August 2010

Assessment of Health and Environmental Impacts of Uranium Mining and Milling

Five-year Plan Grants Mining District, New Mexico

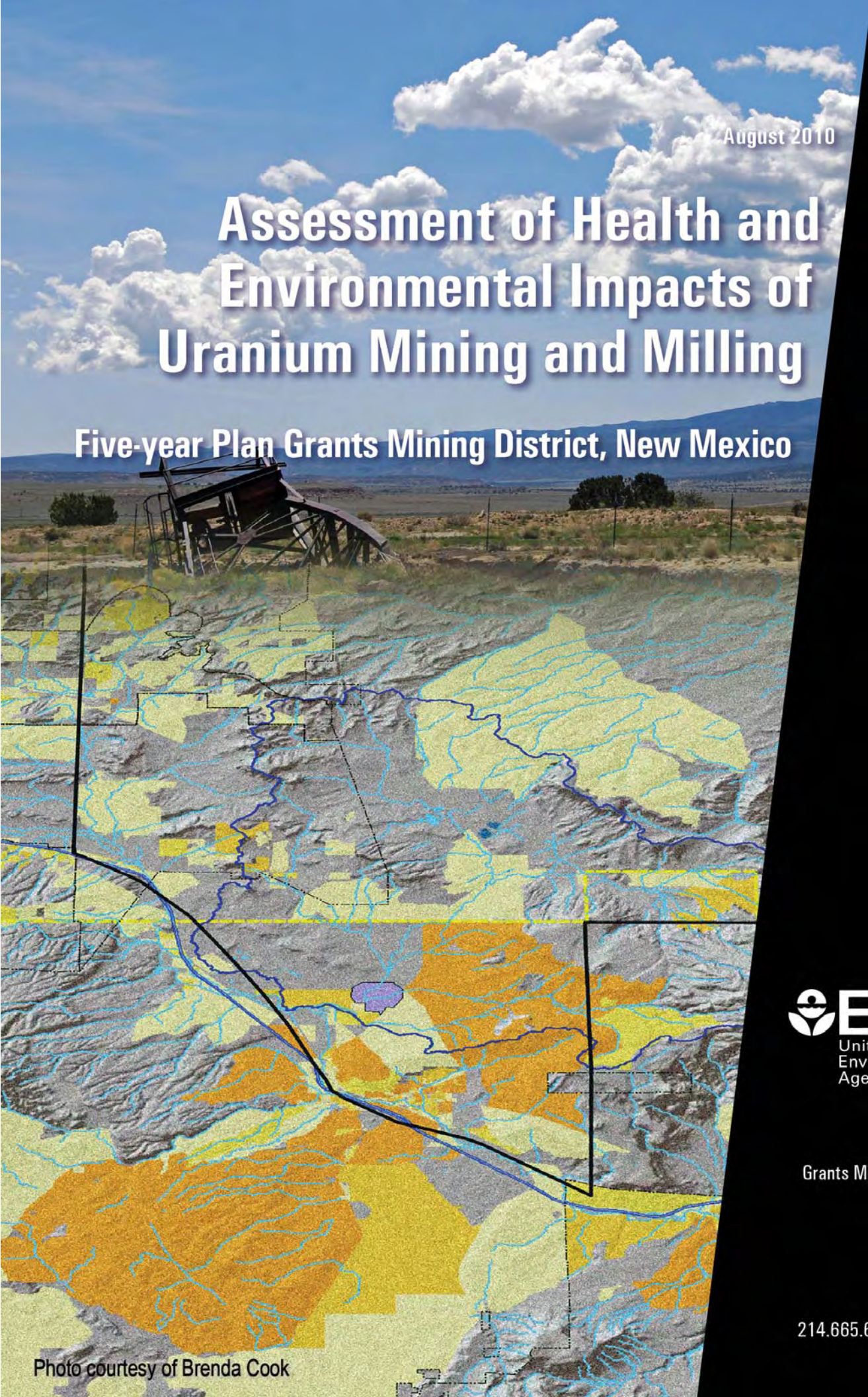

Photo courtesy of Brenda Cook

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Contents

1.0 Introduction 3
1.1 Purpose 3
1.2 Scope and Objectives 5
2.0 Agency Action Plans 8
2.1 Assessment of Water Supply Sources for Contamination 8
2.3 Contaminant Assessment, Cleanup, and Long-Term Management of Former Uranium Milling Sites 16
2.4 Assessment and Cleanup of Contaminated Structures 24
2.5 The Jackpile Mine on Laguna Pueblo 26
2.6 Public Health Surveillance 28
3.0 Implementation Plan Time Line 30
4.0 Associated Superfund Sites 33
4.1 Homestake Mining Company (Barrick Gold Corp.), Grants, New Mexico 33
4.2 United Nuclear Corporation, McKinley County, New Mexico 34
4.3 Northeast Church Rock Mine, Coyote Canyon, New Mexico 35

Figures

Figure 1. Grants Mining District, New Mexico 4

Attachments

Attachment A: Meeting Fact Sheet 38
Attachment B: State of New Mexico Correspondence 45
Attachment C: Environmental Justice Correspondence 48
Attachment D: Potential Applicable or Relevant and Appropriate Requirements 52

1.0 Introduction

1.1 Purpose

The five-year plan is intended to compile all activities contributing to the identification and cleanup of legacy uranium milling and mining activities in the Grants Mining District in the State of New Mexico. Assessment efforts will be coordinated among federal, state and tribal participants responsible for protecting human health and the environment. The authorized organizations will implement appropriate laws, regulations, and policies within their jurisdiction to accomplish cross-organizational activities.

Participating federal, state, and tribal agencies are committed to assessing legacy contamination of structures, surface and ground water resources, and sediment to eliminate, reduce or manage associated risks to human health and the environment with this five-year plan during 2010 through 2014. Agencies have established specific objectives that will guide this endeavor.

Some activities and funding levels discussed in this report may not be included in current or future budgets. The five-year plan serves as a possible roadmap for the future recovery of the Grants Mining District. Agencies will address the five-year plan and funding needs as necessary and together with other priorities and resource demands.

Influences from uranium mining and milling extend beyond the Grants Mining District; and therefore the proposed actions may be extended to areas with similar activities based on risk, priorities, or available resources. Contamination associated with former activities in a portion of the Ambrosia Lake sub-district is under jurisdiction of the Navajo Nation and is addressed in detail in the Health and Environmental Impacts of Uranium Contamination in the Navajo Nation Five-Year Plan, website: http://epa.gov/region09/superfund/navajo-nation/index.html.

Updates will be incorporated annually into this plan as new information becomes available. Project information and reports will be publicly available on the following website: www.epa.gov/earth1r6/6sf/newmexico/grants/nm_grants_index.html.

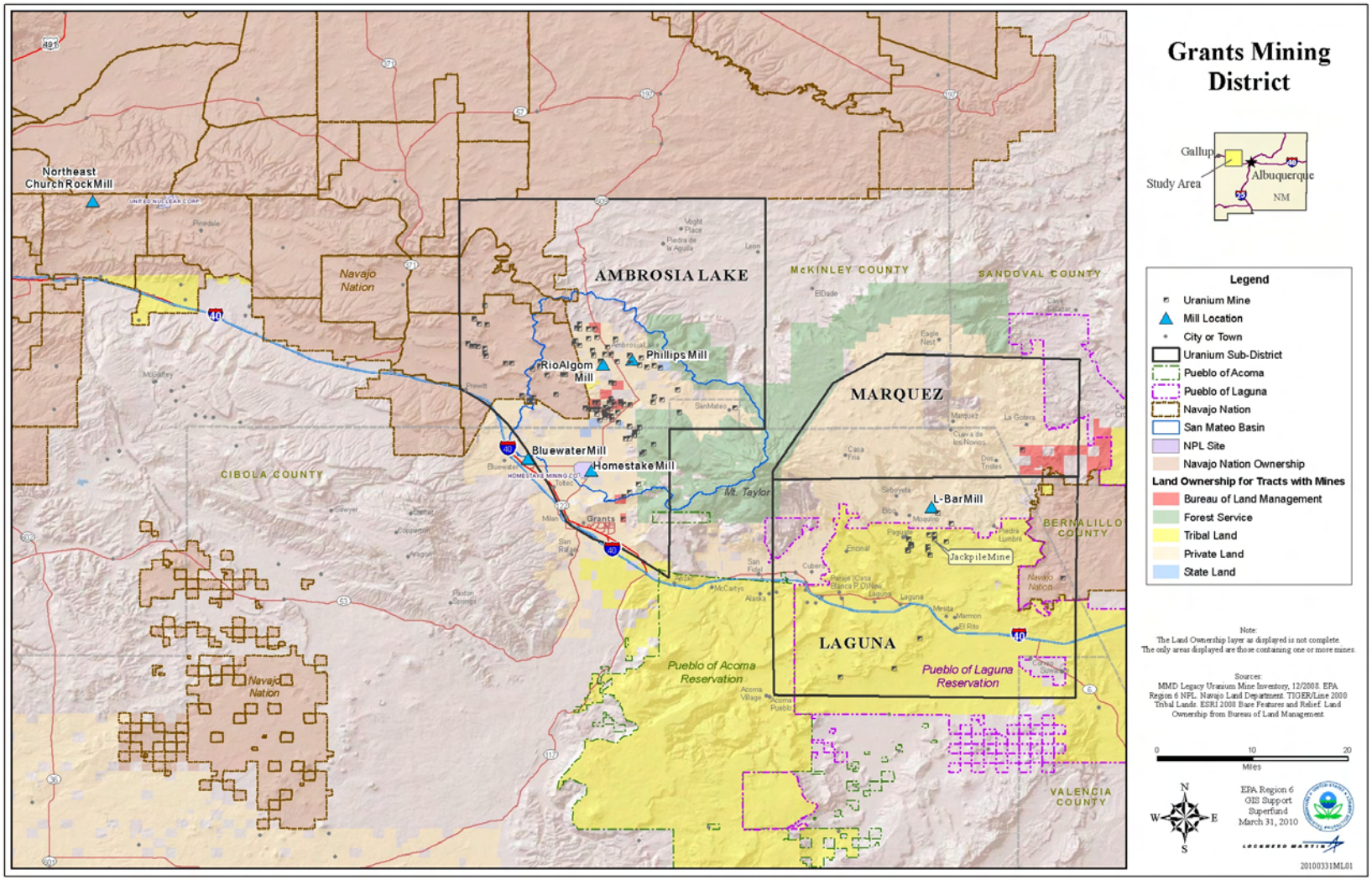

Figure 1. Grants Mining District, New Mexico

1.2 Scope and Objectives

The goal of the five-year plan is to promote and advance the work needed to help restore and preserve the natural and cultural resources in the Grants Mining District and to ensure protection of human health for future generations. Objectives identified in this document consider community input from a public meeting held on October 20, 2009 (Attachment A), and consequent correspondence from the New Mexico State Legislature, dated November 23, 2009 (Attachment B) and the Multicultural Alliance for a Safe Environment, New Mexico to the Environmental Protection Agency's Environmental Justice Office, Washington D.C. (Attachment C).

The Grants Mining District provided significant uranium extraction and production in New Mexico from the 1950s until late into the 20th century. Three mining sub-districts within the Grants Mining District (Ambrosia Lake, Laguna, and Marquez) are recognized in this plan. Land ownership within these sub-districts consists of public, tribal and private property (see Figure 1). These mining sub-districts contain former legacy uranium mines and mill sites. Participating agencies will utilize existing potential Applicable, Relevant and Appropriate Requirements to guide and gage progress of project objectives (Attachment D). Throughout 2010 through 2014, participating agencies will continue to:

- Refine coordination and collaboration to maximize efforts and resources.
- Promote public involvement and communication.
- Evaluate progress and update the plan annually.

Six objectives have been designed to comprehensively address legacy contamination of water resources, sediment and structures and ensure urgent issues are acknowledged and mitigated. The objectives are not listed in order of priority or timing. Agency Action Plans designating lead and support agencies responsible for implementing each objective is provided in Section 2.0 of this document. The objectives are as follows:

1. <u>Assessment of water sources for contamination:</u> The Environmental Protection Agency and New Mexico Environment Department will continue to evaluate impacts from legacy uranium sites and historical activities on water resources. Activities include: testing private wells or other water supply sources within the Grants Mining District; working with private well owners when impacted wells are identified and provide technical assistance and recommendations to reduce exposure to chemicals above federal and state standards; monitoring upgradient ground water for legacy contamination; and testing public water supplies to ensure potable water supplies under the Safe Drinking Water Act. Department of Energy will provide site information from near by Uranium Mill Tailings Remedial Action mill sites and assist with additional evaluation work associated with the potential of mill site ground water impacting adjacent areas.

   As initial areas are screened, an implementation plan will be developed to determine the extent and future costs for this activity. Additional funding sources may need to be identified

to develop strategies for monitoring and protecting water supplies, and addressing risks to private wells.

2. Assessment and cleanup of legacy uranium mines: Beginning in 1986 through the present, Bureau of Land Management and state agencies have surveyed uranium mines within the study area. Most recently the New Mexico Environment Department began screening of mines within the Poison Canyon area in 2009. These screenings will be used to identify sites that may warrant emergency removal actions, remedial actions, or more detailed investigations. Agencies will jointly investigate ownership and operation history at high priority abandoned mines and pursue viable responsible parties. The Environmental Protection Agency will use its Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) authority to recover costs and compel work as appropriate for abandoned mines, and will continue to assist New Mexico Environment Department with voluntary remediation and enforcement-lead actions. The New Mexico Environment Department currently provides regulatory oversight for assessment and abatement activities for 13 legacy uranium mines within the Ambrosia Lake and Laguna sub-districts. Legacy sites on Bureau of Land Management property will be administered by the Bureau of Land Management who will use its Comprehensive Environmental Response, Compensation, and Liability Act authority to undertake cleanup responses, pursue responsible parties, and recover costs in coordination with appropriate state and federal agencies.

   The New Mexico Energy, Minerals, and Natural Resources Department administers two programs that affect surface reclamation of mines, and is developing surface reclamation designs for approximately seven legacy uranium mine sites located primarily on Bureau of Land Management property in the Poison Canyon area of the Ambrosia Lake sub-district. The New Mexico Energy, Minerals and Natural Resource Department has been assessing former uranium mine sites across the state since 2007 and has developed a database identifying mine site locations. Additional assessments at former legacy mine sites will progress as funding becomes available.

   Funding to expand the regional hydrogeologic studies, re-establish strategies for monitoring wells, ground water modeling, contaminant source identification, source remediation, remedial strategies and long-term stewardship may need to be identified.

3. Contaminant assessment, cleanup, and long-term management of former uranium mill sites: The Department of Energy is responsible for long-term surveillance and maintenance of three former uranium mill sites, Anaconda Bluewater mill and Ambrosia Lake-Phillips mill, located in the Ambrosia Lake sub-district, and the L-Bar mill located in the Laguna sub-district.

   The Department of Energy will continue to conduct long-term surveillance and maintenance activities at its sites in accordance with approved Nuclear Regulatory Commission Long-Term Surveillance and Maintenance Plans. The Department of Energy will evaluate and participate in additional studies and conduct additional ground water monitoring to address potential data gaps.

Also in the Ambrosia Lake sub-district, the Homestake Mining Company mill and Ambrosia Lake-Rio Algom mill are currently undergoing reclamation under Nuclear Regulatory Commission oversight in coordination with the New Mexico Environment Department and the Environmental Protection Agency.

4. Assessment and cleanup of contaminated structures: In coordination with the affected communities and residents, the Environmental Protection Agency will survey structures in five areas that are possibly contaminated with radiation attributable to legacy contamination. Where structures are found to pose a health risk to current or future occupants, the Environmental Protection Agency will take appropriate response actions using its Superfund authority. Actions may include demolition and replacement of a structure or a portion of a structure. Alternative actions will be considered, as necessary, to ensure long-term protectiveness.

   Depending on the number of structures identified under the screening process, additional funding sources may need to be identified.

5. Laguna Pueblo/Jackpile Mine: The Jackpile Mine, once the world's largest open pit uranium mine, is located on the Pueblo of Laguna near the village of Paguate. The mining operations at Jackpile Mine were started by Anaconda Copper Company in 1953 and operations ceased in 1982 under ARCO. A Record of Decision was adopted by the Bureau of Indian Affairs and the Bureau of Land Management in 1986 with the objective of reclaiming and stabilizing the Jackpile Uranium Mine site.

   The Environmental Protection Agency is using its Superfund authority to conduct site investigations to determine the extent of residual risk from legacy activities. The Environmental Protection Agency and the Laguna Pueblo are finalizing a Memorandum of Understanding that will document site assessments, removal activities, and establish protocols for interaction and disclosure of information.

6. Public Health Surveillance: Historical releases to ground and surface water, soil and air from legacy uranium sites throughout the Grants Mining District have been documented. It is unknown where releases and dispersions had occurred and extent of the impact to the public health and the environment. Area residents have requested health screenings and studies to evaluate health impacts from uranium mining and wastes in the San Mateo Creek basin. The New Mexico Department of Health proposes to conduct public health surveillance to gather data and assess exposure to uranium. This will be achieved by recruiting volunteers in the community who live near legacy uranium sites and or naturally occurring uranium deposits. Each volunteer will provide a urine sample and a drinking water sample which will be tested for uranium levels. In addition, volunteers will answer survey questions about their exposure to uranium. Any volunteers who are found to have elevated levels of uranium exposure will be provided recommendations about how to reduce exposure. The New Mexico Department of Health will coordinate with appropriate service and health agencies to develop a communication and outreach plan.

2.0 Agency Action Plans

2.1 Assessment of Water Supply Sources for Contamination

Lead agencies:	Environmental Protection Agency, New Mexico Environment Department, Nuclear Regulatory Commission, Department of Energy,
Potential resource agencies:	Agency for Toxic Substances and Disease Registry, United States Fish and Wildlife Service, Bureau of Indian Affairs, United States Geological Survey, University of New Mexico, New Mexico Bureau of Geology and Mineral Resources, New Mexico Department of Health, New Mexico Office of the State Engineer, Army Corps of Engineers, Acoma Pueblo, Laguna Pueblo
Land-owner agencies:	Bureau of Land Management, United States Forest Service, Department of Energy, New Mexico State Lands Office, Laguna Pueblo, Acoma Pueblo

Background

Residents within the Ambrosia Lake and Laguna sub-districts primarily rely on private wells for residential-domestic, stock-watering, and agricultural uses. Legacy uranium mining and milling operations generated liquid wastes that included water produced from mine dewatering and aquifer depressuring operations, and process waters from unlined on-site ore leach pads, evaporation and tailing ponds, heap- and stope-leaching, and uranium milling operations. These wastes were discharged to the alluvium directly, as well as via impoundment infiltration and overflow. From mining operations alone, approximately 80 billion gallons of mine water was extracted from the subsurface, with the majority discharged to the surface over a 30-year period. Effluent discharges that occurred prior to the establishment of state and federal ground water regulations had little or no treatment prior to discharge directly to the land surface or to surface water channels. These effluents that were discharged to alluvium during legacy uranium site operations, as well as subsequent runoff from contaminated soils continuing to the present and may impact regional bedrock drinking water aquifers that are accessed by scattered private residences and nearby municipal water systems. Additionally, extensive dewatering during underground mine operations created a regionally-extensive cone of depression, into which oxygenated ground water currently is flowing, and possibly dissolving and mobilizing unmined uranium and associated contaminants.

Current-day impacts to regional ground water quality from legacy uranium sites for the most part have not been assessed, but are indicated by the results from historical data and limited current assessment and abatement work on a few mine sites within the Ambrosia Lake and Laguna sub-districts that have been ordered by the State under its ground water abatement regulations.

Previous and ongoing regulatory actions

The New Mexico Environment Department under a Cooperative Agreement with the Environmental Protection Agency began a sampling effort in 2009 to determine possible legacy uranium site impacts to private wells in the San Mateo Creek basin. This task was begun in the vicinity of the Homestake Mining Company uranium mill site, and has continued to the present-day into the San Mateo Creek basin. Results from these sampling activities have been shared with residents and public health officials to determine appropriate actions.

In 2009, the New Mexico Environment Department executed an agreement with Homestake Mining Company to provide water to the City of Milan water service to a limited number of residents in the vicinity of the Homestake Mining Company Superfund site. Additionally, the New Mexico Environment Department issued a health advisory to inform residents, within the San Mateo Creek basin, that private well water may contain contaminant concentrations associated with legacy uranium site operations in excess of drinking water standards.

Action Plan

1. Continue ongoing Environmental Protection Agency/New Mexico Environment Department sampling of area water supply sources, with notifications and interpretation of analytical results sent to well owners. Provide technical assistance and recommendations to reduce exposure to chemicals above federal and state standards to owners of impacted private wells.
2. Initiate regional hydrogeologic and geochemical studies to evaluate and model potential anthropogenic and natural contaminant pathways for persistent potential threats to drinking water supplies.
3. Evaluate public water supply wells that are potentially at risk from contamination originating from legacy uranium sites.
4. The Department of Energy has provided all existing data from the Uranium Mill Tailings Radiation Control Act mill sites, and continues to work with the other agencies and the New Mexico Environment Department to provide site access, split samples, and has offered to expand the suite of analytes as well as installing some new wells to improve the understanding of the possible site impacts to the ground water in the immediate area of the Office of Legacy Management managed mill sites.
5. The Environmental Protection Agency will issue a twice-yearly update to the public on progress of the assessment of water supply sources objective.

Cost estimates

The ongoing New Mexico Environment Department sampling program utilizes the Environmental Protection Agency Contract Laboratory Program for metals and general chemistry ground water sample analyses; radiological analyses will require utilization of non-Environmental Protection Agency laboratories at an estimated annual cost of up to $50,000 for two years.

The cost of an individual monitor well is estimated to range between $25,000 and $100,000, depending upon depth. Aquifer testing costs could range between $5,000 and $50,000,

depending upon well depth and test duration. Information from these wells also will be useful in addressing objectives of other tasks proposed herein.

Limitations

Funding
The Environmental Protection Agency has provided limited funding through a Cooperative Agreement with the New Mexico Environment Department to start proposed activities. Additional funding may be necessary to establish a ground water monitoring network to ensure protection of public water supply systems and the drinking water resource.

Regulatory
Water supply sources with elevated uranium, but lacking evidence of legacy uranium site impacts, may not be appropriate for action by the Environmental Protection Agency's Superfund Program due to Superfund's limitation on response to naturally occurring substances. However, background water quality data reflecting pre-milling and/or pre-mining conditions do not exist; therefore, impacts attributable to legacy uranium sites may be difficult to distinguish from natural sources.

The Department of Energy has and will continue to improve understanding of the local ground water at the Uranium Mill Tailings Radiation Control Act Title I and Title II sites under its long term stewardship. The ground water at Uranium Mill Tailings Radiation Control Act Title I and Title II sites are regulated by the Nuclear Regulatory Commission with standards promulgated by the Environmental Protection Agency at 40 CFR Part 192, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings, and adopted by the Nuclear Regulatory Commission at 10 CFR Part 40, Appendix A, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content.

Nuclear Regulatory Commission requirements that utilize Environmental Protection Agency standards at 40 CFR 192 for mill site ground water restoration may not be totally consistent with the New Mexico Water Quality Control Commission requirements.

Point of Contact
Dana Bahar, New Mexico Environment Department (505) 827-2908

2.2 Assessment and Cleanup of Legacy Uranium Mines

Lead agencies:	New Mexico Environment Department, New Mexico Energy, Minerals, and Natural Resources Department, Bureau of Land Management, United States Forest Service, Environmental Protection Agency
Potential resource agencies:	United States Geological Survey, Army Corps of Engineers, University of New Mexico, New Mexico

	Bureau of Geology and Mineral Resources, Nuclear Regulatory Commission, Department of Energy, Bureau of Indian Affairs
Land-owner agencies:	Bureau of Land Management, United States Forest Service, New Mexico State Lands Office, Laguna Pueblo, Acoma Pueblo

Background

The Grants Mining District comprises an area of 100 miles by 25 miles that was the primary location of uranium extraction and production activities in New Mexico from the 1950s until late into the 20th century. The Grants Mining District extends along the southern margin of the San Juan basin in Cibola, McKinley, Sandoval, and Bernalillo counties as well as Tribal lands. Three mining sub-districts located within the Grants Mining District-Ambrosia Lake, Laguna, and Marquez-contain an estimated 96 legacy uranium mines with recorded uranium ore production outside of the boundaries of the Navajo Nation (mines that are located on lands within the boundaries of the Navajo Nation are being addressed in detail in the Health and Environmental Impacts of Uranium Contamination in the Navajo Nation Five-Year Plan). During the operational period, many of the larger mines conducted extensive dewatering to access ore below the water table. Most effluent from dewatering received little or no treatment before discharge to the ground or surface drainages during the majority of the mine operational period, causing perennial stream flows in major drainages. The extensive dewatering operations significantly changed areal hydrologic conditions, resulting in continuing influx of oxygenated ground water to areas that were dewatered during the mine operational period. Impacts to ground water from these discharges were noted both in a 1975 Environmental Protection Agency document titled "Summary of Ground-Water Quality Impacts of Uranium Mining and Milling in the Grants Mineral Belt, New Mexico" and a 1986 New Mexico Environmental Improvement Division (predecessor agency of New Mexico Environment Department) document. Other environmental impacts may have been caused by erosion and leaching of mine waste materials, some of which were deposited into arroyos where it remains to the present-day, and by the reported operation of on-site heap-leach and stope-leaching operations. Few of the legacy uranium mine sites have undergone surface reclamation, and many have physical hazards that remain such as open adits and shafts, as well as uncontrolled waste rock and ore piles on-site.

Previous and Ongoing Regulatory Actions

Within the Ambrosia Lake sub-district, the New Mexico Environment Department has completed preliminary assessments of the Poison Canyon Mining District in the late 1980s, a preliminary assessment in 1991 and a preliminary assessment Addendum in 2008 of the Febco Mine, a preliminary assessment of the Silver Spur mine in 2008, a hazard ranking package in 1984 for the Haystack Mining District, and a preliminary assessment in 1988 of the San Mateo mine. Additionally, in 2008 the New Mexico Environment Department completed a preliminary assessment of the San Mateo Creek basin, which is located within the Ambrosia Lake sub-district in which the majority of legacy uranium mine and mill sites are located. In the Laguna Mining District, New Mexico Environment Department completed a preliminary assessment of the St. Anthony mine in 1995.

The New Mexico Environment Department oversees assessment and abatement activities at 13 legacy mine sites within the Ambrosia Lake and Laguna sub-districts, including the St. Anthony mine in accordance with state regulations. Additionally, the New Mexico Environment Department administers DP-61, the discharge permit, for the Mt. Taylor mine.

From 1990-2003 the New Mexico Energy, Minerals, and Natural Resources Department safeguarded hazardous mine openings at 12 legacy uranium mines in the Poison Canyon area and is currently overseeing surface reclamation at nine mine sites. Additionally, the New Mexico Energy, Minerals, and Natural Resources Department is developing site assessment and engineered reclamation designs for approximately 20 legacy uranium mines that are located primarily on Bureau of Land Management-administered lands in the Poison Canyon area. Reclamation activities will primarily address remediation of waste rock piles and physical hazards, which will assist in mitigating contaminant pathways.

To help identify and coordinate reclamation activities, the New Mexico Energy, Minerals, and Natural Resources Department has also developed a uranium mine inventory to compile information and reclamation status on all known uranium mines in New Mexico.

In 1985-87 approximately 40 legacy uranium mines on Bureau of Land Management property were inventoried in the checkerboard areas in the Ambrosia Lake sub-district. All of these sites predate Bureau of Land Management surface management authority which was promulgated in 1981.

The Bureau of Land Management manages about 13 million acres of public land surface in New Mexico which includes hundreds of dangerous abandoned hard rock mine features such as open shafts, adits, and pits; waste rock and tailings, and dilapidated buildings and structures. These dangerous mine features, especially those in high use areas and near cities and towns present an elevated risk to the public. The Bureau of Land Management is mandated to provide protection and restoration of the land it manages and to provide public land users with a safe environment.

The project objective is to improve the quality of public lands placed in Bureau of Land Management care; to mitigate hazards present at abandoned mine sites; when practical to restore watersheds for natural resource value and to protect public health and safety. Addressing and remediating abandoned mine land impacts is becoming increasingly important as more and more people choose to live and recreate near public lands.

The Bureau of Land Management has been working with the New Mexico Mining and Minerals Division Abandoned Mine Land Program for several years in characterizing and remediating abandoned mines throughout the state, and has recognized New Mexico Mining and Minerals Division as a partner agency in this effort. Bureau of Land Management will work with New Mexico Mining and Minerals Division through an Assistance Agreement and will pursue several million dollars of funding for the next several years. The results of a successful partnership will be the remediation of the most dangerous abandoned mine land features on the public land administered by the Bureau of Land Management in New Mexico, including but not limited to legacy uranium mines.

Two major legacy uranium areas which appear of high priority at this time include the Barbara J Group and the Mesa Top Group, located along Poison Canyon on Bureau of Land Management land near Grants. The Abandoned Mine Land Program has initiated characterization in this area and estimates cost of four to five million dollars for engineering, administration and construction. The Bureau of Land Management, facilitated by the above mentioned Assistance Agreement, will work with New Mexico Mining and Minerals Division in final prioritization of remediation and funding to address the entire Grants Mining District.

The United States Forest Service is developing an environmental cleanup plan for the San Mateo Uranium Mine under Superfund authority. The site is located on the Mt. Taylor Ranger District of the Cibola National Forest. The United State Forest Service prepared an Engineering Evaluation and Cost Analysis report to identify and evaluate several removal action alternatives to address the waste rock piles associated with legacy uranium mining activities. The United States Forest Service also performed a risk assessment at the site to identify the risks to potential recreational visitors and to the environment. Elevated concentrations of uranium and radium are present in the waste rock and leach pad at the site. The United States Forest Service's planning for the cleanup of the San Mateo mine site is nearing completion. A final Engineering Evaluation and Cost Analysis incorporating revisions from the public is expected in August of 2010. The cleanup is tentatively planned for 2011.

Non-Regulatory Actions

The United States Geological Survey is currently (2010-2011) working in partnership with the United States Forest Service to characterize the hydrogeologic characteristics of aquifers within the upper San Mateo Creek Basin near Mt. Taylor. The aquifers areas include areas on United States Forest Service lands that are proposed for exploratory uranium drilling and possible mining. Most of the study area is within the upper San Mateo Creek Basin but also includes small areas along the hydrologic divide of the San Mateo and Cañada Las Vacas basins to the north and the San Mateo and Lobo Creek basins to the south. Results of this study will be published in a United States Geological Survey Scientific Investigations Report that is scheduled for publication in 2011.

The United States Geological Survey, through its State Map Geologic-Mapping Program, has provided funding to the New Mexico Bureau of Geology and Mineral Resources for mapping six 7.5 minute quadrangles in the Grants Mineral District, including the Ambrosia Lake, San Lucas Dam, and Cerro Pelon quadrangles for which mapping is in progress and the San Mateo, Lobo Springs, and Mt. Taylor quadrangles for which mapping was recently completed. In 2011 the New Mexico Bureau of Geology and Mineral Resources plans to begin geologic mapping of quadrangles on the east side of Mt. Taylor.

Other United States Geological Survey activities not necessarily taking place in the Grants Mineral District but are relevant include:

- Preparation of a bibliography of United States Geological Survey publications on research conducted in the Grants Mineral District inclusive of references and abstracts;

- Research to examine isotopic compositions, primarily of uranium and sulfur, in water in relation to a variety of solid phase sources; and
- Preparation of "Uranium and the Environment" community education modules for tribes in the Grants Mineral District to be developed in consultation with the New Mexico Environment Department, the Environmental Protection Agency and possibly others.

The New Mexico Bureau of Geology and Mineral Resources and New Mexico Institute of Mining and Technology have had an active program in uranium resources, uranium geochemistry and remediation around New Mexico for many years. The studies have included a uranium resource assessment for the state, understanding the mobility of uranium in the environment and what influences migration of uranium in soils, understanding uranium bioavailability to plants and the potential application of phytoremediation to mitigate contamination in a semi-arid environment, site assessment studies at abandoned mine sites that included soils and plant surveys, and looking at traditional and non-traditional technologies for remediating mine/mill sites.

Action Plan

1. Review available data on legacy uranium mine sites. Compile historical chemical data into a geodatabase. Prioritize areas of contiguous mine sites for assessment screening in coordination with ongoing New Mexico Energy, Minerals, and Natural Resources Department surface reclamation program actions and identify data gaps.
2. Conduct and document site screening assessments on the estimated 96 mine sites by the end of September 2011 to determine site hazards and needs for immediate removal, regulatory enforcement, and/or further site investigation and remedial action. Mitigate threats from sites that pose an immediate and substantial threat to human health and the environment and prioritize sites for remedial actions.
3. Assemble preliminary assessment reports and plan for phased investigation and assessment activities on appropriate sites as prioritized; such investigational phases may include geologic mapping, sediment and surface water sampling, geophysical surveys, and shallow and bedrock aquifer monitor well installations and sampling.
4. Initiate regional hydrologic and geochemical studies:
   a) Compile, analyze, and, as necessary, acquire additional areal water source sample geochemical data to assess possible background hydrochemistry (i.e., pre-mining/pre-milling), and the nature and extent of both anthropogenic and natural contamination; evaluate threat to public health; and to provide data for contaminant-transport modeling and to support decisions for possible future remedial actions.
   b) Characterize possible geochemical changes in contaminant properties that occur during mining operations and subsurface transport to assist with the detection of anthropogenically-derived contamination and potential site attribution.
   c) Evaluate and assess the regional hydrogeologic framework, including sediment/surface water/ground water interconnections, areal and spatial variations of aquifer properties, and ground and surface water flow regime changes induced by legacy uranium mine operations and subsequent remedial activities.
   d) Develop a conceptual model based on existing studies.
   e) Evaluate baseline concentrations of contaminants within regional natural uranium ore

bodies in relationship to natural aquifer contaminant concentrations.

5. Conduct phased investigations and successive site reprioritizations, in coordination with the New Mexico Energy, Minerals, and Natural Resources Department surface reclamation program activities; beginning with highest-priority mine sites from the investigations.
   a) Mitigate threats from sites that pose an immediate and substantial threat to human health and the environment, as indicated by data from an investigational phase
   b) Initiate voluntary remedial and enforcement actions under state and/or federal authority, as appropriate.
   c) Document acquired investigational data as reports, and compile data into a geo-database.
   d) Prioritize sites for removal, enforcement, investigation, remedial action and "no further action" as data are acquired.
   e) Perform successive site investigation, site prioritization, documentation, and data compilation activities as indicated; initiate enforcement and/or contaminant mitigation, as appropriate.
   f) Develop remedial strategies for sites as required.
6. Develop integrated protocols for site characterization and cleanup goals.
   a) Convene an inter-agency group to develop site characterization methods and protocols.
   b) Develop a process to manage and share data across agencies.
   c) Continue on-going discussions to resolve inconsistencies in cleanup goals.
7. The Environmental Protection Agency will issue a twice-yearly update to the public on progress of the assessment and cleanup of legacy uranium mines objective.

Cost Estimates

The cost of conducting 10 to 20 site screens is estimated to cost $200,000.
Preliminary assessments are estimated at a cost of $15,000 per site. If required, site investigations will follow and be grouped geographically to minimize costs and to maximize funding. Estimated costs for complete mine site assessments range from approximately $210,000 to slightly over $1 million per site; these costs are dependent upon the possible areal and depth extent of contaminant impact investigation, which could vary widely from the size and scope of previous mining activities. No initial estimates for sampling have been developed. The state and federal government agencies will use enforcement authority for Legacy Uranium Mines that have viable potential responsible parties as appropriate supporting data are collected. If no viable potential responsible parties can be identified, then state and federal agencies will explore funding options as part of the budget request process to enable appropriate response actions.

Cleanup costs for a legacy uranium mine range from several hundred thousand dollars to several million dollars. Until assessments and decision-making are complete, it is difficult to estimate with any confidence the scope of total cleanup costs.

These cost estimates are very preliminary since many critical cost-sensitive assumptions had to be made. The size of the Grants Mining District, the remoteness and scale of many legacy uranium mine sites, and the dearth of roads and infrastructure may add significant challenges and costs. The Environmental Protection Agency and other resource agencies will refine these cost estimates as more information is obtained, and will incorporate these estimates into the agencies' ongoing budget processes.

Limitations

Funding:
Currently, funding is limited and activities will need to be prioritized by lead agencies.

Regulatory:
Unlike the uranium mill tailings cleanup program, there is no specific legislation to address legacy uranium mines, nor do pre-operational data exist to establish individual site remediation standards. Individual agencies have established cleanup criteria, but consistent national standards do not exist. Action under Superfund is not ideally tailored to the legacy uranium mine problem because of low population density in the Grants Mining District.

The New Mexico Energy, Minerals, and Natural Resources Department may utilize funds from the abandoned mine program under the Surface Mine Coal Reclamation Act for surface reclamation of some sites; however the Department of the Interior has recently interpreted the law to severely limit the use of Surface Mine Coal Reclamation Act funds for non-coal mines.

Transportation and Disposal:
For mine sites that require remediation and where onsite waste disposal presents an unacceptable risk level to human health or the environment, offsite disposal of wastes may be required. For such sites, the potential impacts and associated costs for waste removal and transport to a distant repository for disposal must be evaluated. The agencies will collaborate with Nuclear Regulatory Commission to evaluate possible options for disposal.

Technical:
Establishing individual site attribution for possible ground water contamination will be difficult due to the large number of contiguous formerly-operational mines that had accessed the same ore-bearing stratigraphic units, and the amount of time that has elapsed since the cessation of mining activities. Additionally, background water quality data reflecting individual site pre-mining conditions do not exist; therefore, impacts attributable to legacy uranium mines may be difficult to discern from those of natural sources.

Points of Contact
New Mexico Environment Department, Dana Bahar (505) 827-2908
New Mexico Energy, Minerals, and Natural Resources Department, John Pfeil (505) 476-3407
Bureau of Land Management, Tony Herrell (505) 954-2134
United States Forest Service, Nancy Rose (505) 346-3900

2.3 Contaminant Assessment, Cleanup, and Long-Term Management of Former Uranium Milling Sites

Lead agencies:	Department of Energy, Nuclear Regulatory Commission, Environmental Protection Agency, New Mexico Environment Department
Potential resource agencies:	Department of Energy, United States Geological Survey,

	University of New Mexico, New Mexico Bureau of Geology and Mineral Resources
Land-owner agencies:	Department of Energy, private

Background

In enacting the Uranium Mill Tailings Radiation Control Act of 1978, Congress had two general goals. The first was to provide a remedial action program to stabilize and control the uranium mill tailings at various inactive mill tailing sites. The second was to ensure adequate regulations for uranium production activities and cleanup of mill tailings at mill processing sites that were active and licensed by the Nuclear Regulatory Commission (or Agreement States). At the time, the Nuclear Regulatory Commission did not have direct regulatory control over uranium mill tailings because the tailings did not fall into any category of Nuclear Regulatory Commission-licensable material. Before 1978, the Nuclear Regulatory Commission was regulating tailings at active mill sites indirectly through licensing of source materials milling operations under the Atomic Energy Act of 1954, as a result of the enactment of the National Environmental Policy Act of 1969, to address environmental impact of licensing actions.

Under provisions of the Title I of Uranium Mill Tailings Radiation Control Act, Congress addressed the problem of inactive, unregulated mill tailings piles. Title I of the Uranium Mill Tailings Radiation Control Act specifies the inactive mill sites for remediation. Under Title 1, the Environmental Protection Agency establishes standards for cleanup and disposal of contaminated material; the Department of Energy identifies and remediates the sites and vicinity properties to the Environmental Protection Agency standards; the Nuclear Regulatory Commission evaluates and concurs with the Department of Energy's remediation plans and concurs when site remediation has been adequately completed. Upon completion of decommissioning, the Department of Energy becomes the long-term site custodian under Nuclear Regulatory Commission General License and is responsible for performing routine surveillance and maintenance activities.

Title II of the Uranium Mill Tailings Radiation Control Act addresses the issue of mill tailings produced at active mill operations sites licensed by Nuclear Regulatory Commission or Agreement States. Title II amended the definition of byproduct material to include mill tailings and added specific authorities for the Nuclear Regulatory Commission to regulate this new category of byproduct material at licensed sites. Under Title II, the Environmental Protection Agency establishes standards for cleanup and disposal of byproduct material; the Nuclear Regulatory Commission or Agreement State reviews license applications, issues licenses, conducts inspections, and oversees the decommissioning activities in meeting Environmental Protection Agency standards; Nuclear Regulatory Commission reviews and concurs on Department of Energy's Long Term Surveillance Plans for conventional mills; the Nuclear Regulatory Commission or the Agreement State terminates the specific licenses for the mill operations sites and the Nuclear Regulatory Commission concurs in Agreement State license termination. Upon completion of decommissioning, the Department of Energy becomes the long-term site custodian under Nuclear Regulatory Commission General License.

Remediation criteria for uranium mill were first promulgated by the Environmental Protection Agency in 1983, and amended in 1987. These criteria are found in 40 CFR 192, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailing, are as follows:

For soil and buildings:

- 5 ρCi/g averaged over the first 15 cm of soil below surface
- 15 ρCi/g averaged over 15 cm thick layers of soil more than 15 cm below surface

Radon:

- 20 ρCi/m^2sec

Ground water:

- Background or maximum contaminant level whichever is higher, or
- Alternate concentration limit

The Nuclear Regulatory Commission's final regulations for mill tailings were promulgated in 1985 and amended in 1987 in 10 CFR Part 40, Appendix A, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content.

Within the San Mateo Basin, milling activities occurred at the Ambrosia Lake - Phillips Mill (Anaconda Bluewater) site from 1958 to1982; at L-Bar Mill site from 1977 to 1981; at the Homestake site from 1957 to 1990; at the Anaconda-Bluewater site from 1953 to 1982, and at the Rio Algom-Ambrosia Lake site from 1958 to 2002. In 1973, New Mexico became a Nuclear Regulatory Commission Agreement State and started regulating milling operations. With the passage of Uranium Mill Tailing Radiation Control Act in 1978, the Department of Energy was responsible for remediating Title I sites including the Ambrosia Lake-Philips Mill site while the Nuclear Regulatory Commission or the Agreement State is responsible for licensing Title II sites and their reclamation activities. In 1983, the Homestake site was designated as a Superfund site due to leaking tailings impoundments. In 1986, at the request of the State, the Nuclear Regulatory Commission re-assumed its regulatory authority from New Mexico for Title II sites located within the state.

Four legacy uranium mill sites are located within the Ambrosia Lake sub-district. The Ambrosia Lake-Phillips Mill site, a Title I site, and the Anaconda Bluewater Mill site, a Title II site that was reclaimed and transferred to the Department of Energy in 1997. Both sites are under the Department of Energy custody for long-term surveillance, maintenance and ground water monitoring under the Nuclear Regulatory Commission general license provisions. The Homestake Superfund site and Rio Algom-Ambrosia Lake mill site are both Title II sites under the jurisdiction of the Nuclear Regulatory Commission for reclamation. Located in the Laguna sub-district is the L-Bar mill site, a Title II site that was reclaimed and transferred to the Department of Energy in 2004 for long-term stewardship. The Bokum Mill is located within the Marquez sub-district; according to Nuclear Regulatory Commission records, the source material license was terminated in 1988 following multiple inspections, which confirmed that no ore was ever produced or processed at the site.

Anaconda Bluewater Mill (Department of Energy)
The 3,300-acre former Anaconda Bluewater Mill site is located in Cibola County in west-central New Mexico. The Anaconda Copper Company constructed the original carbonate-leach mill at the site in 1953 to process uranium ore. The mill had a production capacity of 300 tons of ore per day. Mill effluents were stored in unlined evaporation ponds. Water budget calculations and ground water monitoring indicated the occurrence of substantial leakage from these ponds. In 1959, the Anaconda Company drilled a deep well for injection-disposal of mill effluents. This well was operated between 1960 and 1977. By 1965, an estimated 500 million gallons of effluent had been injected. Water pressure monitoring and hydraulic head/flow calculations indicated that injected effluents may have leaked to overlying formations.

Milling operations at the site ended in 1982. Contamination of ground water with molybdenum, selenium, and uranium from this site was identified in several aquifers. Several years of active remediation by pumping contaminated ground water from the aquifer produced no significant reduction in contaminant concentrations. Under Nuclear Regulatory Commission regulations and Environmental Protection Agency standards, when background and drinking water limits are not practically achievable, alternate concentration limits that present no significant hazard and are as low as reasonably achievable may be considered. Based on the criteria evaluated, the Nuclear Regulatory Commission approved the site-specific alternate concentration limits for site contaminants of concern in 1996, and transferred the site to Department of Energy for long-term stewardship in 1997.

Surface remediation consisted of consolidating and encapsulating all contaminated material on-site in an engineered disposal cell, which covers about 320 acres and contains an estimated 23 millions tons (16 million cubic yards) of tailings and other contaminated materials having a total activity of about 11,200 curies of radium-226.

The Department of Energy manages the disposal site according to a site specific Long-Term Surveillance Plan to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, the Department of Energy conducts annual inspections of the site to evaluate the condition of surface features, performs site maintenance as necessary, and monitors ground water to verify the integrity of disposal cells. The Department of Energy compliance strategy includes annual ground water monitoring at nine monitor wells located inside the site boundary. Samples are analyzed annually for polychlorinated biphenyls and every three years for molybdenum, selenium, and uranium.

Ambrosia Lake – Phillips Mill (Department of Energy)
The Ambrosia Lake-Phillips Mill is a former uranium ore processing facility in McKinley County, approximately 25 miles north of Grants, New Mexico, near the Rio Algom-Ambrosia Lake mill site. The site is within the Ambrosia Lake sub-district, near the center of the Grants Mining District. Numerous abandoned underground mines are located in close proximity to the site. The mill processed more than 3 million tons of uranium ore between 1958 and 1963 to provide uranium for the United States Government national defense programs. All mill operations ceased in 1982, leaving radioactive mill tailings, a predominantly sandy material, on approximately 111 acres. Wind and water erosion spread some of the tailings across a 230-acre area. The Department of Energy remediated this site and local contaminated vicinity properties

between 1987 and 1995 under Title I of the Uranium Mill Tailings Radiation Control Act. Surface remediation consisted of consolidating and encapsulating all contaminated material on site in an engineered disposal cell. An engineered disposal cell, which occupies 91 acres of the 290-acre site, encapsulates all site-derived contaminated material. Ground water remediation of the site was not conducted due to the determination by the Department of Energy that the ground water in the uppermost aquifer underlying the site is of limited use based on aquifer yield.

The Department of Energy manages the disposal site according to a site specific Long-Term Surveillance Plan concurred on by the Nuclear Regulatory Commission to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, the Department of Energy conducts annual inspections of the site to evaluate the condition of surface features, performs site maintenance as necessary, and samples two monitor wells every three years.

Homestake Superfund Site (Nuclear Regulatory Commission)
The site was an alkaline-process uranium mill that is currently under reclamation. Uranium processing started in the late 1950s and continued until 1990. Tailings generated from the milling operation were placed on two piles, a large tailings pile and a small tailing pile, which together cover an area of 170 acres with a weight of approximately 22 million tons. Surface reclamation is complete. Seepage from the tailings piles was first noted in 1975, and is now documented to impact four underlying aquifers. Ground water restoration under the jurisdiction of the Nuclear Regulatory Commission is ongoing, with the Environmental Protection Agency involvement under the Superfund authority and a site Memorandum of Understanding executed between the Nuclear Regulatory Commission and the Environmental Protection Agency. The Memorandum of Understanding documents agreement between the two agencies that the Nuclear Regulatory requirements at 10 CFR Part 40, Appendix A, are the Federal environmental and public health requirements applicable or relevant and appropriate to the disposal site. The Nuclear Regulatory Commission completed a license amendment in 2006 to revise site-specific ground water protection standards, which were based on determination of site background contaminant concentrations. Site background concentrations were coordinated with and concurred on by the Environmental Protection Agency and the New Mexico Environment Department. In August 2008, the Nuclear Regulatory Commission approved an expansion for third evaporation pond to enhance ground water restoration. The New Mexico Environment Department administers a discharge permit for ongoing remedial activities. Currently, Homestake is waiting for approval of a discharge permit to construct the lined evaporation pond. The cost for completion of decommissioning activities is estimated to be approximately $52.4 million and is projected to be completed by 2017.

Ambrosia Lake - Rio Algom (Nuclear Regulatory Commission)
The Ambrosia Lake-Rio Algom uranium mill site is located approximately 25 miles north of Grants, New Mexico, near to the Ambrosia Lake-Phillips mill site. The tailings impoundment contains 33 million tons of uranium ore and covers an area of approximately 370 acres.

Ground water reclamation was completed in 2001. Surface reclamation is nearing completion. The site status changed from standby to reclamation in August 2003 to reflect the licensee's intent to begin full demolition and reclamation of the site leading to termination of the specific

license. The mill was demolished and disposed of in the tailings impoundment in late 2003. The Nuclear Regulatory Commission issued a license amendment for alternate concentration limits at the site in February 2006. Ground water corrective actions continue under abatement plans and discharge permits issued by the New Mexico Environment Department, and Rio Algom is finalizing the site tailings reclamation. A portion of the tailings impoundment is still open for disposal under the Atomic Energy Act, Section 11e (2), as byproduct material. The cost for decommissioning is estimated to be approximately $18 million. License termination is projected in 2011.

L-Bar Mill (Department of Energy)
The former L-Bar uranium mill is located in Cibola County approximately 47 miles west of Albuquerque, New Mexico, and 10 miles north of Laguna Pueblo. The site is located on part of the former L-Bar Ranch and is about four miles east-southeast of the village of Seboyeta. The site was previously owned and operated by SOHIO Western Mining Company. Mining and milling at L-Bar began in 1977 and continued until 1981, when the nearby mine closed due to uranium industry economic conditions. About 2.1 million tons of ore was processed at the mill. SOHIO Western Mining Company completed site surface reclamation in 2000.

The site currently comprises a 100-acre disposal cell, which contains approximately 700,000 cubic yards of tailings, within the overall 740-acre site. Ground water withdrawal at the L-Bar site essentially dewatered the First Tres Hermanos aquifer underlying the site, decreasing well yields to the point that recovery of contaminants was no longer effective. The Department of Energy's compliance strategy at the L-Bar site is application of the Nuclear Regulatory Commission-approved alternate concentration limits and the New Mexico Water Quality Control Commission-approved alternate abatement standards for the contaminants of concern. The Department of Energy will conduct ground water monitoring annually for three years; if monitoring results indicate that seepage from the disposal cell is under control, sampling frequency will be reduced to once every three years thereafter. Ground water monitoring will continue as long as any contaminant of concern or total dissolved solids concentration in any well exceeds a state ground water protection standard.

<u>Previous and ongoing regulatory actions</u>

As part of the long-term stewardship, the Department of Energy performs monitoring, maintenance, and emergency measures necessary to protect public health and safety. The Department of Energy conducts annual site inspections of Ambrosia Lake-Phillips Mill, Anaconda Bluewater Mill, and L-Bar Mill sites and samples ground water from on-site monitor wells in accordance with site-specific Long-Term Surveillance Plans under the Nuclear Regulatory Commission's general license provision. The Nuclear Regulatory Commission in coordination with the Environmental Protection Agency and the New Mexico Environment Department currently oversee ongoing remedial activities at the Homestake Mining Company Uranium Mill site. The Nuclear Regulatory Commission oversees reclamation in coordination with the New Mexico Environment Department at the Rio Algom-Ambrosia Lake Mill site. The New Mexico Environment Department currently administers discharge permit DP-200 for ongoing remedial activities at the Homestake Mining Company mill site, and discharge permit DP-169 for the Rio Algom-Ambrosia Lake mill site.

In 2008, the New Mexico Environment Department began to investigate the occurrence of possible site-related off-site contaminant concentrations in aquifers that were documented to have been impacted during site operation from the Anaconda Bluewater mill site. Concentrations of possible site-related contaminants were measured ground-water samples collected from several off-site wells screened in the San Andres aquifer. The New Mexico Environment Department recommended further investigation of potential releases to ground water from the former mill site. Additionally, the New Mexico Environment Department also reviewed information regarding the Ambrosia Lake-Phillips mill site in 2009. The New Mexico Environment Department identified possible inadequacies in the site hydrologic assessment and remediation, and also documented that mill tailings had been used to backfill some area mines. The results of both of these investigations have been discussed with the Department of Energy.

Action Plan

The proposed action plan is focused on data gaps related to the potential for continued releases ground water from the Anaconda Bluewater mill and the Ambrosia Lake-Phillips mill sites.

1. The Department of Energy will continue all surveillance and maintenance, perform ground water monitoring, complete compliance reporting, and conduct public outreach as required by the Nuclear Regulatory Commission approved Long Term Surveillance and Maintenance Plans at these sites.
2. The Department of Energy has and will continue to work cooperatively with the New Mexico Environment Department to better understand the ground water quality at the Uranium Mill Tailings Radiation Control Act mill sites. The Department of Energy Office of Legacy Management has entered into a cooperative agreement with the New Mexico Environment Department to improve coordination, provide samples and site access and to ensure timely communication of concerns and protection of human health and the environment within the given regulatory framework of Uranium Mill Tailings Radiation Control Act.
3. The Department of Energy will install additional monitoring wells at the Ambrosia Lake-Phillips Mill and the Anaconda Bluewater Mill site. The monitoring well data will help in further determining movement of contaminants and ground water flow in those areas.
4. The Environmental Protection Agency will issue a twice-yearly update to the public on progress of the assessment, cleanup, and long-term management of former uranium milling objective.

Cost estimates

The Department of Energy has provided some funding to the State of New Mexico via a cooperative agreement to participate in the Department of Energy sites. Non- Department of Energy costs for assessment of possible off-site contamination from each legacy uranium mill site is estimated to be in the range of $600,000 to $1 million per site.

Limitations

Funding
Current Department of Energy funds provides adequate funding for execution of all regulatory required activities in a timely manner. Offsite evaluations and assessments are not within the required Department of Energy activities and no funds have been requested for these activities.

Regulatory
Nuclear Regulatory Commission requirements that utilize Environmental Protection Agency standards at 40 CFR 192 for mill site ground water restoration may not be consistent with the New Mexico Water Quality Control Commission requirements. The agencies are in on-going discussions to better understand the issue.

Uranium Mill Tailings Radiation Control Act sites under the Department of Energy's long-term stewardship are licensed by the Nuclear Regulatory Commission under the general license provision in accordance with a site-specific Long Term Surveillance Plan indicating required site inspections and maintenance activities and, in some cases, ground water monitoring as appropriate. Ground water monitoring is performed according to that Long Term Surveillance Plan or a Ground Water Compliance Action Plan, as appropriate to each site, and using the standards promulgated by the Environmental Protection Agency at 40 CFR Part 192. Site reclamation of Title I Uranium Mill Tailings Radiation Control Act sites is complete and the authority for further surface cleanup of mill sites or vicinity properties expired according to the Uranium Mill Tailings Radiation Control Act, although there is no such limitation on the remediation of ground water. None of the Uranium Mill Tailings Radiation Control Act Title I sites managed by the Department of Energy Office of Legacy Management are under active surface remediation and it is not now anticipated that surface remediation would be necessary. The Title II sites are under remediation by private licensees consistent with regulatory requirements. It is the intent of the Uranium Mill Tailings Radiation Control Act that these sites can be transferred to the state or the Department of Energy Office of Legacy Management for long term care once all surface and ground water remediation is complete. The Anaconda Bluewater Mill and the L-Bar Mill sites were reclaimed and transferred to the Department of Energy for long-term stewardship in 1997 and 2004, respectively. Reclamation at the Rio Algom-Ambrosia Lake and Homestake mills sites are still underway. The Department of Energy has no formal role in the reclamation of these mill sites, but maintains communication with the Nuclear Regulatory Commission, the Environmental Protection Agency, and the New Mexico Environment Department as well as the licensees as the eventual recipients of the sites in order to ensure the final conditions will be acceptable to the Department of Energy upon transition.

Technical:
Establishing individual site attribution for possible off-site ground water contamination will be difficult due to the large number of nearby formerly-operational mines and mills, which are known to have released similar contaminants, as well as the amount of time that has elapsed since the cessation of legacy uranium activities. Additionally, background water quality data reflecting pre-milling conditions do not exist; therefore, impacts attributable to legacy uranium mills may be difficult to discern from those of mine sites and natural sources, and due

consideration of how much effort should be applied to further evaluate this will be discussed between the parties.

Points of Contact
Department of Energy, Tracy Plessinger (970) 248-6197
Nuclear Regulatory Commission, Lydia Chang (301) 415-8141
Environmental Protection Agency, John Meyer (214) 665-6742
New Mexico Environment Department, Dana Bahar (505) 827-2908

2.4 Assessment and Cleanup of Contaminated Structures

Lead agency:	Environmental Protection Agency
Potential resource agencies:	New Mexico Environment Department, New Mexico Energy, Minerals, and Natural Resources Department, United States Fish and Wildlife Service, Agency for Toxic Substances and Disease Registry, New Mexico Department of Health, Indian Health Service, Bureau of Indian Affairs, Nuclear Regulatory Commission, Acoma Pueblo, Laguna Pueblo and Navajo Nation governments

Background

Some structures within the Grants Mining District may be constructed or remodeled with radiological contaminated materials from legacy uranium sites or located on legacy uranium sites and may pose risks to human health.

Previous and ongoing regulatory actions

The Environmental Protection Agency Region 6 is in the process of conducting a removal site assessment at potentially contaminated residential structures in the Ambrosia Lake, and Laguna uranium mining sub-districts of the Grants Mining District, near Grants, New Mexico. The removal assessment is being conducted in two general phases; 1) aerial radiological survey conduct by Environmental Protection Agency owned aircraft equipped with Airborne Spectrophotometric Environmental Collection Technology Gamma Emergency Mapper and 2) on-the ground residential radiological survey using a peer reviewed assessment protocol developed specifically for this assessment.

Five general areas of interest were originally targeted for aerial radiological assessment by the Airborne Spectrophotometric Environmental Collection Technology in the Ambrosia Lake sub-district: 1) the greater Grants area (includes Milan, Toltec, Bluewater, and San Rafael), 2) the village of San Mateo, 3) the area surrounding the intersection of State Highway 605 and State Highway 509, 4) the Mormon Farms area (south of Homestakes Mill Site, and 5) the Lobo Canyon sub-divisions. Within the Laguna sub-district, two areas were targeted for the aerial radiological assessment: 1) the six main villages of the Laguna Pueblo (Paguate, Encinal, Seama, Paraje, Laguna and Mesita) and 2) the three villages of the Cebolleta Land Grant (Bibo,

Moquino and Seboyeta). The Laguna sub-district area is being addressed as the Oak Canyon Site.

The aerial radiological assessment was completed in October 2009 and the final report was submitted in January 2010. Prior to being submitted as final, the data used in this report was extensively peer reviewed. Copies of the final report have been distributed to all applicable partners and a copy has been made available for public review at the public library in Grants, New Mexico. Results from the aerial radiological assessment have allowed the Environmental Protection Agency to prioritize its resources into the areas of greatest probability for excessive radiological contamination within the original area of interest. Areas of highest priority are the village of San Mateo in the Ambrosia Lake sub-district and all of the Oak Canyon Site (Laguna sub-district). The remainder of the Ambrosia Lake sub-district referenced above, with the exception of the Mormon Farms area, is of lower priority due to surface radiological readings of background or slightly above. These areas will be addressed using a more abbreviated on-ground protocol. The Mormon Farms area will be addressed by the Environmental Protection Agency Remedial Project Manager for the Homestake National Priority List site, due to its proximity to the National Priority List site.

In December 2009, Environmental Protection Agency began public outreach and seeking voluntary access to conduct Phase One of the on-ground removal assessment at the village of San Mateo in the Ambrosia Lake sub-district and the three village of the Cebolleta Land Grant at the Oak Canyon Site.

In January 2010, the Environmental Protection Agency began the on-ground radiological surveys and residential Radon sampling in the villages of the Cebolleta Land Grant. The Environmental Protection Agency opted to amend the radiological protocol to include radon sampling in Phase One, rather than Phase Two of the protocol in the villages of the Land Grant. The Environmental Protection Agency completed the Phase One and radon sampling portions of the on-ground radiological survey in March 2010. The Environmental Protection Agency is currently awaiting laboratory radiological data and interpretation of field instrument data by the project certified health physicist. Phase Two of the protocol will be initiated if necessary, pending recommendations from the project certified health physicist.

In February 2010, the Environmental Protection Agency continued outreach activities with the Laguna Pueblo government and specifically the village of Paguate. In March 2010, the Environmental Protection Agency began seeking voluntary access in the Village and continued outreach activities. In late March 2010, the Environmental Protection Agency began the on-ground radiological surveys and residential radon sampling in the village of Paguate. Residental on-ground radiological surveys have continued in the major villages of the Laguna Pueblo, all surveys should be complete by late 2010.

<u>Action Plan</u>

1. Continue to work with residential structure owners to identify contamination issues.

2. Coordinate public outreach in other targeted areas as needed. Iteratively conduct removal radiological assessments and develop mitigation strategies as required. Continue and complete on-ground removal assessments.
3. The Environmental Protection Agency will issue a twice-yearly update to the public on progress of the assessment and cleanup of contaminated structures objective.

Cost Estimates

The estimated cost for assessing each structure is approximately $6,000 per structure and the estimated cost for remediating each contaminated structure is up to $200,000. As initial areas are screened, Environmental Protection Agency will develop an implementation plan to determine the extent and projected future costs for this activity.

Limitations

Property access permission, notification among agencies and tribal nations

Removal assessment and mitigation activities, as required, for residential structures owned by Native Americans must be sensitive to cultural values and customs.

Disposal and management of waste material will be coordinated with federal, tribal and state regulatory authorities as appropriate.

Point of Contact
Environmental Protection Agency, Warren Zehner (281) 983-2229

2.5 The Jackpile Mine on Laguna Pueblo

Lead agency:	Laguna Pueblo, Environmental Protection Agency
Potential resource agencies:	Bureau of Indian Affairs, Bureau of Land Management, Indian Health Service, Agency for Toxic Substances and Disease Registry, United States Geological Survey
Land-owner agencies:	Laguna Pueblo

Background

The Pueblo of Laguna is located in the western area of New Mexico. Western New Mexico had one of the richest uranium ore deposits in the United States. The Jackpile Mine is located on the Pueblo of Laguna near the village of Paguate. The mining operations at Jackpile Mine were started by Anaconda Copper Company in 1953 and operations ceased in 1982 under ARCO. Approximately 7,868 acres of land was leased to Anaconda throughout the years of operation. The Jackpile Mine originally started as an open pit mine but at the end of operation turned into an underground mine. In addition to the Jackpile pit, two other open pit mines existed, the North and South Paguate pits. Approximately 400 million tons of earth was removed from the open pits over their operation span. The Jackpile Pit was the deepest of the three open pits. Excavation was

down approximately 625 feet into the earth. The North Paguate Pit was excavated down approximately 200 feet and the South Paguate Pit was excavated down approximately 325 feet. At its peak of production, the mine was operated 24 hours a day, 7 days a week. In early 1982, mine operations ceased because the price for uranium ore was no longer profitable. As part of the agreement made between Anaconda/ARCO and the Tribe, once operations at the mine ceased, ARCO was to pay for reclamation. It took approximately seven years for all parties involved to reach an agreement on reclamation. A Record of Decision for the Jackpile-Paguate Uranium Mine Reclamation Project was signed between the Bureau of Land Management and Bureau of Indian Affairs in December 1986. In 1989, the Tribe was paid approximately $45 million by ARCO to do the reclamation work themselves. The Laguna Construction Company was created by the Tribe to do the reclamation. It took from 1989 until 1994 to complete the reclamation project. The reclamation project will be monitored closely for the next 15 years.

Previous and ongoing regulatory actions

For the past three years, the Laguna Pueblo has been receiving grant funding through the Environmental Protection Agency 106 Clean Water program. With this funding the Pueblo has been sampling surface water at various locations and has collected analytical data on uranium. Elevated levels of uranium have been detected in the surface waters of the Rio Paguate and in the Mesita Dam. The levels of uranium could have an impact on Traditional/Cultural and Ceremonial uses of surface water bodies below the convergence of the Rio Paguate.

Levels of uranium vary per sampling event due to multiple factors, but below the Jackpile Mine the levels are consistently high. Downstream locations exhibit lower uranium levels but are above the background level.

Action Plan

1. Continue the consultation process with the Pueblo. The first formal consultation was held with the Pueblo Governor and council members on October 13, 2009.
2. A Memorandum of Understanding signed by the Pueblo of Laguna and the Environmental Protection Agency on June 22, 2010 facilitates consultation, coordination and cooperation in both the removal and site assessment phases/processes of activities and protocols.
3. The Environmental Protection Agency Superfund Program will conduct a Preliminary Assessment and Site Investigation at the Jackpile Mine.
4. The Environmental Protection Agency will issue a twice-yearly update to the public on progress of the assessment and investigation at the Jackpile Mine.

Cost Estimates

The cost to conduct a Preliminary Assessment is approximately $15,000. The estimated cost to conduct a Site Investigation is between $40,000 to $75,000 depending on the necessary sampling and analysis for the site.

Limitations

Funding:
Currently, funding is limited and activities will be prioritized by the lead agency.

Point of Contact
Environmental Protection Agency, LaDonna Turner (214) 665-6666

2.6 Public Health Surveillance

Lead agency:	New Mexico Department of Health
Potential resource agencies:	Indian Health Service, Agency for Toxic Substances and Disease Registry, New Mexico Environment Department, Environmental Protection Agency

Background

Historical releases to ground and surface water, soil and air have been documented from legacy uranium sites throughout the Grants Mining District, and may be continuing into the present from on-site wastes. Area residents have requested health assessments associated with environmental impacts from historical known and possible legacy uranium activities and wastes in the San Mateo Creek basin and throughout the Laguna sub-district.

Previous and ongoing regulatory actions

The New Mexico Department of Health's Environmental Health Epidemiology Bureau has a long history of investigating New Mexicans' exposure to uranium.

From 2002-2008, New Mexico was a member of the 6-state Rocky Mountain Biomonitoring Consortium and participated in planning and implementation grants. The Rocky Mountain Biomonitoring Consortium was funded by the Centers for Disease Control and Prevention to address environmental health problems in Arizona, Colorado, Montana, New Mexico, Utah, and Wyoming. These states share common environmental characteristics and have extensive histories of mining, especially for uranium and federal military operations. Some of these states have some of the highest levels of arsenic and uranium in drinking water in the nation, both from naturally occurring deposits as well as mining/milling and coal-fired power plants. These activities have also led to lakes and stream with elevated levels of heavy metals. In New Mexico, approximately 850 participants (volunteers) had their drinking water and urine tested for a number of chemicals, including uranium. With respect to uranium, the 90th percentile exposure among New Mexicans (0.12 ug/L) was higher than the 90th percentile for the nation (0.029 ug/L, according to the National Health and Nutrition Examination Survey, 2001-2002).

From October 2007 to June 2008, urine and water samples were collected as part of the New Mexico's general fund-supported efforts to assess veterans' exposure to uranium, and more specifically, depleted uranium. Depleted uranium has been used for armor-penetrating bullets

and sabots because of its high density, its ability to self-sharpen as it penetrates its target and its propensity to self-ignite.

During 2009-2010, state general funds will be used to expand testing of residents for uranium exposure. Specifically, the New Mexico Department of Health has identified the Grants Mining District as the priority area given the elevated levels of naturally occurring uranium due to uranium mineralization. Individuals in this area will be invited to have their drinking water and urine tested for total uranium levels. In addition, they will be given a survey to assess other routes of uranium exposure.

As of April 2009, uranium in urine greater than 0.08 ug/L is a notifiable condition in New Mexico and therefore must be reported to the Department of Health under New Mexico Administrative Code 7.4.3.12.

Action plan

1. Residents in the Grants Mining District will be recruited to participate in the project, which will occur in late spring. Recruitment will be multi-pronged, including:
   a) Coordinating with the Environmental Protection Agency to identify individuals who are living in contaminated structures (and willing to participate); b) Through newspaper ads, radio spots, and other means; c) Coordinating with the New Mexico Environment Department to identify individuals on private wells with elevated uranium levels;
   d) Residents who live near legacy uranium mines will be encouraged to participate, as will those who are on private wells.
2. Physicians in the area will be notified about the project and the Agency for Toxic Substances and Disease Registry will work with the lead agency to provide training on uranium exposure and guidelines for care. In addition, a communication and outreach plan will be developed to inform the public of investigation findings and possible appropriate mitigation strategies.
3. The Environmental Protection Agency will issue a twice-yearly update to the public on the status and results of the public health surveillance.

Limitations

Funding from the New Mexico Legislature was spent by June 30, 2010 to conduct analyses of urine and water samples for total uranium. The New Mexico Department of Health anticipates providing these results to participants by August 31, 2010.

Point of Contact
New Mexico Department of Health, Heidi Krapfl (505) 476-3577

3.0 Implementation Plan Time Line

Objective	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Water Source	Continue water supply sources sampling throughout Grants Mining District		Complete water supply sources sampling throughout Grants Mining District	Continue out-reach to owners of impacted water sources and perform follow up sampling as required	
	Identify solutions to ensure availability of safe drinking water sources while strategies for ground water remediation are developed and implemented				
	Evaluate susceptibility of vicinity community water systems to contamination from legacy uranium sites				
	Initiate hydrogeologic studies through compilation of available data and hydrogeologic mapping				
Uranium Mines	Continue screening assessments (10-20 per year) of mine sites in Grants Mining District	Complete screening assessments	Conduct further investigation of mines prioritized for further investigation.		
	Evaluate and prioritize assessed mines for response actions including further investigation, removal, and remedial actions.				
	Initiate removal planning and other response actions	Initiate response actions as appropriate			
	Develop a strategy to engage potential responsible parties and address legacy mines	Prioritize sites for further investigation activities Engage Potential Responsible Parties in investigation and response actions Develop remedial strategies as required			
	Initiate hydrogeologic studies through compilation of available data and hydrogeologic mapping	Continue hydrogeologic studies and data compilation			
Long-term Management of Former Uranium Mill Sites	Conduct long-term surveillance, maintenance, and ground water monitoring requirements at three former mill sites	Conduct long-term surveillance, maintenance, and ground water monitoring requirements at three former mill sites	Conduct long-term surveillance, maintenance, and ground water monitoring requirements at three former mill sites	Conduct long-term surveillance, maintenance, and ground water monitoring requirements at three former mill sites	Conduct long-term surveillance, maintenance, and ground water monitoring requirements at three former mill sites
	Install one additional bedrock monitoring well to evaluate alluvial/bedrock interconnections at Ambrosia Lake--Phillips Mill site	Complete evaluation of alluvial/bedrock interconnections at Ambrosia Lake--Phillips Mill site			

Objective	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
	Replace one monitor well and install additional wells on Anaconda Bluewater Mill site, as appropriate	Monitor and evaluate the ground water data at the Anaconda Bluewater Mill site			
	Initiate hydrogeologic studies through compilation of available data and hydrogeologic mapping	Continue hydrogeologic studies and data compilation			
Contaminated Structures	Develop screening protocol				
	Conduct preliminary assessment activities over all targeted areas (includes aerial reconnaissance)	Identify site that may require remedial action and long term stewardship			
	Develop and implement community outreach plan				
	Complete access agreements with owners and Tribal governments				
	Initiate structure assessments	Continue assessments	Complete assessments.		Determine if further action necessary
	Prioritize and begin cleanup of structures found to be contaminated above acceptable levels				
Laguna/Jackpile Mine	Develop Environmental Protection Agency and Laguna Pueblo MOU				
	Conduct preliminary assessment and site investigation of Jackpile Mine				
Public Health Surveillance	Exposure Assessment: Seek participants and develop data collection tools.				
	Conduct drinking water and urine sampling.	Conduct analysis of morbidity data			

Objective	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
	Conduct health education and outreach for doctors	Conduct health education and outreach for doctors			

4.0 Associated Superfund Sites

This section describes the status of the work under the Environmental Protection Agency's Superfund program in the Grants Mining District. This information provides a larger picture of related legacy uranium activities in northwestern New Mexico.

4.1 Homestake Mining Company (Barrick Gold Corp.), Grants, New Mexico

The Homestake Mining Company Superfund site is located in Cibola County, New Mexico, approximately 5.5 miles north of the Village of Milan, at the intersection of Highway 605 and Country Road 63. Five residential subdivisions, Murray Acres, Broadview Acres, Pleasant Valley Estates, Felice Acres, and Valle Verde are located within two miles south and southwest of the Site. The Site is the location of a former uranium mill operated by Homestake Mining Company.

The Homestake Mining Company operated a uranium mill at the Site from 1958 until 1990. The mill was decommissioned and demolished between 1993 and 1995. The Site currently includes two tailings piles (i.e., Large Tailings Pile and Small Tailings Pile), a ground water extraction and injection system, tailings flushing and dewatering systems, a reverse osmosis water treatment plant, two lined collection ponds, two lined evaporation ponds, associated equipment and structures, and office building and related support structures. Currently, the Homestake Mining Company is waiting for approval of a permit from the New Mexico Environment Department to construct a third lined evaporation pond.

The hydrogeology at the site is complex. The shallowest aquifer at the site is the San Mateo Alluvial Aquifer that merges with the Rio San Jose Alluvial Aquifer to the west and the Lobo Canyon Alluvial Aquifer to the southeast. The San Mateo Alluvial Aquifer extends from land surface to the underlying Chinle formation up to a depth 80 feet.

Beneath the alluvial formation is the Chinle formation that is comprised of shale and sandstone. Three distinct aquifers are present in this formation including the upper, middle and lower Chinle aquifer. The Upper Chinle Aquifer is an approximately 20-foot thick sandstone layer. Below the Upper Chinle is the Middle Chinle Aquifer that is approximately 40 foot continuous sandstone layer. The Lower Chinle extends up to 120 feet below the Middle Chinle. The regional San Andreas Aquifer lies below a confining layer several hundred feet below the alluvial aquifer.

<u>Regulatory Framework</u>

The Homestake Mining Company operated the uranium mill under a Nuclear Regulatory Commission license. For license termination, Homestake Mining Company is required to cleanup the site in accordance with the Nuclear Regulatory Commission requirements of 10 CFR Part 40, Appendix A. The facility is conducting remediation under a Nuclear Regulatory Commission approved Corrective Action Plan.

The site was listed on the National Priorities List in 1983. Homestake Mining Company entered into an Administrative Order on Consent with the Environmental Protection Agency to provide alternate water to impacted residents. Subsequently, Homestake Mining Company has met all the obligations under this agreement. In 1989 the Environmental Protection Agency issued a No Action Record of Decision. The 1989 No Action Record of Decision addressed only radon exposure and did not address ground water as it was already addressed by the Nuclear Regulatory Commission. In 1993 the Environmental Protection Agency and the Nuclear Regulatory Commission signed a Memorandum of Understanding that spelled out the regulatory responsibilities at the Site. Under this Memorandum of Understanding, the Nuclear Regulatory Commission is the lead agency to direct cleanup and the Environmental Protection Agency has oversight authority.

The facility has two discharge permits DP-200 and DP-725 issued by the New Mexico Environment Department. The discharge permits authorizes Homestake Mining Company to extract, inject and discharge ground water in to the evaporation ponds.

Current Activities

The Homestake Mining Company continues to operate the remediation system to achieve cleanup goals by 2017. In 2009, the Homestake Mining Company entered in to a Memorandum of Agreement with the New Mexico Environment Department to connect several residents in the subdivisions near the site who did not have access to public water supply. Currently, all of the homeowners identified have alternate water supply.

Recently the Environmental Protection Agency commissioned a Remedy System Evaluation performed by the Army Corps of Engineers. The Remedy System Evaluation was conducted to evaluate the effectiveness of the current remedial strategy. A draft report was issued to stakeholders in February 2010. A revised draft report was issued to stakeholder before the end of the original comment period, thus extending the comment period on the Remedy System Evaluation until the end of July 2010. The Army Corps of Engineers is currently waiting for comments from the stakeholders prior to finalizing the report.

Future Activities

The Environmental Protection Agency is also planning to conduct a human health risk assessment to determine risk to the residents living near the site during remedial activities. The scope of work for the risk assessment has been shared with the stakeholders including the Bluewater Valley Downstream Alliance. The Environmental Protection Agency is currently planning the sampling schedule and expects the sample collection to begin in August 2010.

4.2 United Nuclear Corporation, McKinley County, New Mexico

The United Nuclear Corporation site was listed on the Environmental Protection Agency's National Priority List on December 30, 1982. The site is located 17 miles northeast of Gallup, New Mexico and on the southern border of the Navajo Indian Reservation. United Nuclear Corporation was granted a radioactive materials license by the State of New Mexico in May

1977 and operated the site as a uranium mill facility from 1977 to 1982. The site includes a former ore processing mill and tailings disposal area. The tailing cells have been capped with an interim radon barrier cover as part of the reclamation activities directed by the Nuclear Regulatory Commission.

Regulatory Authorities

Under a 1988 Memorandum of Understanding between the Environmental Protection Agency and the Nuclear Regulatory Commission, the Environmental Protection Agency is responsible for regulating the remediation of ground water contamination outside of the Tailings Disposal Site under Superfund. The Nuclear Regulatory Commission is the lead agency responsible for surface reclamation and source control at the licensed site, with the Environmental Protection Agency to monitor all such activities and provide review and comment directly to the Nuclear Regulatory Commission.

Current Activities

The United Nuclear Corporation is currently extracting seepage-impacted ground water from Zone 3 to an evaporation pond on-site under a Unilateral Administrative Order issued by the Environmental Protection Agency.

The ground water extraction systems for Zone 1 and the Southwest Alluvium have been shut off. Zone 1 pumping rates have declined over time and do not support pumping due to a lack of natural recharge to the aquifer. Contaminant levels have also declined over time and no further movement of contamination downgradient has been observed. Pumping in the Southwest Alluvium was discontinued because little progress was being made toward achieving cleanup levels for sulfate and total dissolved solids; natural attenuation is being evaluated. Pumping in Zone 3 continues to slow down the migration of seepage-impacted ground water, but is not likely to stop its movement to the north toward Navajo land.

The Environmental Protection Agency has also directed United Nuclear Corporation to conduct a site-wide supplemental feasibility study to evaluate other cleanup options (remedial alternatives). United Nuclear Corporation has made several proposals such as water injection testing, a technical impracticality waiver, and institutional controls to prevent ground water use.

Future Activities

The Environmental Protection Agency is developing a holistic plan to evaluate ground water contamination in the area of the Site, the Northeast Church Rock Mine, and another nearby historic mine (Quivira mine) located to the north of the Site.

4.3 Northeast Church Rock Mine, Coyote Canyon, New Mexico

The Northeast Church Rock Mine is a former uranium mine that was operated by United Nuclear Corporation from 1967 to 1982. Most of the 125-acre mine permit area is held in trust for the Navajo Nation by the United States Government and is immediately adjacent to the Navajo Reservation. Approximately 40 acres are patented mining claim land owned by United Nuclear Corporation. The Environmental Protection Agency found contaminated sediments from treatment ponds, waste piles with low-grade uranium, and widespread radium contamination.

Regulatory Authorities

The Environmental Protection Agency Region 9 is the lead on the mine Site according to the terms of a Memorandum of Understanding with the Navajo Nation and Environmental Protection Agency Regions 6, 8 and 9.

Current Activities

In November 2006, the United Nuclear Corporation, under order by the Environmental Protection Agency, started conducting a removal site investigation. In April 2007, the Environmental Protection Agency initiated a time critical removal action of radium contaminated soils. Detailed information on background, current activities, and future plans can be found in the Health and Environmental Impacts of Uranium Contamination in the Navajo Nation Five-Year Plan.

ATTACHMENTS

Attachment A: Meeting Fact Sheet

Grants Mineral Belt
Fact Sheet

New Mexico January 2010

This Fact Sheet will tell you about:

- Background information
- Current activities
- Meeting questions and answers
- What happens next?
- Where to get more information

Background Information

The Grants Mineral Belt in New Mexico extends along the southern margin of the San Juan Basin within Cibola, McKinley, Sandoval, and Bernalillo counties as well as on Tribal lands. The Grants Mineral Belt was the primary area for uranium extraction and production activities in New Mexico from the 1950's until late in the 20th century.

Historical uranium mining impacts within the Shiprock Mining District and part of the Ambrosia Lake sub-district of the Grants Mining District are under the jurisdiction of the Navajo Nation and are being addressed by U.S. Environmental Protection Agency (EPA) Region 9. The remainder of the Ambrosia Lake sub-district, as well as the Laguna, and Marquez sub districts contain legacy uranium sites that are under the jurisdiction of EPA Region 6 and the State of New Mexico.

Current activities

On October 20, 2009, EPA Region 6 sponsored a community meeting in Grants, New Mexico to kick off public participation to assist EPA, the New Mexico Environment Department (NMED), and their Tribal, federal, state and local partners in planning for interagency activities to address the environmental legacy from uranium mining and milling. This interaction was the first in a series of planned collaborative activities wherein the communities can provide input to long-range planning activities for the Grants Mineral Belt Five-Year Plan, which sets forth the goals, objectives, and tasks to assess health risks and environmental impacts that may have resulted from legacy uranium mining and milling extraction, processing, and waste disposal. NMED, EPA, Tribal and other partners will interface with the community as we move forward with this wide-ranging effort.

Meeting questions and answers

A number of questions asked by the meeting participants were related to the Homestake Mining Company (uranium mill) Superfund Site. Although the Homestake Site is within the San Mateo Creek Basin, those questions have been referred to the Homestake Mining Company Site Remedial Project Manager to address in a separate document.

Below are responses to questions from the October 2009 community meeting related to the Grants Mineral Belt 5 Year Plan initiative:

1. What structures in the area will be evaluated?

In coordination with the affected communities and residents, EPA will assess structures on land likely to be contaminated with radiation from uranium waste rock and/or debris. Based on data gathered from aerial over flights, this effort will focus on the areas of San Mateo, Poison Canyon, Spanish Land Grant and Laguna Pueblo. Impacted structures could include homes, barns, sheds, fences and free standing shelters that may have been built with uranium waste or waste rock from uranium mining or milling sites, which could pose a health risk to current or future occupants.

2. Why is the partnership addressing small, dry mines first?

Site assessments of mines within Poison Canyon were conducted to understand whether these mines may contribute to ground water contamination observed up-

gradient of the nearby Homestake Mining Company Superfund Site. In 2009, NMED completed site screenings at 27 mines that were the closest up-gradient mines to the Homestake Mining Company Superfund Site. This work was conducted as follow-up to the 2008 Preliminary Assessment conducted by NMED that evaluated 85 legacy uranium sites in the San Mateo Creek Basin. Additionally, NMED also has conducted a Preliminary Reassessment and Site Investigation of the Anaconda Company Bluewater uranium mill site, which is also up gradient of the Homestake Mining Company Superfund Site. NMED has requested that the U.S. Department of Energy evaluate the source of elevated contaminant concentrations in the Alluvial and San Andres aquifers possibly attributable to this site.

3. Will there be an aquifer study throughout the Grants Mineral Belt?

The EPA, working with NMED and other partners, began a sampling effort in 2009 to determine impacts to private wells in the San Mateo Basin. Results from this sampling will be shared and discussed with NMED, residents, and public health officials to determine appropriate future actions. Additional work may be conducted to fill in any data gaps that may be identified.

4. a. What work has been done by the Department of Health to evaluate human exposure to uranium contamination?

b. What were the concentrations of uranium found by the Department of Health that caused concern?

a.) The New Mexico Department of Health's Environmental Health Epidemiology Bureau has been actively involved in investigating New Mexicans' exposure to uranium. Here are some examples:

From 2002-2008, New Mexico was a member of the 6-state Rocky Mountain Biomonitoring Consortium, which was funded by the Centers for Disease Control and Prevention to address environmental health problems in Arizona, Colorado, Montana, New Mexico, Utah, and Wyoming. These states share common environmental characteristics and have extensive histories of mining, especially for uranium and federal military operations. The goal in part was to assess the extent of human exposure to environmental contaminants through testing of drinking water and urine. For New Mexico, the primary focus was arsenic, which was known to occur naturally at elevated levels along the Rio Grande Rift Valley. The study invited volunteers to have their drinking water and urine tested for a variety of metals and other chemicals. Because this biomonotoring project was based on volunteers, there was not representation from every potentially impacted county. It is also important to note that areas with naturally higher ground water arsenic levels were preferentially selected for this biomonotoring project. However, regions with the highest uranium deposits, such as McKinley or Cibola counties were not included because they were not identified as having high levels of arsenic.

In New Mexico, approximately 850 volunteer participants had their drinking water and urine tested for a number of chemicals, including uranium. With respect to uranium, the 90th percentile exposure among New Mexicans was higher than the 90th percentile for the nation, according to the National Health and Nutrition Examination Survey, 2001-2002).

From October 2007 to June 2008, urine and water samples were collected as part of New Mexico state general fund-supported efforts to assess veterans' exposure to uranium, and more specifically, depleted uranium. Specific information and monitoring results are available at http://nmhealth.org/eheb/documents/Bio/DUSummary6.9.09.pdf.

b.) Through working with the Rocky Mountain Biomonitoring Consortium, the New Mexico Department of Health staff learned that levels of uranium in some New Mexicans' drinking water supplies and urine exceeded average levels in a national study that is representative of the US population. All New Mexico participants whose uranium drinking water concentrations exceeded the EPA maximum contaminant level (MCL) of 30 micrograms per liter were contacted and advised to utilize reverse osmosis filtration or to drink bottled water in order to avoid this exposure.

In addition, the New Mexico Department of Health also conducted an evaluation of veterans' exposure to depleted uranium. A summary of the depleted uranium project is available at http://nmhealth.org/eheb/documents/Bio/DUSummary6.9.09.pdf

All results of the biomonitoring project's participants are being analyzed to evaluate exposure to uranium and other metals. A final summary report from this study will be available by the end of December 2009. No results from individual participants will be identified.

5. Are comprehensive health studies planned for the Grants Mineral Belt?

At this time, the New Mexico Department of Health has no funds to conduct comprehensive health studies. However,

if funds become available the Department of Health will conduct water and/or urine sampling and analysis for uranium in the Grants Mineral Belt region. Specifically, Department of Health would identify areas in New Mexico with elevated levels of naturally occurring uranium due to uranium mineralization and then prioritize areas for testing. Individuals in these areas would be invited to have their drinking water and urine sampled for total uranium levels. They would collaborate with other agencies on these efforts to ensure that they are not duplicating efforts.

It has been reported that by the end of the year, Indian Health Service will begin medical monitoring clinics across the Navajo Nation to screen individuals for non-job-related exposure to uranium. Dr. Douglas Peter, chief medical officer and deputy director for the Navajo Area Indian Health Service, said Indian Health Service was charged with conducting the study as part of a five-year plan to address uranium contamination on the Navajo Nation.

6. **Can the key contacts' information for EPA, NMED, Mining & Minerals Division, Department of Energy, Nuclear Regulatory Commission, Health Dept, Agency for Toxic Substances and Disease Registry, Bureau of Indian Affairs, Bureau of Land Management, Department of the Interior and their web site link(s) be made available to the community?**

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Superfund (6SF)
US EPA, Region 6
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Water and Waste Management Division
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Bill Brancard, Director
New Mexico Energy, Minerals, and Natural Resources Department
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Heidi Krapfl, Chief
Environmental Health Epidemiology Bureau
Epidemiology and Response Division
New Mexico Department of Health
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Dr. C. Mark Sewell
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George Pettigrew
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Stephen Spencer
Regional Environmental Officer
U.S. Department of the Interior
Office of Environmental Policy and Compliance
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Albuquerque, NM 87104

7. **Why wasn't the Bluewater Valley Downstream Alliance informed about the aerial radiological survey before the October 20, meeting?**

The aerial over-flight of populated areas that may have structures impacted by legacy uranium site wastes was conducted by the EPA National Decontamination Team (NDT) who operates and maintains the fixed-wing aircraft and the instruments utilized to collect data. As the operator of the aircraft, the EPA NDT and their contract pilots have an established protocol with the Federal Aviation Administration (FAA) regarding notification of low-level flights in public airspace. All notifications procedures established under the EPA NDT protocol were met prior to the commencement of the aerial over-flights. In addition, the survey was specifically for populated areas that have structures built from mine wastes. If any future overflights are planned, EPA will ensure that the

affected population, including the Bluewater Valley Downstream Alliance, are alerted to the activity.

8. **Did the aerial radiological survey extend to San Mateo Creek?**

The aerial radiological survey did not extend to the geographical area directly north of the Homestake Mining Company Superfund Site. The survey was specifically conducted over populated areas that may have structures built from mine and/or mill waste.

9. **Can part of the Five-Year Plan include evaluations for radon and plant uptakes?**

Radon evaluation and plant uptake studies may be considered for future sampling events. Plant uptake studies are more commonly considered during the extensive site characterization studies associated with human health or ecological risk assessments and may not be included in the preliminary site evaluation stages.

10. **Why were residents of the Grants Mineral Belt excluded from the uranium exposure study conducted by the Department of Health?**

Please see response to question number 4.

11. **Can EPA/partners locate funding for new health studies, i.e. bio-monitoring?**

EPA will continue to work with the state and federal health agencies to identify future studies and potential funding sources.

12. **Did industry funding for (the New Mexico Energy, Minerals, and Natural Resources Department) Mining and Minerals Division studies cause any "heartburn" for the Agency? Could industry participation be a conflict of interest?**

Since the Mining and Minerals Division (MMD) directed the contract, we did not have concerns about the industry funding. MMD drafted the scope of the contract, approved the contractor and oversaw the fieldwork and report preparation.

13. **Will the Five-Year Plan going to consider the potential impacts of new mining on legacy sites?**

The response to this question involves agencies' policy decisions. We will provide an update on this issue in the future.

14. **Can the Bluewater Valley Downstream Alliance receive copies of the presentation shown at the October meeting?**

Copies of the PowerPoint® presentation, along with a list of meeting participants were provided electronically to all requestors several days after the October meeting.

15. **Why didn't EPA provide the community enough advance notice about the October meeting?**

EPA mailed the meeting invitations on October 6, 2009, providing the community approximately a two-week notice. Meeting invitations notification were also placed in four local newspapers several weeks before the meeting. Over a number of years working with diverse communities, we have found that notices sent too far in advance of community meetings (more than several weeks) tend not to work as well as notifications providing an approximate two-weeks notice. We also provided a number of e-mail notifications to different agencies' electronic mailing lists. In the future, we will endeavor to provide the Grants Mineral Belt community meeting notices in advance of the normal two-weeks.

16. **Why doesn't EPA communicate their expectations better? The October meeting invitation did not mention the Five-Year Plan, but participants were asked to provide input?**

We believed that the language in the invitation, ***"We are asking community members to assist us in gathering information and providing input on planning activities related to the coordinated efforts to assess and address environmental impacts resulting from legacy mining and milling activities. EPA, NMED and their partners are seeking community input as we move forward in this comprehensive effort."*** *did adequately inform the community of how we hoped they would participate in the meeting. EPA will increase and enhance our efforts to clarify community expectations in all future communications.*

17. **Is EPA complying with "Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations?"**

EPA is complying with the Order. In April, June and August of 2009, EPA began communications and meetings related to the New Mexico legacy uranium issues with the Multicultural Alliance for a Safe Environment (MACE), the Southwest Network for Economic and Environmental Justice (SNEEJ), the Indigenous Environmental Network, the Bluewater Valley Downstream Alliance and other

organizations concerned with issues of environmental justice. The October 2009 meeting was the first in a series of large community meetings to open up the collaboration process to the wider community.

18. What is Superfund?

Superfund is the Federal Government's program to clean up the Nation's uncontrolled hazardous waste sites. The EPA Superfund cleanup process begins with site discovery or notification to the EPA of possible releases of hazardous substances. Sites are discovered by various parties, including citizens, State agencies and by Region 6 staff. Once discovered, we enter the site into our computerized inventory of potential hazardous substance release sites which is named the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS). We then evaluate the potential for a release of hazardous substances from the site through multiple iterative steps in the Superfund process.

19. Why aren't the Bluewater Valley Downstream Alliance, the Multicultural Alliance for a Safe Environment and the Haaku Water Office part of the partnership?

The initial focus of the Grants Mineral Belt Partnership was to share information with State, Federal and Tribal agencies who have currently, or had historically, conducted work in the area to share information and resources. EPA hosted a meeting last spring with over 60 representatives from 19 federal, state, and Tribal organizations to better understand how each organization is involved. It was decided that a multi-agency plan or a "Five Year Plan" could serve as a planning tool for each of the organizations to align their work and to achieve greater benefits.

In addition to its own funding mechanisms, each of the organizations has its own mission and rules to identify and plan future work. Community groups provide a valuable resource to each organization's planning process. EPA and NMED consider Bluewater Valley Downstream Alliance, the Multicultural Alliance for a Safe Environment and Tribes as valuable partners and will work directly with them to ensure that community input is reflected in the planning and implementation of the Five-Year Plan.

What happens next?

In the next several months, federal, state, Tribal and local partners will participate in a series of meetings to discuss activities, planning and future directions for the Grants Mineral Belt Five-Year Plan. NMED, EPA and our other partners plan to present the first draft of the Five-Year Plan at a public meeting in spring 2010.

In follow-up to an aerial radiological survey that EPA completed in October 2009, the EPA will be conducting residential structural assessments in Cibola and McKinley Counties, New Mexico over the next several months. The aerial survey covered approximately 300 square miles which included the towns of Toltec, Bluewater, Milan, Grants, San Rafael, San Mateo, Bibo, Seboyeta, Moquino, the villages within the Laguna Pueblo and the Lobo Canyon sub-divisions. The areas of interest for further structural assessments are San Mateo, Bibo, Seboyeta, and Moquino. Other tribal villages may be addressed depending on requests from the tribes.

The structural assessments will assist EPA in determining the impact of former uranium mining and milling on residential properties. EPA will be requesting additional information and/or property access from homeowners in areas of elevated radiological activity as defined by the aerial assessment. EPA will begin contacting the potentially- effected residents for additional information and/or property access in December 2009.

Where to get more information

All media contact should be made to the Region 6 Office of External Affairs at 214.665.2200.

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All of the above EPA staff can also be reached on 1.800.533.3508 (toll-free).

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Site Repository

New Mexico State University at Grants
Campus Library
1500 Third Street
Grants, NM 87020
505.287.6639

On the web:
http://www.epa.gov/earth1r6/6sf/newmexico/grants/nm_grants_index.html

Attachment B: State of New Mexico Correspondence

New Mexico State Legislature

STATE CAPITOL
Santa Fe
November 23, 2009

Sam Coleman, Director
Superfund Division
Environmental Protection Agency
1445 Ross Ave.
Dallas, TX 75202

Dear Director Coleman:

On behalf of the interim legislative Indian Affairs and Radioactive and Hazardous Materials committees, we write to thank you and your agency for taking the lead in coordinating a five-year plan to address the health and environmental impacts of the uranium legacy in New Mexico. Moreover, we write respectfully to request that the five-year plan include a broad scope of work with specific priorities, the participation of critical federal, state and tribal agencies with authority to address the uranium legacy, an ongoing assessment of benchmarks and goals and a public participation process and specific identification of the limitations in both federal funding and the statutory authority preventing comprehensive uranium legacy cleanup.

We ask that the scope of work for the five-year plan be broad enough to assess and develop strategies to address and clean up adverse impacts to human health and the environment associated with past uranium mining and milling activities. The assessments and strategies to address the risks to human health and the environment from uranium legacy sites need to be established in order of urgency. Of greatest urgency is the assessment of potentially contaminated water supply sources associated with the uranium legacy effects. The second priority is assessment and cleanup of the uranium legacy contamination from all pathways that pose a threat to human health and the environment. Closely associated with that priority is the cleanup of sediment, surface materials, surface and ground water and air contamination originating from past mining and dewatering of abandoned uranium mines. Lastly, assessment and cleanup of potentially contaminated structures may be undertaken. In order to complete this broad scope of work, many federal, state and tribal agencies will need to work together.

The input, participation and cooperation of federal, state and tribal agencies are necessary to achieve comprehensive uranium legacy cleanup. More importantly, the active participation and cooperation of critical federal agencies are necessary for effective

and efficient use of available resources. We request that all efforts be made to include the active participation of all critical federal agencies, particularly the Department of Energy's Office of Environmental Management and Office of Legacy Management, the Department of the Interior's Office of Surface Mining Reclamation and Enforcement, the Bureau of Land Management, the Bureau of Indian Affairs, the United States Forest Service, the United States Geological Survey, the Nuclear Regulatory Commission, the Agency for Toxic Substances and Disease Registry and the United States Army Corps of Engineers. A coordinated interagency implementation of the five-year plan is necessary to maximize resources and achieve comprehensive uranium legacy cleanup.

In order to adequately evaluate the implementation of the five-year plan, a process for ongoing public participation and assessment of benchmarks and goals is needed. Public input in the initial scope of work and in ongoing cleanup efforts is very important. Additionally, a process to assess benchmarks and goal achievements is necessary to ensure timely and comprehensive uranium legacy cleanup.

We understand that there are many limitations preventing comprehensive uranium legacy cleanup activities. The five-year plan must identify the limitations in federal funding and the statutory authority that prevent efforts to fully address and clean up uranium legacy risks to human health and the environment.

Thank you for your time and for your consideration of this very important matter. We look forward to reviewing a draft of the five-year plan. Please feel free to contact us, or Damian Lara, staff attorney at the Legislative Council Service, at (505) 986-4600, should you have any questions or comments regarding this matter.

Sincerely,

James Roger Madalena
JAMES ROGER MADALENA
State Representative, District 65
Co-Chair, Indian Affairs Committee

Richard C. Martinez
RICHARD C. MARTINEZ
State Senator, District 5
Chair, Radioactive and
Hazardous Materials Committee

John Pinto
JOHN PINTO
State Senator, District 3
Co-Chair, Indian Affairs Committee

John Heaton
JOHN HEATON
State Representative, District 55
Vice Chair, Radioactive and
Hazardous Materials Committee

JRM/RCM/JP/JH:kf

Attachment C: Environmental Justice Correspondence

MULTICULTURAL ALLIANCE FOR A SAFE ENVIRONMENT (MASE)
P.O. Box 4254, Albuquerque, NM 87196 • 505-262-1862 (office) • 505-262-1864 (fax)

Core Groups:

Bluewater Valley Downstream Alliance
Milan

Dineh Bidziil Coalition
Navajo Nation

Eastern Navajo Diné Against Uranium Mining (ENDAUM)
Churchrock and Crownpoint

Laguna-Acoma Coalition for a Safe Environment
Acoma and Laguna Pueblos

Post-71 Uranium Workers Committee
Grants

Affiliated Groups:

Amigos Bravos
Taos and Albuquerque

McKinley Community Health Alliance
Gallup

Moquino Mutual Domestic Water Consumers Association
Cebolleta

New Mexico Environmental Justice Working Group
Albuquerque

New Mexico Environmental Law Center
Santa Fe

Office of Peace, Justice and Creation Stewardship
Gallup

Partnership for Earth Spirituality
Albuquerque

Ramah Navajo Community
Ramah

Red Water Pond Road Community Association
Coyote Canyon Chapter

SAGE Council
Albuquerque

Sierra Club Environmental Justice Office
Flagstaff

Southwest Research and Information Center
Albuquerque

Stewards of Creation
Albuquerque and Gallup

October 13, 2008

Mr. Charles Lee, Director
Office of Environmental Justice
U.S. Environmental Protection Agency
Mail Code: 2201A
1200 Pennsylvania Ave., NW
Washington, D.C. 20460-0001

Dear Mr. Lee:

The Multicultural Alliance for a Safe Environment (MASE) is a coalition of grass-roots communities, based largely in New Mexico, whose residents have been living with and fighting for cleanup of abandoned uranium mines that continue to pollute our air, land and water, threaten our health, and disrupt our traditional and cultural practices. While these impacts have been ongoing for nearly 60 years, covering three generations, sadly, the Federal Government is poised to facilitate a new round of uranium development in the same communities that have lived through previous boom and bust cycles and have nothing sustainable to show for it.

If this were any major city in America, the problem would have been solved long ago, and no new threats would be proposed. But not here, where Native, Hispano and Anglo families still live next to contaminated sites that won't be reclaimed or restored for many years. The slow pace of cleanup spurred by a lack of money for reclamation plans, failed groundwater restoration methods, few health studies, and limits on worker compensation for radiation-induced illnesses and death smacks of environmental racism at worst and extreme environmental *injustice* at best.

That is why we are writing you, the National Environmental Justice Advisory Council (NEJAC) — the only Federal entity impaneled to hear the concerns of people and communities beset by some of our nation's worst environmental problems. We request that this letter be read at the forthcoming meeting in Atlanta, Georgia on October 22.

MASE also requests that NEJAC hold a fact-finding trip and meeting in uranium-impacted communities in New Mexico early in 2009. By focusing an upcoming meeting on the uranium industry and its impact on the environment and the health of people in our communities, NEJAC not only will

facilitate the testimonies of peoples impacted by every aspect of this industry, but also raise awareness about the Federal Government's lack of response to what we now call the Uranium Legacy. You will see sites and hear stories that establish the basis for —

- Enactment of a Federal abandoned uranium mine (AUM) reclamation program
- Expanded Federal budgets for AUM reclamation and community compensation
- Federal funding for community health studies
- Regional expansion of an existing Superfund site to address historic uranium mining and milling pollution of massive quantities of groundwater
- Expansion of the Radiation Exposure Compensation Act (RECA) to include Post-1971 uranium workers
- Oversight of the Nuclear Regulatory Commission's deference to the uranium industry on both legacy responses and approvals of new uranium recovery

You may be surprised to learn that the Federal Government *never* regulated underground and open-pit uranium mining, and still doesn't. As a result, the Government has taken a hands-off approach to clean up of abandoned mines developed for the nuclear weapons program from the late-1940s to the early-1970s. Efforts by the USEPA to use the Superfund law to force financially viable companies to reclaim mines developed in the 1970s and abandoned in the 1980s has been slowed by the current Administration's refusal to ask Congress to appropriate adequate clean-up funds.

In the one area of uranium development that the Government does have authority — regulation of conventional uranium milling and *in situ* leach (ISL) recovery — the NRC has allowed companies to continue to use groundwater restoration methods that have failed to clean up groundwater contaminated by mill tailings seepage for more than 30 years. Furthermore, NRC's recently released draft Generic Environmental Impact Statement (GEIS) on uranium ISL mining is widely viewed in our communities as a way for the agency to curtail public involvement in site-specific ISL licensing decisions. Indeed, the GEIS's analysis of "environmental justice" impacts of ISL recovery — a superficial recitation of demographic statistics and income levels for the local population — reflects the agency's lack of commitment to one of the most important EJ principles, the notion of early and frequent participation of *affected communities of color* in government decision making.

The lack of an appropriate and thorough response by the Federal Government and the uranium industry to the Uranium Legacy has left our communities devastated economically and culturally. Because so little had been done since uranium was last mined in the early-1980s, our communities decided to address the Legacy head-on. We advocated for the identification and assessment of abandoned uranium mines and compensation for uranium workers and community members alike. In some communities, we raised money and developed collaborations with nongovernmental, academic and government agencies to conduct radiological and heavy metal assessments in residential areas near abandoned mines. One of those assessments spurred USEPA's recent emergency soil removal around Navajo homes near Churchrock, N.M. While progress toward cleanup has begun as a result of these efforts, to this day, many of our homes are located near unreclaimed mines, posing a continued threat to our health.

To bring grassroots power to policy, we have participated in a variety of actions that brought attention to our issues. Community members affected by mine wastes testified before the House Oversight and Government Reform Committee in October 2007 and at the Udall Roundtable in Washington, D.C., in November 2007. They conducted tours of uranium sites for New Mexico elected officials and testified before several standing committees of the New Mexico Legislature over the past two years.

Despite these collective efforts, we still need your help. With the rise in price of uranium our groups have found it necessary to organize to protect our communities from new mining, and NEJAC can give us a national voice in that work. We have enunciated a vision predicated on the idea that clear and profitable alternatives already exist in the form of the sun and wind, particularly here in New Mexico. The stress on resources of Planet Earth today demands that we must become sustainable now and invest in practices that will not continue to endanger our environment, health and, ultimately, our survival. NEJAC can help us and many other communities promote this shared vision.

You would receive a warm welcome in New Mexico. We are one of only a few states whose Governor issued an Executive Order on Environmental Justice in 2005. The New Mexico Environment Department has shown enough of a commitment to the principles of environmental justice to be tapped by NEJAC to receive an award at your October meeting. And despite the threats of new mining in Navajo communities, the Navajo Nation's enactment in 2005 of a tribal law prohibiting uranium mining and processing, by any method, anywhere in "Navajo Indian Country," still stands as the highest action a sovereign government can take to protect its resources and its people. Similarly, the Pueblo of Laguna in March placed a moratorium "on any further uranium drilling or other exploratory or mining activity on Pueblo lands from this day forward."

In closing, we thank you in advance for considering our request. MASE is committed to helping coordinate key contacts in our state and to facilitating a successful gathering.

Sincerely,

FOR THE MULTICULTURAL ALLIANCE FOR A SAFE ENVIRONMENT

Candace Head-Dylla
Bluewater Valley Downstream Alliance
Milan, N.M.

Mitchell W. Capitan
Eastern Navajo Diné Against Uranium Mining
Crownpoint, N.M.

Linda Evers and Liz Lucero
Post-71 Uranium Workers Committee
Grants, N.M.

Hazel James
Dineh Bidziil Coalition
The Navajo Nation

Carletta Garcia
Laguna Acoma Coalition for a Safe Environment, Paguate, N.M.

cc: Richard Moore, chair, NEJAC
cc: Rep. Henry Waxman
cc: Rep. Tom Udall
cc: Pres. Joe Shirley, Jr., Navajo Nation
cc: Gov. John Antonio, Laguna Pueblo
cc: Ron Curry, NMED Secretary

Attachment D: Potential Applicable or Relevant and Appropriate Requirements

FEDERAL STATUTES AND REGULATIONS

Resource Conservation and Recovery Act (RCRA) of 1976, as amended –
Surface Mining Control and Reclamation Act of 1977 (SMCRA), as amended --
Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), as amended –
The Native American Graves Protection And Repatriation Act
National Historic Preservation Act
Archeological Resources Protection Act of 1979
American Indian Religious Freedom Act
Endangered Species Act (ESA)
Atomic Energy Act of 1954, as amended
Clean Air Act
Clean Water Act
Safe Drinking Water Act
National Environmental Policy Act
Comprehensive Environmental Response, Compensation, and Liability Act
Oil Pollution Act
Water Resource Development Act
10 CFR Part 40, Appendix A, Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content
40 CFR Part 192, Health and Environmental Protection Standards for Uranium and Thorium Mill Tailing

STATE STATUTES, REGULATIONS, AND GUIDANCE

New Mexico Statutes 1978 Hazardous Waste Act, Chapter 74, Environmental Improvement, Articles 1, 2, 3, 4, 6, & 9.
New Mexico Statutes 1978, New Mexico Surface Mining Act Sections 69-25A-1 et. seq.
New Mexico Statutes 1978, New Mexico Mining Act Section 69-36-1 et. seq.
New Mexico Statutes 1978, Mine abandonment; fencing; warning notices Section 69-12-4
New Mexico Statutes 1978, Mine abandonment; precautions, 69-27-3
NMAC 20.1.4: Environmental Permit Procedures
NMAC 20.1.2: Water Quality, Ground and Surface Water Protection
NMAC 20.1.3: Voluntary Remediation
NMAC 19.7.2 New Mexico Mine Safeguarding
NMAC 19.8: Coal Mining
NMAC 19.10: Non-Coal Mining
Mine Closeout Plan Guidelines (New Mexico Mining and Minerals Division Website)