue and have waited more than 60 days to file this litigation as required by 42 U.S.C. §300j-8(b)(1)(A).

37. This court has jurisdiction to offer declaratory relief relative to the Safe Drinking Water Act pursuant to 28 U.S.C. §§ 2201 and 2202, of the Declaratory Judgment Act.

38. This court has supplemental jurisdiction of the nuisance and nuisance per se actions by virtue of 28 U.S.C. § 1367(a), claims that are so related to claims in the action within such original jurisdiction that they form part of the same case or controversy under Article III of the United States Constitution

III. VENUE

39. Pursuant to 28 U.S.C. §§ 1391 (a) and (c), venue is proper because a substantial part of the events or omissions giving rise to the claims occurred in this district and a substantial part of the property that is subject of the action is situated in this district.

IV. PARTIES

40. Plaintiff, Goliad County, Texas, is a corporate and political body created pursuant to Article IX, Section 1 of the Texas Constitution.

41. Plaintiffs, Craig and Luann Duderstadt, are property owners and residents of Goliad County, Texas. Their residence is located within the area permitted to Uranium Energy Corp. for uranium exploration mining by the Texas Railroad Commission. The Duderstadt's

livelihood is dependent on a water supply derived from two water wells also located within this exploration area.

42. Defendant Uranium Energy Corp. is a corporation organized under the laws of the State of Nevada with permission to and conducting business in the State of Texas and was originally served by serving its registered agent INCORP SERVICES INC. at 720 Brazos Street, Suite 1115, Austin, Texas 78701 and is now represented by counsel who may be served in accordance with the applicable Federal Rules of Civil Procedure.

V. FACTS

43. Goliad County lies west of Victoria, Texas.

44. The County Seat of Goliad County is the city of Goliad.

45. The legal entity known as Goliad County is administered by County Judge Gleinser and four County Commissioners – Commissioners Long, Flores, Rodriguez and Kreneck.

46. Goliad County relies upon fresh groundwater aquifers for its source of water throughout virtually the entire county.

47. Groundwater in Goliad County is relied upon for drinking water, cattle and livestock watering, irrigation and wildlife.

48. The Goliad County Groundwater Conservation District ("GCGCD") was formed under the provisions of Texas law in 2003 to protect, preserve, conserve and prevent waste of the groundwater in Goliad County. TEX. WATER CODE § 36.011.

49. GCGCD has responsibility for issuing permits allowing the use of groundwater in Goliad County and for monitoring water quality within the aquifer.

50. The GCGCD is presided over by Chairman Art Dohmann, Vice President Joe Kozielski, and Directors – Wesley Ball, John Dreier, John Duke, Raulie Irwin and Barbara Smith.

51. In certain areas of the State of Texas, uranium has been deposited within the sands of subsurface aquifers over the eons.

52. Uranium is deposited in certain of these aquifers at specific locations as a result of subsurface chemistry and resultant chemical reactions that caused uranium that was in solution in the aquifer waters to precipitate within the sand formation.

53. TCEQ authorizes by permit extraction of uranium by the process of in situ solution mining. TEX. WATER CODE §§ 27.002(12) and 27.011.

54. In order to explore for uranium, wells are drilled to a particular depth in the sand formation and a sample of the deposit is removed and brought to the surface for analytical testing.

A. Facts Relating to Illegal Injection and Contamination of the Aquifer

55. Uranium exploration in Texas is regulated by the Railroad Commission of Texas. 16 T.A.C. § 11.136.

56. On or about April 4, 2006, UEC applied for and received Permit #123 from the TRRC to conduct uranium exploration activities in Goliad County, Texas.

57. The project approved by Permit #123 is also known as the Weesatche Project.

58. The geographic area that is the subject of exploration mining Permit #123 is located near Weser, Texas, east of U.S. Highway 183.

59. In or around May of 2006, UEC initiated exploration activities by drilling test holes and extracting samples pursuant to Permit #123.

60. The terms of the permit and the TRRC rules specify the manner in which exploration activities are to be conducted.

61. TRRC Rules 16 T.A.C. §§ 11.138(1) and (2) require that reclamation of any material such as debris, trash and well cuttings be addressed in the application for an exploration permit.

62. TRRC Rule 16 T.A.C. § 11.138(4)(A) requires that no boreholes remain open after the exploratory sample is taken.

63. The representations of the permit application submitted by UEC also become enforceable requirements of law.

64. A number of Goliad County residents in the vicinity of the UEC exploratory activity use groundwater for drinking water and other household uses.

65. In December 2006, GCGCD contracted the San Antonio River Authority to test fifteen (15) water wells including the wells of Tom Anklam, Craig and LuAnn Duderstadt and Ted Long.

66. On February 5, 2007, Goliad County informed the TRRC that Goliad County had tested 15 wells for radiation and that the levels of radiation found in three of these wells – 13, 14 and 15 – were alarming.

67. Radiation levels in wells 13, 14, and 15 were found to be significantly higher than the EPA standard and are downdip of the exploration activity.

68. In this February 5, 2007 correspondence, Goliad County complained of residue being left on the surface in violation of UEC representations, and concluded by asking for an investigation by the TRRC.

69. The Texas Railroad Commission conducted an inspection of the Weesatche field from March 7-9, 2007.

70. On March 26, 2007, field inspectors issued a Notice of Violation (NOV) identifying two (2) violations of various Texas Railroad Commission rules and a violation of Exploration Permit #123.

71. The field inspectors identified that seventy-four (74) exploratory boreholes were not properly re-topsoiled and that multiple boreholes were not properly sealed.

72. Upon receipt of this NOV, UEC proceeded to address the regulatory violations.

73. On April 20, 2007 Melvin Hodgkiss of the Surface Mining and Reclamation Division of the Texas Railroad Commission responded to Goliad County's concerns about groundwater contamination, stating that an assessment of the material submitted by Goliad County had been undertaken by Tim Walter, P.G. of the TRRC staff.

74. According to this letter, Mr. Walter concluded that no ground water contamination has occurred as a result of drilling activities and that the source of groundwater contamination identified in the samples was from natural sources in contact with the sampled wells.

75. In or around the first quarter of 2007, LuAnn and Craig Duderstadt observed coloration and gray slimy residue and sand and iron residue in the filter bowl.

76. Prior to this time, the Duderstadts had experienced no problems with the quality of the groundwater from their well.

77. In or around the first quarter of 2007, Tom Anklam, Aldon Bade and Reta Brown experienced a reddish coloration in their household water.

78. Prior to this time, Tom Anklam, Aldon Bade and Reta Brown had not experienced problems with the quality of the groundwater from their wells.

79. In or around the first quarter of 2007, the residence of Ted Long experienced a red deposit in the toilet bowl.

80. Prior to this time, Ted Long had not experienced any such problems with the quality of the groundwater in his well.

81. In the first two weeks of April, 2007 the GCGCD was advised of five individual residences that were experiencing plugged water filters and discolored water.

82. On April 26, 2007, further testing was undertaken by the GCGCD of five wells near the Weesatche field, including the three wells previously tested by both GCGCD and UEC and two more – one owned by Alton Bade and one by Reta Brown – that had been previously tested only by UEC.

83. A comparison of the April 26 test data with earlier tests on the Bade property indicated that chloride, sulfate, iron and sodium levels had increased during the time between December, 2006 and April 26, 2007.

84. A comparison of the April 26 test data with earlier tests on the Anklam property indicated that sulfate and sodium had increased.

85. A comparison of the April 26 test data with earlier tests on the Reta Brown property indicated that iron had increased.

86. A comparison of the April 26 test data with earlier tests on the Duderstadt property indicated that chloride, sulfate, nitate, calcium, sodium and magnesium had all increased.

87. On May 3, 2007 a geologist with the TRRC named Murphy Hawkins visited the Duderstadt residence.

88. After observing dirty filters and filter bowl residue from the Duderstadt water well, Mr. Hawkins stated that the TRRC had no jurisdiction over this problem.

89. On May 9, 2007, responding to Goliad County's concerns submitted in its February 5, 2007 letter, the TRRC wrote County Judge Harold Gleinser regarding the results of their gamma radiation study of the Weesatche project.

90. In this May 9, 2007 letter the TRRC stated that their gamma radiation study confirmed that cuttings had been left on the land surface and that while some elevated gamma radiation levels were found, the readings were not sufficient to pose a radiation hazard.

91. On July 9, 2007 the Goliad County Groundwater Conservation District sent a letter to the TRRC, conveying water well sampling data and a report from a groundwater geohydrologist titled "Evaluation of Potential Impacts Related to Proposed Uranium Mining in Goliad County, Texas," and requesting further investigation of this situation by the TRRC.

92. Subsequent to that letter, field observations have indicated further groundwater problems and violation of TRRC rules.

93. On around December 20, 2007, Goliad Commissioner Ted Long documented additional unplugged boreholes in violation of Texas Railroad Commission Rule 16 T.A.C. § 11.138(4)(A) and (C).

94. On February 6, 2008, Dr. Bruce Darling, P.G. of Southwest Groundwater Consulting, LLC. accompanied Ms. LuAnn Duderstadt onto property owned by Mr. Elder Abrameit.

95. At this time, Dr. Darling observed additional boreholes that had been left open to the land surface.

96. Some of these boreholes extended into the aquifer in the subsurface.

97. These holes were left open to surface water runoff occurring across the surface of Mr. Abrameit's property.

98. The boreholes were left open for at least more than 48 hours.

99. By leaving a borehole open to the surface for more than 48 hours, UEC violated TRRC Rule § 11.138 (4)(A) and (C).

100. Storm water has flowed down these open boreholes into the aquifer contributing and/or exacerbating the contamination of the Evangeline Aquifer.

B. Facts Regarding In Situ Solution Mining and Aquifer Exemption

101. On or about August 7, 2007, UEC submitted an application for Permit # UR03075 to the TCEQ to conduct in situ solution mining for uranium in Goliad County, Texas of the Evangeline aquifer in accordance with 30 T.A.C. § 331.7(a).

102. In Section 5 of that application, UEC identified a baseline water quality within the proposed permit area.

103. In that baseline, the water quality of the Evangeline Aquifer was shown to be relatively poor.

104. UEC has proposed to conduct uranium mining activities in the approximate area where the exploratory boreholes have been completed.

105. UEC proposes to mine uranium using in situ solution mining processes.

106. In situ solution mining is accomplished by injecting fluids into the subsurface.

107. The injection of fluids into the subsurface through a well is regulated by the Underground Injection Control Program of the federal Safe Drinking Water Act (SDWA). 42 U.S.C. § 300f et seq.; 40 C.F.R. § 144.11.

108. Under the regulatory process of the SDWA, in situ mining is regulated as a Class III injection well.

109. Under the regulatory program of the SDWA, underground sources of drinking water (USDWs) are to be protected from underground injection. 42 U.S.C. § 300h-1(a); 40 C.F.R. § 144.12.

110. The state of Texas has been delegated primary enforcement responsibility pursuant to § 300h-1(b)(3) of the Safe Drinking Water Act, which has been adopted by the State under Chapter 27 of Texas Water Code.

111. The Evangeline Aquifer within the area where the uranium mining is proposed to occur contains drinkable water, currently used for drinking water purposes, the presence of which generally requires a Class III permit application to be denied under the various rules applicable to underground injection. 30 T.A.C. § 331.5(a); 30 T.A.C. § 331.13.

112. If, however, the underground aquifer were not suitable for or used for drinking water purposes, a Class III permit could be obtained if the aquifer were "exempted" from the protections of the Safe Drinking Water Act. 40 C.F.R. § 144.7(b); 30 T.A.C. § 331.13.

113. Under the SDWA, a process exists to exempt a portion of an aquifer or a USDW. 40 C.F.R. § 144.7(b).

114. UEC has indicated in Section 14 of the permit application submitted to TCEQ that it intends to obtain approval from both the TCEQ and United States Environmental Protection Agency for an exemption of a portion of the Evangeline aquifer.

115. Section 5 of UEC's permit application contends that UEC "completed 20 baseline wells within the proposed permit area" and that the "average Ra-226 concentration in the permit area is approximately 122 times higher than the drinking water standard, and the average uranium level is approximately 17 times higher than the standard."

116. UEC collected samples between December 13, 2006 and January 3, 2007 for the "baseline" data from water wells in the Area of Review defined in the application for Permit #UR03075.

117. This so-called baseline water quality data was collected after the initiation of exploration mining activities by UEC, which began in May 2006 – six months prior to the baseline testing.

118. In letter correspondence dated September 5, 2007, the Texas Railroad Commission confirmed that, "no baseline water quality data appeared to be available for the subject wells (prior to exploration)."

C. Facts Regarding Nuisance and Nuisance Per Se

119. Craig and LuAnn Duderstadt are residents of Goliad County.

120. The Duderstadts own a 100 acre tract of land in Goliad County.

121. On this tract of land, the Duderstadts operate two water wells within or adjacent to UEC's permitted area for uranium mining exploration.

122. The Duderstadts formerly relied upon groundwater for drinking and domestic use.

123. The well on the Duderstadt property has become contaminated.

124. The contamination has caused Mr. and Mrs. Duderstadt to rely primarily on bottled water for drinking and domestic use, precluding the reasonable use and enjoyment of their land.

125. The contamination identified by Mr. and Mrs. Duderstadt was not present in their water wells until exploration mining activities had begun.

126. The contamination identified by the Anklams, Longs, Browns and Bades was not present in their water wells until exploration mining activities had begun.

127. On March 26, 2007, almost one year after initiation of borehole drilling, field inspectors issued a NOV identifying that seventy-four (74) exploratory boreholes were not properly re-topsoiled and that multiple boreholes were not properly sealed NOV 080A.

128. On or around December 20, 2007, County Commissioner Ted Long took photographic documentation of additional improperly sealed or completely open boreholes.

129. On February 6, 2008, Dr. Bruce Darling, P.G. of Southwest Groundwater Consulting, LLC accompanied Ms. LuAnn Duderstadt onto property owned by Mr. Elder Abrameit.

130. At this time, Dr. Darling observed additional boreholes that had been left open to the land surface.

131. By leaving the boreholes open from the land surface to the aquifer in violation of TRRC rules, UEC provided a pathway for contamination and subsurface disturbance.

132. By leaving the boreholes open from the land surface to the aquifer, UEC caused storm water to be injected into a well without a permit being issued under the SDWA.

VI. CAUSES OF ACTION

133. The facts set forth in paragraphs 1 to 132 are adopted and incorporated herein.

Cause of Action No. 1: Violation of SDWA

134. 42 U.S.C. § 300j-8 authorizes "any person [to] commence a civil action on his own behalf against any person ... who is alleged to be in violation of any requirement prescribed by or under this subchapter."

135. Sixty days have lapsed since Plaintiffs, Goliad County, Texas, and Craig and LuAnn Duderstadt served Defendant with its notice of intent to sue pursuant to the Safe Drinking Water Act citizen suit provision.

136. 40 C.F.R. § 1441.11 explicitly states, "any underground injection, except into a well authorized by rule or except as authorized by permit issued under the UIC program, is prohibited."

137. 40 C.F.R. § 144.3 defines "Underground injection" as a "well injection", which is "subsurface emplacement of fluids through a well." .

138. 40 C.F.R. § 144.3 defines fluid as "any material or substance that flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state."

139. 40 C.F.R. § 144.3 defines "well" as "a bored, drilled, or driven shaft whose depth is greater than the largest surface dimension."

140. UEC began drilling exploration boreholes around May of 2006.

141. The Texas Railroad Commission issued UEC a Notice of Violation of 16 T.A.C. § 11.138(4)(A) for 74 boreholes were not properly re-topsoiled and for multiple boreholes were not properly sealed.

142. On two occasions subsequent to the Notice of Violation residents of Goliad County discovered additional boreholes improperly left open by UEC in violation of 16 T.A.C. § 11.138(4)(A).

143. Each borehole left open to the land surface exposes the Evangeline Aquifer to contamination by means of storm water flowing overland and entering the borehole, taking with it particulates and radiation-containing material and other debris left near the surface by UEC.

144. This pattern of intentional disregard of these plugging requirements is sufficient to lead to the inference of intent to emplace fluids in the subsurface.

145. UEC has converted exploration boreholes into illegal injection wells drilled and operated without a permit.

146. UEC does not possess a permit for this emplacement of such fluids and has violated 40 C.F.R. § 1441.11. See *Exhibit 1, Notice of Intent to Sue.*

147. The injection wells converted by UEC are located in Goliad County and penetrate an underground aquifer – the Evangeline Aquifer - that is suitable for and used by many Goliad residents for drinking water as well as for livestock and wildlife.

148. The injection wells are responsible for contamination of the Evangeline Aquifer.

149. These injection wells have precluded Goliad residents from continuing usage of this water for drinking and domestic purposes.

150. The underground water within the permit area now violates the primary drinking water standard for uranium and radium.

151. Accordingly, the conversion of exploration boreholes into injection wells and the emplacement of fluids through each well is also a direct violation of 40 C.F.R. § 144.12, which states "no owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if presence of that contaminant

may cause a violation of any primary drinking water regulation under 40 C.F.R. part 142 or may otherwise adversely affect the health of persons."

Cause of Action No. 2: Declaratory Relief

152. But for the actions taken by Defendant UEC, the Goliad County aquifer would not be contaminated.

153. Plaintiffs seek a declaration of the rights and responsibilities of the relevant parties under the Safe Drinking Water Act.

154. Plaintiffs seek a declaration that UEC has converted exploration boreholes into injection wells without possession of the necessary permit.

155. Plaintiffs seek a declaration that this conversion of exploration boreholes into injection wells caused contamination in the Evangeline Aquifer.

156. Plaintiffs seek a declaration that UEC may not benefit from its illegal activity and that UEC is precluded from seeking a permit for uranium in-situ mining prior to remedying the damage it caused to the Evangeline Aquifer.

157. The presence of contaminants in a portion of the Goliad County aquifer creates a fact situation for a possible issuance of an aquifer exemption by regulatory agencies that, if issued, would allow the issuance of a Class III permit allowing in situ solution mining within the contaminated portion of the aquifer.

158. UEC's pattern of rule violations coupled with the violation of the Safe Drinking Water Act, 40 C.F.R. §§ 144.11 and 144.12, created pathways for subsurface contamination of the aquifer and helped create the contamination necessary to exempt an aquifer from the protection of the UIC Program.

159. Plaintiffs Goliad County and Duderstadts seek a declaration that the regulatory structure of the Safe Drinking Water Act has been violated by Defendant UEC and that UEC not be allowed to benefit from the fruits of its contamination and legal infractions and be estopped and enjoined from submitting data from the contaminated zone as part of the aquifer exemption process.

160. Under the rules of the EPA, an applicant must submit a plan for aquifer clean-up and monitoring after completion of in situ mining that demonstrates adequate protection of surrounding underground sources of drinking water. 40 C.F.R. § 147.3011(a)(1); 30 T.A.C. § 331.104(d).

161. This plan requires the concentrations in the aquifer must "be set as close as is feasible to the original conditions." 40 C.F.R. § 147.3011(a)(2).

162. Plaintiffs Goliad County and Duderstadts also seek a declaration that the regulatory structure of the Safe Drinking Water Act has been violated by Defendant UEC and that UEC not be allowed to submit its tainted water samples for purposes of setting the restoration level upon completion of in situ mining.

Cause of Action No. 3: Nuisance

163. The groundwater resources of Goliad County are a natural resource essential to the continued economic development of Goliad County.

164. As a result of its exploration mining activities, UEC has caused contamination of the Evangeline Aquifer in Goliad County.

165. Residents of Goliad County, Texas, including the Duderstadts, have lost the use of their drinking water well as a result of the exploration mining activities by UEC.

166. As a result of the manner of the use of its property for exploration mining activity, UEC has unreasonably interfered with the use and enjoyment of groundwater resources within Goliad County.

167. As a result of the manner of the use of its property for exploration and mining activity, UEC has created a condition of nuisance

Cause of Action No. 4: Nuisance Per Se

168. While conducting its exploration mining activities, UEC violated TRRC Rules 16 T.A.C. § 11.137 and § 11.138.

169. On March 26, 2007, field inspectors issued a NOV identifying two (2) violations of various Texas Railroad Commission rules and a violation of Exploration Permit #123.

170. The field inspectors identified that seventy-four (74) exploratory boreholes were not properly sealed.

171. In December of 2007, after being cited by the Texas Railroad Commission, Commissioner Ted Long documented additional boreholes left open in violation of Texas Railroad Commission Rules 16 T.A.C. § 11.137 and § 11.138 - the same rules cited in the March 26, 2007 NOV.

172. Similarly, on February 6, 2008, Dr. Bruce Darling, P.G. of Southwest Groundwater Consulting, LLC. found additional open boreholes in violation of Texas Railroad Commission Rules 16 T.A.C. §11.137 and §11.138.

173. As a result of these violations, storm water was allowed to be introduced into the subsurface, leading to cause of action #1

174. The violations of the Texas Railroad Commission rules and the Safe Drinking Water Act caused and/or exacerbated the contamination of the aquifer and represent nuisance per se.

VII. STANDING

175. Plaintiff Goliad County, Texas is a local governmental body created pursuant to Article IX, Section 1 of the Texas Constitution, which states that Counties "shall exercise such powers and jurisdiction over all *county business*, as is conferred by this Constitution and the laws of the State, or as may be hereafter prescribed."

176. More specifically, the Supreme Court has held that "a county commissioners court is a unit of local government having general governmental powers over the county's entire geographic area, where the commissioners perform legislative, executive, administrative, and judicial functions, such as setting tax rates, equalizing assessments, issuing bonds, preparing and adopting a budget for allocating the county's funds, choosing subjects on which to spend, maintaining buildings, administering welfare services, determining school districts, and making various decisions affecting all citizens of the county." *Avery v. Midland County*, 390 U.S. 474, 483 (U.S. 1968).

177. Counties satisfy the definition of municipality as defined by the SDWA, which furnishes the right to file citizen suits.

178. The Texas Water Code establishes Counties as a "local government" which authorizes Plaintiff, Goliad County, Texas, to challenge injection well permit applications before administrative agencies. TEX. WATER CODE § 26.001(18); TEX. WATER CODE § 27.108..

179. Craig and LuAnn Duderstadt are residents of Goliad County.

180. The Duderstadts own a 100 acre tract of land in Goliad County.

181. On this tract of land, the Duderstadts operate a water well adjacent to UEC's permitted area for uranium mining exploration.

182. The Duderstadts rely on this water for drinking and domestic use.

183. The Duderstadts' well has become contaminated.

184. The Duderstadts have been forced to use bottled water for more than a year due to uranium exploration drilling.

VIII. Relief Requested

185. Plaintiffs Goliad County, Texas, and Craig and LuAnn Duderstadt respectfully requests the Court:

a. exercise jurisdiction over this matter;

b. issue an order prohibiting UEC from benefiting from its illegal activities, to wit, issue an order prohibiting UEC from seeking an uranium in-situ mining permit from the TCEQ.

c. or in the alternative, issue an order prohibiting UEC from benefiting from its illegal activities, to wit, issue an order prohibiting UEC from seeking an uranium in-situ mining permit from the TCEQ prior to restoring water quality to the condition of pre-exploration.

d. issue an order prohibiting UEC from benefiting from its illegal activities, to wit, that it be prohibited from using any water quality data for purposes of establishing baseline water quality if such data was collected after initiation of the mining activity; (See UEC Permit Application, Section 14).

e. issue an order granting Goliad County payment of its expert fees necessitated to prosecute this litigation;

f. issue an order granting Goliad County payment of its attorneys fees necessitated to prosecute this litigation;

g. grant Plaintiff such additional relief as this Court may deem just, proper and equitable, including an award of reasonable attorneys' fees, expenses, and costs.

IX. PRAYER

WHEREFORE, PREMISES CONSIDERED, Plaintiff requests that upon a final trial hereof, that an injunction be issued and the relief as requested and listed above be granted, and for other and further relief to which the Plaintiff may show itself justly entitled, including attorneys fees.

Respectfully submitted,

BLACKBURN CARTER, P.C.

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1-3-08

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY
LAND QUALITY DIVISION

SETTLEMENT AGREEMENT

The Wyoming Department of Environmental Quality, Land Quality Division (DEQ) and Power Resources, Inc. (PRI) doing business as Cameco Resources enter into this Settlement Agreement to fully and finally resolve without litigation the violations alleged in Notice of Violation (NOV) Docket No. 4231-08, dated March 7, 2008, regarding Highland, Permit 603, and Smith Ranch, Permit 633, insitu uranium mines. The NOV alleges non-concurrent restoration at both mines. DEQ rules and the respective mine permits require concurrent restoration or, if concurrent restoration is not possible, earliest possible restoration consistent with the orderly and economic development of the property. The Highland and Smith Ranch mines are located in Converse County.

Wyoming Statute (W.S.) §35-11-901(a)(ii) authorizes the DEQ to attempt to eliminate the cause of the violations by settlement, in lieu of litigation. To that end, PRI and the DEQ stipulate and agree as follows:

1/24 The DEQ pursuant to W.S. §35-11-104, is a department in the executive branch of the state government of Wyoming and is located in Cheyenne, Wyoming. DEQ is the agency responsible for administering the Wyoming Environmental Quality Act and the DEQ rules and regulations.

2/24 PRI is the permit holder and operator of DEQ Permits 603 and 633 for uranium mining operations located in parts of Townships 35 and 36 North, Ranges 73 to 75 West in Converse County.

3/24 DEQ rules and the Highland and Smith Ranch mine permits require concurrent restoration or, if concurrent restoration is not possible, earliest possible restoration consistent with the orderly and economic development of the property. Failure to comply with this requirement is a violation of DEQ rules and the respective mine permits.

4/24 PRI shall cease land application activities on or before October 15, 2009, unless PRI demonstrates wastewater disposed of via land application has an average selenium level of 0.1 mg/L or less.

5/24 PRI will bond Highland and Smith Ranch for eighty million dollars ($80,000,000.00) within 45 days of the execution of this Settlement Agreement by increasing the bond for Highland, Permit 603, to $48,000,000.00 and increasing the bond for Smith Ranch, Permit 633, to $32,000,000.00.

6/24 PRI will submit Highland and Smith Ranch permit revisions for revised restoration plans including restoration schedules for the existing permit approved mine units by August 1, 2008. The revision will include discussion of extraction rates, number of pore volumes of groundwater sweep and reverse osmosis treatments, and a water balance demonstrating the volumes available to conduct restoration as well as the waste water capacity to support the disposal of these volumes.

7/24 PRI will submit by August 1, 2008, a capital improvement plan. The capital improvement plan will provide for a minimum of eight million dollars ($8,000,000.00) to be spent by December 31, 2010 to accelerate restoration and reclamation activities.

8/24 DEQ will review the Highland and Smith Ranch revised restoration plans, restoration schedules, and the capital improvement plan within 45 days of receipt and either approve the permit revisions for insertion into the respective permits or provide review comments to PRI.

9/24 In the event DEQ issues review comments on the Highland and Smith Ranch revised restoration plans, restoration schedules, or capital improvement plan, PRI will respond to the DEQ within 45 days of receipt of the review comments.

10/24 Both PRI and the DEQ commit to finalizing the Highland and Smith Ranch revised restoration plans, restoration schedules, and capital improvement plan by December 31, 2008. Upon approval, the restoration plans and restoration schedule will be inserted into the respective permits and the capital improvement plan will be filed with the Settlement Agreement. Upon approval, PRI also will recalculate the bond amount for Highland and Smith Ranch and submit this information to the DEQ for review no later than February 28, 2009.

11/24 PRI will accelerate restoration activities in accordance with the following schedule:

Commencement Date	Site Reference	Restoration Activity
August 1, 2008	Mine Unit C	Accelerate restoration by replacing the membranes on the existing reverse osmosis unit thereby increasing the restoration capacity of the unit by 70 gpm, which is anticipated to result in an increase in the annual average flow rate to approximately 390 gpm. PRI will maintain the pertinent flow rate data on site.
October 1, 2008	Mine Unit 1	Accelerate restoration by increasing reverse osmosis treatment capacity by 200 gpm, which is anticipated to result in an increase in the annual average flow rate to approximately 390 gpm. PRI will maintain the pertinent flow rate data on site.

12/24 Subject to PRI fully complying with this Settlement Agreement, Permit 603 and Permit 633, and other applicable laws and regulations, PRI may maintain uranium mining activities at an annual production level equal to PRI's average annual production of U_3O_8 for the years 2006 and 2007 (not more than 2,000,000 pounds annually), and PRI may file applications for permit revisions to bring Mine Units 9, 10, 11, 12, K, and/or J-Extension into production as necessary to maintain this level of production. DEQ will not authorize PRI to increase U_3O_8 production at Highland and Smith Ranch mines over the average annual production for 2006 and 2007 before March 1, 2009.

13/24 PRI agrees to pay a penalty of nine hundred thousand dollars ($900,000) as stipulated settlement as partial resolution to this matter in lieu of litigation under W.S. § 35-11-901(a)(ii). PRI will pay five hundred thousand dollars ($500,000) directly to the DEQ upon execution of the signed Settlement Agreement. Four hundred thousand dollars ($400,000) will be suspended if PRI satisfies the terms of the Settlement Agreement. In the event PRI does not satisfy the terms of the Settlement Agreement, four hundred thousand dollars ($400,000) will be due within thirty (30) days notice by the DEQ. Payment to the DEQ shall be by check and made payable to the Wyoming Department of Environmental Quality/Land Quality Division, and shall be sent to: Donald R. McKenzie, Administrator, WDEQ, LQD, Herschler Building, 3 Fl-West, 122 West 25th Street, Cheyenne, WY 82002.

14/24 Upon execution of the signed Settlement Agreement, PRI also will pay five hundred thousand dollars ($500,000.00) to the DEQ to fund future, unspecified Supplemental Environmental Projects (SEP's). SEP's shall be determined by the DEQ and shall address groundwater restoration, protection, monitoring, or pollution reduction issues related to in situ uranium mining. Payment of the SEP funds shall be made by check and made payable to the Wyoming Department of Environmental Quality.

15/24 PRI's full compliance with this signed Settlement Agreement including payment by PRI as specified above shall constitute full satisfaction for and resolution of all claims by the DEQ against PRI based on the violations alleged in NOV Docket No. 4231-08. Contingent upon PRI compliance with the terms of this Settlement Agreement, the DEQ will refrain from taking further enforcement action against PRI for these particular violations cited in this Settlement Agreement. By this Settlement Agreement, the parties intend to resolve with prejudice all allegations that were asserted in NOV Docket No. 4231-08.

16/24 PRI waives any statute of limitations which may apply to an enforcement action by the DEQ involving the specific matters described here in, in the event that PRI fails to fulfill its obligations under this Settlement Agreement.

17/24 Neither party shall be liable for failure to perform under this Agreement if such failure to perform arises out of causes beyond the control and without the fault or negligence of the nonperforming party. Such causes may include, but are not limited to, acts of God or the public enemy, fires, floods, epidemics, quarantine restrictions, freight embargoes, and unusually severe weather. This provision shall become effective only if the party failing to perform promptly notifies the other party of the extent and nature of the problem, limits delay in performance to that required by the event, and takes all reasonable steps to minimize delays.

18/24 Nothing in this agreement precludes DEQ from taking additional enforcement action, including the issuance of a NOV, and/or pursuing additional penalties, should PRI violate Wyoming Statutes or applicable rules and regulations in the future.

19/24 This Settlement Agreement shall be admissible by either party without objection by the other party in any subsequent action between these parties.

20/24 Not withstanding any other language in this Settlement Agreement, the State of Wyoming and the DEQ do not waive sovereign immunity by entering into this Settlement Agreement with PRI and specifically retain all immunity and all defenses available as sovereigns under state and federal law.

21/24 Each party is responsible for its own costs, including attorney fees through the signing of this Settlement Agreement.

22/24 This Settlement Agreement is binding upon PRI successors and assigns, and upon the DEQ.

23/24 The persons signing this Settlement Agreement certify that they are duly authorized to bind their respective parties to this Settlement Agreement.

24/24 This Settlement Agreement shall become binding when signed by all parties.

FOR POWER RESOURCES, INC.:

Signed: Stephen P. Collings Date: July 8, 2008

Title: President

FOR THE WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY:

John V. Corra 7/7/08

John V. Corra, Director, DEQ Date

Donald R. McKenzie 07-07-08

Donald R. McKenzie, Administrator, LQD Date

xc: Becky Brosius, NOV Files (603 & 633), Lowell Spackman, LQD, Doug Mandeville, NRC

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Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Dave Freudenthal, Governor

John Corra, Director

March 10, 2008

CERTIFIED MAIL, RETURN RECEIPT REQUESTED #7005 1820 0005 1478 8828

Mr. John McCarthy
Power Resources, Inc.
P.O. Box 1210
Glenrock WY 82637

RE: Insitu Uranium Permits 603 and 633, Notice of Violation, Docket No. 4231-08

Dear Mr. McCarthy:

Enclosed you will find a Notice of Violation issued under the provisions of W.S.§ 35-11-415(a) and (b)(ii). The Notice of Violation is based on the investigation conducted Mr. Mark Moxley during the fall of 2007. The investigation found that PRI failed to conduct concurrent reclamation which is a violation of Chapter 3, Section 2(k)(i)(D), and that PRI failed to follow the approved permits.

The Wyoming Department of Environmental Quality/Land Quality Division (LQD) is attempting to resolve this issue without further enforcement action, and requires that you contact Mr. Donald R. McKenzie, LQD Administrator at 307-777-7046 **within fifteen (15) days of receipt of this letter** to schedule a meeting to resolve this enforcement action. Should resolution of this enforcement action be reached as a result of this meeting, a Settlement Agreement including a penalty assessment will be signed by both parties.

Respectfully,

John V. Corra
Director
Department of Environmental Quality

Donald R. McKenzie
Administrator
Land Quality Division

Enclosures: Notice of Violation
Investigation Report

cc: Lowell Spackman, District I w/attachments
Mark Moxley, District II w/attachments
Docket # 4231-08 w/attachments
Doug Mandeville, NRC w/attachments

DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE OF WYOMING

NOTICE OF VIOLATION

IN THE MATTER OF THE NOTICE OF VIOLATION ISSUED TO POWER RESOURCES, INC.
P.O. BOX 1219
GLENROCK, WY 82637
Re: Insitu Uranium Operation, Permit #603
Re: Insitu Uranium Operation, Permit #633

DOCKET NO. 4231-08

NOTICE

NOTICE IS HEREBY GIVEN THAT:

1. Notice of Violation is being sent to you pursuant to W.S. §35-11-701(c) which requires that a written notice shall be issued in the case of failure to correct or remedy an alleged violation specifying the provision of the act, rule, regulation, standard, permit, license, or variance alleged to be violated.

2. As a result of Land Quality Division (LQD) concerns over the slow pace of groundwater restoration of wellfields at Power Resources, Inc. Permits 603 and 633 Insitu Uranium Mine, an investigation was conducted of the mine and reclamation plans in the approved permits, plus information provided in annual reports. This investigation was conducted by LQD staff during October and November of 2007. In addition to the violations cited below, LQD identified serious deficiencies with both permits. The plans contained in the permit documents are dated and incomplete in numerous ways: spill detection, reporting, and follow-up protocols are not defined in the permit; groundwater restoration procedures, necessary facilities, and time schedules for restoration must be thoroughly described; waste disposal facilities and processes must be described for all waste streams; all critical process installations need thorough construction details and specifications; and topsoil protection procedures are not adequately defined. As a consequence of the inadequacies of the permits, both operations are seriously under-bonded.

3. The investigation found that PRI failed to conduct concurrent reclamation which is a violation of Chapter 3, Section 2(k)(i)(D) requiring concurrent reclamation; and that PRI failed to follow the approved permits, which is a violation of W.S. §35-11-415(a). The following lists the specific violations:

   Permit 603

   a. Wellfield C was in production for approximately ten years. The approved Mine Plan states, *"Once a wellfield is installed it takes approximately one to three years to recover the leachable uranium from a production area."* Extending the production time period has become a routine practice and is not in compliance with the approved permit or the requirement for concurrent reclamation.

   b. In addition to the production phase, Wellfield C has now been in restoration for ten years. The 2007 Annual Report states that the ground water quality is similar to *"end of mining"* wellfield conditions. The permit states that restoration and stability are estimated to take approximately five years. This restoration delay is not in compliance with the approved permit or the requirement for concurrent reclamation.

   c. Wellfield E has removed 100% of the leachable reserves, and in recent years wellfield production has slowed to maintenance levels. This rate of production delays completion of mining and restoration of this wellfield unit. This is not in compliance with the approved permit, and is a violation of Chapter 2, Section 2(b)(ii) which requires coordination of the Mine and Reclamation Plans to facilitate orderly development and reclamation.

d. The timetable listing the schedule of mining-related activities in the permit (Figure A, page OP-3A) and the timetable provided in the 2007 annual report both indicate that PRI is not in compliance with their restoration schedules for Wellfields C, D, and E. The schedule shows that Wellfield C should be decommissioning instead of in restoration, and that Wellfields D and E should be in restoration instead of production.

Permit 633

a. The permit indicates that "An updated schedule will be supplied with the annual report if the mining or restoration schedule varies from Table 3-1." The timetable commitments in the permit are not consistent with wellfield status. Therefore, the table in the annual report is the schedule that PRI is committed to for wellfield status. Based on this table, PRI is not in compliance with their restoration schedules for Wellfields 2, 3, and 4/4A. The annual report text indicates that Wellfield 2 will continue to be in production, while the annual report schedule referred to in the permit shows that it will be in restoration in 2008. Wellfields 3 and 4/4a should be in restoration instead of production.

b. The permit states that it generally takes "three years for uranium production, and three years for aquifer restoration." Actual times for wellfield production and restoration are, thus far, 2-3 times longer than permit commitments.

4. Wyoming Statute §35-11-901(a) provides that any person who violates any provision of the Environmental Quality Act or any rule, standard, permit, license or variance adopted hereunder is liable to a penalty of ten thousand dollars ($10,000.00) for each day of violation, which penalty may be recovered in a civil action brought by the Attorney General in the name of the People of the State of Wyoming.

NOTHING IN THIS NOTICE shall be interpreted to in any way, limit or contravene any other remedy available under the Environmental Quality Act, nor shall this Order be interpreted as being a condition precedent to any other enforcement action.

SIGNED this 7th day of March, 2008

John V. Corra
Director
Department of Environmental Quality

Donald R. McKenzie
Administrator
Land Quality Division

Please direct all inquiries regarding this Notice of Violation to Mr. Donald R. McKenzie, Administrator, Land Quality Division, Wyoming Department of Environmental Quality, 122 West 25th Street, Cheyenne, WY 82002. Telephone No. (307) 777-7046.

ec: Lowell Spackman, District I
Mark Moxley, District II
Docket # 4231-08
Doug Mandeville, NRC

B 5

MEMORANDUM

TO: John V. Corra, Director, Wyoming Department of Environmental Quality

THROUGH: Don McKenzie, Administrator, Land Quality Division

FROM: Steve Ingle

For #4231-08

DATE: December 13, 2007

SUBJECT: Notice of Violation, Docket No. 4197-07, Permit #603, Power Resources, Inc. (PRI), Support Documentation

I have divided this memo into five sections. The first section lists the regulatory requirements for concurrent restoration, the second section details the permit commitments and timelines in the permit. The third section discusses Wellfield C, which has been in restoration for approximately ten years. The fourth section discusses Wellfields E and F, where it appears completion of mining and initiating restoration has been delayed by PRI. The final section presents several possible reasons for why restoration may have been delayed.

Regulatory Requirements

Below is a list of regulations that require PRI to restore affected groundwater in a timely manner:

Chapter 2, Section 2(b)(ii) requires a time schedule for each reclamation step that coordinates the operators reclamation plan with the mining plan to facilitate reclamation at the earliest possible time.

Chapter 3, Section 2(k)(D) requires the company to establish reclamation concurrently with mining operations, whenever possible.

Chapter 11, Section 5(a)(i)(D) requires the capacity of the water/waste water treatment systems and correlation of the capacity with the mining and restoration schedules.

Permit Requirements

Permit #603 contains language that is intended to meet the regulations cited, above. This language is found on Page OP-4 of the Mine Plan and Page RP-7B of the reclamation plan. These pages state:

1. The estimated wellfield life and times needed for restoration are stated on Page OP-4 in Permit #603. The permit states:

- Once a wellfield is installed it takes approximately one to three years to recover the leachable uranium from a production area.
- Groundwater restoration activities are started once a wellfield is depleted.
- Restoration and stability is estimated to take approximately five years.

2. Page RP-7B states that ground water sweep will be used for approximately three to four pore volumes and an additional two to three pore volumes will be withdrawn and treated with reverse osmosis.

Wellfield C

Restoration began in Wellfield C in 1997 with groundwater sweep at a rate of 15-20 gpm for the first year. During the past ten years of restoration, the peak groundwater sweep rate was 63 gallons per minute (gpm) in 2003. This rate is approximately 0.278 Acre Feet/day. One pore volume in the C Wellfield is 236.9 AF of water. In order to remove one pore volume at a rate of 63 gpm, it would take approximately 2.3 years of continuous operation. Table 1 shows the historic groundwater sweep rates and the time needed to remove one pore volume if the sweep was continuous. To treat three pore volumes as stated in the permit would take approximately 6.9 years for the groundwater sweep phase of restoration. Reverse Osmosis (RO) was initiated during 2006 at a rate of 180 gpm and increased to 321 gpm in 2007. To date 2.25 pore volumes of RO have been completed. The 2007 Annual Report states that the water quality remains at pre-treatment values. Table 3-2 in the 2007 Annual Report does show an improvement in water quality, especially after the RO units began operating.

The decarbonation unit (which recirculates groundwater after removal of carbon dioxide and bicarbonate) has processed a total of 5,755 AF (24.3 pore volumes) of groundwater since restoration began. Testing of the decarbonation unit showed that the unit is up to 90% efficient. The 24.3 pore volumes should have removed all the carbon dioxide prior to this time.

The restoration bond is for one pore volume of groundwater sweep and five pore volumes of RO. If three pore volumes of groundwater sweep and three pore volumes of RO are necessary, the bond amount for groundwater treatment is adequate to cover restoration of the wellfield, because the RO costs exceed the groundwater sweep costs.

Other wellfields

Other wellfields, specifically the E and F wellfields have had between 90% and 100% of the leachable uranium removed (Figure 2 and Figure 3). The E-wellfield has had over 99% of the leachable uranium removed for approximately 5 years and 100% for 2 years and the F-wellfield has had over 90% of the leachable uranium removed for over 4 years (Table 2). The amount of uranium removed per year from these wellfields over these time periods has been less than 1% per year. Essentially, all that's been happening at these wellfields is maintaining a bleed, similar to Interim Mine Stabilization. It is my opinion that these wellfields have not been completely mined out, because PRI does not have sufficient wastewater disposal capacity, to begin restoration of these wellfields and maintain current production rates. To a certain extent, groundwater sweep in these wellfields may hamper mining activities in adjacent operating fields, however pattern groups within the wellfield can begin groundwater sweep operations or certainly decarbonation.

The E-Wellfield is clearly a violation of the concurrent reclamation requirements in Chapter 3, Section 2(k). The wellfield has had 100% of the leachable uranium recovered for the past two years and less than 99% leachable uranium removed, for the five previous years.

Potential factors affecting the rate of restoration

There are several factors that may potentially slow the rate of restoration. The first factor is insufficient wastewater disposal facilities. PRI is maintaining production in several wellfields at their Highland and Smith Ranch properties and each wellfield produces more water than it injects, this bleed stream helps maintain a cone of depression into the wellfield to prevent excursions. The bleed stream fluid needs to be disposed of as wastewater. Chapter 11, Section 5(a)(i)(D) requires PRI to have sufficient wastewater treatment facilities to meet mining and restoration schedules.

Wellfield C, in part, adjoins Wellfield D and higher rates of groundwater sweep in Wellfield C may draw mining fluids into the field from Wellfield D. The permit allows PRI to establish a line of injection wells, between Wellfield D and Wellfield C to create a hydraulic barrier between the wellfields. A hydraulic barrier would allow Wellfield C to be restored with minimal effects to Wellfield D.

Hydrologic factors such as permeability and available water levels above production unit can also influence the maximum groundwater sweep rate. If the pumping rate is too high, the aquifer can be temporarily dewatered. Closely monitoring the water level changes can determine the maximum allowable groundwater sweep rate.

TABLE 1

Year	Sweep Rate/gpm	Volume AF	Cum Vol AF	AF/day	AF/year	Years/p.v.
2007	46	74	551	0.2	73	3.245205
2006	36	54	477	0.16	58.4	4.056507
2005	53	80	423	0.23	83.95	2.821918
2004	59	93	343	0.26	94.9	2.496312
2003	63	61	250	0.28	102.2	2.318004
2002	50	59.6	189.2	0.22	80.3	2.950187
2001	23	36.3	129.6	0.1	36.5	6.490411
2000	23	41.2	87.4	0.1	36.5	6.490411
1999	15-20	23.8	63.6	0.09	32.85	7.211568

AF = acre feet

p.v. = pore volume, one pore volume for Wellfield C is 236.9 acre-feet of water

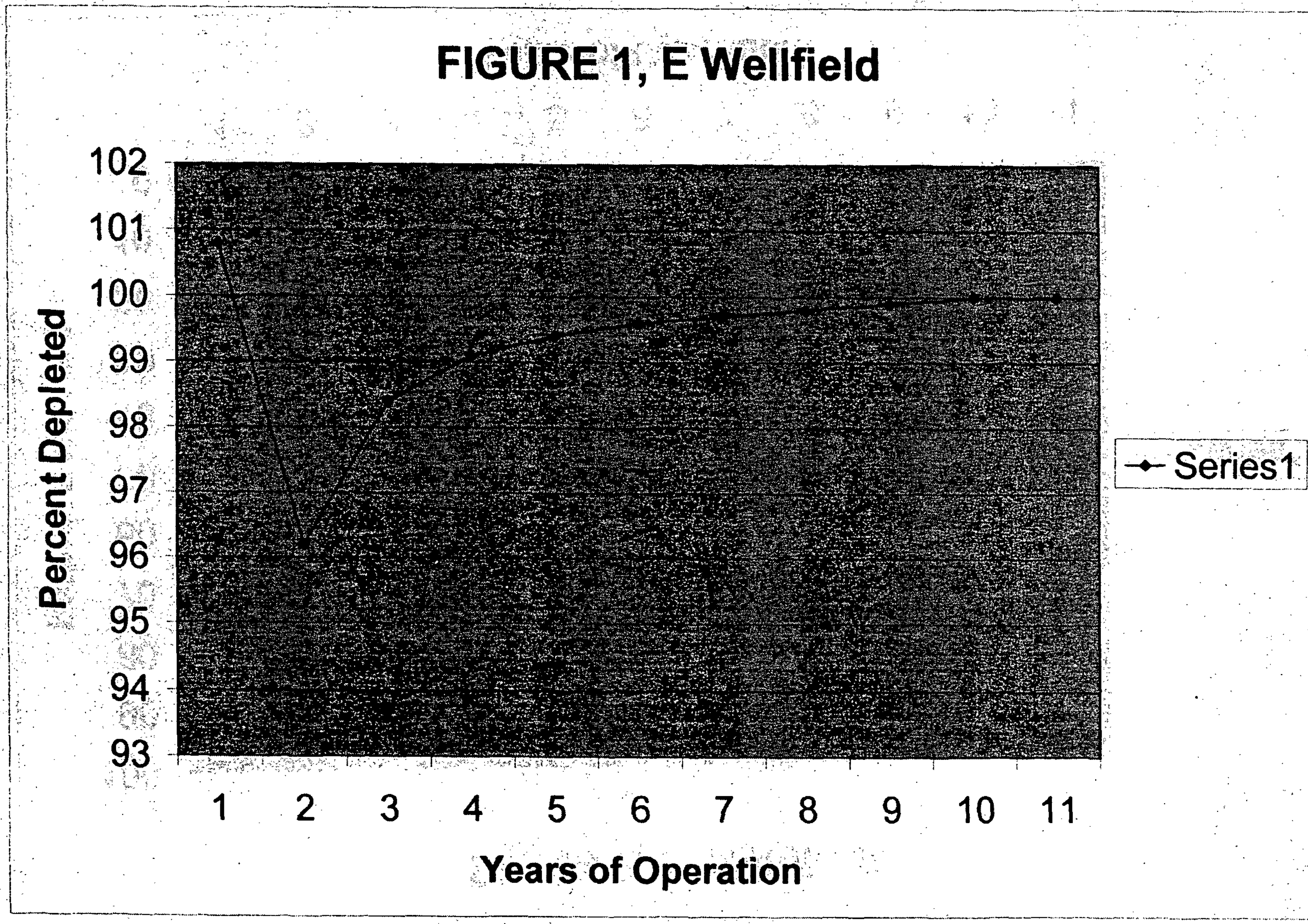

FIGURE 1, E Wellfield
102
101
100
99
98
97
96
95
94
93
Percent Depleted
1
2
3
4
5
6
7
8
9
10
11
Years of Operation
Series1

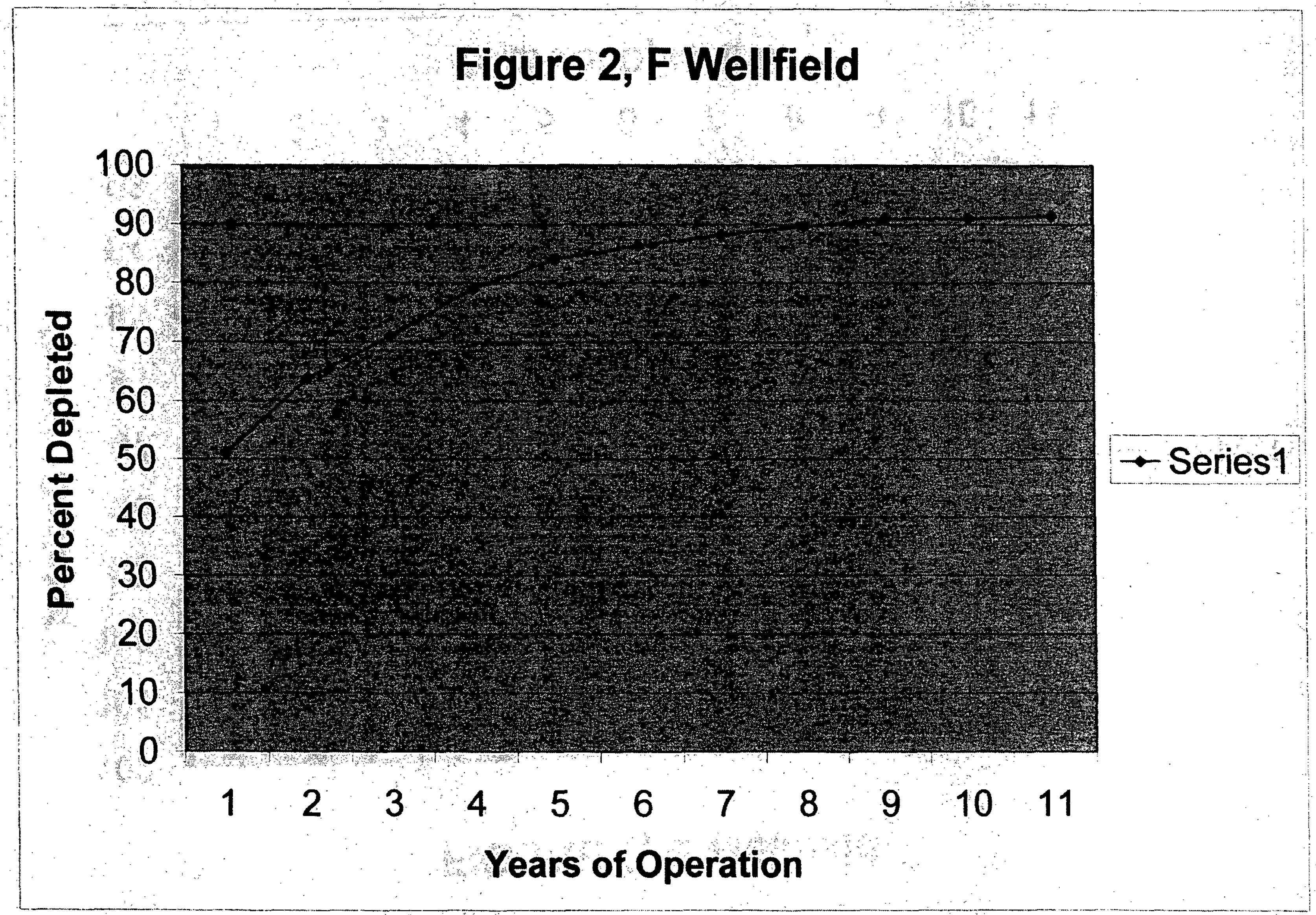
Figure 2, F Wellfield
Percent Depleted
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
Years of Operation
Series1

Report of Investigation

Operator	:	**Power Resources, Inc.**
Facility	:	**Smith Ranch - Highland Uranium Project** **Mine Permit #603 (Highland) and #633 (Smith Ranch)**
Prepared By	:	**Mark Moxley, LQD District 2 Supervisor**
Date	:	**November 21, 2007**

Background:

This investigation was conducted at the request of Rick Chancellor, LQD Administrator, in response to concerns over recent spills and the slow pace of groundwater restoration at the Smith Ranch-Highland ISL operation. PRI's operation is located in Converse county in LQD District 1. An investigator was brought in from LQD District 2 with the intention of having a fresh pair of eyes look at the operation. The investigation was intended to identify and focus on "big picture" issues, not specific details. The investigation proceeded as follows:

- Review of permit documents and annual reports
- Interviews with LQD District 1 staff
- Site tour and interviews with PRI staff
- Interviews with LQD District 3 staff
- Follow-up reviews and discussions

PRI began producing in 1988 and is currently the only significant producer of uranium in Wyoming. They are currently producing at capacity levels (2 million pounds of yellow-cake in 2006 and they are expecting similar production in 2007). PRI has applied for a mine permit amendment to add the Reynolds Ranch property and they are also planning to consolidate the Smith Ranch and Highland permits. This will result in a combined mine permit area some 41,000 acres in size. PRI is planning to increase their throughput capacity next year and add approximately 30 people to their current staff of 100. They are also considering adding facilities to provide toll milling services to process feedstock from other operators.

Given that PRI's operation has for many years been the major uranium producer in Wyoming, there is an expectation that the operation might serve as a model for excellence in ISL mining. Unfortunately, this is not the case. There are a number of major long-standing environmental concerns at this operation that demand immediate attention. Recommendations are made as to how to address these concerns.

Currently the uranium industry is experiencing a major boom. Drilling and pre-permitting investigations are proceeding on many different properties around the state, including several owned by PRI. The LQD is expecting numerous new ISL mine permit applications within the coming 12-18 months. This increase in workload will be a major challenge for the LQD staff. Achieving regulatory effectiveness and efficiency will be a high priority for LQD and it will require the cooperation of the industry.

Major Regulatory Issues and Concerns with Permits 603 & 633:

1. Mine Permit:

The mine permit document is the primary regulatory mechanism governing the operation. The mine and reclamation plan should describe in detail how the operation will be conducted so as to comply with all of the major regulatory requirements. The mine and reclamation plans should be updated and maintained so as to be a definitive reference for the operator, the regulatory agencies, and also the public. Having a definitive mine and reclamation plan is particularly important for new staff. In the case of the Smith Ranch - Highlands operation (mine permits #603 and #633), the plans contained in the permit document are out of date and incomplete in several important areas. The following major deficiencies were noted:

A. The approved mining and reclamation schedules are not being followed and are not current. PRI is not conducting contemporaneous restoration as required by their permit and WDEQ-LQD regulations. See discussion under item 2, below.

B. Spill detection, reporting, delineation, remediation, follow-up and tracking protocols are not defined in the permit and should be. PRI experiences spills on a routine basis. See discussion under item 3 below.

C. Groundwater restoration processes, facilities and procedures (incorporating and defining BPT), flow rates and time schedules should be thoroughly described in the permit so that expectations are clear. This has implications for bonding also.

D. Waste disposal facilities and processes should be clearly defined for all waste streams. One example of inaccurate information in permit #603 (on pages OP-15 and 19) states that byproduct solid waste materials will be disposed at the ANC Gas Hills facility (which closed in 1994). This waste actually goes to the Pathfinder Shirley Basin facility.

E. Construction details and specifications should be thoroughly described for critical process installations, including wells, pipelines, header houses, ponds, etc. One example of inaccurate information in permit #603(on page OP-24)states that well casing joints are fastened with screws. This practice is not consistent with the regulations and was discontinued years ago.

F. Topsoil protection procedures are not adequately defined to assure that disturbance is minimized and that the soil resource is protected. PRI's typical wellfield installation procedures result in the near total disturbance of the native vegetation and soils. This is not consistent with the regulation that allows for "minor disturbance" without topsoil stripping. More definitive procedures should be implemented to restrict and consolidate disturbance from roadways and pipelines and to insure careful topsoil salvage from well sites, mud pits, pipelines, roadways, etc.

With the permit updates required by Chapter 11 and the proposed consolidation of the Highland and Smith Ranch permits, now is an opportune time to correct permit deficiencies and construct a permit that is informative and useful to all parties.

Report of Investigation

Operator : Power Resources, Inc.

Facility : Smith Ranch - Highland Uranium Project
Mine Permit #603 (Highland) and #633 (Smith Ranch)

Prepared By : Mark Moxley, LQD District 2 Supervisor

Date : November 21, 2007

Background:

This investigation was conducted at the request of Rick Chancellor, LQD Administrator, in response to concerns over recent spills and the slow pace of groundwater restoration at the Smith Ranch-Highland ISL operation. PRI's operation is located in Converse county in LQD District 1. An investigator was brought in from LQD District 2 with the intention of having a fresh pair of eyes look at the operation. The investigation was intended to identify and focus on "big picture" issues, not specific details. The investigation proceeded as follows:

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PRI began producing in 1988 and is currently the only significant producer of uranium in Wyoming. They are currently producing at capacity levels (2 million pounds of yellow-cake in 2006 and they are expecting similar production in 2007). PRI has applied for a mine permit amendment to add the Reynolds Ranch property and they are also planning to consolidate the Smith Ranch and Highland permits. This will result in a combined mine permit area some 41,000 acres in size. PRI is planning to increase their throughput capacity next year and add approximately 30 people to their current staff of 100. They are also considering adding facilities to provide toll milling services to process feedstock from other operators.

Given that PRI's operation has for many years been the major uranium producer in Wyoming, there is an expectation that the operation might serve as a model for excellence in ISL mining. Unfortunately, this is not the case. There are a number of major long-standing environmental concerns at this operation that demand immediate attention. Recommendations are made as to how to address these concerns.

Currently the uranium industry is experiencing a major boom. Drilling and pre-permitting investigations are proceeding on many different properties around the state, including several owned by PRI. The LQD is expecting numerous new ISL mine permit applications within the coming 12-18 months. This increase in workload will be a major challenge for the LQD staff. Achieving regulatory effectiveness and efficiency will be a high priority for LQD and it will require the cooperation of the industry.

2. Contemporaneous Reclamation:

One of the fundamental requirements for any mining operation is that reclamation be conducted concurrently with mining. Not only is this the most efficient operational strategy but it also insures that the reclamation liability is kept at a reasonable and manageable level. This approach ensures that the public is protected in the event of a forfeiture.

The schedule in permit #603, Highland, dates from 2005. An identical schedule was provided in the July, 2007 annual report. That schedule shows that restoration of the C wellfield should have been completed in 2006 and decommissioning should now be in progress. In actuality the restoration of the C wellfield has been on-going for ten years and the RO treatment phase has only just recently begun. According to the schedule, restoration of the D wellfield should have commenced in 2006 and restoration of the E wellfield should have commenced in early 2007. The annual report states that both the D and E wellfields are still in production. According to the schedule there should now be five wellfields in production (D-ext, F, H, I & J), two in restoration (D & E) and three restored (A, B & C). In fact there are currently 7 wellfields in production, one in restoration (C), and only 2 restored (A & B) at Highland.

The schedule contained in permit #633, Smith Ranch, dates from 1998. A more current schedule was provided in the July, 2007 annual report, yet even this recent schedule is not being followed. According to that schedule, wellfields 1, 3 and 4/4A should now be in restoration. Production from these wellfields was started in 1997, 1998 and 1999 respectively. Restoration of wellfield 1 is to be complete by mid 2008 and restoration in wellfield 2 is to commence in early 2008. However, as reported in the annual report only wellfield 1 is in restoration (no completion date stated) and no mention is made of any other planned restoration. In addition, a new wellfield (K) went into production this year and it does not even appear on the schedule. According to the schedule there should now be three wellfields in production (2, 15 & 15A)and three in restoration (1,3 & 4/4A). In fact there are currently five wellfields in production and only one in restoration. No wellfields have been restored at Smith Ranch.

It is readily apparent that groundwater restoration is not a high priority for PRI. Reclamation is not contemporaneous with mining. A total of 12 wellfields are now in production and restoration is proceeding (slowly) in only 2 wellfields. Only 2 wellfields (A and B) have been restored in 20 years of operation. The permits project that production will typically last for 3-5 years per wellfield and restoration will take 3-5 years per wellfield. It appears in reality that both production and restoration timeframes have doubled or tripled and yet additional wellfields are being brought into production.

It is recommended that a notice of violation be issued to PRI for failure to conduct concurrent reclamation and failure to follow the approved schedules. A rigorous compliance schedule should be implemented to accelerate restoration. A thorough re-evaluation of the operation schedules is warranted. As pointed out below, new deep disposal wells (DDW's) and RO units will be required to support restoration operations. LQD approval of the Reynolds Ranch amendment as well as any new wellfields should be contingent on installation of appropriate DDW's and RO units and completion of restoration in existing wellfields.

3. Spills, Leaks and Excursions:

Over the years there have been an inordinate number of spills, leaks and other releases at this operation. Some 80 spills have been reported, in addition to numerous pond leaks, well casing failures and excursions. Unfortunately, it appears that such occurrences have become routine. The LQD currently has two large three- ring binders full of spill reports from the Smith Ranch - Highland operations.

Protocols for spill detection, reporting, control, delineation, remediation and tracking should be defined in the mine plan to cover all potential fluid types (injection fluids, production fluids, waste fluids, chemicals and petroleum products) and all potential sources (buried pipelines, surface pipelines, wellhead fittings, headerhouses, ponds, well casing failures, etc.). Protocols should include mapping and delineation of the extent of soil and/or groundwater contamination associated with each occurrence. A GIS system should be developed to facilitate long term tracking of all spills and releases. An updated cumulative spill map showing all historic spills and releases should be presented in each annual report along with documentation of follow-up actions. Excursion protocols are addressed in some detail in the permit, but excursions should be tracked on a cumulative basis in the annual report.

Cumulative tracking of spills and releases is important to insure appropriate follow-up on every incident. Some of the spills may have little impact individually, but cumulatively they might have a significant effect on soils and/or groundwater. A cumulative record will also assist in pinpointing potential problem areas and developing appropriate preventative measures. PRI should develop and implement an inspection and maintenance program designed to prevent future spills. Spills should not and need not be an accepted consequence of ISL mining.

4. Reclamation Cost/Bonding:

The reclamation cost estimates contained in PRI's annual reports assume completion of all groundwater and surface reclamation in 4 years with a staff of 26 people (1/4 of current staff), using the existing facilities with the addition of only 2 new 400gpm RO units. This scenario is totally infeasible and unsupported by any critical path timeline or water balance. Rough calculations based primarily on PRI's figures reveal an alarming scenario.

- Adding the pore volumes for all of the existing wellfields gives a total pore volume (PV) for the project (excluding restored wellfields A&B) of 5,133 Ac.Ft.

- PRI's bond calculation includes only one PV of groundwater sweep, vs three PV's specified in the permit. [Removal of this volume of water from the aquifer would be problematic and warrants further evaluation.] PRI's four existing deep disposal wells (DDW's) have a combined capacity of approximately 600gpm (@100% availability). Disposal of one PV would take more than 5 years! This is not an acceptable schedule. A more reasonable scenario would require at least doubling the disposal capacity (1,200gpm), which would require 4 or 5 new DDW's. These would also be needed for disposal of RO brine and should be included in the bond.

- PRI's bond calculation includes only 3 pore volumes of RO treatment. The approved reclamation plan specifies circulation of a total of 6 PV's (3 groundwater sweep and 3 RO). It is likely that at least 5 PV's of RO treatment would be required if only one PV of groundwater sweep was completed. Using the five existing RO units on the site, plus two new 400 gpm units included in the bond calculation, producing a combined total of 1,360gpm of permeate (@80/20 permeate to brine ratio @100% availability), it would take 854 days (2.3 years) to treat one PV! It would take at least 11.5 years to treat 5 pore volumes. This is a not an acceptable schedule. A more realistic reclamation scenario would require increasing the RO capacity by 2-3 times (3,000 - 4,000 gpm permeate production). The additional RO units, as well as the additional building space, ancillary treatment facilities and piping, should be included in the bond.

- Using the existing RO units (plus the two bonded RO units) and existing DDW's, reclamation would take 20+ years, assuming groundwater restoration was achieved without any problems. (5 years for one PV of GW sweep + 11.5 years for 5 PV's of RO treatment + 1 year stability monitoring + 1 year decommissioning + 1 year of surface reclamation). Clearly this is not an acceptable schedule, but it does point out the need for reevaluation of the reclamation plan, restoration schedule and the bond calculation.

- PRI's bond calculation includes minimal funds for new infrastructure, maintenance, replacement and repair. Only two new 400 gpm RO units are included in the bond estimate. The need for new wells, including DDW's, water storage and treatment ponds, additional RO units, membranes, pumps, piping and general wellfield renovation should be anticipated and included in the bond calculation.

- PRI's bond calculation assumes a staff of only 26 people, with 22 of them on a salary of only $34,000 per year! If their current operations require a staff of 100 people then it will take at least 1/2 to 2/3 of that staff to conduct restoration. The restoration operations will look very similar to production operations. Operation of RO units, in particular, is very high maintenance and labor intensive. Retaining competent staff will require that wages and benefits be at least $50,000 per year.

- Considering that reclamation will take several times longer, require at least twice the staff with higher wages and require much greater investments in infrastructure than PRI has estimated, a realistic reclamation cost estimate for this site would likely be on the order of $150 million, as compared to PRI's current calculation of $38,772,800. PRI is presently bonded for a total of only $38,416,500. No bond adjustments have been made since 2002. Clearly the public is not protected. It is recommended that PRI's bond be immediately raised to a level of $80 million until a thorough evaluation, including critical path analysis, can be completed and an appropriate bonding level established. No permit amendments should be approved or new wellfields authorized until the bonding situation is corrected.

5. Regulatory compliance:

Achieving environmental compliance at an operation of the size and complexity of PRI's Smith Ranch - Highland Mine requires a high level of commitment from both the company and the regulatory agency. PRI's environmental efforts have suffered from inadequate staffing, high turnover, lack of institutional memory and a low level of corporate commitment. There has been a lack of continuity and follow-through on many issues. At this point in time, overall environmental compliance at this operation is poor. PRI should retain a full-time environmental staff of 4-5 qualified people, including a groundwater hydrologist to manage the groundwater restoration. It is recommended that LQD immediately assign a staff person full-time to manage this project as their #1 priority, and that monthly inspections be conducted to get a handle on the issues identified in this investigation.

End of Report

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WDEQ/WQD Spill List (2003 for Year 1993) (see http://deq/state/wy/us/wqd/events/1203rpt.htm)														
ID	Complaint	Release	Incident #	Employee	Rpt Date	Rpt Time	Report Name	Report Title	Report Company	Report Addre	Report City	Rpt State	Report Zip	Report Phone
Uranium mine spills, 1999:														
61	FALSE	TRUE	990216-1515	Burns	2/16/1999	1/0/1900	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
97	FALSE	TRUE	990319-1420	Palmer	3/19/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
111	FALSE	TRUE	990329-1420	Nuss	3/29/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
112	FALSE	TRUE	990329-1425	Nuss	3/29/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
118	FALSE	TRUE	990405-1140	Nuss	4/5/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
122	FALSE	TRUE	990409-1120	Nuss	4/9/1999	1/0/1900	John Vaselin	Radiation Sfty	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
129	FALSE	TRUE	990413-1455	Barnes	4/13/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
135	FALSE	TRUE	990416-1300	Palmer	4/16/1999	1/0/1900	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
223	FALSE	TRUE	990504-1350	Palmer	5/4/1999	1/0/1900	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
236	FALSE	TRUE	990512-1528	Nuss	5/12/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
276	FALSE	TRUE	990614-1335	Palmer	6/14/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
313	FALSE	TRUE	990713-1330	Burns	7/13/1999	1/0/1900	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
359	FALSE	TRUE	990816-1157	Nuss	8/16/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427
445	FALSE	TRUE	991004-1330	Fowles	10/4/1999	1/0/1900	Craig Toal	Env Spclst	Cogema Mine	PO Box 703	Mills	WY	82644	(307) 464-1427
14	FALSE	TRUE	990112-1350	Palmer	1/12/1999	1/0/1900	Bill Kearney	Env Super	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
41	FALSE	TRUE	990202-0950	Palmer	2/2/1999	1/0/1900	Phil Kerney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
46	FALSE	TRUE	990203-1400	Palmer	2/3/1999	1/0/1900	Phil Kerney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
57	FALSE	TRUE	990215-1324	Husmann, Capitol Police	2/15/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
63	FALSE	TRUE	990217-1535	Burns	2/17/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
65	FALSE	TRUE	990222-1420	Barnes	2/22/1999	1/0/1900	Mark Wittrup	Dir Env Sfty	Power Resources	800 Werner C	Casper	WY	82601	(307) 472-2035
98	FALSE	TRUE	990322-0825	Palmer	3/22/1999	1/0/1900	Paul Hildenbrand	Mgr Env Affrs	Power Resources	800 Werner C	Casper	WY	82601	(307) 472-2035
224	FALSE	TRUE	990505-1400	Burns	5/5/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
229	FALSE	TRUE	990507-1330	Burns	5/7/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
241	FALSE	TRUE	990517-1400	Palmer	5/17/1999	1/0/1900	Bill Kearney	Env Super	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
253	FALSE	TRUE	990525-1513	Nuss	5/25/1999	1/0/1900	Bill Kearney	Env Super	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
258	FALSE	TRUE	990601-1300	Barnes	6/1/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
375	FALSE	TRUE	990824-1540	Burns	8/24/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
424	FALSE	TRUE	990920-1535	Nuss	9/20/1999	1/0/1900	Ralph Knode	Gnrl Mgr	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
438	FALSE	TRUE	990929-1505	Palmer	9/29/1999	1/0/1900	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(301) 735-8654
463	FALSE	TRUE	991012-0910	Fowles	10/12/1999	1/0/1900	Paul Hildebrand	Mgr Env & Reg	Power Resources	800 Werner C	Casper	WY	82601	(307) 472-2035
327	FALSE	TRUE	990722-1450	Palmer	7/22/1999	1/0/1900	John McCarthy	Radiation Sfty	Rio Algom Mining Corp	PO Box 1390	Glenrock	WY	82637	(307) 358-3744
398	FALSE	TRUE	990901-1720	Sparacio, Cptl Plc	9/1/1999	1/0/1900	John Cash	Spvsr Env Affr	Rio Algom Mining Corp	PO Box 1390	Glenrock	WY	82637	(307) 358-3744
448	FALSE	TRUE	991005-1310	Fowles	10/5/1999	1/0/1900	John McCarthy	Radiation Sfty	Rio Algom Mining Corp	PO Box 1390	Glenrock	WY	82637	(307) 358-3744
479	FALSE	TRUE	991101-0845	Fowles	11/1/1999	1/0/1900	John Cash	Spvsr Env & Reg	Rio Algom Mining Corp	PO Box 1390	Glenrock	WY	82637	(307) 358-3744
Uranium mine spills, after 1999:														
CS1		TRUE			6/30/2008		2008 Annual Report, p. 12		Cameco Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
CS2		TRUE			6/30/2008		2008 Annual Report, p. 12		Cameco Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541
CS3					6/30/2008		2008 Annual Report, p. 17		Cameco Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541

EXHIBIT

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WDEQ/\																
ID	Resp Pty Name	RP Title	RP Company	RP Address	RP City	RP State	RP Zip	RP Phone	'Date of incident	'Time of incident	County	'Quarter sections	Section	Township	Range	Street address
Uranium																
61	Craig Toal, ext 22		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	2/12/1999	1/0/1900	Joh	NW NE	16	45	77	
97	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	3/17/1999	1/0/1900	Joh	NE SW	9	45	77	53 mi NE of Midwest, WY
111	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	3/26/1999	1/0/1900	Joh	NE NW	7	44	76	
112	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	3/29/1999	1/0/1900	Joh	NE NW	7	44	76	
118	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	4/3/1999	1/0/1900	Joh	NW NE	9	45	77	
122	John Vaselin	Radiation S	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	4/8/1999	1/0/1900	Joh	SE SW	9	45	77	
129	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	4/12/1999	1/0/1900	Cam	SE NW	4	44	76	
135	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	4/15/1999	1/0/1900	Joh	SW SE	9	45	77	
223	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	5/3/1999	1/0/1900	Cam	SW SW	16	44	76	
236	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	5/12/1999	1/0/1900	Joh	NE NW	7	44	76	
276	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	6/14/1999	1/0/1900	Joh	NW NE	16	45	77	
313	Craig Toal		Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	7/12/1999	1/0/1900	Cam	NW NW	16	44	76	
359	Craig Toal	Env Spclst	Cogema Mine	PO Box 730	Mills	WY	82644	(307) 464-1427	8/15/1999	1/0/1900	Joh	SW SE	9	45	77	
445	Craig Toal	Env Spclst	Cogema Mine	PO Box 703	Mills	WY	82644	(307) 464-1427	10/4/1999	1/0/1900	Cam	SW SE	4	44	76	
14	Bill Kearney, ext 205	Env Super	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	1/12/1999	1/0/1900	Con	NE SE	21	36	73	
41	Phil Kerney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	1/29/1998	1/0/1900	Con	SE NE	21	36	73	
46	Phil Kerney, ext 205		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	2/3/1999	1/0/1900	Con	NW SE	22	36	73	
57	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	2/14/1999	1/0/1900	Con	SW NW	22	36	73	
63	Bill Kearney, ext 205		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	2/17/1999		Con	NW SE	22	36	73	
65	Mark Wittrup	Dir Env Sft	Power Resources	800 Werner Ct #352	Casper	WY	82601	(307) 472-2035	2/20/1999	1/0/1900	Con			0	0	
98	Paul Hildenbrand	Mgr Env A	Power Resources	800 Werner Ct Ste 352	Casper	WY	82601	(307) 472-2035	3/21/1999	1/0/1900	Con	SE SE	20	36	73	124 Highland Loop Rd
224	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	5/5/1999	1/0/1900	Con	SW SW	14	36	73	
229	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	5/6/1999	1/0/1900	Con	NW SE	21	36	73	
241	Bill Kearney	Env Super	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	5/17/1999	1/0/1900	Con	NW NW	21	36	72	
253	Bill Kearney	Env Super	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	5/25/1999	1/0/1900	Con	NE SE	21	36	73	
258	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	6/1/1999	1/0/1900	Con	NE NW	29	36	72	
375	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	8/24/1999	1/0/1900	Con			0	0	
424	Ralph Knode	Gnrl Mgr	Power Resources	PO Box 1210	Glenrock	WY	82637	(307) 358-6541	9/18/1999	1/0/1900	Con			0	0	
438	Bill Kearney		Power Resources	PO Box 1210	Glenrock	WY	82637	(301) 735-8654	9/29/1999	1/0/1900	Con	NE SE	21	36	73	
463	Paul Hildebrand	Mgr Env &	Power Resources	800 Werner Ct Ste 201	Casper	WY	82601	(307) 472-2035	10/1/1999	1/0/1900	Con			0	0	
327	John McCarthy	Radiation S	Rio Algom Mining	PO Box 1390	Glenrock	WY	82637	(307) 358-3744	7/21/1999	1/0/1900	Con	NE SW	26	36	74	27 mi N of Glenrock
398	John Cash	Spvsr Env	Rio Algom Mining C	PO Box 1390	Glenrock	WY	82637	(307) 358-3744	9/1/1999	1/0/1900	Con	NE SW	26	36	74	762 Ross Rd Douglas
448	John McCarthy	Radiation S	Rio Algom Mining C	PO Box 1390	Glenrock	WY	82637	(307) 358-3744	10/5/1999	1/0/1900	Con	SE NW	36	36	74	
479	John Cash	Spvsr Env	Rio Algom Mining C	PO Box 1390	Glenrock	WY	82637	(307) 358-3744	10/30/1999	1/0/1900	Con	SE NE	36	36	74	
Uranium																
CS1	John McCarthy								6/27/2007							
CS2	John McCarthy								8/23/2007							
CS3	John McCarthy								2nd half, 2005							

WDEQ/\											
ID	Addl Info	Fixed	Transportation	Refinery	O&G	Mine	AFO/CAFO	Government	Bus/Ind	LAUST	LAUST FacId
Uranium											
61		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
97		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
111	Plumbing failure in Module 31 bldg	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
112		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
118		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
122	Spill is at Irigary Mine Production Unit	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
129		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
135	Toal's extension is 22	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
223	Toal's ext is 22	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
236		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
276	Toal's ext is 22	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
313		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
359		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
445	Toal's ext is 22	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
14	Spill is 30 mi NE of Glenrock at Highland Uranium Mine	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
41	Kerney's ext is 205. Spill is 30 mi N of Douglas.	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
46		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
57		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
63		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
65	Spill is at 294 Highland Loop Rd in Douglas 82633, on Co Rd 95 between Glenrock and Douglas	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
98	Spill is at the Highland Uranium Project in Douglas	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
224	Spill is in "E" well field	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
229		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
241	Kearney's ext is 205	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
253	Kearney's ext is 205	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
258		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
375		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
424	Spill is at Highland Mine	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
438	Kearney's ext is 205	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
463		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
327		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
398	Spill is at well #3-I-251	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
448	Spill is at header house 1-1	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
479		TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	
Uranium											
CS1											
CS2											
CS3	East Evap Pond liner leak										

WDEQ/\											
ID	Fixed Other	Fixed Other Desc	Vehicle	Train	Accident	Pipeline	Equipmen	Human error	Dumping	Suspected Release	Confirmed Release
Uranium											
61	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
97	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE
111	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
112	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
118	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
122	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
129	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
135	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
223	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
236	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
276	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
313	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
359	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
445	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
14	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
41	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
46	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
57	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
63	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
65	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
98	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
224	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
229	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
241	FALSE	Uranium mine	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
253	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
258	FALSE		FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE
375	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
424	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
438	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
463	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
327	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
398	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
448	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
479	FALSE		FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
Uranium											
CS1						FALSE	TRUE				TRUE
CS2						TRUE	TRUE				TRUE
CS3						FALSE	TRUE				TRUE

WDEQ/\											
ID	Cause Other	Diesel	Crude oil	Condensa	Oil	Haz waste	Gasoline	Produced water	Substance Other	Quantity	Gallons
Uranium											
61		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution	1000	TRUE
97	Loose flange on pipe	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection and recovery solution	3000	TRUE
111	2" hose disconnected	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection solution, 1.2 mg/L uranium	23,520	TRUE
112	Wellhead separated from casing	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection solution, 0.4 mg/L uranium	60,918	TRUE
118	Injection trunk line split	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection solution/permiate	13,000	TRUE
122	Plumbing on wellhead came off	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution, 3.8 mg/L of U308	1000	TRUE
129		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection solution	32,400	TRUE
135	Valve froze and split	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution 6.2 mg/l U308	200	TRUE
223		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection solution, 1.6 mg/L U308	2650	TRUE
236	Wellhead separated from casing	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection solution, no detectable uranium	1000	TRUE
276	Disconnected hose on wellhead LI-73	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution 6.7 mg/L U308	1000	TRUE
313		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution	3780	TRUE
359	Union on wellhead split	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution	5000	TRUE
445	Hose separated from wellhead	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Recovery solution	400	TRUE
14	Stuck popoff valve on injection wellhead	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Uranium injection fluid, 2-4 ppm uranium, 2	Appx 3000-6000	TRUE
41	Gasket failure	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection water	1000	TRUE
46	Popoff valve	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	500	TRUE
57	Pipe failed	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Uranium production fluid	800	TRUE
63		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	Unknown	FALSE
65		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	800-900	TRUE
98	Gas valve on injection well stuck open	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	1200	TRUE
224	Seal on pump failed	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	1000	TRUE
229	Popoff valve on injection well malfunctioned	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	200	TRUE
241	1" union on pipe broke	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Reverse osmosis permeate, .01 mg/L uran	2500	TRUE
253	Cracked bushing on a pipe caused a leak	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Uranium production fluid	2000	TRUE
258	Excavation behind central plant hit pipeline to waste disposal well	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Waste disposal well fluid	4000	TRUE
375	Cracked flange on wellhead	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Injection fluid	200	TRUE
424	Wellhead failed	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Wellfield production fluid with uranium	292	TRUE
438	Brass hose fitting broke	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	54 ppm uranium	300	TRUE
463	Sand in casing soaked with water, causing break	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Groundwater with oxygen and carbon dioxi	Unknown	FALSE
327	Power outage caused trunk line in header house to fail	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Uranium production water 58.7 ppm U308	15,300	TRUE
398	Leaking well	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE		1600	TRUE
448	Injection line ruptured	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE		930	TRUE
479	Pump went out and valve failed to hold water	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE		1000	TRUE
Uranium											
CS1	Broken flange in Mine Unit 2 (2I-156)								ISL injection fluid	900	TRUE
CS2	Joint failure in buried wastewater pipeline								ISL mine wastewater (unspecified)	7,500	TRUE
CS3	East Evap Pond taken out of service								ISL mine wastewater (U = 148-164 mg/l)	no data	

WDEQ/\											
ID	Barrels	Unit other	Land	Air	Media Other	Stormsewer	Sanitary s	Groundwa	Surface w	Name of w	Sara
Uranium											
61	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
97	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
111	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Ran down	FALSE
112	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
118	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
122	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
129	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Intermitten	FALSE
135	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Dry draw to	FALSE
223	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	A draw tha	FALSE
236	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	Willow Cre	FALSE
276	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
313	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
359	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
445	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
14	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
41	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
46	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	1st depres	FALSE
57	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
63	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
65	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
98	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Dry draw	FALSE
224	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
229	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
241	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
253	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
258	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
375	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
424	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
438	FALSE		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	Dry ditch	FALSE
463	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE		FALSE
327	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
398	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
448	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
479	FALSE		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		FALSE
Uranium											
CS1			TRUE								
CS2			TRUE								
CS3											

WDEQ/\	
ID	**Disposal actions**
Uranium	
61	Soaked in, will sample soil and determine what, if any, corrective action
97	Soaked into ground; took samples that analyzed at 4.2 mg/L of U308
111	Soaked into ground, took samples from creek bed
112	Recovered 3000-5000 gal of water with vac truck, will take it to waste pond in Lincoln City
118	Soaked into soil, will take samples and then decide on appropriate cleanup
122	Contained in draw, reattached plumbing, will take soil samples
129	None
135	Collected samples
223	Will collect samples
236	None, 600-700 gal of spill went into creek
276	Soaked into ground, took samples
313	Soaked into ground; took samples
359	Collected 1800 gal, tested soil for uranium to determine how to dispose of it
445	Testing soil to determine necessary cleanup
14	Dug some holes and vacuumed up liquid, took soil sample
41	Water soaked into ground, replaced all gaskets in building, will take samples.
46	Recovered 250 gal, built sump which will collect the other 250 gal during thaw for later disposal
57	Dug pits to collect fluid, will vac truck when it thaws
63	Started investigation, will put wells in to pump out liquid
65	Collected in barrow ditch, then picked up 800 gal with vac truck
98	Vac trucked out of draw, put in wastewater system, treated and disposed of through land application
224	500 gal went out of building & soaked into ground, will evaluate
229	Soaked into ground
241	Soaked into ground
253	Removed from land and dry creek bed for processing
258	Reprocessed fluid
375	Soaked into ground
424	Soaked into ground
438	Soaked into ground; collected samples
463	Contained in sand zone
327	Soaked into ground, collected 3 soil samples
398	None
448	Contained in header house, soaked into ground
479	Water ran out onto ground
Uranium	
CS1	
CS2	
CS3	

WDEQ/\							
ID	Final Additional Info	W3District	EmergCoord	SHWD	AQD	AML	LQD1
Uranium							
61	Notified Glen Mooney in Sheridan DEQ	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
97	Palmer will call Mooney at LQD	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
111	Mooney at LQD Sheridan, Howl at NRC	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
112	Will call Mooney in LQD Sheridan	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
118	Will call Mooney in LQD Sheridan	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
122	Notified Glen Mooney in Sheridan LQD	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
129	The released solution mixed with spring runoff in a draw 3 miles from Willow Creek, and might have gone into the creek	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
135	Notified Mooney of Sheridan LQD; Toal will follow up to McKenzie	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
223	Toal will send a letter to Mooney or McKenzie	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
236	Palmer notified Collins of G&F 5/12/99 15:45	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
276	Toal will follow up with letter to McKenzie and Mooney	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
313		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE
359		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
445		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
14	Spill went into dry stream channel	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
41	300 gal went out of building. Kerney will follow up with letter to Harmon.	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
46	Fluid went into swale on first draw. Will follow up with letter to Harmon and Paula Cutillo, LQD.	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
57		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
63		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
65	Roberta Hoy in LQD, phone ext 7756	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
98	Notified Paula Cutillo in LQD; injection fluid has oxygen, carbon dioxide and 1.5 ppm uranium; will send written report to Harmon and Cutillo within 7 days	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
224		FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
229		FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
241	Kearney will send followup letter to Harmon and Cutillo	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
253	Notified Cutillo in LQD	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
258		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE
375		TRUE	FALSE	FALSE	FALSE	FALSE	FALSE
424	Notified Cutillo in LQD	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
438	Notified Cutillo (LQD); will follow up to Harmon and Cutillo	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE
463		FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
327	Notified Lusher at NRC; caller will follow up to Cutillo and Palmer	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE
398	Notified NRC	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
448	Notified NRC	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
479	Notified NRC by phone and letter	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE
Uranium							
CS1							
CS2							
CS3							

WDEQ/\												
ID	UST/LUST	Watershed	NPDES/CBM	NPDES/Other	GPC	UIC	WEMA	ReferOther	Contact	RefDate	Resolved	ResDate
Uranium												
61	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie		FALSE	
97	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie		FALSE	
111	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie		FALSE	
112	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie		FALSE	
118	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie	4/5/1999	TRUE	4/6/1999
122	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie		FALSE	
129	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie	4/13/1999	TRUE	8/3/1999
135	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie	4/16/1999	TRUE	5/5/1999
223	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie, Glenn Mooney	5/4/1999	FALSE	
236	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Glen Mooney, McKenzie	5/12/1999	FALSE	
276	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie and Glenn Mooney	6/14/1999	TRUE	8/3/1999
313	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie	7/13/1999	TRUE	8/3/1999
359	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Glen Mooney	8/16/1999	TRUE	3/21/2000
445	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Don McKenzie	10/4/1999	TRUE	1/18/2000
14	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	1/12/1999	TRUE	3/21/2000
41	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE				FALSE	
46	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	2/3/1999	TRUE	3/21/2000
57	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	2/15/1999	TRUE	3/21/2000
63	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon		FALSE	
65	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	2/22/1999	TRUE	3/21/2000
98	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	3/22/1999	TRUE	3/21/2000
224	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	5/5/1999	FALSE	
229	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	5/10/1999	FALSE	
241	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon, Paula Cutillo	5/17/1999	FALSE	
253	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	5/25/1999	TRUE	3/21/2000
258	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	6/1/1999	TRUE	3/21/2000
375	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	8/24/1999	FALSE	
424	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon	9/21/1999	FALSE	
438	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Lou Harmon, Paula Cutillo	9/29/1999	FALSE	
463	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Georgia Cash, Paula Cutillo	10/12/1999	FALSE	
327	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Paula Cutillo and Bill Palmer	7/22/1999	TRUE	4/6/2000
398	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Paula Cutillo	9/2/1999	TRUE	9/9/1999
448	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Paula Cutillo	10/5/1999	FALSE	
479	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE		Georgia Cash	11/1/1999	TRUE	4/6/2000
Uranium												
CS1												
CS2												
CS3												

J̄

FILED AT 2:00 O'CLOCK P M

AUG 2 8 1995

R. BARTON, CLERK
DISTRICT COURT, DUVAL COUNTY TEXAS
BY: _______________ DEPUTY

CAUSE NO. 16264

MANUEL T. LONGORIA, individually and as trustee for MARIA A. LONGORIA GST EXEMPT TRUST	§	IN THE DISTRICT COURT
vs.	§	DUVAL COUNTY, T E X A S
URANIUM RESOURCES, INC., URI, INC., and WILLIAM M. MCKNIGHT, SR.	§	229TH JUDICIAL DISTRICT

PLAINTIFF'S ORIGINAL PETITION

TO THE HONORABLE JUDGE OF SAID JUDGE:

MANUEL T. LONGORIA, individually and as trustee for MARIA A. LONGORIA GST EXEMPT TRUST, files his Original Petition complaining of URANIUM RESOURCES, INC., URI, INC., and WILLIAM M. MCKNIGHT, and would show the Court as follows:

I.

MANUEL T. LONGORIA, (hereinafter referred to as "Plaintiff), is a natural person residing at 1408 Mier, Laredo, Webb County, Texas 78040. He is the sole Trustee for the MARIA A. LONGORIA GST EXEMPT TRUST. Said Plaintiff owns the property , both individually and as Trustee, made subject to this suit.

Defendant URANIUM RESOURCES, INC., is a Delaware corporation with its principal place of business in Dallas, Dallas County, Texas. URANIUM RESOURCES, INC. may be served with process through Thomas Ehrlich, 12750 Merit Drive, Suite 1210, Lock Box 12, Dallas, Dallas County, Texas 75251.

Defendant URI, INC., is a Delaware corporation with its principal place in Dallas, Dallas County, Texas. URI, INC. is a wholly-owned subsidiary of URANIUM RESOURCES, INC. URI, INC. may

EXHIBIT J

also be served with process through Thomas Ehrlich, 12750 Merit Drive, Suite 1210, Lock Box 12, Dallas, Dallas County, Texas 75251.

Defendant, WILLIAM M. MCKNIGHT, SR., is a natural person, resident of Nueces County, Texas, who may be served with process at URI, INC., 5656 South Staples, Suite 250, LB 8, Corpus Christi, Texas 78411.

II.

Venue is proper in Duval County pursuant to Tex. Civ. Prac & Rem. Code § 15.001 because all or part of Plaintiff's causes of action accrued in Duval County.

III.

Defendants, URANIUM RESOURCES, INC. and URI, INC., for many years engaged in uranium mining and processing operations on ranch property owned by Plaintiff, pursuant to a mineral lease with Plaintiff, as well as on property immediately adjacent to Plaintiff's land. As a result of these uranium mining and processing operations, URANIUM RESOURCES, INC. and URI, INC., have, on many occasions, released toxic chemicals and/or radioactive materials onto Plaintiff's land polluting the soil, aquifer, and vegetation of Plaintiff's Ranch, in violation of Texas law and said Defendants' contractual obligations to Plaintiff.

IV.

Plaintiff would further aver that Defendant WILLIAM R. MCKNIGHT in the events giving rise to this suit, is a person who had supervisory and management authority over the uranium operations in question, including such a degree of control that would have enabled him, in the exercise of ordinary care, to properly protect the Plaintiff from the injuries and damages suffered by Plaintiff in the events giving rise to this suit.

Plaintiff would assert and allege that the cause or causes of action herein arose from or are connected with purposeful acts committed by said Defendant.

V.

Plaintiff MANUEL T. LONGORIA is the owner and trustee of the property which is the subject of this suit. The property is a ranch located in Duval and Webb Counties. In the late 1970's Plaintiff leased the rights to mine for uranium on portions of his Ranch to Defendants, URANIUM RESOURCES, INC., AND URI, INC., who thereafter engaged in uranium mining and processing operation on Plaintiff's land at all times relevant herein. During the course of said Defendants' Uranium mining and processing operations on Plaintiff's Ranch, and on adjacent land, Defendants URANIUM RESOURCES, INC. and URI, INC. (hereinafter collectively referred to as "URI"), wrongfully discharged excessive and hazardous materials onto Plaintiff's property, contaminating the soils, aquifer, and vegetation on his Ranch, and creating a serious health hazard thereon. Despite the Defendants' knowledge that URI's activities were contaminating Plaintiff's property, they completely failed to inform Plaintiff of the pollution, and instead constantly assured him that URI's activities were doing no harm. Plaintiff did not learn of the pollution and contamination of his property until only recently. The contamination has damaged the value of the property, preventing Plaintiff's use and enjoyment of the property, and has become a substantial toxic health hazard.

VI.

URI's Uranium mining and processing operations on Plaintiff's Ranch (hereinafter referred to as the "Longoria Ranch"), and the adjacent property, first began in 1979. URI mined the Uranium through in-situ solution mining, a process which contaminated the soil, aquifer, and vegetation on Plaintiff's land with toxic materials and hazardous waste.

VII.

URI also discharged massive amounts of wastewater into the Arroyo de los Angeles in its uranium mining and processing operations, both on the Longoria Ranch and on adjacent property, including discharging directly into an extremely rare and attractive natural spring fed pool in the Arroyo that was used for swimming and fishing. As a result, portions of property owned by Plaintiff, including the Arroyo spring, and the Arroyo meadows, is contaminated with hazardous materials and hazardous waste.

VIII.

Defendant MCKNIGHT represented to Plaintiffs that the discharge onto the Arroyo de Los Angeles from URI's mining operations would consist of water cleaner than typical City drinking water, and convinced Plaintiff to allow for such discharge, when said Defendant knew that in fact the Arroyo would be contaminated with massive amounts of wastewater laden with hazardous materials.

IX.

The Arroyo de los Angeles on the Longoria Ranch property in Duval County is now polluted with dangerous chemicals. These chemicals were deposited by discharges onto the Arroyo. Such contamination was caused by URI and has damaged the value of Plaintiff's property, prevented use of the property, and has created a serious health hazard which has resulted in the need for extensive remediation of the affected soil, aquifer, and vegetation.

X.

Other property on the Longoria Ranch, including the uranium mine fields operated by URI, and property on which URI's uranium processing facilities were located, were contaminated with hazardous materials and dangerous chemicals as a result of the uranium mining activities of URI. Such contamination was caused by URI and has damaged the value and use of Plaintiff's property, and has created a serious health hazard which has resulted in the need for extensive remediation of the affected soil, aquifer, and vegetation.

XI.

Following the cessation of its solution mining operations at the Longoria Ranch, URI was asked by the State to clean-up its pollution. Plaintiff subsequently also requested of URI that it remediate the property. URI has failed to comply.

XII.
NEGLIGENCE AND GROSS NEGLIGENCE

Defendants owed a duty of reasonable care to Plaintiff to ensure that its activities on Plaintiff's property did not injure or damage Plaintiff. Defendants breached this duty of care through acts and omissions including but not limited to:

1. Failing to adequately and safely conduct mining operations;

2. Failing to adequately and safely conduct uranium processing operations;

3. Failing to adequately and properly conduct mining restoration activities;

4. Failing to dispose of wastewater in an adequate and proper manner;

5. Failing to choose a safe and adequate location for its wastewater discharge;

6. Failing to conduct accurate, timely and frequent testing of chemicals in its wastewater stream;

7. Failing to conduct accurate, timely and frequent testing of chemicals in the soil at its wastewater discharge locations;

8. Failing to properly investigate and take appropriate action when notified of contamination by the State;

9. Misinforming the Plaintiff and the public of the scope and nature of contamination on the Longoria Ranch;

10. Failing to take timely and appropriate actions to clean-up the contamination on the Longoria Ranch;

11. Failing to comply with the State of Texas regulations regarding limits for chemical contamination of soil and water;

12. Failing to comply with State of Texas regulations regarding the frequency of testing for chemicals in its wastestream, and in the soil;

13. Failing to take adequate corrective measures when it

knew or should have known that its activities were polluting and contaminating Plaintiff's property;

14. Failing to warn Plaintiff of the potential contamination of his property;

15. Failing to notify Plaintiff of the contamination of his property.

Defendants' negligent acts and omissions were and are a proximate cause of injuries and damages to Plaintiff.

XIII.
NEGLIGENCE PER SE

URI's wastewater disposal caused contamination and pollution of Plaintiff's property in excess of the pollution threshold limits defined in Texas law.

XIV.
BREACH OF CONTRACT

Plaintiff entered into a Uranium mining lease with R.L. Burns Corp. on August 10, 1977. This lease was subsequently assigned by R.L. Burns Corp. to URI. URI breached the lease through its improper, inadequate, and unsafe conduct in its uranium mining and processing operations, including the disposal of polluted wastewater onto the Longoria Ranch which contaminated Plaintiff's soil, aquifer, and vegetation with toxic and radioactive materials, and other unsafe uranium mining and processing activities, all of which contaminated Plaintiff's land; and further breached the lease in failing to remediate Plaintiff's contaminated land to its original condition. Furthermore, URI has failed to pay any compensation whatsoever to Plaintiff for the damage to his property. URI's breaches of its agreements with Plaintiff have damaged and injured Plaintiff beyond the jurisdictional limits of the Court.

XV.
FRAUD

Prior to entering into the original Uranium lease with Plaintiff, as well as the subsequent wastewater pipeline easement agreement, URI and MCKNIGHT made false material representations to Plaintiff regarding the environmental impact of URI's operations on Plaintiff's property. URI and MCKNIGHT told Plaintiff that its operations were clean, safe, and well-regulated and would not affect Plaintiff's property or its value. When URI and MCKNIGHT made these representations, they knew they were false, or in the alternative, made them recklessly without any knowledge of their truth as a positive assertion. URI and MCKNIGHT made false representations with the full intent that Plaintiff rely upon them in order to encourage Plaintiff to enter into a Uranium mining lease with URI and to allow URI and MCKNIGHT to discharge wastewater into the Arroyo de Los Angeles. Based upon URI's and MCKNIGHT'S representations that its activities would not contaminate or pollute his land, Plaintiff entered into the lease with URI and allowed the discharge of waste water into the Arroyo, through a pipeline easement, and has thereby suffered substantial and severe injuries and damages.

XVI.
NUISANCE

URI's pollution and contamination of the soil, aquifer, and vegetation of Plaintiff's ranch has unreasonably interfered with

Plaintiff's use and enjoyment of his land. URI's conduct was a result of its intentional or negligent wrongdoing. Such wrongdoing as plead elsewhere in this petition is incorporated into this section by reference. URI's interference with Plaintiff's use and enjoyment of his land has caused Plaintiff significant and substantial harm.

XVII.
TRESPASS

URI's dumping of toxic and radioactive materials on Plaintiff's property through its wastewater discharge constituted an unauthorized physical entry on the property. It was URI's full intention to dispose of the wastewater on Plaintiff's property, and such disposal was done voluntarily. As a result of the unauthorized entry of URI's toxic materials on his ranch, Plaintiff has suffered significant and substantial injuries and damages.

XVIII.
INTENTIONAL INFLICTION OF EMOTIONAL DISTRESS

URI's pollution of Plaintiff's property, its efforts to conceal the contamination from Plaintiff, and its attempt to abandon the contaminated area prior to clean-up demonstrate extreme and outrageous conduct by URI. Such conduct was undertaken intentionally or recklessly by URI, and caused Plaintiff to suffer severe emotional distress as a result.

XIX.
DAMAGES

As a direct and proximate cause of URI's wrongful acts and omissions, Plaintiff has been severely injured and damaged. Such injuries and damages include the following:

1. Personal discomfort, annoyance, and inconvenience for damage to Plaintiff's ranch property;

2. Loss of the productivity of Plaintiff's ranch property;

3. Loss of the use of Plaintiff's property;

4. Loss of the value of Plaintiff's property;

5. Lost rental value of the property;

6. Loss in the value of Plaintiff's livestock;

7. Cost of restoring the Ranch to the condition it was in prior to Defendant's activities, including restoring the soil, aquifer, and vegetation to its prior condition;

8. Damage to the property, to the underground aquifers, and injury to vegetation by past and future restoration activities;

The Plaintiff's injuries and damages are in an amount greatly in excess of the minimum jurisdictional requirements of this Court.

Plaintiff also requests that the Court require URI to specifically perform its obligations with Plaintiff, and with the State of Texas, to restore the land, including, without limitation, the soil, aquifer, and vegetation Defendants contaminated to the condition it was in prior to URI's mining activities.

XX.
PUNITIVE DAMAGES

Defendants' conduct that resulted in the pollution and contamination of Plaintiff's property was fraudulent, malicious, and grossly negligent. It further demonstrated conscious indifference to the rights and welfare of the Plaintiff. Plaintiff is entitled to punitive damages because Defendants intentionally made false statements to Plaintiff concerning the environmental effect of URI's mining and restoration activities. Defendants knew of the falsity of its statements and made them intentionally to deceive Plaintiff or with heedless and reckless disregard of the consequences of their statements.

Plaintiff is further entitled to punitive damages because Defendants' conduct demonstrates malice. Defendants polluted and contaminated the Longoria Ranch, concealed the degree of contamination from Plaintiff, and attempted to deceitfully claim that there was no contamination. Defendants carried out these acts with flagrant disregard for the rights of Plaintiff and with actual awareness that their acts would in reasonable probability result in damage to Plaintiff's property.

Plaintiff is also entitled to punitive damages because of Defendants' gross negligence. Defendants' conduct that resulted in the pollution and contamination of Plaintiff's property demonstrated such an entire want of care that it reflects a conscious indifference to the rights, and welfare of Plaintiff. Defendant's activities on the ranch involved an extreme degree of risk of harm to the Plaintiff. Defendants knew of the risk involved, but nevertheless proceeded with its wrongful activities with conscious indifference to the rights, safety, and welfare of Plaintiff.

XXI. DISCOVERY RULE

The Discovery Rule applies to this matter. No limitation begins to run until Plaintiff learned of, or in the exercise of reasonable diligence, should have learned of Defendants' misconduct herein complained of. Plaintiff brought suit promptly after learning of the existence of facts constituting the causes of action herein pleaded. Any suggestions that in the exercise of reasonable diligence that Plaintiff should have discovered Defendants' misconduct earlier in incorrect. Accordingly, the defenses of limitations, latches, estoppel or ratification do not apply.

XXII.
ATTORNEY'S FEES

Because of Defendant's wrongful acts and omissions, Plaintiff has had to hire the below signed attorneys to prosecute this suit on his behalf. Plaintiff thereby will incur liability for the usual, customary and reasonable fees for the attorneys' services in the prosecution of the claim. If Plaintiff is successful in the prosecution of his Breach of Contract and Punitive Damages claims, he is entitled to recover the reasonable and necessary attorneys' fees he has incurred.

XXII.
PRAYER

WHEREFORE, PREMISES CONSIDERED, Plaintiff prays that Defendants be cited to answer and appear herein and that, upon final trial hereof, Plaintiff recover judgment against Defendants for damages, exemplary damages, costs, pre-judgment interest, post-judgment interest, attorneys fees, and all such other and further relief at law and equity to which they may show themselves justly entitled.

Respectfully Submitted,

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Laura L. Gomez
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By: ______________________
Ricardo de Anda
State Bar No. 056895000

Attorneys for Plaintiff

PLAINTIFF REQUESTS TRIAL BY JURY.

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April 4, 1997

Mr. Dale P. Kohler, Leader
Inspection and Compliance Team
UIC, Uranium, and Radioactive Waste Section
TNRCC
P O Box 13087
Austin, Texas 78711-3087

RE: Permit #1989

Dear Mr. Kohler:

As you may recall, I represent Mr. Manuel Longoria, the owner of the property subject to the above Permit issued by your office.

In response to URI's request that the property be released from URI's Permit requirements, URI took samples of soil from the Arroyo de Los Angeles in November, and again in December of 1996, to determine the extent of uranium contamination of the Arroyo caused by its long-standing discharge of contaminated wastewater into the Arroyo on the Longoria Ranch. URI had the samples analyzed by Jordan Labs. We took split samples of the December soil retrievals and had them analyzed by Teledyne labs. I take it that URI has forwarded you copies of Jordan's lab analysis. I am enclosing herewith copies of Teledyne's lab analysis.

I have attached hereto two tables setting out the more relevant data regarding the lab results. On Table 1, I have compared URI's results from the November 1996 retrievals, with the results which they obtained from an analysis which they undertook in 1994. I believe you have a copy of the 1994 results. On Table 2, I have compared URI's results from the December 1996 retrievals as reported by Jordan Labs, with our split sample results as reported by Teledyne Labs.

It is evident from Table 1 that of the 20 samples taken downstream from the discharge point, 19 of the samples exhibit uranium contamination substantially above background levels, and 8 of the samples indicate contamination above the State's limits for releasing a permittee from its obligations. Moreover, 14 of the 20 samples taken in November of 1996 exhibited an increase in levels of contamination from URI's 1994 tests. For example, several locations that were below legal limits in 1994 rose to above legal limits in November of 1996. Indeed, Table 1 shows that uranium is moving after each rainstorm, and that levels that are decontaminated today will likely become recontaminated later, unless extensive decontamination is undertaken to remove all vestiges of uranium above background.

While Table 1 shows that measurements upstream, at the boundary of the Longoria-Cogema leased property, are below the legal limit, uranium concentrations are four times above background. Moreover, the uranium concentrations recorded from the November 1996 retrievals are above those measured in 1994, and indicate uranium is moving downstream from the URI discharge point on property owned by Servando Benavides. This shows that uranium from the URI/Benavides discharge point has not only contaminated the Cogema leased stretch of the Arroyo, but is also moving onto the Longoria Ranch. URI should thus not be relieved of its permit obligations until the Longoria property is completely remediated, and until leakage from the URI/Benavides discharge point and the Cogema leased property is resolved as well.

While Table 1 shows that uranium concentrations further down the Arroyo on Longoria property are not above legal limits, they are still significantly above background levels, and there is no question uranium has moved more than 3/5 of a mile downstream to the border of the Longoria property, and undoubtedly onto neighboring properties.

Finally, we are concerned with the understated results reported by URI, when compared with our split sample report from Teledyne labs. URI soil concentration of uranium results reported by Jordan Labs are consistently lower when compared to the Teledyne Lab results, as shown on table 2. This is probably explained by the fact that the laboratory methods of measurement are different. Teledyne uses a more precise method, dissolving the uranium in acid first. We believe that this suggests that most of the URI samples reported on Table 1 as being below legal limits, are understated, and should be considered as being in fact above limits.

We submit that the whole stretch of the Arroyo from the URI/Benavides discharge point until it leaves the Longoria Ranch needs to be decontaminated before URI is discharged from its permit obligations. Moreover, we have concern about URI's proposed method for remediation. URI wishes to simply remove contaminated soil. We fear that unless your office directs an independent monitoring of the work, URI could simply mix surface uranium where concentrations are higher in with deeper arroyo soils so that the resultant concentrations are below regulatory limits without actually moving uranium out of the arroyo. This is hardly remediation. A remediation plan should be required of URI which is designed to effectively and permanently decontaminate the Arroyo, and safely dispose of the contaminated soils in a validated manner.

Please advise as to your response to this letter before you take action on URI's request for release from its permit obligations, specifically providing us with any proposed remediation plan, so that we may be provided with an opportunity to comment on how you intend to provide for the required remediation.

Thank you.

Sincerely yours,

Ricardo de Anda

RDA/lbv

ARROYO DE LOS ANGELES SOIL
TABLE 1. URI ANALYSIS COMPARISON

NATURAL U (PPM AVERAGES)

URI '94		URI '96	
Location		**Location**	
LG100	0.93		1
LG200	0.93		1
LG300	0.93		1.2
LG400	1		1.2
LG500	1.1		1
LCK0	38	LCK50	24
LCK100	16	LCK150	71
LCK200	34	LCK250	47
LCK300	14	LCK350	7.6
LCK400	30	LCK450	48
LCK500	35	LCK550	54
LCK600	33	LCK650	100
LCK700	53	LCK750	36
LCK800	20	LCK850	24
LCK900	34	LCK950	39
LCK1000	34	LCK1050	58
LCK1100	43	LCK1150	40
LCK1200	25	LCK1250	18
LCK1300	12	LCK1350	14
LCK1400	37	LCK1450	70
LCK1500	37	LCK1550	47
LCK1600	27	LCK1650	27
LCK1700	11	LCK1750	12
LCK1800	10	LCK1850	25
LCK1900	10	LCK1950	20
LCK2000	20	LCK2050	17

Note: URI '96 samples taken November 19, 1996, at LCK 50, 150, 250, etc., while URI '94 samples taken at LCK0, 100, 200, etc. URI '94 results were apparently taken 75' beyond the LCK designation.

ARROYO DE LOS ANGELES SOIL
TABLE 2. TOTAL TELEDYNE V. URI

	MAXIMUM		AVERAGE	
Location	**Teledyne**	**URI**	**Teledyne**	**URI**
LCK 50	**100**	**66**	**27.5**	**20.68**
LCK 650	**69**	**64**	**41.2**	**35.8**
LCK 1550	**48**	**44**	**17.54**	**22.82**
LCK 2850	**19**	**20**	**8.46**	**9.94**
LG 50	**1.5**	**1**	**1.28**	**0.82**
LG 150	**1.3**	**1**	**1.14**	**0.896**
LG 550	**1.5**	**1.2**	**.24**	**0.936**

Note: URI, Teledyne split samples taken Dec. 3, 1996. "Average" designations include an average compilation of the 5 samples taken across the Arroyo at the designated points. "Maximum" designations include the maximum determination found between the 5 samples taken across the designated points.

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

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DE ANDA LAW FIRM
PLAZA DE SAN AGUSTIN
212 FLORES AVENUE
LAREDO TX 78040

S O I L

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32271	LCK-50 A 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.0 +-0.2 E 02 PPM	*				3
							U-235	L.T. 7. E-01		01/14			4
							TH-234	3.6 +-0.4 E 01		01/14			4
							PB-214	2.8 +-0.3 E 01		01/14			4
							BI-214	2.6 +-0.3 E 01		01/14			4
							AC-228	L.T. 4. E-01		01/14			4
							PB-212	L.T. 2. E-01		01/14			4
							TL-208	L.T. 1. E-01		01/14			4
							K-40	5.1 +-0.9 E 00		01/14			4
							CS-137	1.3 +-0.6 E-01		01/14			4
32272	LCK-50 A 6-12		12/03				PREP	DISSO LVED					3
							TOTAL-U	6.4 +-1.0 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/14			4
							TH-234	3.1 +-0.6 E 00		01/14			4
							PB-214	1.2 +-0.1 E 00		01/14			4
							BI-214	1.1 +-0.1 E 00		01/14			4
							AC-228	L.T. 2. E-01		01/14			4
							PB-212	3.0 +-0.4 E-01		01/14			4
							TL-208	1.3 +-0.3 E-01		01/14			4
							K-40	5.7 +-0.6 E 00		01/14			4
							CS-137	8.7 +-3.0 E-02		01/14			4
32273	LCK-50 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	2.5 +-0.4 E 01 PPM	*				3
							U-235	L.T. 5. E-01		01/10			4
							TH-234	8.5 +-0.9 E 00		01/10			4
							PB-214	8.6 +-0.9 E 00		01/10			4
							BI-214	8.3 +-0.8 E 00		01/10			4
							AC-228	L.T. 3. E-01		01/10			4
							PB-212	5.2 +-0.7 E-01		01/10			4

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212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32273	LCK-50 B 0-6		12/03				TL-208	1.5 +-0.5 E-01		01/10			4
							K-40	8.0 +-0.8 E 00		01/10			4
							CS-137	2.0 +-0.4 E-01		01/10			4
32274	LCK-50 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	2.3 +-0.3 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 6. E-01		01/10			4
							PB-214	5.6 +-0.7 E-01		01/10			4
							BI-214	4.9 +-0.7 E-01		01/10			4
							AC-228	2.3 +-1.1 E-01		01/10			4
							PB-212	2.4 +-0.4 E-01		01/10			4
							TL-208	1.1 +-0.3 E-01		01/10			4
							K-40	6.2 +-0.6 E 00		01/10			4
							CS-137	9.1 +-3.1 E-02		01/10			4
32275	LCK-50 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	8.5 +-1.3 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/14			4
							TH-234	L.T. 7. E-01		01/14			4
							PB-214	9.3 +-0.9 E-01		01/14			4
							BI-214	8.8 +-0.9 E-01		01/14			4
							AC-228	L.T. 1. E-01		01/14			4
							PB-212	2.8 +-0.3 E-01		01/14			4
							TL-208	9.5 +-2.1 E-02		01/14			4
							K-40	6.9 +-0.7 E 00		01/14			4
							CS-137	1.9 +-0.3 E-01		01/14			4

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MR RICARDO DE ANDA
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PLAZA DE SAN AGUSTIN
212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32276	LCK-50 E 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.7 +-0.3 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	7.2 +-3.3 E-01		01/10			4
							PB-214	7.2 +-0.7 E-01		01/10			4
							BI-214	6.8 +-0.7 E-01		01/10			4
							AC-228	3.4 +-0.9 E-01		01/10			4
							PB-212	3.7 +-0.4 E-01		01/10			4
							TL-208	1.3 +-0.2 E-01		01/10			4
							K-40	6.8 +-0.7 E 00		01/10			4
							CS-137	1.1 +-0.3 E-01		01/10			4
32277	LCK-650 A 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	6.9 +-1.0 E 01 PPM	*				3
							U-235	1.4 +-0.3 E 00		01/14			4
							TH-234	2.8 +-0.3 E 01		01/14			4
							PB-214	5.7 +-1.0 E-01		01/14			4
							BI-214	4.1 +-0.9 E-01		01/14			4
							AC-228	L.T. 2. E-01		01/14			4
							PB-212	3.1 +-0.6 E-01		01/14			4
							TL-208	1.2 +-0.4 E-01		01/14			4
							K-40	5.0 +-0.7 E 00		01/14			4
							CS-137	3.3 +-0.5 E-01		01/14			4
32278	LCK-650 A 6-12		12/03				PREP	DISSO LVED					3
							TOTAL-U	4.4 +-0.7 E 00 PPM	*				3
							U-235	L.T. 3. E-01		01/14			4
							TH-234	2.0 +-0.6 E 00		01/14			4
							PB-214	6.9 +-0.8 E-01		01/14			4
							BI-214	6.0 +-0.8 E-01		01/14			4
							AC-228	4.3 +-1.1 E-01		01/14			4
							PB-212	5.1 +-0.6 E-01		01/14			4

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SOIL

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32278	LCK-650 A 6-12		12/03				TL-208	1.8 +-0.3 E-01		01/14			4
							K-40	9.3 +-0.9 E 00		01/14			4
							CS-137	6.2 +-2.8 E-02		01/14			4
32279	LCK-650 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	2.2 +-0.3 E 01 PPM	*				3
							U-235	L.T. 6. E-01		01/14			4
							TH-234	1.3 +-0.2 E 01		01/14			4
							PB-214	6.1 +-1.3 E-01		01/14			4
							BI-214	5.7 +-1.1 E-01		01/14			4
							AC-228	L.T. 3. E-01		01/14			4
							PB-212	3.0 +-0.7 E-01		01/14			4
							TL-208	7.7 +-4.3 E-02		01/14			4
							K-40	4.2 +-0.7 E 00		01/14			4
							CS-137	3.0 +-0.6 E-01		01/14			4
32280	LCK-650 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.5 +-0.2 E 01 PPM	*				3
							U-235	L.T. 3. E-01		01/10			4
							TH-234	7.4 +-0.7 E 00		01/10			4
							PB-214	4.3 +-0.7 E-01		01/10			4
							BI-214	4.5 +-0.7 E-01		01/10			4
							AC-228	L.T. 2. E-01		01/10			4
							PB-212	3.6 +-0.4 E-01		01/10			4
							TL-208	1.1 +-0.4 E-01		01/10			4
							K-40	7.8 +-0.8 E 00		01/10			4
							CS-137	1.8 +-0.4 E-01		01/10			4

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

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MR RICARDO DE ANDA
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212 FLORES AVENUE
LAREDO TX 78040

S O I L

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32281	LCK-650 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	7.1 +-1.1 E 01	PPM *				3
							U-235	1.5 +-0.2 E 00		01/14			4
							TH-234	3.1 +-0.3 E 01		01/14			4
							PB-214	5.5 +-0.8 E-01		01/14			4
							BI-214	4.2 +-0.7 E-01		01/14			4
							AC-228	L.T. 2. E-01		01/14			4
							PB-212	2.9 +-0.6 E-01		01/14			4
							TL-208	7.7 +-2.9 E-02		01/14			4
							K-40	2.5 +-0.4 E 00		01/14			4
							CS-137	1.2 +-0.4 E-01		01/14			4
32282	LCK-650 E 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	2.9 +-0.4 E 01	PPM *				3
							U-235	5.2 +-2.4 E-01		01/14			4
							TH-234	1.2 +-0.1 E 01		01/14			4
							PB-214	3.0 +-0.8 E-01		01/14			4
							BI-214	4.3 +-0.8 E-01		01/14			4
							AC-228	L.T. 2. E-01		01/14			4
							PB-212	3.3 +-0.5 E-01		01/14			4
							TL-208	1.1 +-0.4 E-01		01/14			4
							K-40	4.4 +-0.5 E 00		01/14			4
							CS-137	1.8 +-0.4 E-01		01/14			4
32283	LCK-1550 A 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	4.8 +-0.7 E 01	PPM *				3
							U-235	7.9 +-1.8 E-01		01/14			4
							TH-234	1.8 +-0.2 E 01		01/14			4
							PB-214	8.3 +-0.8 E-01		01/14			4
							BI-214	6.6 +-0.7 E-01		01/14			4
							AC-228	6.2 +-1.0 E-01		01/14			4
							PB-212	7.5 +-0.8 E-01		01/14			4

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

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MR RICARDO DE ANDA
DE ANDA LAW FIRM
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212 FLORES AVENUE
LAREDO TX 78040

S O I L

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32283	LCK-1550 A 0-6		12/03				TL-208	2.8 +-0.3 E-01		01/14			4
							K-40	1.3 +-0.1 E 01		01/14			4
							CS-137	L.T. 4. E-02		01/14			4
32284	LCK-1550 A 6-12		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.8 +-0.3 E 01 PPM	*				3
							U-235	5.8 +-2.0 E-01		01/14			4
							TH-234	1.1 +-0.1 E 01		01/14			4
							PB-214	6.5 +-0.7 E-01		01/14			4
							BI-214	6.7 +-0.7 E-01		01/14			4
							AC-228	5.3 +-0.9 E-01		01/14			4
							PB-212	5.7 +-0.6 E-01		01/14			4
							TL-208	2.4 +-0.3 E-01		01/14			4
							K-40	1.0 +-0.1 E 01		01/14			4
							CS-137	L.T. 3. E-02		01/14			4
32285	LCK-1550 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	9.3 +-1.4 E 00 PPM	*				3
							U-235	2.8 +-1.4 E-01		01/10			4
							TH-234	5.0 +-0.6 E 00		01/10			4
							PB-214	4.1 +-0.6 E-01		01/10			4
							BI-214	4.0 +-0.6 E-01		01/10			4
							AC-228	3.0 +-0.9 E-01		01/10			4
							PB-212	3.0 +-0.4 E-01		01/10			4
							TL-208	1.2 +-0.3 E-01		01/10			4
							K-40	8.2 +-0.8 E 00		01/10			4
							CS-137	2.6 +-0.4 E-01		01/10			4

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PLAZA DE SAN AGUSTIN
212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32286	LCK-1550 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.4 +-0.2 E 01	PPM *				3
							U-235	9.1 +-1.7 E-01		01/10			4
							TH-234	1.3 +-0.1 E 01		01/10			4
							PB-214	6.3 +-0.6 E-01		01/10			4
							BI-214	5.9 +-0.6 E-01		01/10			4
							AC-228	5.0 +-0.9 E-01		01/10			4
							PB-212	7.0 +-0.7 E-01		01/10			4
							TL-208	2.3 +-0.3 E-01		01/10			4
							K-40	1.0 +-0.1 E 01		01/10			4
							CS-137	2.0 +-0.3 E-01		01/10			4
32287	LCK-1550 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	6.4 +-1.0 E 00	PPM *				3
							U-235	L.T. 3. E-01		01/10			4
							TH-234	3.5 +-1.7 E 00		01/10			4
							PB-214	4.8 +-0.7 E-01		01/10			4
							BI-214	4.6 +-0.7 E-01		01/10			4
							AC-228	L.T. 2. E-01		01/10			4
							PB-212	3.9 +-0.4 E-01		01/10			4
							TL-208	1.8 +-0.3 E-01		01/10			4
							K-40	8.4 +-0.8 E 00		01/10			4
							CS-137	1.4 +-0.3 E-01		01/10			4
32288	LCK-1550 E 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.0 +-0.2 E 01	PPM *				3
							U-235	L.T. 3. E-01		01/14			4
							TH-234	6.8 +-0.8 E 00		01/14			4
							PB-214	5.9 +-0.8 E-01		01/14			4
							BI-214	5.3 +-0.8 E-01		01/14			4
							AC-228	L.T. 2. E-01		01/14			4
							PB-212	4.0 +-0.5 E-01		01/14			4

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212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32288	LCK-1550 E 0-6		12/03				TL-208	1.8 +-0.4 E-01		01/14			4
							K-40	9.2 +-0.9 E 00		01/14			4
							CS-137	2.6 +-0.4 E-01		01/14			4
32289	LCK-2850 A 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 01 PPM	*				3
							U-235	L.T. 4. E-01		01/10			4
							TH-234	9.7 +-1.0 E 00		01/10			4
							PB-214	1.8 +-0.2 E 00		01/10			4
							BI-214	1.7 +-0.2 E 00		01/10			4
							AC-228	5.8 +-1.5 E-01		01/10			4
							PB-212	1.0 +-0.1 E 00		01/10			4
							TL-208	3.0 +-0.5 E-01		01/10			4
							K-40	8.8 +-0.9 E 00		01/10			4
							CS-137	4.4 +-0.6 E-01		01/10			4
32290	LCK-2850 A 6-12		12/03				PREP	DISSO LVED					3
							TOTAL-U	7.6 +-1.4 E 00 PPM	*				3
							U-235	L.T. 4. E-01		01/10			4
							TH-234	4.2 +-1.3 E 00		01/10			4
							PB-214	8.5 +-1.1 E-01		01/10			4
							BI-214	8.5 +-1.0 E-01		01/10			4
							AC-228	6.3 +-1.5 E-01		01/10			4
							PB-212	6.5 +-0.7 E-01		01/10			4
							TL-208	2.1 +-0.4 E-01		01/10			4
							K-40	1.1 +-0.1 E 01		01/10			4
							CS-137	1.5 +-0.4 E-01		01/10			4

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PLAZA DE SAN AGUSTIN
212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32291	LCK-2850 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.9 +-0.3 E 01 PPM	*				3
							U-235	4.5 +-1.8 E-01		01/10			4
							TH-234	L.T. 1. E 00		01/10			4
							PB-214	1.1 +-0.1 E 00		01/10			4
							BI-214	9.4 +-0.9 E-01		01/10			4
							AC-228	3.2 +-0.9 E-01		01/10			4
							PB-212	7.5 +-0.8 E-01		01/10			4
							TL-208	2.0 +-0.3 E-01		01/10			4
							K-40	7.2 +-0.7 E 00		01/10			4
							CS-137	2.3 +-0.4 E-01		01/10			4
32292	LCK-2850 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.8 +-0.3 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	1.1 +-0.4 E 00		01/10			4
							PB-214	4.2 +-0.5 E-01		01/10			4
							BI-214	4.1 +-0.5 E-01		01/10			4
							AC-228	3.6 +-0.8 E-01		01/10			4
							PB-212	4.2 +-0.4 E-01		01/10			4
							TL-208	1.4 +-0.2 E-01		01/10			4
							K-40	8.0 +-0.8 E 00		01/10			4
							CS-137	7.6 +-2.2 E-02		01/10			4
32293	LCK-2850 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	6.6 +-1.0 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 9. E-01		01/10			4
							PB-214	9.0 +-0.9 E-01		01/10			4
							BI-214	7.1 +-0.7 E-01		01/10			4
							AC-228	4.2 +-0.9 E-01		01/10			4
							PB-212	4.5 +-0.5 E-01		01/10			4

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212 FLORES AVENUE
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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32293	LCK-2850 D 0-6		12/03				TL-208	1.8 +-0.3 E-01		01/10			4
							K-40	7.5 +-0.8 E 00		01/10			4
							CS-137	1.8 +-0.3 E-01		01/10			4
32294	LCK-2850 E 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.9 +-0.3 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 5. E-01		01/10			4
							PB-214	5.5 +-0.6 E-01		01/10			4
							BI-214	4.9 +-0.5 E-01		01/10			4
							AC-228	L.T. 1. E-01		01/10			4
							PB-212	5.3 +-0.5 E-01		01/10			4
							TL-208	1.7 +-0.2 E-01		01/10			4
							K-40	8.0 +-0.8 E 00		01/10			4
							CS-137	1.2 +-0.3 E-01		01/10			4
32295	LG-50 A 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.1 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/14			4
							TH-234	L.T. 7. E-01		01/14			4
							PB-214	4.1 +-0.7 E-01		01/14			4
							BI-214	3.8 +-0.6 E-01		01/14			4
							AC-228	4.0 +-1.0 E-01		01/14			4
							PB-212	3.0 +-0.4 E-01		01/14			4
							TL-208	1.1 +-0.3 E-01		01/14			4
							K-40	7.4 +-0.7 E 00		01/14			4
							CS-137	L.T. 3. E-02		01/14			4

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212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32296	LG-50 A 6-12		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 6. E-01		01/10			4
							PB-214	3.9 +-0.6 E-01		01/10			4
							BI-214	4.3 +-0.6 E-01		01/10			4
							AC-228	3.9 +-1.0 E-01		01/10			4
							PB-212	3.2 +-0.3 E-01		01/10			4
							TL-208	9.4 +-2.5 E-02		01/10			4
							K-40	1.1 +-0.1 E 01		01/10			4
							CS-137	L.T. 3. E-02		01/10			4
32297	LG-50 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.2 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 6. E-01		01/10			4
							PB-214	4.2 +-0.6 E-01		01/10			4
							BI-214	3.5 +-0.6 E-01		01/10			4
							AC-228	L.T. 2. E-01		01/10			4
							PB-212	3.5 +-0.4 E-01		01/10			4
							TL-208	1.4 +-0.3 E-01		01/10			4
							K-40	7.7 +-0.8 E 00		01/10			4
							CS-137	L.T. 3. E-02		01/10			4
32298	LG-50 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.5 +-0.2 E 00 PPM	*				3
							U-235	L.T. 1. E-01		01/14			4
							TH-234	L.T. 5. E-01		01/14			4
							PB-214	4.6 +-0.5 E-01		01/14			4
							BI-214	3.9 +-0.5 E-01		01/14			4
							AC-228	3.9 +-0.7 E-01		01/14			4
							PB-212	3.2 +-0.3 E-01		01/14			4

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212 FLORES AVENUE
LAREDO TX 78040

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32298	LG-50 C 0-6		12/03				TL-208	1.2 +-0.2 E-01		01/14			4
							K-40	8.0 +-0.8 E 00		01/14			4
							CS-137	L.T. 3. E-02		01/14			4
32299	LG-50 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 5. E-01		01/10			4
							PB-214	4.2 +-0.5 E-01		01/10			4
							BI-214	4.2 +-0.5 E-01		01/10			4
							AC-228	3.1 +-0.7 E-01		01/10			4
							PB-212	4.2 +-0.4 E-01		01/10			4
							TL-208	1.5 +-0.2 E-01		01/10			4
							K-40	8.6 +-0.9 E 00		01/10			4
							CS-137	L.T. 3. E-02		01/10			4
32300	LG-50 E 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 7. E-01		01/10			4
							PB-214	4.5 +-0.6 E-01		01/10			4
							BI-214	5.2 +-0.7 E-01		01/10			4
							AC-228	3.4 +-0.9 E-01		01/10			4
							PB-212	3.8 +-0.4 E-01		01/10			4
							TL-208	1.5 +-0.3 E-01		01/10			4
							K-40	8.4 +-0.8 E 00		01/10			4
							CS-137	L.T. 4. E-02		01/10			4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32301	LG-150 A 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.0 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 5. E-01		01/10			4
							PB-214	4.0 +-0.5 E-01		01/10			4
							BI-214	3.6 +-0.5 E-01		01/10			4
							AC-228	2.5 +-0.8 E-01		01/10			4
							PB-212	2.7 +-0.3 E-01		01/10			4
							TL-208	1.0 +-0.2 E-01		01/10			4
							K-40	6.3 +-0.6 E 00		01/10			4
							CS-137	L.T. 3. E-02		01/10			4
32302	LG-150 A 6-12		12/03				PREP	DISSO LVED					3
							TOTAL-U	8.3 +-1.2 E-01 PPM	*				3
							U-235	L.T. 1. E-01		01/10			4
							TH-234	6.8 +-3.4 E-01		01/10			4
							PB-214	4.0 +-0.5 E-01		01/10			4
							BI-214	3.5 +-0.4 E-01		01/10			4
							AC-228	2.6 +-0.7 E-01		01/10			4
							PB-212	3.3 +-0.3 E-01		01/10			4
							TL-208	1.0 +-0.2 E-01		01/10			4
							K-40	6.6 +-0.7 E 00		01/10			4
							CS-137	L.T. 2. E-02		01/10			4
32303	LG-150 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.1 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/10			4
							TH-234	L.T. 5. E-01		01/10			4
							PB-214	5.4 +-0.5 E-01		01/10			4
							BI-214	4.4 +-0.5 E-01		01/10			4
							AC-228	3.5 +-0.7 E-01		01/10			4
							PB-212	3.1 +-0.3 E-01		01/10			4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32303	LG-150 B 0-6		12/03				TL-208	1.1 +-0.2 E-01		01/10			4
							K-40	7.0 +-0.7 E 00		01/10			4
							CS-137	L.T. 2. E-02		01/10			4
32304	LG-150 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.0 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	L.T. 6. E-01		01/13			4
							PB-214	4.4 +-0.7 E-01		01/13			4
							BI-214	4.2 +-0.6 E-01		01/13			4
							AC-228	4.0 +-1.1 E-01		01/13			4
							PB-212	2.5 +-0.4 E-01		01/13			4
							TL-208	1.3 +-0.3 E-01		01/13			4
							K-40	7.7 +-0.8 E 00		01/13			4
							CS-137	7.3 +-2.9 E-02		01/13			4
32305	LG-150 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	L.T. 5. E-01		01/13			4
							PB-214	4.3 +-0.5 E-01		01/13			4
							BI-214	3.8 +-0.5 E-01		01/13			4
							AC-228	2.9 +-0.8 E-01		01/13			4
							PB-212	2.9 +-0.3 E-01		01/13			4
							TL-208	9.3 +-2.2 E-02		01/13			4
							K-40	6.9 +-0.7 E 00		01/13			4
							CS-137	L.T. 3. E-02		01/13			4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE TIME	STOP DATE TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32306	LG-150 E 0-6		12/03		PREP	DISSO LVED				3
					TOTAL-U	1.3 +-0.2 E 00 PPM	*			3
					U-235	L.T. 2. E-01		01/13		4
					TH-234	L.T. 6. E-01		01/13		4
					PB-214	5.5 +-0.6 E-01		01/13		4
					BI-214	5.2 +-0.6 E-01		01/13		4
					AC-228	2.8 +-0.9 E-01		01/13		4
					PB-212	3.4 +-0.3 E-01		01/13		4
					TL-208	1.2 +-0.3 E-01		01/13		4
					K-40	7.6 +-0.8 E 00		01/13		4
					CS-137	L.T. 3. E-02		01/13		4
32307	LG-550 A 0-6		12/03		PREP	DISSO LVED				3
					TOTAL-U	1.2 +-0.2 E 00 PPM	*			3
					U-235	L.T. 2. E-01		01/13		4
					TH-234	L.T. 5. E-01		01/13		4
					PB-214	4.6 +-0.6 E-01		01/13		4
					BI-214	4.6 +-0.6 E-01		01/13		4
					AC-228	2.5 +-0.7 E-01		01/13		4
					PB-212	2.8 +-0.3 E-01		01/13		4
					TL-208	1.0 +-0.2 E-01		01/13		4
					K-40	6.5 +-0.7 E 00		01/13		4
					CS-137	L.T. 3. E-02		01/13		4
32308	LG-550 A 6-12		12/03		PREP	DISSO LVED				3
					TOTAL-U	1.2 +-0.2 E 00 PPM	*			3
					U-235	L.T. 1. E-01		01/13		4
					TH-234	L.T. 4. E-01		01/13		4
					PB-214	4.0 +-0.4 E-01		01/13		4
					BI-214	4.0 +-0.4 E-01		01/13		4
					AC-228	3.4 +-0.6 E-01		01/13		4
					PB-212	4.1 +-0.4 E-01		01/13		4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32308	LG-550 A 6-12		12/03				TL-208	1.0 +-0.2 E-01		01/13			4
							K-40	7.8 +-0.8 E 00		01/13			4
							CS-137	3.9 +-1.6 E-02		01/13			4
32309	LG-550 B 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.1 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	L.T. 6. E-01		01/13			4
							PB-214	4.8 +-0.6 E-01		01/13			4
							BI-214	3.7 +-0.5 E-01		01/13			4
							AC-228	2.5 +-0.9 E-01		01/13			4
							PB-212	2.7 +-0.3 E-01		01/13			4
							TL-208	9.3 +-2.5 E-02		01/13			4
							K-40	6.7 +-0.7 E 00		01/13			4
							CS-137	L.T. 3. E-02		01/13			4
32310	LG-550 C 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.5 +-0.2 E 00 PPM	*				3
							U-235	L.T. 3. E-01		01/13			4
							TH-234	L.T. 1. E 00		01/13			4
							PB-214	5.1 +-0.8 E-01		01/13			4
							BI-214	L.T. 1. E-01		01/13			4
							AC-228	L.T. 2. E-01		01/13			4
							PB-212	2.8 +-0.4 E-01		01/13			4
							TL-208	1.4 +-0.3 E-01		01/13			4
							K-40	7.0 +-0.7 E 00		01/13			4
							CS-137	9.6 +-2.9 E-02		01/13			4

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32311	LG-550 D 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.1 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	1.1 +-0.3 E 00		01/13			4
							PB-214	3.6 +-0.5 E-01		01/13			4
							BI-214	3.5 +-0.5 E-01		01/13			4
							AC-228	2.7 +-0.7 E-01		01/13			4
							PB-212	2.6 +-0.3 E-01		01/13			4
							TL-208	1.1 +-0.2 E-01		01/13			4
							K-40	7.6 +-0.8 E 00		01/13			4
							CS-137	3.9 +-0.4 E-01		01/13			4
32312	LG-550 E 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	L.T. 6. E-01		01/13			4
							PB-214	4.8 +-0.5 E-01		01/13			4
							BI-214	4.7 +-0.5 E-01		01/13			4
							AC-228	2.8 +-0.7 E-01		01/13			4
							PB-212	3.9 +-0.4 E-01		01/13			4
							TL-208	1.1 +-0.2 E-01		01/13			4
							K-40	7.6 +-0.8 E 00		01/13			4
							CS-137	1.1 +-0.2 E-01		01/13			4
32320	POND A NO.1 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	3.0 +-0.5 E 00 PPM	*				3
							U-235	L.T. 1. E-01		01/13			4
							TH-234	1.7 +-0.4 E 00		01/13			4
							PB-214	6.4 +-0.6 E-01		01/13			4
							BI-214	5.6 +-0.6 E-01		01/13			4
							AC-228	3.8 +-0.7 E-01		01/13			4
							PB-212	3.5 +-0.4 E-01		01/13			4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32320	POND A NO.1 0-6		12/03				TL-208	1.3 +-0.2 E-01		01/13			4
							K-40	5.5 +-0.6 E 00		01/13			4
							CS-137	L.T. 2. E-02		01/13			4
32321	POND A NO.2 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	3.9 +-0.6 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	9.6 +-3.5 E-01		01/13			4
							PB-214	3.6 +-0.5 E-01		01/13			4
							BI-214	4.1 +-0.5 E-01		01/13			4
							AC-228	3.0 +-0.7 E-01		01/13			4
							PB-212	3.7 +-0.4 E-01		01/13			4
							TL-208	1.2 +-0.2 E-01		01/13			4
							K-40	5.7 +-0.6 E 00		01/13			4
							CS-137	L.T. 3. E-02		01/13			4
32322	POND B NO.1 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.0 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/13			4
							TH-234	6.6 +-3.4 E-01		01/13			4
							PB-214	6.3 +-0.6 E-01		01/13			4
							BI-214	5.7 +-0.6 E-01		01/13			4
							AC-228	2.2 +-0.8 E-01		01/13			4
							PB-212	2.8 +-0.3 E-01		01/13			4
							TL-208	1.3 +-0.2 E-01		01/13			4
							K-40	5.2 +-0.5 E 00		01/13			4
							CS-137	L.T. 3. E-02		01/13			4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32323	POND B NO.2 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	7.0 +-1.1 E 00 PPM	*				3
							U-235	L.T. 5. E-02		01/14			4
							TH-234	3.6 +-0.5 E 00		01/14			4
							PB-214	1.2 +-0.1 E 00		01/14			4
							BI-214	1.1 +-0.1 E 00		01/14			4
							AC-228	1.1 +-0.1 E 00		01/14			4
							PB-212	1.1 +-0.1 E 00		01/14			4
							TL-208	3.6 +-0.4 E-01		01/14			4
							K-40	1.5 +-0.2 E 01		01/14			4
							CS-137	L.T. 5. E-02		01/14			4
32324	POND C NO.1 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	1.3 +-0.2 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/14			4
							TH-234	L.T. 5. E-01		01/14			4
							PB-214	6.1 +-0.6 E-01		01/14			4
							BI-214	5.4 +-0.6 E-01		01/14			4
							AC-228	3.1 +-0.8 E-01		01/14			4
							PB-212	2.1 +-0.4 E-01		01/14			4
							TL-208	1.0 +-0.3 E-01		01/14			4
							K-40	5.3 +-0.5 E 00		01/14			4
							CS-137	L.T. 3. E-02		01/14			4
32325	POND C NO.2 0-6		12/03				PREP	DISSO LVED					3
							TOTAL-U	3.1 +-0.5 E 00 PPM	*				3
							U-235	L.T. 2. E-01		01/14			4
							TH-234	1.0 +-0.5 E 00		01/14			4
							PB-214	9.3 +-0.9 E-01		01/14			4
							BI-214	9.6 +-1.0 E-01		01/14			4
							AC-228	9.2 +-1.2 E-01		01/14			4
							PB-212	8.9 +-0.9 E-01		01/14			4

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TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM DRY)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32325	POND C NO.2 0-6		12/03				TL-208	3.2 +-0.3 E-01		01/14			4
							K-40	1.3 +-0.1 E 01		01/14			4
							CS-137	L.T. 4. E-02		01/14			4

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VEGETATION/TERRESTRIAL

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM WET)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32313	VEG SPG OUTPD NO SIDE		12/03				BE-7	1.97+-0.47E 00		12/06			4
							K-40	2.35+-0.50E 00		12/06			4
							MN-54	L.T. 6. E-02		12/06			4
							CO-58	L.T. 6. E-02		12/06			4
							FE-59	L.T. 1. E-01		12/06			4
							CO-60	L.T. 6. E-02		12/06			4
							ZN-65	L.T. 1. E-01		12/06			4
							ZR-95	L.T. 6. E-02		12/06			4
							RU-103	L.T. 7. E-02		12/06			4
							RU-106	L.T. 6. E-01		12/06			4
							I-131	L.T. 9. E-02		12/06			4
							CS-134	L.T. 6. E-02		12/06			4
							CS-137	L.T. 7. E-02		12/06			4
							BA-140	L.T. 7. E-02		12/06			4
							CE-141	L.T. 9. E-02		12/06			4
							CE-144	L.T. 4. E-01		12/06			4
							RA-226	L.T. 1. E 00		12/06			4
							TH-228	L.T. 1. E-01		12/06			4
							TOTAL-U	L.T. 1. E 00		12/06			4
32314	VEG SPG OUTPD SO SIDE		12/03				BE-7	2.38+-0.85E 00		12/06			4
							K-40	7.01+-1.09E 00		12/06			4
							MN-54	L.T. 1. E-01		12/06			4
							CO-58	L.T. 1. E-01		12/06			4
							FE-59	L.T. 2. E-01		12/06			4
							CO-60	L.T. 1. E-01		12/06			4
							ZN-65	L.T. 3. E-01		12/06			4
							ZR-95	L.T. 1. E-01		12/06			4
							RU-103	L.T. 1. E-01		12/06			4
							RU-106	L.T. 1. E 00		12/06			4
							I-131	L.T. 2. E-01		12/06			4
							CS-134	L.T. 1. E-01		12/06			4

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VEGETATION/TERRESTRIAL

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM WET)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32314	VEG SPG OUTPD SO SIDE		12/03				CS-137	L.T. 1. E-01		12/06			4
							BA-140	L.T. 1. E-01		12/06			4
							CE-141	L.T. 2. E-01		12/06			4
							CE-144	L.T. 7. E-01		12/06			4
							RA-226	L.T. 2. E 00		12/06			4
							TH-228	L.T. 2. E-01		12/06			4
							TOTAL-U	L.T. 2. E 00		12/06			4
32315	VEG SPG OUTPD E SIDE		12/03				BE-7	1.89+-0.51E 00		12/06			4
							K-40	2.26+-0.55E 00		12/06			4
							MN-54	L.T. 7. E-02		12/06			4
							CO-58	L.T. 6. E-02		12/06			4
							FE-59	L.T. 1. E-01		12/06			4
							CO-60	L.T. 7. E-02		12/06			4
							ZN-65	L.T. 1. E-01		12/06			4
							ZR-95	L.T. 7. E-02		12/06			4
							RU-103	L.T. 7. E-02		12/06			4
							RU-106	L.T. 6. E-01		12/06			4
							I-131	L.T. 9. E-02		12/06			4
							CS-134	L.T. 7. E-02		12/06			4
							CS-137	L.T. 7. E-02		12/06			4
							BA-140	L.T. 8. E-02		12/06			4
							CE-141	L.T. 9. E-02		12/06			4
							CE-144	L.T. 4. E-01		12/06			4
							RA-226	L.T. 1. E 00		12/06			4
							TH-228	L.T. 1. E-01		12/06			4
							TOTAL-U	L.T. 1. E 00		12/06			4

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VEGETATION/TERRESTRIAL

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/GM WET)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32316	VEG SPG OUTPD W SIDE		12/03				BE-7	3.33+-0.52E 00		12/06			4
							K-40	3.36+-0.59E 00		12/06			4
							MN-54	L.T. 6. E-02		12/06			4
							CO-58	L.T. 6. E-02		12/06			4
							FE-59	L.T. 1. E-01		12/06			4
							CO-60	L.T. 7. E-02		12/06			4
							ZN-65	L.T. 1. E-01		12/06			4
							ZR-95	L.T. 6. E-02		12/06			4
							RU-103	L.T. 7. E-02		12/06			4
							RU-106	L.T. 6. E-01		12/06			4
							I-131	L.T. 1. E-01		12/06			4
							CS-134	L.T. 7. E-02		12/06			4
							CS-137	L.T. 7. E-02		12/06			4
							BA-140	L.T. 8. E-02		12/06			4
							CE-141	L.T. 1. E-01		12/06			4
							CE-144	L.T. 5. E-01		12/06			4
							RA-226	L.T. 2. E 00		12/06			4
							TH-228	L.T. 1. E-01		12/06			4
							TOTAL-U	L.T. 1. E 00		12/06			4
32317	VEG SPG OUTPD LWR ARE		12/03				BE-7	4.13+-2.19E-01		12/06			4
							K-40	3.17+-0.32E 00		12/06			4
							MN-54	L.T. 3. E-02		12/06			4
							CO-58	L.T. 3. E-02		12/06			4
							FE-59	L.T. 6. E-02		12/06			4
							CO-60	L.T. 3. E-02		12/06			4
							ZN-65	L.T. 7. E-02		12/06			4
							ZR-95	L.T. 3. E-02		12/06			4
							RU-103	L.T. 3. E-02		12/06			4
							RU-106	L.T. 3. E-01		12/06			4
							I-131	L.T. 4. E-02		12/06			4
							CS-134	L.T. 3. E-02		12/06			4

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

REPORT OF ANALYSIS

RUN DATE 01/21/97

WORK ORDER NUMBER 3-1784 | CUSTOMER P.O. NUMBER | DATE RECEIVED 12/05/96 | DELIVERY DATE 01/08/97 | PAGE 24

MR RICARDO DE ANDA
DE ANDA LAW FIRM
PLAZA DE SAN AGUSTIN
212 FLORES AVENUE
LAREDO TX 78040

VEGETATION/TERRESTRIAL

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	START TIME	STOP DATE	STOP TIME	NUCLIDE	ACTIVITY (PCI/GM WET)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	MID-COUNT TIME TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32317	VEG SPG OUTPO LWR ARE		12/03				CS-137	L.T. 3. E-02		12/06			4
							BA-140	L.T. 4. E-02		12/06			4
							CE-141	L.T. 4. E-02		12/06			4
							CE-144	L.T. 2. E-01		12/06			4
							RA-226	L.T. 6. E-01		12/06			4
							TH-228	L.T. 5. E-02		12/06			4
							TOTAL-U	L.T. 5. E-01		12/06			4

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

REPORT OF ANALYSIS

RUN DATE 01/21/97

WORK ORDER NUMBER	CUSTOMER P.O. NUMBER	DATE RECEIVED	DELIVERY DATE	PAGE 25
3-1784		12/05/96	01/08/97	

MR RICARDO DE ANDA
DE ANDA LAW FIRM
PLAZA DE SAN AGUSTIN
212 FLORES AVENUE
LAREDO TX 78040

W A T E R

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	TIME	STOP DATE	TIME	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-% U/M *	MID-COUNT TIME DATE	TIME	VOLUME - UNITS ASH-WGHT-% *	LAB.
32318	WATER SPRING OUTPOND		12/03				RA-226	L.T. 3. E-01		01/02			2
							TOTAL U	7.0 +-1.1 E 00	UGM/LITER *				3
32319	WATER SPG NATRL POND		12/03				RA-226	9.4 +-2.8 E-01		01/02			2
							TOTAL U	5.4 +-0.8 E 00	UGM/LITER *				3

LAST PAGE OF REPORT

J. Guenther
APPROVED BY J. GUENTHER 01/21/97

SEND 1 COPIES TO DE205S MR RICARDO DE ANDA
SEND 1 COPIES TO DE205T MR MARVIN RESNIKOFF

2 - GAS LAB. 3 - RADIO CHEMISTRY LAB. 4 - GE(LI) GAMMA SPEC LAB. 5 - TRITIUM GAS/L.S. LAB. 6 - ALPHA SPEC LAB.

K

SOUTHWEST GROUNDWATER CONSULTING, LLC
7425 Amanda Ellis Way
Austin, TX 78749
512-560-9131
bkdarling@southwestgroundwater.com

Report on Findings Related to the Restoration of In-Situ Uranium Mines in South Texas

Submitted to
Blackburn & Carter
4709 Austin Street
Houston, Texas 77004

September 29, 2008

EXHIBIT
K

SOUTHWEST GROUNDWATER CONSULTING, LLC
7425 Amanda Ellis Way
Austin, TX 78749
512-560-9131
bkdarling@southwestgroundwater.com

September 29, 2008

Mr. Jim Blackburn
Blackburn & Carter
4709 Austin St.
Houston, TX 77004

RE: **Report on Findings Related to the Restoration of In-Situ Uranium Mines in South Texas**

Dear Mr. Blackburn:

You have asked me to research the files of the Texas Commission on Environmental Quality (TCEQ) to determine the track record of the Underground Injection Control (UIC) office with regard to the restoration of aquifers after mining operations have been completed. As part of my investigation, I have talked with representatives of the office of Underground Injection Control (Mr. Ben Knape, and Mr. David Murry). Mr. Knape made available, for inspection and copying, ring binders of documents related to each in-situ mining site in south Texas; and Mr. Murry gave me a collection of spreadsheets that allow for comparison of Original Restoration Target Values, Amended Restoration Target Values, and Last Sampled Values of 26 water quality indicators listed on each table of restoration values approved by TCEQ. It will be necessary to verify data from the ring binders and the spreadsheets made available by Mr. Knape and Mr. Murry with data from microfiche and microfilm files in the Central Records office of TCEQ. I found the microfiche and microfilm files in Central Records to be unorganized and difficult to navigate, without reference to paper and digital copies from which the data in Central Records were copied.

The spreadsheets were compiled by Mr. John Santos, retired geologist with the UIC program. A copy of the spreadsheet with dates that restoration tables were amended is included with this report as Attachment A. Tables of Original Restoration Target Values, Amended Restoration Target Values, and Final Sample Values are listed as Attachments B through D. Comparisons of Original Restoration Target Values with Amended Restoration Target Values and Last Sampled Values for uranium, radium-226, arsenic, and sulfate are included as Attachments E through H. I am pulling together information from the large volume of data scanned from the files of UIC in an effort to re-produce and update all of Mr. Santos' spreadsheets. The final step will involve reconciliation of the above data with data from Central Records.

Regulation of In-Situ Uranium Mining

The regulation of in-situ uranium mining in Texas falls under the Texas Railroad Commission (TRC) and the Texas Commission on Environmental Quality (TCEQ). TRC oversees exploration, and TCEQ handles mine permitting, applications for aquifer exemptions, and aquifer restoration. The U.S. Environmental Protection Agency (USEPA) grants aquifer exemptions, based on recommendations made by TCEQ.

Restoration

Restoration is one of the final steps in the process of in-situ uranium mining. TCEQ sets restoration standards (in the form of Restoration Tables) in the mining permits of operators, based on 26 water quality indicators. Restoration standards vary from one Production Area to another, using background data and data from proposed Production Areas, as collected and submitted by mining companies. My survey of records at UIC and Attachments A through H reveals that Restoration Tables are routinely amended by TCEQ. Relaxed restoration standards allow operators to depart from original groundwater cleanup objectives.

Amended Restoration Tables

The columns in Attachment A list (1) the names of the in-situ uranium mines, (2) Production Area Authorization (PAA) numbers, (3) restoration methods used at each Production Area, (4 and 5) the starting and ending dates of restoration programs, (6) pore volumes of water removed, (7) millions of gallons of water removed, (8) the date a Restoration Table was amended, (9) the dates that wells at a Production Area were plugged, and (10) the revocation date of the mining permit.

Attachment A lists 76 Production Areas and 51 dates on which TCEQ approved Amended Restoration Tables. Some of the Production Areas have been combined, but the final count in this report is based on the number of sites listed in Column 1. Eighty sites are listed in Attachments B through H, and it will be important to reconcile discrepancies between listings in those attachments and the listings of Attachment A.

Some of the sites listed in the first column of Attachment A, such as Gruy, were never mined, and others, such as Kingsville Dome, are in production. In the latter case, the Original Restoration Tables remain applicable, until the operator requests amended values. New sites, such as Goliad, are not listed because Production Areas have not been delineated and Restoration Tables assigned. Thus far, I have not found, in UIC's records, evidence that requests for Amended Restoration Tables have been denied by TCEQ.

Figures

Figures 1 through 4 show, in the form of bar charts, the Original Restoration Target Values, Amended Restoration Target Values, and Last Sampled Values for uranium, radium-226, arsenic, and sulfate from mining sites for which all three values were recorded by Mr. Santos (Attachments E through H). The figures are based on data in the spreadsheets listed as Attachments B through D. Attachment B is the list of Original Restoration Target Values; Attachment C is the list of Final Restoration Target Values; and Attachment D is the list of Last Sample Values for all 26 water quality indicators. Attachments E through H list the differences and percent change between the Original Restoration Target Values and the Amended and Final Sample Values for uranium, radium-226, arsenic, and sulfate, respectively. The following observations are made with respect to Figures 1 through 4:

Uranium

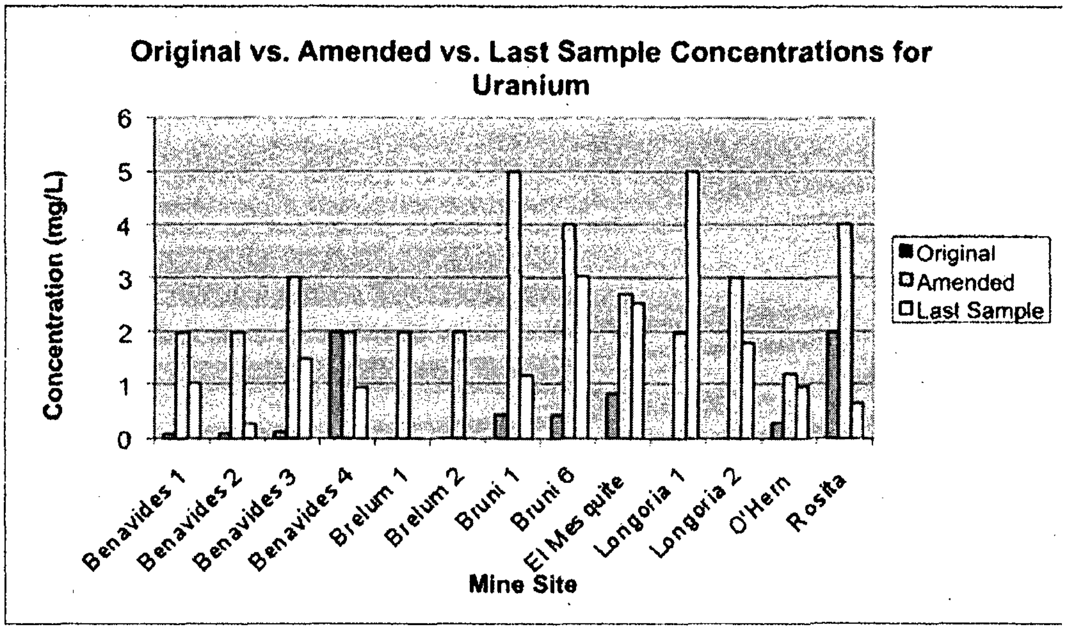
- In all but two cases (Benevides 4 and Rosita), the Amended Restoration Table Values and the Last Sampled Concentrations of uranium for the Production Areas listed on Figure 1 (next page) exceed the Original Restoration Table Values approved by TCEQ.

- The Primary Drinking Water Standard (PDWS) for Uranium is 0.03 mg/l (or 30 μg/l).

- In all cases, the Amended and Last Sampled Concentrations of uranium exceed the PDWS.

- The higher Amended Restoration Values and the Last Sampled Concentrations are results of the inability of site operators to reduce uranium concentrations based on their respective proposed groundwater restoration programs. This calls into question the operators' understanding of the geochemistry of the hydrogeologic systems that they are exploiting.

Figure 1



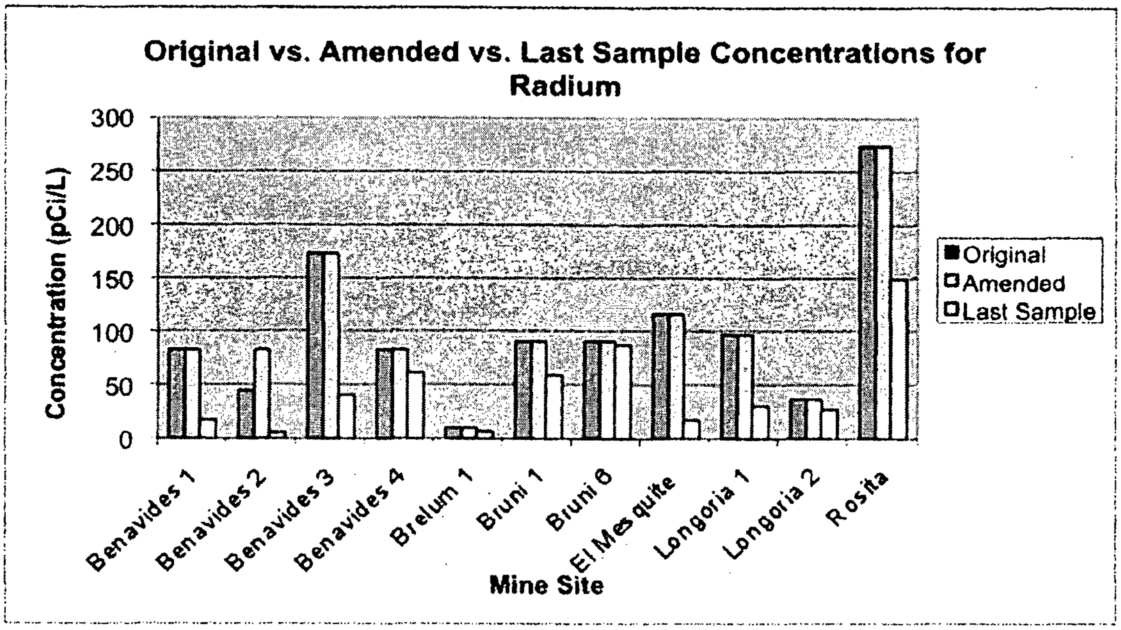
Radium-226

- All of the 12 Last-Sampled values were less than the Original Restoration Target Values (Attachment F).

- In all cases, radium-226 of the Amended Restoration Tables and Last Samples exceed the combined radium-226 and radium-228 PDWS of 5 picocuries per liter (pCi/L) (Attachment F; Figure 2, next page).

- The Original Restoration Table Values of radium-226 also exceed the radium-226/radium-228 PDWS of 5 pCi/L (Attachment F). What has not been established is the range of pre-exploration background radium-226 activities because (1) the Texas Water Development Board seldom includes radiochemical data in its groundwater chemistry database, and (2) the operators' methods of exploration have not been demonstrated not to destabilize uranium orebodies enough to release uranium and daughter products in sufficient concentrations and activities above true background and pre-mining levels. In other words, adequate pre-exploration background studies have not been conducted.

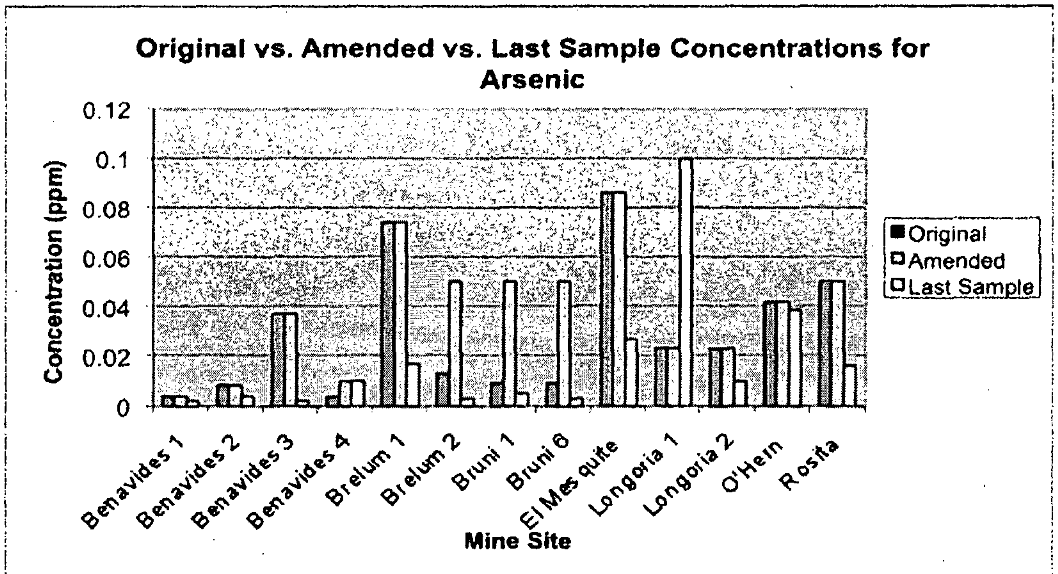
Figure 2



Arsenic

- In 53 of 73 cases, the Original Restoration Target Values exceed the current PDWS of 0.01 mg/l (10 μg/l) (Attachment G).
- In 25 cases, the Amended Restoration Target Values exceed the 53 Original Restoration Target Values (Attachment G).
- Seven of the 13 Last Sample Values are either equal to or greater than the PDWS of 0.01 mg/l (10 μg/l) (Figure 3, next page).
- The previous PDWS for arsenic was 0.05 mg/l.
- At 12 of the Production Areas, the Original Restoration Target Valued exceeded the old PDWS.

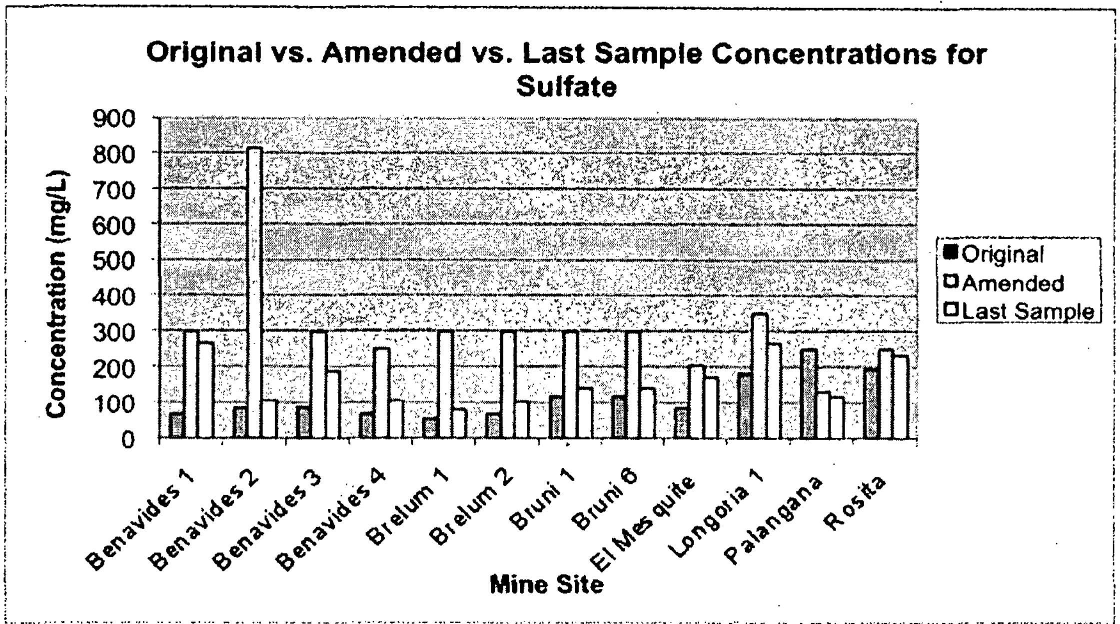
Figure 3



Sulfate

- With one exception, the Amended Restoration Target Values and Last-Sampled Concentrations of sulfate exceed the Original Restoration Target Values (Attachment H; Figure 4, next page).
- Although there is no PDWS for sulfate, the increased Amended and Last Sampled concentrations of sulfate underscore the potential for in-situ leach mining to increase major dissolved solids that affect the aesthetic properties of drinking water.

Figure 4



CONCLUSION

Based on data that I have evaluated as of the date of this letter report, I have found a minimum of 76 authorized in-situ uranium mining Production Areas in south Texas, and 51 dates on which Original Restoration Tables were amended by TCEQ (Attachment A). Other spreadsheets (Attachments B through H) show as many as 80 Production Areas. At least one of the mining areas (Gruy) was never developed. Others such as Kingsville Dome are still in production, so that amended restoration tables have not been issued.

Thus far, I have found it necessary to rely on data organized in ring binders at UIC, along with spreadsheets compiled by a retired geologist with the UIC program. The files in Central Records are on microfiche or microfilm, and there is no straightforward way to locate specific records without going through each file frame by frame. The system seems to be designed to make it difficult to find specific files at Central Records. This makes it necessary to rely on paper records and digital files which representatives of UIC are reluctant to certify as official records, even though official seals are affixed to paper copies. TCEQ must find a way to make available certified paper records and digital files and to affirm the accuracy of each. Otherwise, researchers are condemned to sort through a morass of poorly organized microfiche and microfilm files at Central Records.

The large number of amended restoration tables indicates that TCEQ routinely grants requests for relaxed restoration standards at in-situ uranium mining sites. As of this date, I have found no evidence in correspondence between UIC and site operators that TCEQ has denied requests for Amended Restoration Tables.

The revision of a Table of Restoration Target Values is an admission, after the fact, that the operator of an in-situ uranium mine is unable to meet the original restoration standards for one or more of 26 water-quality indicators. Furthermore, there is no reasonable guarantee that natural conditions within an aquifer will lead to the restoration of contaminated groundwater from an in-situ uranium mine any sooner than would an aggressive program employing the latest groundwater treatment technologies.

I appreciate the opportunity to be of assistance on this matter. As noted above, I will continue to evaluate the large body of data made available by representatives of UIC, along with data from Central Records. Please call or contact me by email if you have questions regarding this letter report.

Sincerely,
SOUTHWEST GROUNDWATER CONSULTING, LLC

Bruce K. Darling, Ph.D., P.G.

Attachment A

Restoration History

Restoration History

MINE	PAA	Method	Restoration Start	Restoration End	pore vol. removed	pore vol. = Mill. gal.	Rest. table amended
Benavides		RO					8/12/91
Benavides	4	RO					
Boots/Brown	1						9/5/02
Brelum 106-2(	1	RO					
Brelum 106-2(	2	RO					
Bruni	1	changed to 05					
Bruni	2	changed to 05					
Bruni	3						
Bruni	4	added to 03					
Bruni	5-1	RO	Feb-90	Sep-90	2.4	14	2/25/91
Bruni	5-2	RO					2/3/92
Burns Ranch	1						8/14/89
Burns Ranch	2						
Burns/Moser	1						12/12/02
Burns/Moser	2						12/19/02
Burns/Moser	3						12/19/02
Burns/Moser	4						12/5/02
Clay West	1						9/9/99
Clay West	2						9/9/99
El Mesquite	1	RO					8/14/89
El Mesquite	2	RO & inj	Oct-90	Dec-99	6.4	66.8	5/6/01
El Mesquite	3	GW sweep, RO	Jan-94	Jan-04	11.5	29.5	11/3/04
El Mesquite	4	RO & inj	Jan-94	Oct-01	8.56	252	9/9/03
El Mesquite	7						
Gruy	1						
Gruy	2						
Gruy	3						
Hobson	1	GW sweep					1/8/90
Holiday	1						
Holiday	2	RO	Oct-90	May-99	6		3/9/00
Holiday	3	RO					2/20/89
Holiday	4	RO & inj	Sep-99	Nov-01	12.2	1.6	9/9/03
Holiday	5	RO & inj	Oct-00	Mar-04	12.5	27.3	1/31/93
Holiday	6	RO & inj	Sep-99	Apr-01	15.9	25	10/31/02
Holiday	7						
Kingsville Dom	1						
Kingsville Dom	2						
Lamprecht	1						
Lamprecht	2						
Lamprecht	3						
Lamprecht	4						
Las Palmas	1						2/14/93
Las Palmas	2						6/13/93

Restoration History

MINE	PAA	Method	Restoration Start	Restoration End	pore vol. removed	pore vol. = Mill. gal.	Rest. table amended
Las Palmas	3						7/13/92
Longoria	1	GW sweep					8/12/91
Longoria	2	GW sweep					8/12/91
McBryde	1	GW sweep					8/12/91
Mt Lucas	1						9/9/97
Mt Lucas	2	RO & inj	Mar-90	Mar-96	10.3		9/9/97
Mt Lucas	3						9/9/99
Mt Lucas	4						8/2/98
Mt Lucas	5	RO & inj	Jun-92	Mar-96	9.3		9/9/97
Mt Lucas	6	RO & inj	Mar-92	Sep-98	9		9/9/99
Mt Lucas	7	RO & inj	Jun-92	Oct-99	25.7	183	1/23/00
Mt Lucas	8	RO & inj	Jun-92	Dec-98	23.5		9/9/97
Nell	1	ion exchange					6/13/88
O'Hern	1						9/5/02
O'Hern	2	RO					
O'Hern	3						
O'Hern	4	RO & inj	Jan-94	Mar-01	10	15.4	10/31/02
Palangana							
Pawlik							6/22/00
Pawnee							10/22/98
Rosita							
Rosita	2						
Tex-1		RO & inj			12	152	1/23/00
Trevino		EDR			4.5	32.95	8/12/91
Trevino	2a	EDR	Aug-89	Jul-91	10	47.46	1/13/92
Trevino	2b	EDR	Sep-88	Nov-89	7.6	12.8	4/9/90
West Cole		RO & inj	Dec-93	Jun-00	10.7	39.1	6/28/01
West Cole	2	RO & inj	Dec-93	Dec-01	19	9.6	1/27/04
West Cole	3	RO & inj	Apr-95	Oct-03	12.1	225.9	3/12/06
Zamzow		RO & inj	Nov-90	Oct-98	7		6/28/01
Zamzow	2	RO & inj	Nov-90	Oct-98	7		6/28/01
Zamzow	3	RO & inj	Nov-90	Oct-98	7		6/28/01
Zamzow	4	RO & inj	Nov-90	Oct-98	7		6/28/01

Restorati		
MINE	Wells	Permit/PAA
	plugged	revoked
Benavides		4/2/03
Benavides	Jan-91	4/2/03
Boots/Brown	Jul-03	8/18/03
Brelum 106-2(		2/2/89
Brelum 106-2(		2/2/89
Bruni		
Bruni		
Bruni		
Bruni		
Bruni	Oct-91	
Bruni	Jan-93	
Burns Ranch		1/24/91
Burns Ranch		
Burns/Moser	Aug-03	
Burns/Moser	Dec-03	
Burns/Moser	Dec-03	
Burns/Moser	Mar-03	
Clay West		2/15/04
Clay West		
El Mesquite		
El Mesquite	Oct-01	
El Mesquite	Feb-05	
El Mesquite	Nov-03	
El Mesquite		
Gruy		
Gruy		
Gruy		
Hobson	Nov-91	1/24/91
Holiday		
Holiday	Jul-01	
Holiday	Dec-89	
Holiday	Nov-03	
Holiday	Dec-05	
Holiday	Mar-02	
Holiday		
Kingsville Dom		
Kingsville Dom		
Lamprecht		3/7/00
Lamprecht		3/7/00
Lamprecht		3/7/00
Lamprecht		3/7/00
Las Palmas		3/2/03
Las Palmas		3/2/03

Restorati		
MINE	Wells	Permit/PAA
	plugged	revoked
Las Palmas		3/2/03
Longoria		4/2/03
Longoria		4/2/03
McBryde		1/26/93
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Mt Lucas		3/2/03
Nell	Dec-88	7/25/89
O'Hern	Oct-03	1/25/07
O'Hern	Jan-92	1/25/07
O'Hern	May-01	1/25/07
O'Hern	Dec-02	1/25/07
Palangana		
Pawlik	Oct-00	4/2/02
Pawnee		3/7/00
Rosita		
Rosita		
Tex-1		3/2/03
Trevino	Dec-91	2/89
Trevino	Oct-92	2/89
Trevino	Oct-92	2/89
West Cole	Nov-01	
West Cole	Feb-04	
West Cole	May-06	
Zamzow		11/2/01
Zamzow		11/2/01
Zamzow		11/2/01
Zamzow		11/2/01

Attachment B

Original Restoration Target Values

ORIGINAL RTV													
* corrected values		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	**Magnesium**	**Sodium**	**Potassium**	**Carbonate**	**Bicarbonate**	**Sulfate**	**Chloride**	**Fluoride**	**Nitrate-N**	**Silica**	**pH**
Benavides	1	22	6.2	402	14	2	239	69	517	0.48	2.87	26	38146
Benavides	*2	35	13	559	19.9	0.1	181	85	814	0.43	1.3	20.4	8.1
Benavides	3	32	9.4	475	13.6	5	218	86	653	0.55	2.25	21	8.6
Benavides	4	50	15	410	14	2	400	69	517	0.48	2.87	26	6.5-8.5
Boots/Brown	1	50	9	221	11	–	300	43	266	0.98	0.2	45	38146
Breium 106-200	1	40.66	3.5	2138	52.1	14.6	273	54.14	3129.7	1.5	0.33	49.7	8.46
Breium 106-200	2	21.39	5.28	2356	101	10.6	419.08	67.08	3505	1.035	0.19	43.67	8.23
Bruni	1	241	58.3	382	18.3	4.1	160	118	1010	0.21	10	16.3	38146
Bruni	2												
Bruni	3	200	150	465	18	–	500	125	680	1.8	12	15	
Bruni	4	22	30.2	316	13	–	125	80	672.9	0.2	2	27	
Bruni	38107	241	58.3	382	18.3	–	160	118	1010	0.21	10	16.3	
Bruni	38108	241	58.3	382	18.3	–	160	118	1010	0.21	10	16.3	6.5-8.5
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1	49	9	321	13	–	296	39	463	1.44	0.17	43	
Burns/Moser	2	60	11	264	15	–	267	123	320	1	0.11	36	38175
Burns/Moser	3	48	9	174	9	–	250	18	225	1.2	0.04	40	38175
Burns/Moser	4	46	12	191.5	11	1.8	355	10.3	213.5	0.9	0.83	37	6.5-8.5
Clay West	1	65	12	282	13	–	247	85	371		0.4	50	7.9
Clay West	2	75	16	354	17	–	320	201	424	1.1	0.06	43	8.2
El Mesquite	*1	6.16	0.87	382	8.9	8.4	249	61	423	0.53	2.8	18.6	8.58
El Mesquite	2	4.98	0.75	279.1	8.95	17.92	308.62	90.62	186.46	0.96	2.15	24.07	38146
El Mesquite	3	4.13	0.477	279.5	6.38	17.9	324.3	83.2	196.9	0.96	4.25	23.05	8.74
El Mesquite	4	5.2	1.5	340	7.2	17	295	102	301	1	0.47	17	8.98
El Mesquite	7	7.5	1.9	328	8.6	15	288	96	338	0.92	1.94	26	8.74
Gruy	1	95.4	45.2	352	18.2	–	285	1197	542	0.94	3.09	65	7.7
Gruy	2	116	50	340	21	–	282	214	555	0.74	0.9	56	7.85
Gruy	3	121	43	239	22	–	235	144	471	0.6	2.84	66	7.94
Hobson	1	49.1	2	345	29	6.6	230	156	377	0.76	0.33	58	8.15
Holiday	1	9.5	2.3	304	8.1	2.9	295	78	268	0.89	3	21	8.29
Holiday	2	8.5	1	239	6.8	11.8	196	92.6	174	1.2	1.8		19.7
Holiday	3	38.8	15.4	449	16.4	3.8	244.8	92.6	630.4	0.47	3.06	20.4	8.45
Holiday	4	5.5	2.5	335	7.9	14	296	90	289	1.15	0.97	18	8.88
Holiday	5	22	8.3	445	11.1	4.4	240	80	582	0.58	1.87	20	38146
Holiday	6	52.2	24.6	424	15.3	1.5	232	112	643	0.53	2.7	22	8.23
Holiday	7	16	4.8	371	10.56	8	240	61	467	0.57	3.9	21	38146
Kingsville Dome	1	20.8	5.1	344	7.67	38	268	204	234	0.56	0.75	17.9	8.74
Kingsville Dome	2	25.3	5	323	8.2	7	327	224	224	0.65	0.89	27	:7.37-8.66
Lamprecht	1	192.8	24.5	431	29.2	3.6	277.1	60.35	517.9	0.6	1.02	37.6	7.64
Lamprecht	2	182	22.8	527	26.4	–	250	617	656	0.6	1.87	32.2	38146
Lamprecht	3	210.3	25.1	425.6	30.4	–	267.7	636.5	514.8	0.64	0.76	45.5	38146
Lamprecht	4	210	40.4	471	34.2	5	367	520	619	1.41	1.73	37.3	38146
Las Palmas *	1	126.88	31.35	272.47	18.8	–	174.8	96.2	566.2	0.318	2.96	42.24	7.7
Las Palmas *	2	132.1	32.3	304	20.3	–	176	94	631.1	0.35	5.3	45	8.09
Las Palmas *	3	108	24	272	19	–	174	103	527	0.39	6.3	45	7.83

ORIGINAL RTV													
* corrected values		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	**Magnesium**	**Sodium**	**Potassium**	**Carbonate**	**Bicarbonate**	**Sulfate**	**Chloride**	**Fluoride**	**Nitrate-N**	**Silica**	**pH**
Longoria	1	54.5	15.5	619	20.2	2.3	239.6	182.5	854.5	0.56	0.82	36	8
Longoria	2	77	19	610	23	3.4	238	206	856	0.62	2.68	42	8.28
McBryde	1	197	44	350	43	5	244	138	692	1.2	5	76	8.39
Mt Lucas	1	31	6.8	212.3	7.8	–	389	76.2	128	2	0.2	31.2	7.91
Mt Lucas	2	30	7.92	224.2	9.51	–	405	77.2	140.5	1.08	1.11	28	8.11
Mt Lucas	3	28.2	8.3	225	10	–	416	83.4	122.5	1.3	0.16	24.9	8
Mt Lucas	4	21.3	5.5	372	6.7	–	342	26	423	0.76	0.01	20	8.1
Mt Lucas	5	30.8	9.1	212	11.4	–	401	72	133	1.28	0.21	25	6.5-8.5
Mt Lucas	6	50.2	9.2	477	15.4	–	271	192	574	0.33	0.46	23	6.5-8.5
Mt Lucas	7	31.2	6.8	351	10.1	–	336	167	316	0.32	0.03	26	38146
Mt Lucas	8	32.2	6.6	295	10.9	–	372	145	213	0.35	0.97	36	6.5-8.5
Nell	1	79.2	4.14	1932	93	4.6	411.6	15.8	2956	0.78	0.031	55.25	38146
O'Hern	1	0.2	2.9	347	9.7	–	347.8	141	295.6	1.31	2.78	43.7	8.05
O'Hern	2	13.7	2.7	310	9.7	1.78	347	129	254	1.37	0.86	43.7	8.2
O'Hern	*3	200	150	300	12	–	500	160	300	1.8	10	45	38146
O'Hern	*4	14.12	2.8	307.7	9.06	17.57	190.1	132.1	278.8	0.96	2.79	55.1	
Palangana	1	200	125	245	19.3	11	500	250	250	1.8	10	44	38176
Pawlik	1A	144	29	750	32	–	197	14	1405	0.76	0.05	39	38146
Pawlik	1B	51	11	290	16	–	321	20	386	1.08	0.03	37	38146
Pawnee	1	200	125	200	–	–	500	250	250	1.8	10		38146
Rosita	1	155	53	422	26	–	204	196	866	0.81	1.79	50	6.5-8.5
Rosita	2	170	62	420	28	–	216	248	870	0.77	1.3	53	38175
Rosita	3	153	47	751	34	–	231	496	952	1.37	0.97	36	6.5-8.5
Tex-1	1	69.4	2.4	365	34	–	317	147	443	0.64	0.21	98	6.5-8.5
Trevino	1	150	47	380	23	–	264	189	641	0.778	0.22	51.4	7.11
Trevino	2a	95.9	50.2	392.6	26.4	–	388.8	239.5	572.4	0.81	0.16	53.9	6.9
Trevino	2b	95.9	50.2	392.6	26.4	–	388.8	239.5	572.4	0.81	0.16	53.9	
West Cole	1	6.64	1.5	295	10	16.4	333	92.4	201	1.95	1.19	57.8	8.71
West Cole	2	8.8	4	345	23	14	369	122	259	1.4	1.6	47	8.5
West Cole*	3	16.8	6.5	398	18.6	17	378	197	301	1.06	2.1	52	8.63
Zamzow	1	286	42.7	425	30.7	–	308	745	567	0.5	0.19	49	38146
Zamzow	2	306	33	341	24	–	282	773	514	0.5	0.1	48	38146
Zamzow	3	369	30	449.5	35.5	–	290.5	1018	499.5	0.55	0.01	62	7.31
Zamzow	4	395	39.5	430	59.5	–	328	793	720	0.7	0.05	58	6.5-7.5

ORIGINAL RTV													
* corrected values		mg/l	µmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Benavides	1	1211	0	0	0.004	0.0003	2.45	0.023	0.365	0.0003	0.004	0.03	0.083
Benavides	*2	1663	2982	149	0.008	0.01	1.2	0.05	0.41	0.001	0.01	0.03	0.078
Benavides	3	1356	2269	184	0.037	0.01	0.1	0.05	0.01	0.001	0.025	0.05	0.12
Benavides	4	1211	2161	199	0.004	0.0003	2.45	0.023	0.365	0.001	0.004	0.03	2
Boots/Brown	1	811	1423	252	0.059	0.0001	0.12	0.003	0.05	0.001	0.001	0.2	0.28
Brelum 106-200	1	5970.8	9979	248	0.074	0.0031	2	0.022	0.078	0.001	0.089	1.09	0.037
Brelum 106-200	2	6349	11160	349	0.013	0.0126	5.49	0.0134	0.128	0.0009	0.001	0.068	0.0308
Bruni	1	2282	3499	134	0.009	0.005	1.945	0.027	0.139	0.0009	0.022	0.57	0.461
Bruni	2												
Bruni	3												
Bruni	4												
Bruni	38107												
Bruni	38108	2282	3499	134	0.009	0.005	1.945	0.027	0.139	0.0009	0.022	0.57	0.461
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1	960	1579	241	0.076	0.01	0.42	0.028	0.103	0.0027	0.07	0.1	0.3
Burns/Moser	2	954	1674	219	0.02	0.0006	0.53	0.003	0.62	0.0055	0.003	0.05	0.05
Burns/Moser	3	628	1110	205	0.007	0.0002	0.65	0.002	0.02	0.0006	0.002	0.2	0.082
Burns/Moser	4	746.5	1318	291	0.001	0.0001	0.18	0.001	0.025	0.001	0.001	0.21	0.02
Clay West	1	945	1840		0.05	0.0003		0.006	0.12	0.0009	0.001	0.22	0.4
Clay West	2	1320	2431	262	0.044	0.0018	6.1	0.008	1.195	0.0002	0.004	0.62	0.477
El Mesquite	*1	1071	1885	202.5	0.007	0.0005	0.12	0.019	0.014	0.0002	0.004	0.023	0.039
El Mesquite	2	794	1326.9	282.76	0.038	0.0002	0.313	0.516	0.034	0.00014	0.008	0.0456	0.085
El Mesquite	3	785.7	1346.3	285.8	0.086	0.00012	0.25	0.45	0.028	0.00025	0.028	0.49	0.84
El Mesquite	4	940	1628	268	0.002	0.0002	0.18	0.17	0.016	0.0003	0.006	0.09	0.062
El Mesquite	7	965	1640	261	0.001	0.0002	0.23	0.084	0.02	0.0001	0.012	0.1	0.097
Gruy	1	1510	2430	24	0.035	0.0001	0.02	0.001	0.04	0.0001	0.013	0.12	1.12
Gruy	2	1544	2488	231	0.083	0.0001	0.03	0.001	0.27	0.0001	0.08	0.02	0.045
Gruy	3	1261	2100	193	0.043	0.0001	0.073	0.001	0.04	0.0001	0.008	0.1	0.739
Hobson	1	1111	1758	195	0.15	0.0009	0.54	0.04	0.1	0.00064	0.008	0.244	0.025
Holiday	1	884	1498	247	0.03	0.01	2.08	0.05	0.05	0.002	0.02	0.21	0.23
Holiday	2	694	1211	181	0.03	0.005	0.32	0.03	0.02	0.009	0.6	0.2	0.2
Holiday	3	1442	2374	206.5	0.08	0.0001	0.272	1.97	0.22	0.0001	0.026	0.138	1.6
Holiday	4	934	1599	266	0.008	0.0001	0.27	0.065	0.017	0.0002	0.002	0.05	0.036
Holiday	5	1322	2358	204	0.015	0.0001	0.09	0.002	0.013	0.0001	0.007	0.12	0.063
Holiday	6	1486	2626	192	0.02	0.0001	0.2	0.001	0.02	0.0001	0.014	0.1	0.368
Holiday	7	1110	1930	209	0.05	0.0003	0.17	0.003	0.02	0.0001	0.014	0.14	0.1
Kingsville Dome	1	997	1717	272	0.005	0.01	0.04	0.02	0.01	0.001	0.007	1.06	0.164
Kingsville Dome	2	1035	1662	280	0.006	0.0002	0.03	0.004	0.02	0.0001	0.014	0.15	1.89
Lamprecht	1	2022.9	3062.5	193.5	0.013	0.004	0.332	0.014	0.121	0.0009	0.012	0.5	0.16
Lamprecht	2	2178	3466		0.011	0.002	0.332	0.016	0.132	0.0002	0.01	0.91	0.266
Lamprecht	3	2076	3083	193.5	0.026	0.004	0.506	0.018	0.132	0.003	0.026	0.64	0.9
Lamprecht	4	2118	3399	313	0.01	0.002	0.46	0.014	0.127	0.002	0.006	0.07	0.9
Las Palmas *	1	2124	2330	143.4	0.0272	0.0001	0.12	0.0053	0.089	0.0006	0.01	0.02	2.913
Las Palmas *	2	1490	2430	163	0.01	0.0001	0.45	0.02	0.087	0.0001	0.14	0.039	0.566
Las Palmas *	3	1208	2061	143	0.03	0.0001	0.55	0.005	0.046	0.0001	0.137	0.07	2.4

ORIGINAL RTV													
* corrected values		mg/l	µmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	**Conductivity**	**Alkalinity**	**Arsenic**	**Cadmium**	**Iron**	**Lead**	**Manganese**	**Mercury**	**Selenium**	**Ammonia-N**	**Uranium**
Longoria	1	1928			0.023	0.0001	0.04	0.003	0.02	0.0003	0.002	0.01	0.047
Longoria	2	2013	3509	201	0.023	0.0001	0.24	0.028	0.111	0.0003	0.003	0.01	0.037
McBryde	1	1580			0.041	0.0017	0.59	0.228	0.28	0.001	0.049	1.7	0.831
Mt Lucas	1	687.8	1140	318.6	0.0057	0.00014	0.18	0.0018	0.015	0.0001	0.001	0.348	0.293
Mt Lucas	2	740	1174	333.4	0.0014	0.0001	0.078	0.001	0.0134	0.0001	0.0013	0.116	0.076
Mt Lucas	3	728.5	1180	341	0.008	0.0001	0.2	0.001	0.016	0.0001	0.001	0.17	0.77
Mt Lucas	4	1096	2076	284	0.015	0.0001	0.3	0.001	0.026	0.0001	0.001	0.09	0.097
Mt Lucas	5	727	1166	329	0.003	0.0001	0.03	0.001	0.01	0.0001	0.003	0.12	0.258
Mt Lucas	6	1508	2567	222	0.003	0.0001	0.02	0.001	0.01	0.0001	0.004	0.03	0.125
Mt Lucas	7	1115	1817	275	0.003	0.0001	0.02	0.001	0.01	0.0001	0.001	0.07	0.047
Mt Lucas	8	967	1541	305	0.005	0.0001	0.01	0.001	0.01	0.0001	0.002	0.06	0.334
Nell	1	5383	9539	337.4	0.028	0.001	1.21	0.455	0.257	0.0005	0.0012	7.49	0.041
O'Hern	1	1052	1728	278	0.2	0.01	2.9	0.25	5.06	0.0003	0.002	2.1	0.28
O'Hern	2	979	1626		0.2	0.01	3.52	0.25	0.124	0.445	0.01	0.77	0.371
O'Hern	*3	1000			0.05	0.01	6.3	0.05	0.3	0.00003	0.01	0.5	2
O'Hern	*4	952			0.042	0.011	0.63	0.02	0.019	0.008	0.012	0.052	0.307
Palangana	1	878	1281	251	0.05	0.01	0.6	0.1	0.1	0.002	0.11	5	2
Pawlik	1A	2607	4566		0.003	0.0002	0.27	0.001	0.028	0.0001	0.001	0.2	0.002
Pawlik	1B	1002	1748	263	0.001	0.0001	0.29	0.001	0.037	0.0001	0.001	0.12	0.002
Pawnee	1	903	1310		0.05	0.01	0.3	0.05	0.059	0.002	0.05	0.1	2
Rosita	1	1933	3388	169	0.009	0.0005	0.105	0.002	0.06	0.0003	0.008	0.38	0.35
Rosita	2	2045	3519	177	0.014	0.0002	0.02	0.001	0.03	0.0001	0.006	0.08	0.547
Rosita	3	2524	4276	189	0.068	0.002	0.13	0.003	0.04	0.0001	0.034	0.16	0.586
Tex-1	1	1367	2160	260	0.028	0.0001	0.04	0.001	0.11	0.0001	0.002	0.12	0.05
Trevino	1	1577	2761	221	0.089	0.01	0.2	0.04	0.245	0.001	0.001	0.054	0.015
Trevino	2a	1635			0.032	0.01	0.25	0.02	0.32	0.0003	0.001	0.07	0.036
Trevino	2b												
West Cole	1	882.8	1441	296	0.121	0.0001	0.217	0.018	0.046	0.0002	0.006	0.09	0.169
West Cole	2	1036	1656	324	0.044	0.0001	0.72	0.009	0.115	0.0001	0.008	0.06	0.662
West Cole*	3	1234	1938	339	0.028	0.0008	0.58	0.017	0.041	0.0001	0.001	0.09	1.66
Zamzow	1	2289	3204	275	0.013	0.001	0.29	0.004	0.174	0.0007	0.01	0.22	0.01
Zamzow	2	2234	3155	245	0.01	0.001	0.15	0.001	0.14	0.0004	0.01	0.3	0.017
Zamzow	3	2575	3200	238	0.001	0.0001	1.06	0.004	0.38	0.0001	0.001	0.76	0.85
Zamzow	4	2510	3585	269	0.01	0.0001	4.06	0.006	0.39	0.0001	0.001	0.71	0.217

ORIGINAL RTV

ORIGINAL RTV			
* corrected values		mg/l	pCi/l
		Molybdenum	Radium
Benavides	1	0.01	83
Benavides	*2	0.1	45.17
Benavides	3	0.1	173.1
Benavides	4	0.01	83
Boots/Brown	1	0.12	9.45
Brelum 106-200	1	0.152	9.36
Brelum 106-200	2	0.016	1536.5
Bruni	1	0.121	90.5
Bruni	2		
Bruni	3		
Bruni	4		
Bruni	38107	-	
Bruni	38108	0.121	90.5
Bums Ranch	1		
Bums Ranch	2		
Bums/Moser	1	0.4	246.6
Bums/Moser	2	0.01	
Bums/Moser	3	0.1	758
Bums/Moser	4	0.01	568
Clay West	1	0.256	235
Clay West	2	0.1	420
El Mesquite	*1	0.015	9.98
El Mesquite	2	0.024	14.7
El Mesquite	3	0.036	116.68
El Mesquite	4	0.01	6.2
El Mesquite	7	0.03	10.3
Gruy	1	0.016	272
Gruy	2	0.02	24
Gruy	3	0.01	159
Hobson	1	0.133	45.1
Holiday	1	0.3	9.1
Holiday	2	0.1	5.45
Holiday	3	0.116	429.8
Holiday	4	0.01	6.8
Holiday	5	0.05	14.9
Holiday	6	0.06	19.6
Holiday	7	0.06	8.7
Kingsville Dome	1	0.06	21.63
Kingsville Dome	2	0.38	92
Lamprecht	1	0.144	150.7
Lamprecht	2	0.155	76.7
Lamprecht	3	0.291	127.6
Lamprecht	4	0.17	290
Las Palmas *	1	0.04	133.6
Las Palmas *	2	0.01	92.3
Las Palmas *	3	0.03	155

ORIGINAL RTV			
* corrected values		mg/l	pCi/l
		Molybdenum	**Radium**
Longoria	1	0.03	97
Longoria	2	0.03	36.72
McBryde	1	0.03	365
Mt Lucas	1	0.06	535.8
Mt Lucas	2	0.042	391
Mt Lucas	3	0.11	314.6
Mt Lucas	4	0.05	150.8
Mt Lucas	5	0.1	323
Mt Lucas	6	0.02	225.4
Mt Lucas	7	0.07	56.2
Mt Lucas	8	0.08	171
Nell	1	0.126	57.2
O'Hern	1	0.3	39
O'Hern	2	1.1	46.2
O'Hern	*3	1	
O'Hern	*4	0.2	29.49
Palangana	1	1	164
Pawlik	1A	0.01	92.5
Pawlik	1B	0.01	22.7
Pawnee	1	1	274
Rosita	1	0.05	183
Rosita	2	0.06	130.3
Rosita	3	2.53	87.29
Tex-1	1	0.014	246
Trevino	1	0.34	13.8
Trevino	2a	0.1	19
Trevino	2b		
West Cole	1	0.01	8.98
West Cole	2	0.01	*19.6
West Cole*	3	0.011	46
Zamzow	1	0.006	107.9
Zamzow	2	0.2	363.49
Zamzow	3	0.01	45.25
Zamzow	4	1.05	481.9

Attachment C

Final Restoration Target Values

Final Restoration Target Values																
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU	mg/l	mmhos/cm	mg/l
	PAA	Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH	TDS	Conductivity	Alkalinity
Benavides	1	75	6.2	402	14	2	350	300	517	0.48	2.87	26	6.5-8.5	1211		
Benavides	2	100	13	559	19.9	0.1	325	814	814	1.3	8.1	20.4	8.1	2100	2982	149
Benavides	3	76	9.4	475	13.6	5	300	300	653	0.55	2.55	21	8.6	1358	2269	184
Benavides	4	50	15	410	14	2	400	250	517	0.48	2.87	26	7	1211	2161	199
Boots/Brown	1	75	14	221	12	0	350	75	266	1.2	0.2	45	6-8	811	1423	260
Brelum 106-2(	1	75	30	2138	52			300	3130	1.5	10	49.7	6-9	5971		
Brelum 106-2(	2	75	30	2356	101			300	3505	1.8	10	43.67	6-9	6349		
Bruni	1	270	150	410	35		700	300	1100	1.8	10	40	6.5-8.5	2282		
Bruni	2															
Bruni	3	139														
Bruni	4	139														
Bruni	5-1	270														
Bruni	5-2	241	58.3	382	35		700	300	1010	1.8	10	40	6.5-8.5	2282		
Burns Ranch	1															
Burns Ranch	2															
Burns/Moser	1	85	13	321	18		400	90	463	1.44	0.17	43		970	1579	306
Burns/Moser	2	103	17	264	16		290	160	320	1	0.35	36	:7-8	948	1674	234
Burns/Moser	3	120	13	174	12		390	90	225	1.2	0.04	40	7-8	645	1110	315
Burns/Moser	4	220	36	191.5	16	1.8	370	350	270	0.9	0.83	37	6.5-8.5	1265	1936	300
Clay West	1	100	16	282	15		300	110	371	1.8	0.4	50	6.5-8.5	945	1840	
Clay West	2	95	16	354	17	0	320	300	424	1.1	0.06	43	8.2	1320	2431	262
El Mesquite	*1	75														
El Mesquite	2	20	3	315	8.95	17.92	420	100	200	0.96	2.15	24.07	6-9	875	1480	350
El Mesquite	3	21.5	3.9	320	7.5	17.9	410	205	196.9	0.96	4.25	23.5	6-9	910	1520	340
El Mesquite	4	36	8.5	370	8.5	17	440	300	301	1	0.47	17	6-9	1180	1830	362
El Mesquite	7															
Gruy (Not Min	1															
Gruy Not Mine	2															
Gruy (Not Min	3															
Hobson	1	70	3.5	370	35.8	6.6	429	253	425	0.94	0.33	75	8.15	1492	2408	313
Holiday	1															
Holiday	2	30	4	300	6.8	11.8	400	92.6	174	1.2	1.8	19.7	6-9	900	1500	350
Holiday	3	38.8	15.4	449	16.4	3.8	244.8	92.6	630.4	0.47	3.06	20.4	6-9	1442	2374	206.5
Holiday	4	70	16	490	13	14	440	455	350	1.15	0.97	18	6-9	1610	2500	365
Holiday	5	46	17	445	11.1	4.4	385	285	582	0.58	1.87	20	6-9	1322	2358	320
Holiday	6	65	24.6	424	15.3	4	4480	270	643	2.7	0.53	22	8.23	1482	2626	395
Holiday	7															
Kingsville Dom	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Kingsville Dom	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lamprecht	1	198	32.6	444	30.8	3.1	300	523	574	1.05	1.36	37.6	7.4	2059	3221	276
Lamprecht	2	combined with PAA1														
Lamprecht	3	combined with PAA1														
Lamprecht	4	combined with PAA1														
Las Palmas	1	220	43	292	21		300	230	610	0.55	8.8	49	6.5-8.5	1600	2625	250
Las Palmas	2	132.1	32.3	304	23	0	225	180	690	0.57	12.5	45	6.5-8.5	1656	2773	183

Final Restoration Target Values

Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU	mg/l	mmhos/cm	mg/l
	PAA	Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH	TDS	Conductivity	Alkalinity
Las Palmas	3	200	35	272	19		270	250	570	0.6	6.3	45	6.5-8.5	1500	2500	220
Longoria	1	100	15.5	619	20	2.3	400	350	854	0.56	0.82	36	6.5-8.5	1928		
Longoria	2	100	19	610	23	3.4	400	450	856	0.62	2.68	42	6.5-8.5	2200	3509	201
McBryde	1	250	60	350	43		350	500	692	1.2	5	76	6.0-9.0	1738		
Mt Lucas	1	75	13	212.3	11		425	1000	128	2	0.2	31.2	6.5-8.5	776	1210	349
Mt Lucas	2	80	10	224	25		406.5	100	140.5	1.3	1.11	28	6.5-8.5	740	1174	333.4
Mt Lucas	3	70	12	225	10		416	95	122.5	1.3	0.16	24.9	6.5-8.5	728.5	1180	341
Mt Lucas	4	90	12	375	10		510	150	437	1	0.035	21	6.5-8.5	1122	1984	430
Mt Lucas	5	75	15	212	11.4		450	110	133	1.28	0.21	25	6.5-8.5	775	1200	375
Mt Lucas	6	160	24	477	18		370	250	574	0.5	0.46	23	6.5-8.5	1550	2567	300
Mt Lucas	7	90	15	351	12	0	425	250	316	0.4	0.03	26	6.5-8.5	1115	1817	350
Mt Lucas	8	125	18	295	12	0	425	225	213	0.45	0.97	36	6.5-8.5	967	1541	330
Nell	1	100	30	1932	93			300	2956	1.8	10	55.25		5383		
O'Hern	1	32	8	347	9.7	2	347.8	200	295.6	1.31	2.78	43.7	6.5-8.5	1052	1728	
O'Hern	2	14.7														
O'Hern	*3	table not amended														
O'Hern	*4	36	7	307.7	9.06	17.57	325	132.1	278.8	0.96	2.79	55.1		952		
Palangana	1	200	125	245	19.3	11	500	250	250	1.8	10	44	6.5-8.5	878	1750	410
Pawlik	1A	225	50	750	32		325	275	1405	0.9	0.05	39	6-9	2607	4566	290
Pawlik	1B	51	11	290	16		321	20	386	1.08	0.03	37	6-9	1002	1748	263
Pawnee	1	200	125	200			500	250	250	1.8	10		6-9	903	2400	
Rosita	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosita	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosita	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tex-1	1	125	5	377	45		327	400	445	0.62	0.12	110	6.0-8.5	1500	2400	269
Trevino	1	200	47	375	25	0	265	500	639	0.76	0.29	52	6.6-8.0	1700	2806	222
Trevino	2a	130	70	420	26.4	130	450	450	650	1	0.16	60	6.6-8.2	1884		
Trevino	2b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Cole	1	25	10	350	15	16.4	670	92.4	201	1.96	1.19	57.8	6-9	1000	1640	550
West Cole	2	15	7	345	23	14	560	122	259	1.4	1.6	47	6-9	1036	1700	470
West Cole	3	16.8	6.5	398	18.6	17	532	197	301	1.17	2.1	52		1234		
Zamzow	1	317	38.4	450	30.3	0	750	793	538	0.54	0.16	51.6	6.5-8.5	2289	3204	500
Zamzow	2	combined with PAA1														
Zamzow	3	combined with PAA1														
Zamzow	4	combined with PAA1														

Final Restoratio												
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l
	PAA	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium	Molybdenum	Radium
Benavides	1	0.004	0.0003	2.45	0.023	0.365	0.0003	0.004	0.03	2	0.01	83
Benavides	2	0.008	0.01	1.2	0.05	0.41	0.001	0.01	0.03	2	0.1	83
Benavides	3	0.037	0.01	0.1	0.05	0.01	0.001	0.025	0.05	3	0.1	173.1
Benavides	4	0.01	0.01	2.45	0.02	0.37	0.001	0.01	0.05	2	0.01	83
Boots/Brown	1	0.059	0.0001	0.2	0.003	0.05	0.0011	0.002	0.5	0.28	1	150
Brelum 106-2	1	0.074	0.0031	2	0.022	0.078	0.001	0.089	29	2	1	9.36
Brelum 106-2	2	0.05	0.0126	5.49	0.0134	0.128	0.0009	0.01	29	2	1	1536.5
Bruni	1	0.05	0.01	1.945	0.056	0.139	0.002	0.051	200	5	1	90.5
Bruni	2											
Bruni	3											
Bruni	4											
Bruni	5-1											
Bruni	5-2	0.05	0.005	1.945	0.027	0.139	0.0009	0.051	200	4	1	90.5
Burns Ranch	1											
Burns Ranch	2											
Burns/Moser	1	0.275	0.01	65	0.028	0.15	0.003	0.07	5	0.3	3.9	450
Burns/Moser	2	0.02	0.0006	0.503	0.003	0.64	0.0055	0.06	1.2	1.7	0.07	529
Burns/Moser	3	0.059	0.0002	2	0.002	0.27	0.0006	0.002	0.2	1.25	0.1	758
Burns/Moser	4	0.65	0.0001	8	0.001	0.35	0.001	0.001	0.21	0.2	0.5	675
Clay West	1	0.07	0.0003	1.5	0.006	0.75	0.0009	0.02	2.9	0.8	2.9	380
Clay West	2	0.044	0.0018	6.1	0.008	3.3	0.0002	0.05	0.62	0.477	0.3	420
El Mesquite	*1											
El Mesquite	2	0.038	0.0002	0.313	0.516	0.05	0.00014	0.08	0.045	1.35	0.13	46
El Mesquite	3	0.086	0.00012	0.25	0.45	0.028	0.00025	0.105	0.49	2.7	0.11	116.68
El Mesquite	4	0.009	0.0002	0.18	0.002	0.06	0.0003	0.215	0.09	1.95	0.07	20
El Mesquite	7											
Gruy (Not Min	1											
Gruy Not Mine	2											
Gruy (Not Min	3											
Hobson	1	0.422	0.009	2.09	0.04	0.331	0.00064	0.008	75.5	0.29	3.55	70
Holiday	1											
Holiday	2	0.03	0.005	0.32	0.03	0.02	0.009	0.6	0.2	0.5	0.1	26.6
Holiday	3	0.08	0.0001	0.272	1.97	0.022	0.0001	0.026	0.138	2	0.116	429.8
Holiday	4	0.008	0.0001	0.27	0.0065	0.05	0.0002	0.155	0.12	2.55	0.075	19
Holiday	5	0.015	0.0004	0.09	0.002	0.04	0.0001	0.061	0.012	1.095	0.19	28.5
Holiday	6	0.02	0.0001	0.2	0.001	0.1	0.0001	0.37	0.1	2.3	0.11	71
Holiday	7											
Kingsville Dom	1	-	-	-	-	-	-	-	-	-	-	-
Kingsville Dom	2	-	-	-	-	-	-	-	-	-	-	-
Lamprecht	1	0.013	0.007	0.332	0.014	0.121	0.0009	0.012	0.635	0.757	0.144	218.3
Lamprecht	2											
Lamprecht	3											
Lamprecht	4											
Las Palmas	1	0.073	0.0001	0.2	0.0053	0.5	0.0006	0.564	10	7	0.04	134
Las Palmas	2	0.019	0.0001	0.45	0.02	0.31	0.0001	0.14	0.167	2	0.06	100

Final Restoration												
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	pCi/l
	PAA	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium	Molybdenum	Radium
Las Palmas	3	0.03	0.0001	0.55	0.005	0.4	0.0001	0.137	0.15	5	0.15	170
Longoria	1	0.023	0.0001	0.04	0.003	0.02	0.0003	0.002	0.01	2	0.03	97
Longoria	2	0.023	0.0001	0.24	0.028	0.111	0.0003	0.003	0.01	3	0.03	37
McBryde	1	0.041	0.0017	0.59	0.228	0.5	0.001	0.049	1.7	4	0.03	100
Mt Lucas	1	0.0057	0.00014	0.18	0.0018	0.05	0.0001	0.003	0.348	0.55	0.5	962
Mt Lucas	2	0.007	0.0001	0.078	0.001	0.1	0.0001	0.0013	0.116	0.5	0.8	950
Mt Lucas	3	0.02	0.0001	0.2	0.002	0.064	0.0001	0.35	0.17	1.75	1	940
Mt Lucas	4	0.1	0.0001	0.09	0.001	0.1	0.0001	0.003	0.08	1.6	1.6	300
Mt Lucas	5	0.2	0.0001	0.03	0.001	0.5	0.0001	0.025	0.12	1.5	0.6	750
Mt Lucas	6	0.005	0.0001	0.02	0.001	0.1	0.0001	0.015	0.03	2	0.6	750
Mt Lucas	7	0.15	0.0001	0.02	0.003	0.15	0.0001	0.01	0.05	1	0.75	250
Mt Lucas	8	0.006	0.0001	0.01	0.001	0.25	0.0001	0.002	0.06	1.25	1.5	550
Nell	1	0.028	0.001	1.21	0.455	0.257	0.0005	0.0012	7.49	2	1	57.2
O'Hern	1	0.2	0.01	2.9	0.25	5.06	0.36	0.61	2.1	1.55	2.1	
O'Hern	2											
O'Hern	*3											
O'Hern	*4	0.042	0.011	0.63	0.02	0.1	0.008	0.04	0.052	1.2	0.75	
Palangana	1	0.05	0.01	0.6	0.1	0.1	0.002	0.11	100	2	1.7	275
Pawlik	1A	0.003	0.0002	0.27	0.002	0.09	0.0001	0.001	0.2	0.02	0.07	92.5
Pawlik	1B	0.001	0.0001	0.29	0.001	0.037	0.0001	0.001	0.11	0.002	0.01	22.7
Pawnee	1	0.05	0.01	0.3	0.05	0.059	0.002	0.05	240	4	5	274
Rosita	1	-	-	-	-	-	-	-	-	-	-	-
Rosita	2	-	-	-	-	-	-	-	-	-	-	-
Rosita	3	-	-	-	-	-	-	-	-	-	-	-
Tex-1	1	0.35	0.0001	25	0.001	1	0.0001	0.002	0.14	1	0.1	372
Trevino	1	0.2	0.01	1	0.06	1	0.001	0.01	5	2	0.5	131
Trevino	2a	0.05	0.01	0.25	0.02	1	0.0003	0.01	5	2		226
Trevino	2b	-	-	-	-	-	-	-	-	-	-	-
West Cole	1	0.121	0.0001	0.217	0.018	0.046	0.0002	0.018	0.09	2.75	0.03	21.5
West Cole	2	0.12	0.0001	0.72	0.009	0.115	0.0001	0.04	0.09	2.5	0.025	
West Cole	3	0.13	0.0008	0.58	0.0017	0.041	0.0001	0.024	0.09	3.15	0.02	46
Zamzow	1	0.2	0.001	0.915	0.004	0.224	0.0006	0.01	200	3	5	200
Zamzow	2											
Zamzow	3											
Zamzow	4											

Attachment D

Last Sampled Values

Last Sampled Values													
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH
Benavides	1	67	13	418	11.5	6	3.3	265	432	0.29	0.53	13.7	8.36
Benavides	2	39	20	601	16	0	176	105	903	0.44	2.1	23	8.17
Benavides	3	76	18.6	442	12.6	0	224	188	629	0.32	0.41	18	8
Benavides	4	37	9	372	7	0	254	107	497	0.37	0.1	16	7.7
Boots/Brown	1												
Brelum 106-2(	1	44	3.6	2184	49			81	3226	1.6	0.01	31	7.97
Brelum 106-2(	2	49	5.9	2247	70			102	3326	1	0.01	33	7.89
Bruni	1	120	34.6	253	17		390	142	684	0.3	1.5	30	7.8
Bruni	2												
Bruni	3												
Bruni	4												
Bruni	5-1												
Bruni	5-2	129	33.5	248	19		373	142	643	0.325	2.17	39	
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1												
Burns/Moser	2												
Burns/Moser	3												
Burns/Moser	4												
Clay West	1												
Clay West	2												
El Mesquite	*1												
El Mesquite	2												
El Mesquite	3	17.9	3.8	274	7.2	4.1	406	170	138	0.71	0.81	13.4	8.32
El Mesquite	4												
El Mesquite	7												
Gruy	1												
Gruy	2												
Gruy	3												
Hobson	1												
Holiday	1												
Holiday	2												
Holiday	3												
Holiday	4												
Holiday	5												
Holiday	6												
Holiday	7												
Kingsville Dom	1												
Kingsville Dom	2												
Lamprecht	1												
Lamprecht	2												
Lamprecht	3												
Lamprecht	4												
Las Palmas	1												
Las Palmas	2												
Las Palmas	3												

Last Sampled Values													
Units =>		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU
		Calcium	Magnesium	Sodium	Potassium	Carbonate	Bicarbonate	Sulfate	Chloride	Fluoride	Nitrate-N	Silica	pH
Longoria	1	85	20.6	562	13	6	315	265	712	0.55	0.28	30	8.33
Longoria	2	116	29	652	17	3	366	3881	905	0.51	0.59	30	8.27
McBryde	1												
Mt Lucas	1												
Mt Lucas	2												
Mt Lucas	3												
Mt Lucas	4												
Mt Lucas	5												
Mt Lucas	6												
Mt Lucas	7												
Mt Lucas	8												
Nell	1												
O'Hern	1												
O'Hern	2												
O'Hern	*3												
O'Hern	*4	35.7	5	215.1	7.3	1.37	322.9	121.1	155.8	0.6		28.3	
Palangana	1												
Pawlik	1A												
Pawlik	1B												
Pawnee	1	37	9	169	17	7	484	235	242	0.5	0.02	26	8.11
Rosita	1												
Rosita	2												
Rosita	3												
Tex-1	1												
Trevino	1												
Trevino	2a												
Trevino	2b												
West Cole	1												
West Cole	2												
West Cole	3												
Zamzow	1												
Zamzow	2												
Zamzow	3												
Zamzow	4												

Last Sampled Valu													
Units =>		mg/l	mmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Benavides	1	1359	2383	253	0.002	0.01	0.01	0.03	0.01	0.001	0.005	0.1	1.04
Benavides	2	1875	3448	145	0.004	0.0001	0.01	0.004	0.01	0.0001	0.033	0.04	0.279
Benavides	3	1560	2715	184	0.002	0.0001	0.01	0.001	0.18	0.001	0.04	0.16	1.5
Benavides	4	1088	2173	208	0.01	0.01	2.7	0.02	0.18	0.001	0.01		0.95
Boots/Brown	1												
Brelum 106-2(	1	6065			0.017	0.0002	0.12	0.001	0.031	0.0001	0.002	12.7	0.025
Brelum 106-2(	2	6155			0.003	0.0001	0.16	0.001	0.063	0.0001	0.001	5.54	0.013
Bruni	1	1395			0.005	0.0001	0.12	0.001	0.02	0.0001	0.012	109.67	1.185
Bruni	2												
Bruni	3												
Bruni	4												
Bruni	5-1												
Bruni	5-2	1366			0.003	0.0002	0.186	0.002	0.018	0.0001	0.015	89	3.02
Burns Ranch	1												
Burns Ranch	2												
Burns/Moser	1												
Burns/Moser	2												
Burns/Moser	3												
Burns/Moser	4												
Clay West	1												
Clay West	2												
El Mesquite	*1												
El Mesquite	2												
El Mesquite	3	900	1461	338	0.027	0.0001	0.03	0.05	0.014	0.0001	0.102	0.05	2.53
El Mesquite	4												
El Mesquite	7												
Gruy	1												
Gruy	2												
Gruy	3												
Hobson	1												
Holiday	1												
Holiday	2												
Holiday	3												
Holiday	4												
Holiday	5												
Holiday	6												
Holiday	7												
Kingsville Dom	1												
Kingsville Dom	2												
Lamprecht	1												
Lamprecht	2												
Lamprecht	3												
Lamprecht	4												
Las Palmas	1												
Las Palmas	2												
Las Palmas	3												

Last Sampled Valu													
Units =>		mg/l	mmhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
		TDS	Conductivity	Alkalinity	Arsenic	Cadmium	Iron	Lead	Manganese	Mercury	Selenium	Ammonia-N	Uranium
Longoria	1	1860	3200	269	0.1	0.01	1	0.05	0.2	0.002	0.05		5
Longoria	2	2208	3697	307	0.01	0.01	0.02	0.01	0.01	0.01	0.001	0.17	1.8
McBryde	1												
Mt Lucas	1												
Mt Lucas	2												
Mt Lucas	3												
Mt Lucas	4												
Mt Lucas	5												
Mt Lucas	6												
Mt Lucas	7												
Mt Lucas	8												
Nell	1												
O'Hern	1												
O'Hern	2												
O'Hern	*3												
O'Hern	*4	706.3			0.039	0.01	0.07	0.001	0.1	0.001	0.039	0.05	0.96
Palangana	1												
Pawlik	1A												
Pawlik	1B												
Pawnee	1	710	2127	408	0.016	0.0001	0.02	0.001	0.02	0.0001	0.001	120	0.672
Rosita	1												
Rosita	2												
Rosita	3												
Tex-1	1												
Trevino	1												
Trevino	2a												
Trevino	2b												
West Cole	1												
West Cole	2												
West Cole	3												
Zamzow	1												
Zamzow	2												
Zamzow	3												
Zamzow	4												

Last Sampled Valu			
Units =>		mg/l	pCi/l
		Molybdenum	Radium
Benavides	1	0.05	17.35
Benavides	2	0.01	5.2
Benavides	3	0.02	40.5
Benavides	4	0.01	61.3
Boots/Brown	1		
Brelum 106-2(	1	0.08	5.8
Brelum 106-2(	2	0.02	18.7
Bruni	1	0.3	59.6
Bruni	2		
Bruni	3		
Bruni	4		
Bruni	5-1		
Bruni	5-2	0.5	88
Burns Ranch	1		
Burns Ranch	2		
Burns/Moser	1		
Burns/Moser	2		
Burns/Moser	3		
Burns/Moser	4		
Clay West	1		
Clay West	2		
El Mesquite	*1		
El Mesquite	2		
El Mesquite	3	0.097	17.1
El Mesquite	4		
El Mesquite	7		
Gruy	1		
Gruy	2		
Gruy	3		
Hobson	1		
Holiday	1		
Holiday	2		
Holiday	3		
Holiday	4		
Holiday	5		
Holiday	6		
Holiday	7		
Kingsville Dom	1		
Kingsville Dom	2		
Lamprecht	1		
Lamprecht	2		
Lamprecht	3		
Lamprecht	4		
Las Palmas	1		
Las Palmas	2		
Las Palmas	3		

Last Sampled Valu			
Units =>		mg/l	pCi/l
		Molybdenum	Radium
Longoria	1		30
Longoria	2	0.01	27
McBryde	1		
Mt Lucas	1		
Mt Lucas	2		
Mt Lucas	3		
Mt Lucas	4		
Mt Lucas	5		
Mt Lucas	6		
Mt Lucas	7		
Mt Lucas	8		
Nell	1		
O'Hern	1		
O'Hern	2		
O'Hern	*3		
O'Hern	*4	0.72	
Palangana	1		
Pawlik	1A		
Pawlik	1B		
Pawnee	1	0.64	149
Rosita	1		
Rosita	2		
Rosita	3		
Tex-1	1		
Trevino	1		
Trevino	2a		
Trevino	2b		
West Cole	1		
West Cole	2		
West Cole	3		
Zamzow	1		
Zamzow	2		
Zamzow	3		
Zamzow	4		

Attachment E

Uranium Restoration History

Uranium					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Benavides	1	0.083	2	2309.63855	
Benavides	2	0.078	2	2464.10256	
Benavides	3	0.12	3	2400	
Benavides	4	2	2	0	
Boots/Brown	1	0.28	0.28	0	
Brelum 106-2(	1	0.037	2	5305.40541	
Brelum 106-2(	2	0.0308	2	6393.50649	
Bruni	1	0.461	5	984.598698	
Bruni	2	0	0		
Bruni	3	0	0		
Bruni	4	0	0		
Bruni	5-1	0	0		
Bruni	5-2	0.461	4	767.678959	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	0.3	0.3	0	
Burns/Moser	2	0.05	1.7	3300	
Burns/Moser	3	0.082	1.25	1424.39024	
Burns/Moser	4	0.02	0.2	900	
Clay West	1	0.4	0.8	100	
Clay West	2	0.477	0.477	0	
El Mesquite	*1	0.039	0		
El Mesquite	2	0.085	1.35	1488.23529	
El Mesquite	3	0.84	2.7	221.428571	
El Mesquite	4	0.062	1.95	3045.16129	
El Mesquite	7	0.097	0		
Gruy	1	1.12	0		
Gruy	2	0.045	0		
Gruy	3	0.739	0		
Hobson	1	0.025	0.29	1060	
Holiday	1	0.23	0		
Holiday	2	0.2	0.5	150	
Holiday	3	1.6	2	25	
Holiday	4	0.036	2.55	6983.33333	
Holiday	5	0.063	1.095		
Holiday	6	0.368	2.3	525	
Holiday	7	0.1	0		
Kingsville Dom	1	0.164	–		
Kingsville Dom	2	1.89	–		
Lamprecht	1	0.16	0.757	373.125	
Lamprecht	2	0.266	0		
Lamprecht	3	0.9	0		
Lamprecht	4	0.9	0		
Las Palmas	1	2.913	7	140.302094	
Las Palmas	2	0.566	2	253.35689	

Uranium					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Las Palmas	3	2.4	5	108.333333	
Longoria	1	0.047	2	4155.31915	
Longoria	2	0.037	3	8008.10811	
McBryde	1	0.831	4	381.347774	
Mt Lucas	1	0.293	0.55	87.7133106	
Mt Lucas	2	0.076	0.5	557.894737	
Mt Lucas	3	0.77	1.75	127.272727	
Mt Lucas	4	0.097	1.6	1549.48454	
Mt Lucas	5	0.258	1.5	481.395349	
Mt Lucas	6	0.125	2	1500	
Mt Lucas	7	0.047	1	2027.65957	
Mt Lucas	8	0.334	1.25	274.251497	
Nell	1	0.041	2	4778.04878	
O'Hern	1	0.28	1.55	453.571429	
O'Hern	2	0.371	0		
O'Hern	*3	2	0		
O'Hern	*4	0.307	1.2	290.879479	
Palangana	1	2	2	0	
Pawlik	1A	0.002	0.02	900	
Pawnee	1B	0.002	0.002	0	
Rosita	1	2	4		
Rosita	1	0.35	–		
Silver Lake	2	0.547	–		
Silver Lake	3	0.586	–		
Tex-1	1	0.05	1	1900	
Trevino	1	0.015	2		
Trevino	2a	0.036	2		
Trevino	2b	0	–		
West Cole	1	0.169	2.75	1527.21893	
West Cole	2	0.662	2.5	277.643505	
West Cole	3	1.66	3.15	89.7590361	
Zamzow	1	0.01	3	29900	
Zamzow	2	0.017	0		
Zamzow	3	0.85	0		
Zamzow	4	0.217	0		

Attachment F

Radium-226 Restoration History

Radium 266					
Restoration Table Amendment History					
MINE	**PAA**	**Original**	**Amended**	**% Change**	
		pCi/l	pCi/l		
Benavides	1	83	83	0	
Benavides	2	45.17	83	83.7502767	
Benavides	3	173.1	173.1	0	
Benavides	4	83	83	0	
Boots/Brown	1	9.45	150	1487.30159	
Brelum 106-2(	1	9.36	9.36	0	
Brelum 106-2(	2	1536.5	1536.5	0	
Bruni	1	90.5	90.5	0	
Bruni	2	0	0		
Bruni	3	0	0		
Bruni	4	0	0		
Bruni	5-1	0	0		
Bruni	5-2	90.5	90.5	0	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	246.6	450	82.4817518	
Burns/Moser	2	0	529		
Burns/Moser	3	758	758	0	
Burns/Moser	4	568	675	18.8380282	
Clay West	1	235	380	61.7021277	
Clay West	2	420	420	0	
El Mesquite	*1	9.98	0		
El Mesquite	2	14.7	46	212.92517	
El Mesquite	3	116.68	116.68	0	
El Mesquite	4	6.2	20	222.580645	
El Mesquite	7	10.3	0		
Gruy	1	272	0		
Gruy	2	24	0		
Gruy	3	159	0		
Hobson	1	45.1	70	55.210643	
Holiday	1	9.1	0		
Holiday	2	5.45	26.6	388.073394	
Holiday	3	429.8	429.8	0	
Holiday	4	6.8	19	179.411765	
Holiday	5	14.9	28.5	91.2751678	
Holiday	6	19.6	71	262.244898	
Holiday	7	8.7	0		
Kingsville Dom	1	21.63	-		
Kingsville Dom	2	92	-		
Lamprecht	1	150.7	218.3	44.8573324	
Lamprecht	2	76.7	0		
Lamprecht	3	127.6	0		
Lamprecht	4	290	0		
Las Palmas	1	133.6	134	0.2994012	

Radium 266					
Restoration Table Amendment History					
MINE	**PAA**	**Original**	**Amended**	**% Change**	
		pCi/l	pCi/l		
Las Palmas	2	92.3	100	8.34236186	
Las Palmas	3	155	170	9.67741935	
Longoria	1	97	97	0	
Longoria	2	36.72	37	0.76252723	
McBryde	1	365	100	-72.6027397	
Mt Lucas	1	535.8	962	79.5446062	
Mt Lucas	2	391	950	142.966752	
Mt Lucas	3	314.6	940	198.792117	
Mt Lucas	4	150.8	300	98.938992	
Mt Lucas	5	323	750	132.198142	
Mt Lucas	6	225.4	750	232.741792	
Mt Lucas	7	56.2	250	344.839858	
Mt Lucas	8	171	550	221.637427	
Nell	1	57.2	57.2	0	
O'Hern	1	39	0		
O'Hern	2	46.2	0		
O'Hern	*3	0	0		
O'Hern	*4	29.49	0		
Palangana	1	164	275	67.6829268	
Pawlik	1A	92.5	92.5	0	
Pawnee	1B	22.7	22.7	0	
Rosita	1	274	274	0	
Rosita	1	183	-		
Silver Lake	2	130.3	-		
Silver Lake	3	87.29	-		
Tex-1	1	246	372	51.2195122	
Trevino	1	13.8	131	849.275362	
Trevino	2a	19	226	1089.47368	
Trevino	2b	0	-		
West Cole	1	8.98	21.5	139.420935	
West Cole	2	*19.6	0		
West Cole	3	46	46	0	
Zamzow	1	107.9	200	85.3568119	
Zamzow	2	363.49	0		
Zamzow	3	45.25	0		
Zamzow	4	481.9	0		

Attachment G

Arsenic Restoration History

Arsenic

Restoration Table Amendment History

MINE	**PAA**	**Original**	**Amended**	**% Change**	
		mg/l	mg/l		
Benavides	1	0.004	0.004	0	
Benavides	2	0.008	0.008	0	
Benavides	3	0.037	0.037	0	
Benavides	4	0.004	0.01	150	
Boots/Brown	1	0.059	0.059	0	
Brelum 106-2(	1	0.074	0.074	0	
Brelum 106-2(	2	0.013	0.05	284.615385	
Bruni	1	0.009	0.05	455.555556	
Bruni	2	0	0		
Bruni	3	0	0		
Bruni	4	0	0		
Bruni	5-1	0	0		
Bruni	5-2	0.009	0.05	455.555556	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	0.076	0.275	261.842105	
Burns/Moser	2	0.02	0.02	0	
Burns/Moser	3	0.007	0.059	742.857143	
Burns/Moser	4	0.001	0.65	64900	
Clay West	1	0.05	0.07	40	
Clay West	2	0.044	0.044	0	
El Mesquite	*1	0.007	0		
El Mesquite	2	0.038	0.038	0	
El Mesquite	3	0.086	0.086	0	
El Mesquite	4	0.002	0.009	350	
El Mesquite	7	0.001	0		
Gruy	1	0.035	0		
Gruy	2	0.083	0		
Gruy	3	0.043	0		
Hobson	1	0.15	0.422	181.333333	
Holiday	1	0.03	0		
Holiday	2	0.03	0.03	0	
Holiday	3	0.08	0.08	0	
Holiday	4	0.008	0.008	0	
Holiday	5	0.015	0.015		
Holiday	6	0.02	0.02	0	
Holiday	7	0.05	0		
Kingsville Dom	1	0.005	-		
Kingsville Dom	2	0.006	-		
Lamprecht	1	0.013	0.013	0	
Lamprecht	2	0.011	0		
Lamprecht	3	0.026	0		
Lamprecht	4	0.01	0		
Las Palmas	1	0.0272	0.073	168.382353	

Arsenic					
Restoration Table Amendment History					
MINE	PAA	Original	Amended	% Change	
		mg/l	mg/l		
Las Palmas	2	0.01	0.019	90	
Las Palmas	3	0.03	0.03	0	
Longoria	1	0.023	0.023	0	
Longoria	2	0.023	0.023	0	
McBryde	1	0.041	0.041	0	
Mt Lucas	1	0.0057	0.0057	0	
Mt Lucas	2	0.0014	0.007	400	
Mt Lucas	3	0.008	0.02	150	
Mt Lucas	4	0.015	0.1	566.666667	
Mt Lucas	5	0.003	0.2	6566.66667	
Mt Lucas	6	0.003	0.005	66.6666667	
Mt Lucas	7	0.003	0.15	4900	
Mt Lucas	8	0.005	0.006	20	
Nell	1	0.028	0.028	0	
O'Hern	1	0.2	0.2	0	
O'Hern	2	0.2	0		
O'Hern	*3	0.05	0		
O'Hern	*4	0.042	0.042	0	
Palangana	1	0.05	0.05	0	
Pawlik	1A	0.003	0.003	0	
Pawnee	1B	0.001	0.001	0	
Rosita	1	0.05	0.05	0	
Rosita	1	0.009	-		
Silver Lake	2	0.014	-		
Silver Lake	3	0.068	-		
Tex-1	1	0.028	0.35	1150	
Trevino	1	0.089	0.2	124.719101	
Trevino	2a	0.032	0.05	56.25	
Trevino	2b	0	-		
West Cole	1	0.121	0.121	0	
West Cole	2	0.044	0.12	172.727273	
West Cole	3	0.028	0.13	364.285714	
Zamzow	1	0.013	0.2	1438.46154	
Zamzow	2	0.01	0		
Zamzow	3	0.001	0		
Zamzow	4	0.01	0		

Attachment H

Sulfate Restoration History

Sulfate					
Restoration Table Amendment History					
MINE	**PAA**	**Original**	**Amended**	**% Change**	
		mg/l	mg/l		
Benavides	1	69	300	334.782609	
Benavides	2	85	814	857.647059	
Benavides	3	86	300	248.837209	
Benavides	4	69	250	262.318841	
Boots/Brown	1	43	75	74.4186047	
Brelum 106-2(	1	54.14	300	454.118951	
Brelum 106-2(	2	67.08	300	347.227191	
Bruni	1	118	300	154.237288	
Bruni	2	0	0		
Bruni	3	125	0		
Bruni	4	80	0		
Bruni	5-1	118	0		
Bruni	5-2	118	300	154.237288	
Burns Ranch	1	0	0		
Burns Ranch	2	0	0		
Burns/Moser	1	39	90	130.769231	
Burns/Moser	2	123	160	30.0813008	
Burns/Moser	3	18	90	400	
Burns/Moser	4	10.3	350	3298.05825	
Clay West	1	85	110	29.4117647	
Clay West	2	201	300	49.2537313	
El Mesquite	*1	61	0		
El Mesquite	2	90.62	100	10.3509159	
El Mesquite	3	83.2	205	146.394231	
El Mesquite	4	102	300	194.117647	
El Mesquite	7	96	0		
Gruy	1	1197	0		
Gruy	2	214	0		
Gruy	3	144	0		
Hobson	1	156	253	62.1794872	
Holiday	1	78	0		
Holiday	2	92.6	92.6	0	
Holiday	3	92.6	92.6	0	
Holiday	4	90	455	405.555556	
Holiday	5	80	285		
Holiday	6	112	270	141.071429	
Holiday	7	61	0		
Kingsville Dom	1	204	-		
Kingsville Dom	2	224	-		
Lamprecht	1	60.35	523	766.611433	
Lamprecht	2	617	0		
Lamprecht	3	636.5	0		
Lamprecht	4	520	0		
Las Palmas *	1	96.2	230	139.085239	

Sulfate

Restoration Table Amendment History					
MINE	**PAA**	**Original**	**Amended**	**% Change**	
		mg/l	mg/l		
Las Palmas *	2	94	180	91.4893617	
Las Palmas *	3	103	250	142.718447	
Longoria	1	182.5	350	91.7808219	
Longoria	2	206	450	118.446602	
McBryde	1	138	500	262.318841	
Mt Lucas	1	76.2	1000	1212.33596	
Mt Lucas	2	77.2	100	29.5336788	
Mt Lucas	3	83.4	95	13.9088729	
Mt Lucas	4	26	150	476.923077	
Mt Lucas	5	72	110	52.7777778	
Mt Lucas	6	192	110	-42.7083333	
Mt Lucas	7	167	250	49.7005988	
Mt Lucas	8	145	250	72.4137931	
Nell	1	15.8	225	1324.05063	
O'Hern	1	141	300	112.765957	
O'Hern	2	129	200	55.0387597	
O'Hern	*3	160	0		
O'Hern	*4	132.1	0		
Palangana	1	250	132.1	-47.16	
Pawlik	1A	14	250	1685.71429	
Pawlik	1B	20	275	1275	
Pawnee	1	250	20	-92	
Rosita	1	196	250	27.5510204	
Rosita	2	248	-		
Rosita	3	496	-		
Tex-1	1	147	-		
Trevino	1	189	400	111.640212	
Trevino	2a	239.5	500	108.768267	
Trevino	2b	239.5	450	87.8914405	
West Cole	1	92.4	-		
West Cole	2	122	92.4	-24.2622951	
West Cole*	3	197	122	-38.071066	
Zamzow	1	745	197	-73.557047	
Zamzow	2	773	793	2.58732212	
Zamzow	3	1018	0		
Zamzow	4	793	0		

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Voices from the Earth: Current Issue

SRIC Friends

NEWS

In the News

Table of Contents

"The Navajo Nation Council finds that the mining and processing of uranium ore on the Navajo Nation and in Navajo Indian Country since the mid-1940s has

Need or Greed?
Uranium Prices and Demand

The sevenfold increase in uranium prices during the past four years has resulted in a tidal wave of uranium ore exploration and development activity around the world. But based on a close review of existing and projected world uranium supplies, there's really no need for any new mining sites. The fact is, there's more than enough yellowcake (uranium oxide) in existing deposits and secondary sources to meet projected demand for nuclear fuel for more than 50 years.

The rise in the uranium spot market price (for buyers without long-term contracts) reflects that investors and private industry are focused more on profiting from an imaginary "shortage" than filling a fuel gap to address increased uranium demand to feed new nuclear power stations being advocated by reactor manufacturers. All of which begs the question: is the sudden interest in new uranium mining a matter of real need or plain old-fashioned greed?

That opportunist profiteering may be at the root of the current uranium boom is suggested by the entrance into the market of a new wave of uranium companies — many of which are "junior mining companies" joining the uranium market. The "old wave" of the world's major uranium producers had already identified uranium ore resources at existing deposits that are sufficient to meet the more than 50 years of current or projected uranium demand. Junior mining companies often have limited financial resources, and instead plan to make money on a commodity that is relatively inexpensive to find and produce in comparison to current prices. Many junior companies have never actually mined anything, and are instead buying up existing claims, leases and other forms of "uranium properties" in the hope of attracting capital to develop them at some time in the future. Often, junior companies want to attract more substantial "senior" mining companies and banks to invest in the deposits that the juniors may identify, but lack the financial resources or corporate track record to fund them.

The current boom is resulting in renewed uranium exploration and development activities in communities that have suffered from the legacy of uranium mining in the 20th century and prospecting near communities that have never faced the juggernaut of uranium mining or other industrial development activity. Many of the communities facing renewed interest in long-dormant mining districts are in low-income rural areas and indigenous communities that have little long-term benefit to show from past uranium mining. The legacy of the first 50 years of uranium mining in those communities can provide a warning to areas where new mines, and rosy projections of economic benefit from the new mining activity, are being touted.

How do we know there's enough uranium for the next 50 years?
In 2003, the World Nuclear Association ("WNA") asserted that the known

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EXHIBIT
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created substantial and irreparable economic detriments to the Nation and its people..."

"The Navajo Nation Council finds that there is a reasonable expectation that future mining and processing of uranium will generate further economic detriments to the Navajo Nation."

Diné Natural Resources Protection Act of 2005

recoverable uranium resources already identified provide a 50-year supply for conventional nuclear reactors at a projected long-term demand of about 70,000 tonnes per year, countering perceptions that uranium for any future nuclear reactors might be in short supply. Recognizing the enormity of the known recoverable uranium resource, WNA asserted:
"The world's present measured resources of uranium in the lower cost category (3.5 million tonnes) and used only in conventional reactors, are enough to last for some 50 years. This represents a higher level of assured resources than is normal for most minerals."

By 2005, WNA's global total of known recoverable uranium resources had increased by 34% to 4.7 million tonnes. The 1.2 million tonnes of additional uranium in unmined deposits identified in just the last three years is roughly equal to the total amount of uranium consumed by the nuclear weapons and reactor industry from its inception in the 1940s through 2005. Estimates of world uranium resources are a long-time interest of the WNA (www.world-nuclear.org), formerly called the Uranium Institute, and a prominent source of uranium supply and demand information for industry and government for decades. The on-line proceedings of WNA's annual symposia are a readily available source of detailed nuclear fuel market information and a major source for this article.

Table 1 identifies the countries with the largest known recoverable uranium resources and the amount of increase in those resources between 2003-2005. The commonly used term for uranium in unmined mineral deposits that can be exploited at market prices is "known recoverable uranium resources," which are identified as the amount of uranium that can be extracted at a specified cost. The standard cost category for known recoverable uranium resources has been set at $80 per kilogram (/kg), or $36/ per pound, for several decades.

TABLE 1
INCREASES IN KNOWN RECOVERABLE URANIUM RESOURCES*
2003 – 2005
$80/pound ($178/kilogram) cost category • 1 tonne = 1 metric ton = 2,200 pounds

COUNTRY	TONNES U 2003	WORLD PERCENT 2003	TONNES U 2005	PERCENT INCREASE 2003-2005	WORLD PERCENT 2005
Australia	989,000	28%	1,143,000	16%	24%
Kazakhstan	622,000	18%	816,000	31%	17%
Canada	439,000	12%	444,000	1%	9%
South Africa	298,000	8%	341,000	16%	7%
Namibia	213,000	6%	282,000	33%	6%
Brazil	143,000	4%	279,000	97%	6%
Russian Federation	158,000	4%	172,000	9%	4%
USA	102,000	3%	342,000	235%	7%
Uzbekistan	93,000	3%	116,000	20%	2%
All Other Countries	480,000	14%	808,000	68%	18%
World total	3,537,000		4,743,000	34%	

Sources: World Nuclear Association 2005 Symposium, International Atomic Energy Agency

* Throughout this article, the terms "uranium resources," "uranium oxide," and "yellowcake" refer to natural uranium that has been concentrated after extraction from its host rocks, which are called "uranium ore." Concentrated uranium (U_3O_8) must be converted, enriched, and fabricated before being used as fuel in nuclear power plants.
While large increases in recoverable resources are reported for many countries, the largest total increase and largest percentage increase is for the United States (U.S.). Much of this increase can be attributed to reconsideration of U.S. deposits — some through paper exploration involving review and republication of decades-old resource estimates — that were previously identified as recoverable at the cost of $50/pound in the 1970s. "Uranium reserves" are a category of available uranium determined based on future operating and capital expenditures incurred in the recovery of uranium and reflect greater certainty regarding the

availability uranium from a mineral deposit than uranium "resources." In 1979, U.S. "reserves" of uranium at the $50/pound cost of recovery were 979,000 tonnes — almost three times the total of U.S. recoverable uranium "resources" for 2005 — of which New Mexico uranium reserves were 511,500 tonnes, or 52% of the total. New Mexico would be listed as having the third largest uranium resource tonnage in 2005 if the 1979 New Mexico "reserves" figure was used as New Mexico "resources."

How are uranium resources and uranium demand estimated?
WNA reports that annual uranium consumption in 2005 was approximately 70,000 tonnes. Even at the most optimistic of growth projections, future uranium consumption would top off at 125,000 tonnes by 2025; consumption of uranium as nuclear reactor fuel would be even less under more moderate growth predictions. These uranium demand figures are dwarfed by the known recoverable uranium resource in 2005: 4.7 million tonnes, which represents more than 67 years of world requirements at the 2005 rate of 70,000 tonnes. Using the 2025 medium growth scenario of 100,000 tonnes, this total would provide more than 47 years of world requirements. World uranium demand projections are updated frequently by WNA and other sources to reflect changing market conditions.

Is uranium from unmined deposits the only source for potential future use?
Though the amount of identified unmined uranium is enough for 50 years of current and projected use, "recycled or secondary uranium" derived from previously mined and processed uranium (processed for use in nuclear fuel or weapons) has been a significant and growing source of uranium for reactor use in recent years. Secondary sources include:

- Commercial inventories — uranium supplies owned by reactor operators;
- Government inventories — uranium supplies owned by governments;
- Nuclear weapon/military inventories — uranium supplies in the form of "highly enriched uranium" used in nuclear weapons manufacturing and owned by governments;
- Reprocessed uranium and MOX fuel — uranium supplies in used nuclear reactor fuel;
- Re-enriched depleted uranium — uranium supplies in residuals from uranium enrichment processing — called "uranium enrichment tailings," or "depleted uranium."

Uranium from secondary sources such as commercial inventories, weapons-grade uranium stockpiles and, in Russia, uranium enrichment tailings, has been used for nuclear reactor fuel for the past decade. In 2005, secondary sources provided more than 45% of the roughly 70,000 tonnes used worldwide. WNA uranium supply and demand projections estimate that secondary sources will provide 35% of the uranium to be consumed in 2010.

How does the availability of secondary sources of uranium affect uranium prices and future demand?
Secondary uranium sources affect the uranium market in a range of complex ways. In brief, government-held secondary uranium resources entered the reactor-fuel uranium market in a major way during the period when uranium prices were less than $10/pound. The market entry resulted from policy changes by the U.S. and Russian governments that strictly limited the volume and prices of those supplies that have been allowed to enter the market. The prices for the secondary uranium are much higher than the cost of uranium from mines. During the past five years, the price of the uranium at existing mines and unmined deposits or "primary" uranium has risen to approach the secondary uranium prices.

However, mining uranium is very inexpensive compared with the current spot market price. The historic "finding cost" — the cost of finding and identifying mineable uranium ore deposits — is estimated at about $0.60/pound ($1.50/kgU). Estimates of the cost of recovery of uranium oxide by milling or in situ recovery have been in the $15 - $25/pound ($33 - $55/kg) range for more than 20 years. In five years, the uranium market has turned on its head; ore that cost twice the market price to recover in 2000 when the price was $7/pound now costs less than half the September 11, 2006 market price of $52.00.

While the price of uranium has risen, in part, because of secondary supplies, the long-term availability of uranium from secondary sources is yet to be determined. Although the amount of uranium available from secondary sources is very large, the lack of long-term agreements to use the secondary uranium sources leaves the projections of secondary uranium consumption beyond 2010 very uncertain. As plans, and eventually contracts, emerge for use of secondary sources of uranium for reactor fuel, demand for newly mined primary uranium may decrease.

How much uranium is available from secondary supplies?
Substantial amounts of uranium are available in each of the categories of secondary uranium supply. Commercial inventories of uranium — the supplies of uranium owned by reactor operators — were estimated at 110,000 tonnes of uranium in 2005, equal to about 1.5 years of global uranium demand in 2005. Commercial uranium inventories represent holdings for future use and are not predicted to be maintained near current levels for the next several decades by WNA analysts.

Government inventories of uranium are considered by WNA to be composed primarily of non-military government-owned supplies of "highly enriched uranium" (HEU), a form of uranium usable for nuclear weapons production, held largely by the government of the Russian Federation. As noted in Voices in 2004 (Vol. 5, No. 4), the U.S. and Russia, as well as other nations that have nuclear weapons, continue to retain extensive HEU stockpiles. World HEU stocks at the end of 2003 are reported as 1,900 tonnes, of which non-military resources total 175 tonnes and military resources total 1,725 tonnes. Of the total military uranium, 300 tonnes of HEU in Russia are "declared excess," and available for blending down to reactor grade.

Assuming that one tonne of HEU contains the U-235 content of 360 tonnes of yellowcake (which is refined, but unenriched uranium oxide), then 300 tonnes of HEU contain the U-235 content of 108,000 tonnes of yellowcake. The "recycling" of the Russian "excess" HEU is the projected source of 10,000 to 12,000 tonnes of future uranium supply through the year 2013, though future agreements to reuse HEU may be developed sooner.

Russian civilian HEU — HEU transferred from military to non-military government ownership — was estimated at 175 tonnes, or equivalent to 63,000 tonnes of uranium oxide. This resource is projected to contribute about 9,000 tonnes of uranium to global uranium supplies until existing HEU blending and marketing agreements involving the U.S. and Russia expire in 2013.

The 1,725 tonnes of military HEU, held primarily by the governments of U.S. and Russia, is equivalent to more than 600,000 tonnes of yellowcake. Though the global inventory of HEU is under a sales embargo until 2009, the U.S. has initiated plans to market that uranium when the moratorium expires. The first sale of the U.S. civilian uranium inventory is to Bonneville Power Administration, a federally-owned power provider, in an amount equivalent to 2,500 tonnes of yellowcake to be provided during the 2009-2017 period.

The uranium content of enrichment tailings has been estimated to be equivalent to roughly 770,000 tonnes of uranium oxide. Of that amount, U.S. enrichment tailings contain the equivalent of roughly 450,000 tonnes of uranium and Russian enrichment tailings contain roughly 300,000 tonnes of uranium. In recent years, Russian has made 3,000 tonnes of uranium from enrichment tailings available on the world market. The U.S. has yet to make any uranium from enrichment tailings available for use as reactor fuel.

Uranium market analysts estimate that only about 20%, or 130,000 tonnes of uranium oxide equivalent in uranium enrichment tailings, is likely to be marketed during the next 25 years. Of that amount, some 60,000 tonnes of uranium are projected to come from Russian enrichment tailings and 70,000 tonnes from uranium from U.S. enrichment tailings. Since current U.S. policy is not to use recycled enrichment tailings for reactor fuel, stockpiles of uranium enrichment tailings have been growing at the U.S. uranium enrichment sites at Portsmouth, Ohio; Paducah, Kentucky; and Oak Ridge, Tennessee.

The uncertainty about future availability of large amounts of uranium from secondary sources is a focus of considerable speculation within the nuclear industry and is reflected in presentations from WNA symposia. Analysts recognize that government policies play a key role in determining if and when major amounts of secondary sources — particularly highly enriched uranium and uranium enrichment tailings — will enter the uranium market. This uncertainty involves many issues that governments must address, from nuclear weapons production and nuclear non-proliferation policy to the need of states to assure domestic uranium supplies when the U.S. might free up uranium enrichment tailings to supplement primary uranium sources. Certainly, if uranium from non-proliferation-driven "blending down" of highly enriched uranium and reuse of the uranium content of enrichment tailings enters the uranium reactor fuel market during the next several decades, the need for primary uranium, ore from yet to be mined deposits, will be significantly reduced, and the market price would likely drop considerably.

Who is involved in the new uranium boom?
In 2000, about 30 companies were actively involved in uranium exploration. About half were uranium producers, including government-owned companies, and the other half were junior companies. By 2005, the number of firms involved in uranium exploration had increased 500% to approximately 175 companies, and almost all the new entrants are juniors.

Uranium exploration expenditures have also risen steeply. World uranium exploration spending grew from $55 million (U.S.) in 2000 to approximately $185 million (U.S.) in 2005, an increase of more than 333%. During the 2000-2005 period, exploration work by juniors grew from $15 million, about 27% of world uranium exploration spending, to $100 million, or about 54% of world uranium exploration spending.

While the number of uranium exploration companies has exploded in the past five years, the number of uranium producing companies has remained relatively static. In 2004, the leading uranium producer in the world controlled about 20% of world uranium production capacity and 28% of "Western World" capacity. The top three companies controlled more than 50% of world production and more than 70% of Western production capacity. The top five companies controlled 70% of world capacity and 89% of Western capacity.

In 2005 the top uranium producing companies, both "Western World" and "non-Western World" were:

- **Cameco** — a company that is part-owned by the government of the Province of Saskatchewan, Canada, with production primary from its home Province; 20% of world production
- **Rio Tinto** — a private company with production in Australia and Nambia; 13% of world production
- **Areva** (formerly known as Cogema) — a company part-owned by the government of France with production in Saskatchewan and Niger; 12% of world production
- **KazAtomProm** — A government-owned company in Kazakhstan that produces uranium in its home country; 10% of world production
- **BHP Billiton** — a private company with production in Australia; 9% of world production
- **TVEL** — a company owned by the government of the Russian Federation with production in Russia; 8% of world production
- **Navoi** — a company owned by the government of Uzbekistan that produces uranium in its home country; 6% of world production

That list demonstrates the growing significance of uranium production from the Former Soviet Union — the Russian Federation, Kazakhstan and Uzbekistan — and the lack of significant major U.S.-based uranium companies or production.

The 235% increase in known recoverable uranium resources in the U.S., the largest for any country during the 2003-2005 period, may be an indication that the U.S. will return to the list of major uranium-producing regions. Recent uranium exploration and development activity in the U.S. has included both major uranium producers and juniors. Cameco is the only leading world uranium producer operating in the U.S. with in situ leach (ISL) uranium properties in Wyoming and Nebraska.

Only four conventional uranium mills remain in the U.S., as more than 50 have been dismantled since the late-1960s. Cotter Corporation's Canon City, Colo., mill has been in operation the longest, beginning in 1958, but operating only intermittently since 1979. International Uranium Corp., which has kept its White Mesa uranium mill at Blanding, Utah, operating in the past decade by recovering uranium from "alternate feed sources" — usually wastes from remediation projects with high uranium content — has announced plans to operate uranium mines in southeastern Utah. In July 2006, SXR Uranium One (SUO) announced its acquisition of the other two uranium mills in the U.S., the Sweetwater mill in Wyoming (formerly owned and operated by hardrock mining giant Rio Tinto) and the Shootaring Canyon mill in Utah. Both of these facilities have been inactive for many years. Uranium is also being produced from at least three ISL mines operating in Nebraska, Texas and Wyoming. Unlike conventional mills, which crush and grind rocks to extract and concentrate uranium, ISL plants "recover" uranium from groundwater that has been oxidized by injection of chemicals that liberate uranium from the host rocks underground.

Junior companies with no past history of uranium production lead the uranium exploration boom in the U.S. Ur-Energy is actively re-exploring formerly investigated uranium properties in Wyoming. Energy Metals, which recently acquired fellow junior Quincy Energy, Inc., has exploration activities in Wyoming, Arizona, Colorado and New Mexico. Laramide Resources, a Canadian firm, announced the acquisition of Homestake Mining Co.'s properties in the Grants, N.M., area, and is planning exploration on the flanks of Mt. Taylor in the Grants Minerals Belt, the most productive uranium district in the U.S. Mesa Uranium is developing deposits in the Lisbon Valley of southeastern Utah. Strathmore Minerals Corp. (SMC), another Vancouver-based company, has acquired properties in predominantly Navajo areas of New Mexico. Hydro Resources, Inc. (HRI), the wholly owned subsidiary of Uranium Resources, Inc. (URI), a Texas-based uranium company, continues to pursue permits for its Church Rock and Crownpoint holdings. Numerous other junior companies — for example, Glen Hawk Minerals, Golden Patriot, Mill Bay Ventures, Mangum Uranium, Powertech Uranium — have been big splashes in the trade and investor press in the past year with their announcements of acquisitions of existing uranium deposits in the Western U.S. Each of these firms touts the prospects of making serious money in the "hot" uranium market.

Few, if any, of these junior uranium companies have articulated policies reflecting the internationally recognized guidelines for socially responsible mineral development and informed prior consent for mineral exploration and development reflected in the Equator Principles adopted by a growing set of international firms. The principles are reflected in the International Finance Corporation emerging Environmental and Social Development Guidelines (www.ifc.org/enviro) and other institutional policies of the World Bank Group.

The new uranium boom is driven by a rising price of uranium that is considerably higher than the cost of discovery and extraction of known unmined uranium resources. Thus, greedy companies are eagerly pursuing potentially large profits from development of previously explored and cheap to mine uranium deposits. The victims of the boom could again be communities around the world — and including many native communities in the Western U.S. and Canada — that have the legacy of busted uranium economies, health impacts from human exposures, and land and water contamination from past uranium exploration and production.

- Paul Robinson