GJO-2001-186-TAR
MAC–GWSHP 7.1

Public Involvement Plan for the Environmental Assessment of Ground Water Compliance at the Shiprock, New Mexico, Uranium Mill Tailings Remedial Action (UMTRA) Project Site

February 2001

Prepared by
U.S. Department of Energy
Grand Junction Office
Grand Junction, Colorado

Work performed under DOE Contract No. DE–AC13–96GJ8733

Contents

Figures

Tables

Public Involvement Plan for the Environmental Assessment of Ground Water Compliance at the Shiprock, New Mexico, Uranium Mill Tailings Site

This Public Involvement Plan is tiered to the Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project Public Participation Plan dated Fiscal Year 2000. This public involvement plan is specific to the Shiprock, New Mexico, site and describes the activities that will meet the public participation requirements of the National Environmental Policy Act (NEPA) of 1969 and the Uranium Mill Tailings Radiation Control Act of 1978, as amended.

The objectives of this plan are to promote stakeholder awareness, understanding, and participation in the project decision-making processes; to maintain an active public affairs program that accurately identifies public and media concerns and provides timely information; and to establish stakeholder involvement and information to promote communication between the U.S. Department of Energy Grand Junction Office (DOE-GJO) and affected stakeholders to accomplish the project mission successfully.

Regulatory History

In 1978, public concern about potential human health and environmental effects of uranium mill tailings led Congress to pass the Uranium Mill Tailings Radiation Control Act (42 U.S.C. 7901 *et seq*.). In the Uranium Mill Tailings Radiation Control Act, Congress acknowledged the potentially harmful health effects associated with uranium mill tailings and designated 24 inactive uranium-ore processing sites for cleanup (Figure 1). These sites are located in 10 states; 23 of the sites are in states west of the Mississippi River. Of those, five sites are on Native American lands.

In 1983, the U.S. Environmental Protection Agency (EPA) developed standards to protect the public and the environment from potential radiological and nonradiological hazards at abandoned processing sites. These standards included exposure limits for surface contamination and proposed compliance options for ground water contamination. The ground water standards were made final in 1995. DOE is responsible for bringing surface and ground water contaminant levels at the 24 sites into compliance with EPA standards. DOE is accomplishing this through the UMTRA Surface Project and the UMTRA Ground Water Project.

Under the UMTRA Surface Project, DOE has been cleaning up surface contamination since 1983 and completed the final site in 1998. The second phase of the UMTRA Project is to achieve ground water compliance at the 24 millsites. The UMTRA Ground Water Project addresses the cleanup of residual ground water contamination, if any, from the millsites. Once cleanup has been completed, these sites will become part of the Long-Term Surveillance and Maintenance (LTSM) Program, which provides for surveillance, ground water monitoring, and maintenance of sites cleaned up under the UMTRA Project. Project management for the UMTRA Ground Water Project was transferred to DOE-GJO in 1996.

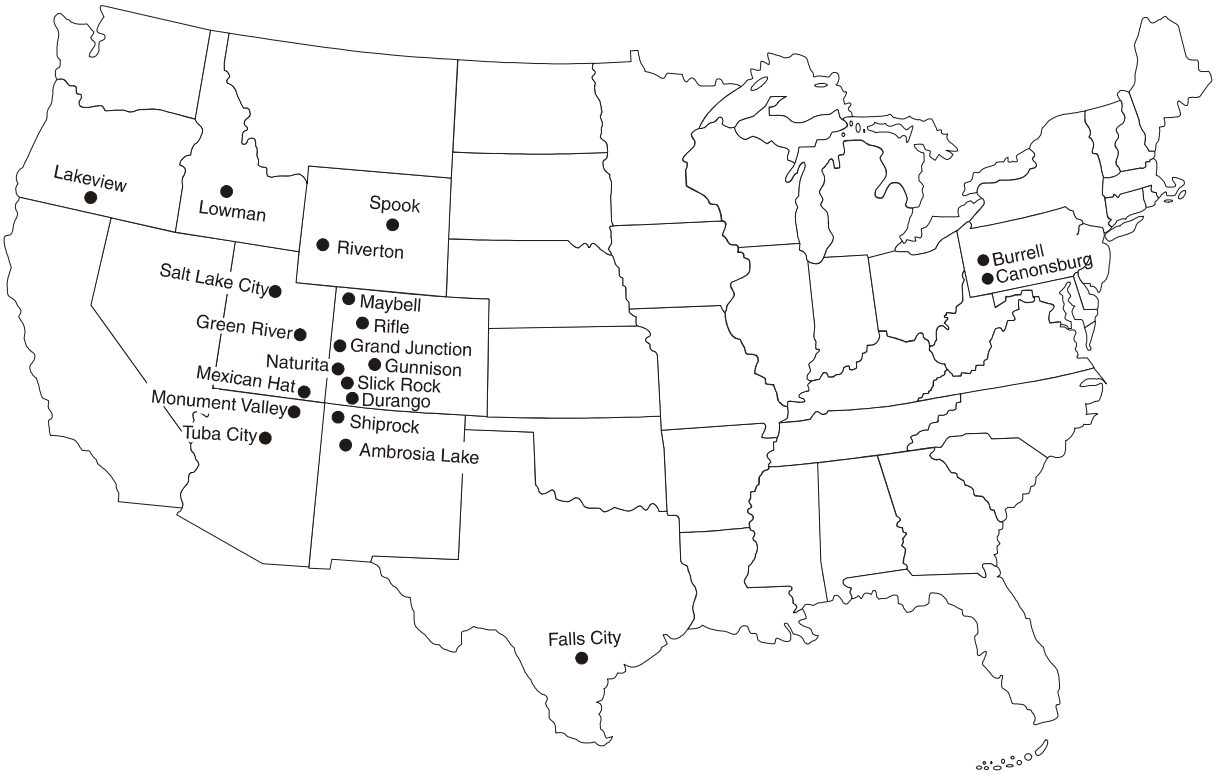

Figure 1. Locations of the Former Uranium-Ore Processing Sites

In 1992, DOE began preparation of a Programmatic Environmental Impact Statement (PEIS) for the UMTRA Ground Water Project. The PEIS presents an analysis of the potential effects of four alternatives for implementing the entire UMTRA Ground Water Project: the proposed action, no action, active remediation to background levels, and passive remediation. Nineteen public meetings were conducted as part of the input for preparing the PEIS, between November 1992 and April 1993. Nine public hearings and a 120-day public comment period followed the issuance of the draft PEIS in April 1995. The final report was distributed to the public in December 1996.

The Record of Decision issued in April 1997 identified the preferred alternative that is the programmatic foundation for conducting the UMTRA Ground Water Project at all sites. Under the proposed-action alternative, three ground water compliance strategies are presented to meet the EPA standards and may be selected for a given site: no remediation, passive remediation with natural flushing and monitoring, and active remediation. DOE may select one strategy or a combination of strategies to meet the EPA standards at a site.

Roles and Responsibilities

The DOE UMTRA Ground Water Project Manager, the DOE Public Affairs Specialist, and the NEPA document manager are responsible for identifying the need for, and proposing the scope and content of public information materials and activities that meet the public participation requirements of NEPA. These individuals are also responsible for developing plans to establish

and maintain communication, identify and resolve issues of concern to stakeholders, and evaluate the success of the communication programs.

The DOE-GJO Public Affairs Office has day-to-day management responsibility for public affairs activities for the UMTRA Ground Water Project. DOE-GJO personnel are the principal spokespersons for the UMTRA Ground Water Project in public meetings and interviews with the media.

Site Background

The Shiprock UMTRA Project site is on Navajo Nation land in San Juan County in the northwest corner of New Mexico **(Figure** 2). The UMTRA Project site is accessible by Uranium Boulevard, which extends from U.S. Highway 666 eastward about 0.5 mi to the Navajo Engineering and Construction Authority (NECA) facility.

The Shiprock uranium-vanadium mill, known as the Navajo Mill, was operated by Kerr-McGee from November 1954 to March 1963 when it was sold to the Vanadium Corporation of America (VCA). VCA operated the mill until August 1967 when the company merged with Foote Mineral Company, which continued operation until milling ended in August 1968. Before and during the milling operations, the site was leased from the Navajo Nation. In 1973, the lease expired and the site ownership reverted back to the Navajo Nation.

During its life, the mill processed about 1.5 million tons of ore. Uranium recovery averaged about 94 percent and vanadium recovery was only about 58 percent, resulting in production of about 7.9 million pounds of uranium and 35.4 million pounds of vanadium. Some of the mill buildings and most of the equipment were dismantled and placed in the west tailings pile from the time that milling ended in 1968 to the expiration of the Foote Mineral Company lease in 1973.

In 1973 when the millsite and tailings property reverted to control of the Navajo Nation, the Navajo Engineering and Construction Authority obtained a lease for the site, occupied the former plant office and shop buildings, and began operating a training school on the site to train Navajo students to operate earth moving equipment. Soon after acquiring the site in 1973, the Navajo Tribal Chairman asked officials from EPA and other federal agencies for assistance in stabilizing the tailings piles. In response, EPA conducted radiation surveys around the site in April 1974 to determine the extent of windblown and water-transported tailings. Following this evaluation, EPA recommended decontaminating the site and stabilizing the tailings, and EPA and the Atomic Energy Commission (predecessor to the Department of Energy) prepared a work plan to accomplish these objectives. The decontamination work began in January 1975 and was conducted primarily by NECA trainees under EPA guidance. These activities continued with the trainees until mid-1978, and with other NECA personnel until 1980.

Final surface remediation under the auspices of the UMTRA Program occurred during late 1985 and 1986. It consisted of consolidating the two tailings piles (stabilization in place) into one disposal cell that covers approximately 76 acres. An excellent photographic record of remediation activities and disposal cell construction during the 1985**?**1987 period are archived at

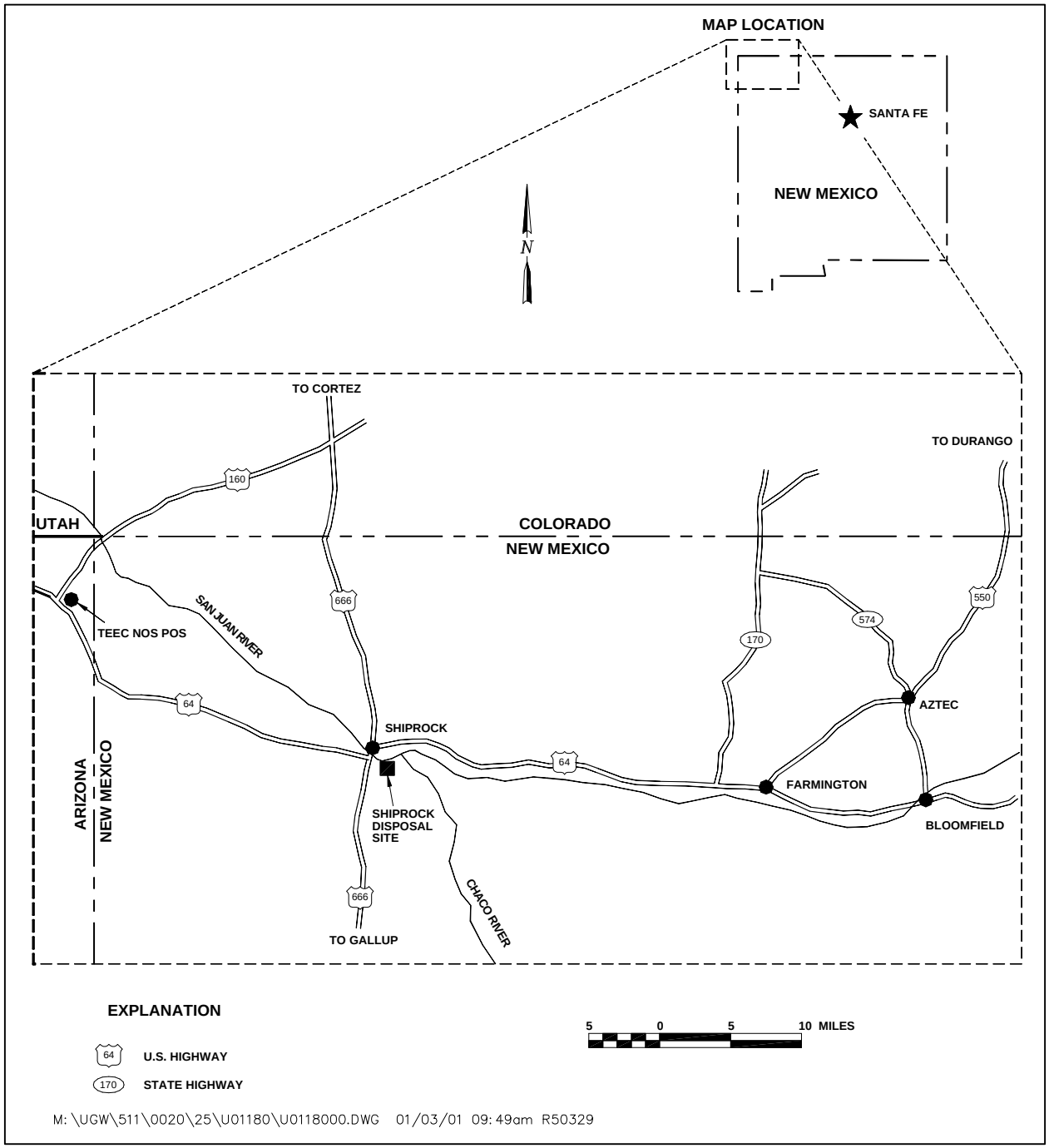

Figure 2. Location of the Shiprock UMTRA Site

the DOE Grand Junction Office; additional information on construction activities is in the Remedial Action Completion Report for the Shiprock Site issued by MK Ferguson in 1987.

In 1994 a long-term surveillance plan was prepared for the Shiprock disposal site. Following approval of this plan, NRC issued a license in September 1996 to the DOE–GJO for the long-

term care of the site. Activities include annual inspections of the site to evaluate the condition of surface features and site maintenance as necessary.

Ground water affected by the uranium-ore processing at the site contains constituents in concentrations exceeding ground water protection standards established by the U.S. Environmental Protection Agency (EPA) in Title 40, Part 192 of the *Code of Federal Regulations* (40 CFR 192). Affected ground water is in a floodplain alluvial aquifer just south of the San Juan River and in an adjacent terrace to the south where ground water is in terrace alluvium and weathered bedrock.

Assessment of Risk to Human Health and the Environment

In 1994, DOE prepared a baseline risk assessment (BLRA) and supplement that identified potential public health and environmental risks at the site. As part of the UMTRA Ground Water Project, additional characterization conducted through 1998 and early 2000 by the DOE-GJO were presented in the 1999 Site Observational Work Plan (SOWP), Revision 1 and SOWP, Rev. 2, in 2000. These studies revealed that contamination from former milling operations was more extensive than previously known. Contamination affected the floodplain aquifer and the terrace ground water system immediately adjacent to the disposal cell, and extended about 1 mile northwest into an irrigated area and about 0.6 mile southeast to Many Devils Wash.

The site is geographically and hydrologically divided into the floodplain and terrace regions. The floodplain is in hydrologic contact with the San Juan River and receives inflow from the terrace system; therefore, any remediation must accommodate these connections. The terrace is divided into Terrace East and Terrace West, reflecting different degrees of contamination and sources of ground water. (Figure 3)

In floodplain ground water, nitrate, uranium, sulfate, selenium, and manganese could potentially cause harm to humans if the ground water were used as their only source of drinking water for a long period of time. The ecological risk evaluation concluded that in addition to these contaminants, ammonium and strontium concentrations in floodplain surface water and sediment are elevated and may pose risks to aquatic receptors. Concentrations of contaminants are generally highest near the escarpment base just north of the disposal cell, and the plume of contamination continues northward in an arc toward the San Juan River. Concentrations are lowest in the northwest and southeast areas of the floodplain. In the northwest, surface water from Bob Lee Wash, containing relatively clean ground water from flowing artesian well 648, naturally flushes the ground water in the floodplain aquifer. In the southeast, clean water from the San Juan River recharges the aquifer.

In the terrace ground water system, contaminants that pose potential risks to humans and the environment are nitrate, sulfate, uranium, selenium, ammonium, manganese, and strontium. Highest concentrations of these contaminants are generally in ground water samples obtained from the former millsite, Bob Lee and Many Devils Washes, and from around the disposal cell. Irrigated areas to the northwest have much lower concentrations because less contamination from milling operations has migrated there and because of the natural flushing effects of irrigation. As in the floodplain, the ecological risk evaluation concluded that the same list of constituents in

surface water in Bob Lee and Many Devils Washes and in the distributary channel may pose potential risks to aquatic receptors.

Proposed Compliance Strategy

DOE's goal at the Shiprock site is to implement a ground water remediation strategy that complies with EPA ground water standards and protects human health and the environment. The requirements for ground water compliance at UMTRA Project sites, including the Shiprock site, are in the Uranium Mill Tailings Radiation Control Act (42 *United States Code* ?7901 *et seq*.). The compliance selection framework was developed in the *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project*. Three compliance strategies are proposed for the Shiprock site? one each for the floodplain, Terrace East, and Terrace West.

The proposed strategy for the floodplain surficial aquifer is active remediation in combination with natural flushing. Ground water will be pumped for up to 14 years from extraction wells located in the most contaminated area of the floodplain and piped to a lined pond on the terrace south of the disposal cell, where it will be evaporated by jet spray. The remainder of the contaminant plume in the floodplain will undergo natural flushing. Numerical modeling of ground water flow and transport indicates that the contaminants will diminish to acceptable levels within 100 years if no continued source of contamination exists. DOE will monitor and sample the floodplain and terrace systems for 5 years after remedial action begins to evaluate drainage of residual moisture from the disposal cell. At the end of this period, DOE will report findings and consult with stakeholders and determine future actions, if any, for the site. During this period, institutional controls and interim actions will protect humans and the environment from potential risks posed by the contaminants.

The proposed strategy for Terrace East, the area around the disposal cell, including Bob Lee Wash and Many Devils Wash and west approximately to U.S. Highway 666, is active remediation. The lack of ground water in terrace alluvium upgradient of the former millsite, tailings piles, and raffinate ponds indicates that this area was dry prior to milling operations. Process solutions used in milling migrated vertically downward and saturated the base of the alluvium and the underlying weathered Mancos Shale, creating an artificial ground water regime with high concentrations of contaminants. Active remedial action is proposed for this region and consists of pumping the most contaminated ground water from an extraction well system and two french drains, piping it to a lined pond south of the disposal cell, and treating it by spray evaporation. This treatment will continue until the terrace ground water system is hydrologically disconnected from the washes and seeps along the escarpment causing the seeps along the escarpment and in the washes to dry up. This strategy will succeed only if no continued source of recharge is present. Therefore, DOE will monitor and sample for 5 years after the start of remedial action to evaluate the nature of any drainage of residual moisture from the disposal cell. At the end of this period, DOE will report findings, consult with stakeholders, and reevaluate the implemented compliance action. During the period of remediation, interim actions in Bob Lee Wash, Many Devils Wash, and seeps 425 and 426 will protect humans and the environment from surface occurrences of contaminated ground water.

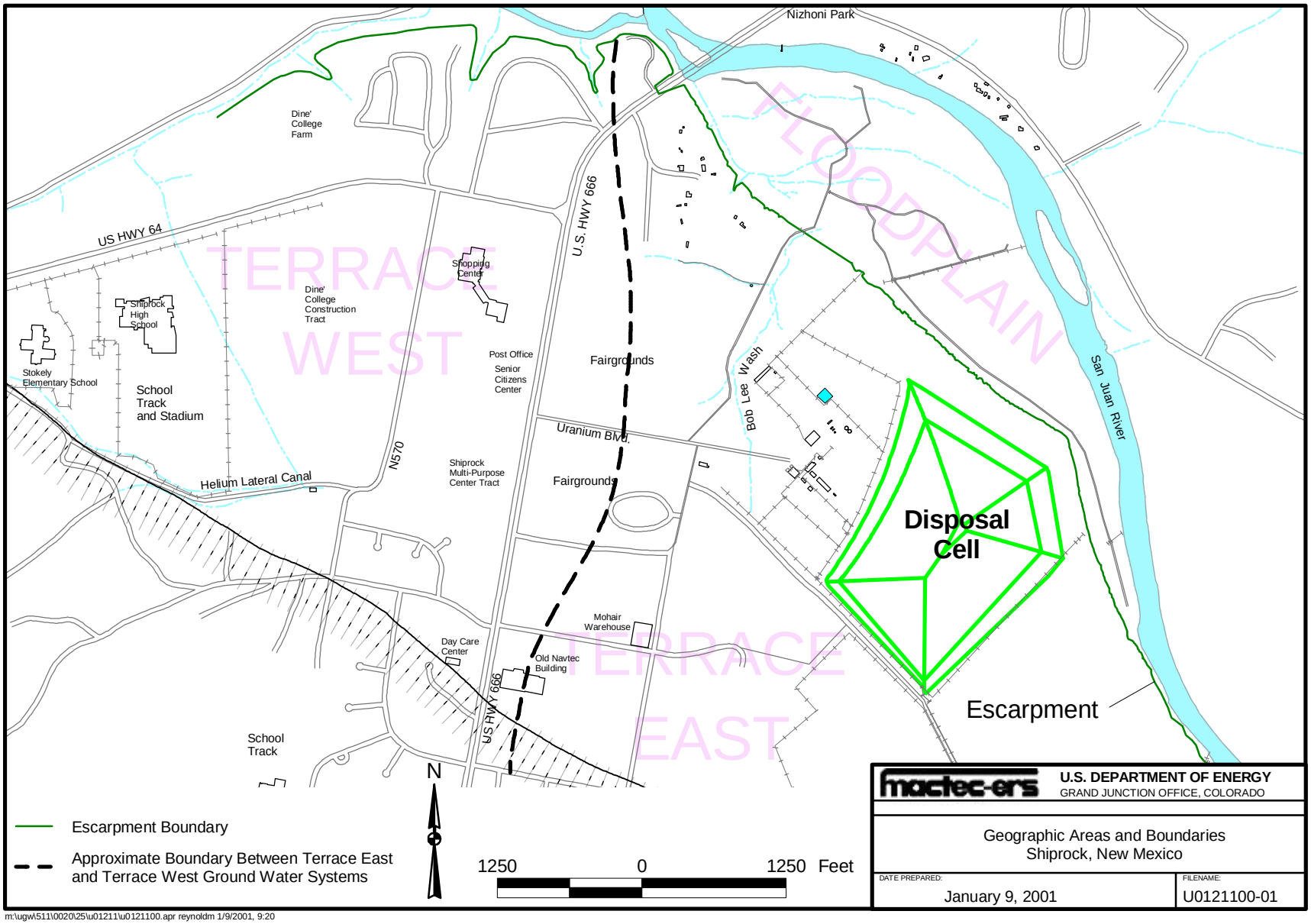

Figure 3. Geographical and Hydrological Illustration of Shiprock UMTRA Site

The proposed strategy for Terrace West, the area generally west of U.S. Highway 666, is no remediation and application of supplemental standards based on the criterion of limited use ground water. This area is underlain by Mancos Shale, and although milling activities may have contributed contamination, most of the contaminant mass is due to leaching of the Mancos Shale by irrigation water, and concentrations will remain elevated as long as irrigation continues. Therefore, the ground water system contains widespread ambient contamination—from uranium, selenium, and sulfate—not due to milling activities and that cannot be cleaned up using methods reasonably employed in public water systems. The presence of nitrate in this region may be due to milling activities or may have other anthropogenic sources. Pumping water from Terrace East will further isolate this region from the millsite, but continued irrigation will release additional naturally occurring uranium, selenium, and sulfate from the Mancos Shale. DOE will continue to monitor and sample ground water for contaminants in this area for at least the next 5 years to ensure that it is not being adversely affected by former millsite-related activities.

Complete pathways for exposure to contaminated ground water existed in the upper part of Bob Lee Wash, the lower part of Many Devils Wash, and at escarpment seeps 425 and 426. Interim actions designed to protect humans and the environment from contaminated ground water that surfaces at several locations were completed in 2000. A first phase was construction of fences around Bob Lee Wash, Many Devils Wash, and seeps 425 and 426. Signs indicating that water should not be used for drinking were placed on all fencing. A second phase was placement of riprap in the bottoms of Bob Lee Wash and Many Devils Wash where pooling was known to occur. An initial layer of cobbles was overlain with geotextile netting, which was overlain by a second layer of larger cobbles. This will effectively limit access to any surfacing ground water by animals and humans. The last interim action was surface netting along seeps 425 and 426 in the floodplain to limit access to the water, especially by birds.

In conclusion, the Shiprock site exhibits three distinct regions where ground water is contaminated due to uranium milling activities. They are the floodplain, Terrace East, and Terrace West regions based on physiography, source of recharge, proximity to the former millsite, and levels of contamination. DOE proposes three compliance strategies: 1) floodplain? active remediation and natural flushing, 2) Terrace East? active remediation to prevent contaminated ground water from surfacing in washes and seeps, and 3) Terrace West? no action based on supplemental standards due to widespread ambient contamination. Interim actions? fencing, riprapping, and netting? were implemented in Many Devils Wash, Bob Lee Wash, and at two seeps along the escarpment to protect humans and animals from contacting contaminated ground water surfacing in these locations.

Public Involvement

DOE is working with the Army Corps of Engineers to determine the need for 404 permitting at the Shiprock site. DOE has established routine communications with the U.S. Fish and Wildlife Service (USFWS), Albuquerque Office, pertaining to the Endangered Species Act and other sensitive species requirements. The USFWS is also an integral team member in the determination of potential ecological risks and has provided guidance to DOE.

Tribal regulations must also be complied with when federal authority has been delegated to the Navajo Nation, or where the Navajo Nation has exercised sovereignty. In cases where the Navajo Nation does not have authority for implementation of a regulatory program (e.g., underground injection permitting), EPA Region 9 has maintained jurisdiction. DOE and its contractors work closely with the Navajo UMTRA compliance specialist on a broad scope of regulatory issues on a regular basis.

DOE has also established routine communication with the Navajo Nation Environmental Protection Agency (NNEPA), Navajo Water Code Administration (NWCA), Navajo Fish and Wildlife Department (NFWD), Navajo Department of Emergency Management (NDEM), Navajo Cultural Resources Program, and district and chapter grazing boards.

The Shiprock Chapter grazing representative and the grazing district have been consulted on a regular basis to determine the need for grazing agreements and restrictions.

On March 1, 2000, DOE and contractor representatives held a public meeting at the Shiprock Chapter House to discuss the proposed compliance strategy for the ground water cleanup.

DOE-GJO has also established a relationship with the Diné College in Shiprock. Numerous historical documents and references have been sent to them for use in the Uranium Education Center.

A meeting with the Navajo Business Development Bureau is scheduled for the second week in February 2001. This meeting will provide information on the procurement process for government contracts.

DOE will be meeting with the Shiprock Planning Department to discuss any concerns they may have over the proposed actions at the Shiprock UMTRA site.

Table 1 provides a chronological listing of activities that will take place to support the completion of the Environmental Assessment.

Table 1. Public Participation Activities Involved in the Environmental Assessment Process

Activity	Timing
Review of final draft by DOE Management Review Team	Completed by March 9, 2001
Notify availability of EA via • News release	March 16, 2001
Transmit draft final EA to interested stakeholders, other agencies, public (upon request)	March 16 – April 20, 2001
Place copies of EA in public locations: • Mesa County Library • DOE-GJO Reading Room • Diné College and Navajo EPA, Chapter House • Other	March 16, 2001
Hold public meetings (as needed)	March 16 – April 20, 2001

Receive comments from stakeholders	April 20, 2001
Address comments	April 20 – May 11, 2001
Send news release of Finding of No Significant Impact (FONSI)	June 29, 2001
Issue final EA and FONSI to the public, stakeholders, and agencies	June 29, 2001
Place copies of EA and FONSI in public locations: • Mesa County Library • DOE-GJO Reading Room • Diné College and Navajo EPA, Chapter House • Other	June 29 – July 6, 2001

Information Contacts

Requests for information should be directed to the DOE UMTRA Ground Water Project manager listed below. A toll-free hotline (1–800–399–5618) has been established to provide information and to take public comments. In addition, the DOE-GJO Home Page has information relevant to the UMTRA Ground Water Project. The home page address is **http://www.doegjpo.com**.

U. S. Department of Energy contacts:

Donald Metzler
UMTRA Ground Water Project Manager
and NEPA Document Manager
U.S. Department of Energy
Grand Junction Office
2597 B ¾ Road
Grand Junction, CO 81503
(970) 248-7612
1–800–399–5618

Audrey Berry
Public Affairs Specialist
U.S. Department of Energy
Grand Junction Office
2597 B ¾ Road
Grand Junction, CO 81503
(970) 248–7727
1-800-399-5618

Glossary

Alluvial aquifer: The uppermost aquifer beneath the Shiprock site; the alluvial aquifer is composed of unconsolidated sediments (silt, sand, gravel, cobbles) deposited by stream flow.

Ambient contamination: Naturally occurring constituents in ground water (i.e., constituents that are not due to ore-processing) that are present in concentrations sufficiently high to render the water undesirable or unfit for domestic use.

Aquifer: A body of rock or sediment that is saturated and sufficiently permeable to conduct ground water in economically significant quantities to wells and springs.

Background: The quality of ground water in nearby portions of the aquifer that was not affected by uranium-ore processing.

Baseline risk assessment: A baseline risk assessment describes the source of contamination, how the contamination reaches people and the environment, the amount of contamination to which people or the ecological environment may be exposed, and the health or ecological effects that could result from exposure.

Compliance strategy: The method used to meet Environmental Protection Agency ground water standards at an UMTRA Project site.

Contaminant: An undesirable substance from uranium-ore processing activities that may affect human health and the environment.

Downgradient: Ground water located in the same direction as ground water flow from a specified location; similar to downstream for surface water.

Environmental assessment: A document that evaluates the potential for significant impacts to the environment from an action.

Environmental impact statement: A document that describes and evaluates the potentially significant impacts on the environment from several alternative actions, including no action.

Escarpment: A long, more or less continuous cliff or relatively steep slope facing in one general direction, breaking the continuity of the land by separating two level or gently sloping surfaces, and produced by erosion.

Ground water plume: A defined area of ground water contamination. In this document, the term “ground water plume” means the contaminated ground water beneath a millsite and surrounding area that DOE determines to contain soluble radioactive or nonradioactive hazardous constituents that are present as a result of the uranium milling process.

Ground water remediation: Treatment of ground water to decrease the amount and mobility of contaminants.

Hydrologic: Pertaining to the origin, distribution, and chemistry of all waters of the earth.

Inflow: Ground water and rainfall flowing into the streams of a drainage basin; also, the amount of water that has flowed in.

Institutional controls: Controls that limit the use of land and thereby minimize human exposure to contaminated ground water. Examples include restrictive easements on private land and purchase of land to control use.

Maximum concentration limits: EPA's maximum concentration of certain constituents for ground water protection. Constituents with maximum concentration limits that may be present in contaminated ground water at UMTRA Project sites include arsenic, barium, cadmium, chromium, lead, mercury, molybdenum, nitrate, radium, selenium, silver, and uranium.

Natural flushing: Allowing natural ground water movement and geochemical process to decrease contaminant concentrations.

Physiography: The description of landforms, i.e., escarpment, terrace, floodplain.

Recharge: The processes involved in the addition of water to the saturated zone, naturally by precipitation or runoff, or artificially by spreading or injection; also, the amount of water added.

Riprap: A layer of large, specially selected and graded, resistant rocks placed on a surface to prevent erosion.

Seep: A small area where water moves slowly to the land surface; flows are too small to be considered as a spring.

Site observational work plan: A document that presents a summary of site hydrogeologic data and presents a site conceptual model. It presents an analysis of site environmental and health risk, data gaps in the conceptual model, and identifies appropriate site-specific ground water compliance strategies.

Supplemental standards: Regulatory standards that are protective of human health and the environment that may be applied when the quantity of certain constituents exceeds the standards.

Tiering: "Tiering" refers to the coverage of general matters in broader environmental impact statements (such as national program or policy statements); subsequent narrower statements or environmental analyses (such as regional or ultimately site-specific statements) are "tiered" to the broader, general statements and incorporate them by reference. The narrower statements concentrate solely on the issues specific to the site.

Uranium mill tailings: The sandy material remaining after the ore has been crushed, ground, and leached with acids and solvents to extract the uranium and, often associated, vanadium.

Vicinity properties: Properties outside a processing site boundary that have been contaminated by residual radioactive materials. These materials could have been dispersed by wind or water erosion, or removed by people.

Wash: A normally dry bed of an intermittent stream, often situated at the bottom of a canyon.