State of Utah

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF RADIATION CONTROL

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
William J. Sinclair
Director

168 North 1950 West
P.O. Box 144850
Salt Lake City, Utah 84114-4850
(801) 536-4250 Office
(801) 533-4097 Fax
(801) 536-4414 T.D.D.

SEP 22 1994

September 21, 1994

Dennis W. Hedberg
Permit Supervisor
Mineral Reclamation Program
Division of Oil, Gas & Mining
3 Triad Center, Suite 350
Salt lake City, Utah 84180-1203

Dear Mr. Hedberg:

We received the enclosed information from the U.S. Department of Energy (DOE). Since the Division of Radiation Control has assisted your staff regarding uranium mine reclamation in the past, we thought you would be interested in the DOE mine closure program.

Sincerely,

Dane L. Finerfrock, Section Manager
Division of Radiation Control

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Department of Energy
Grand Junction Projects Office
Post Office Box 2567
Grand Junction, Colorado 81502-2567

SEP 22 1994

SEP 12 1994

Mr. Bill Sinclair, Director
Division of Radiation Control
Utah Department of Environmental Quality
168 North, 1950 West
P.O. Box 144850
Salt Lake City, UT 84114-4850

SUBJECT: Abandoned Uranium Mine-Site Reclamation Process

Dear Mr. Sinclair:

On August 22, 1994, the U.S. Department of Energy (DOE) Grand Junction Projects Office initiated reclamation efforts on the abandoned uranium mine sites located on four DOE lease tracts (C-SR-14A, C-SR-16, and C-SR-16A located in the Slick Rock, Colorado area, and C-CM-24 located near Uravan, Colorado). These reclamation activities should continue through the first three weeks of September 1994. The enclosed report provides an overview of the DOE uranium leasing program and the process by which the abandoned mine sites will be reclaimed. Please review this report based on your agency's efforts to deal with the same or similar issues. Additionally, the DOE would like to extend an invitation to you or any of your agency personnel to visit these reclamation sites to view first-hand DOE's ongoing reclamation efforts.

The DOE looks forward to your participation in the review of these activities. Upon your review of the enclosed report, please provide any comments to me at the above address. If you have any questions concerning the report, or if you would like to make an on-site visit, please contact me as soon as possible at (303) 248-6014 so that arrangements can be made.

Sincerely,

R Eldon Bray

R. Eldon Bray
Project Manager

Enclosure

cc w/enclosure:
E. Cotter, RUST Geotech

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DOE Uranium Lease Management Program
Abandoned Uranium Mine Reclamation

Historical Overview

The U.S. Department of Energy (DOE) Grand Junction Projects Office (GJPO) currently administers 43 uranium lease tracts located in southwestern Colorado (38), southeastern Utah (4), and northern New Mexico (1) containing approximately 25,000 acres of land. These lands were withdrawn from the public domain from 1948—1954 by the Atomic Energy Commission (AEC), predecessor agency to the DOE, in order to develop a source of domestic uranium ores for defense purposes.

Subsequent to the withdrawal, these lands were included in the Uranium Leasing Program that lasted until 1962. This initial leasing program resulted in the production of approximately 1 million tons of ore that yielded approximately 7 million pounds of uranium and $5 million in royalties to the Government. As this program ended, most, if not all, of the mines were closed, but little else was done to reclaim the environmental disturbances resulting from the previous mining activities.

The present leasing program (currently known as the DOE Uranium Lease Management Program) began in 1974 when the withdrawn lands were again offered to the public for the exploration, development, and mining of uranium and vanadium ores. A provision was added to the 1974 leases (Article XII, paragraph j) that allowed the leaseholders to negotiate in good faith with the AEC/DOE to "correct undesirable conditions existing on the leased premises as a result of previous mining activities" for an appropriate consideration. During the twenty years that followed, many such conditions were corrected by the respective leaseholders in lieu of royalty payments owed to the Government. However, some undesirable conditions of varying degrees still remain on twelve lease tracts, and DOE is continuing its efforts to correct them.

Reclamation Process

First, it must be acknowledged that no regulations exist for the radiological cleanup of abandoned uranium mines. Secondly, many such mines exist on lands controlled by DOE, the U.S. Department of Interior—Bureau of Land Management (BLM), and the U.S. Department of Agriculture—Forest Service (USFS). Finally, the U.S. Environmental Protection Agency is in the process of proposing regulations that may address the presence of naturally occurring radioactive materials (NORM).

The DOE has developed a process for the reclamation of abandoned uranium mines under its administrative jurisdiction that allows for a practicable approach to the presence and cleanup of NORM. DOE's primary concerns in the reclamation of an abandoned uranium mine are four fold:

(1) Eliminate all physical safety hazards that have resulted from previous mining activities including the mine openings/portals.

(2) Recontour the areas of disturbances to blend in with the natural topography, while allowing as much vegetation regrowth to survive as possible.

(3) Redirect all storm water away from the immediate areas where mine openings have been closed to eliminate the possibility of water flow and erosion into the mine workings.

(4) Decrease the potential for exposure to radiological materials as practicable.

Permanent Closure of Mine Openings/Portals

All mine openings/portals (shafts, adits, inclines, and vent holes) will be permanently closed by methods approved by the BLM. These methods include the use of man-made bulkheads and backfilling with rock (waste dump) materials remaining at the site. Selective placement within the mine opening/portals of material according to size is used to enhance slope stability and preclude future sloughing of the materials after the reclamation is complete. All depressions surrounding or immediately adjacent to existing mine openings/portals will be backfilled and slightly mounded to preclude future subsidence.

Recontouring Areas of Disturbance

After the mine openings/portals have been successfully and permanently closed, all areas of disturbance will be recontoured to blend in with the natural topography as practicable. This includes:

(1) Reducing the slopes of the remaining waste dump materials to less than a 3-to-1 ratio while providing a basin effect on the top of the waste dump material to collect and contain all storm waters that contact the site.

(2) Eliminating the potential for these materials to enter natural drainages.

(3) Recontouring the immediate areas to provide an undulating surface that closely represents the natural surrounding topography.

Any area of disturbance that has successfully reclaimed itself during the past several decade will not be redisturbed; as much existing vegetation regrowth will be left as practicable during the reclamation efforts. Any topsoil that was previously stockpiled or is immediately available for use will be spread across the disturbed areas to promote revegetation. If topsoil has not been previously stockpiled or if it is not immediately available within the disturbed area, it will not be mined at another location and hauled in--a second area of disturbance will not be created. The disturbed areas will then be reseeded with a mixture of native grasses and shrubs developed for the specific climatic conditions and approved by the BLM. Silt fences or other similar devices will be installed in/across all drainages located immediately below the mine sites as a means of controlling the transport of sediments from the site by storm water.

Redirection of Storm Water

As previously mentioned, several efforts will be undertaken to control the effects that storm waters have on the abandoned mine site. First, all mine entrance locations will be backfilled sufficiently to provide positive drainage away from the entrance area. Secondly, the waste dump materials will be recontoured in such a manner that a basin is created on top of the dump material to collect and contain all storm waters that come in contact with it. Additionally, the basin will be constructed in such a way that mini-basins are created within the major basin feature to promote individual collection points that will hopefully enhance the revegetation efforts. The storm waters will then be allowed to evaporate and/or percolate from the basin. Next, all major drainage features leading onto the mine site will be diverted around the mine site and/or stabilized in place to reduce the overall effects that major storm water events will have on the reclamation efforts and the abandoned mine site in general. Finally, silt fences or other suitable devices will be placed within and across the drainages, leaving the mine site to preclude the transport of sediments (possibly containing NORM) from the mine site to locations downstream.

Reducing Potential Exposure to Radioactive Materials

All abandoned uranium mines will have residual radioactive material (NORM) associated with them. This material is in the form of low grade material that is uneconomic to transport and mill or residual ore stockpiles. Outcrops of uranium-bearing formations often exist at the mine sites and represent the initial ore deposit that led to the mine's development. These radioactive materials are a potential source of radiation exposure to the general public and the environment. It is DOE's policy that potential sources of mining-related radiation exposure to the public be minimized. However, it is often cost prohibitive, if not entirely impossible, to eliminate these NORM sources from the environment. Consequently, during reclamation activities on the DOE lease tracts, two steps will be taken to reduce/limit the potential for exposure to NORM.

(1) During the preliminary reclamation activities, a cursory scan of the entire mine site will be made to identify the areas of greatest radiological concern.

(2) Any materials within the areas of greatest radiological concern will be used in the initial backfilling of existing mine openings/portals so that the radioactive material is placed at depth below ground, and only less radioactive material will be exposed at the ground surface.

Additional scans will be conducted during the entire reclamation process to continually locate other areas of radiological concern for control/burial. After final recontouring is completed, any remaining areas of radiological concern will be further limited by covering the disturbed areas with any immediately available topsoil.

Conclusion

The DOE administers 43 lease tracts (25,000 acres) that collectively contain a maximum of 200 abandoned and active uranium mine sites. This contrasts to millions of acres administered by the BLM and USFS that contain several thousand abandoned and active uranium mine sites. The DOE feels that the aforementioned process provides a practical and cost effective approach to abandoned uranium mine-site reclamation. Additionally, DOE feels that this process may be applicable to the reclamation of other, non-uranium mine sites.