

THE URANIUM MILL TAILINGS
REMEDIAL ACTIONS PROJECT

James A. Morley
Albuquerque Operations Office
U. S. Department of Energy

ABSTRACT

The "Uranium Mill Tailings Radiation Control Act of 1978," Public Law 95-604, directs the U. S. Department of Energy (DOE) to undertake remedial actions at designated inactive uranium mill sites and associated vicinity properties. The purpose of the remedial actions is to stabilize and control the uranium mill tailings currently stored at the sites in a safe and environmentally sound manner in order to minimize radiation health hazards to the public.

These remedial actions are to be undertaken by the DOE in cooperation with the affected states and Indian tribes and performed in accordance with standards promulgated by the U. S. Environmental Protection Agency (EPA). The disposal sites, which could be the processing sites, will be acquired by the states with title passing to the DOE and will be licensed by the U. S. Nuclear Regulatory Commission (NRC). The DOE's authorization to conduct the program terminates seven (7) years following the promulgation of the EPA standards (January 1983). The current cost estimate for the project in 1982 dollars is \$540 million, however, it is expected that this estimate will be somewhat reduced following completion of a review now in progress.

INTRODUCTION

The first requirements for large quantities of uranium in the United States were those of the Manhattan Project and later the U. S. Atomic Energy Commission (AEC) for the nation's developing nuclear weapons programs and nuclear reactor development programs. These requirements were met by commercial uranium mining and milling operations under government contract. The mines and mills were located almost entirely in the Western United States. As a result of these activities millions of tons of uranium mill tailings, milling byproducts, were accumulated at the mill sites. The period of significant government requirements for uranium extended from 1940 up until about 1970. As the government inventory of uranium built-up this demand was substantially reduced, and with the loss of the government market many of the mills were closed and abandoned by their operators.

Although high level radiation has always been known as a source of harmful effects, low-level radioactivity, in the early years of the nuclear industry, was not viewed in such a context. As we began to learn more about radioactivity and with the availability of more sensitive instrumentation, more stringent requirements were placed into effect. In 1974 the Atomic Energy Commission initiated studies of the potential harmful effects of inactive uranium milling sites, and then in November of 1978 Congress passed the Act which charged the DOE with effecting remedial action at twenty-two (22) inactive uranium mill sites. The Act required that remedial actions be performed in cooperation with the affected states and Indian tribes, and to radiation standards which the EPA would develop. The Act also required that the NRC license the final disposal site selected for the tailings.

The DOE, a successor to the AEC, has now identified twenty-four (24) sites for remedial action and established the Uranium Mill Tailings Remedial Action (UMTRA) Project Office at its Albuquerque Operations Office to manage these remedial action efforts. In January of 1983, EPA promulgated standards for use in stabilizing these tailings² in a safe (and environmentally acceptable) manner. As stipulated by the Act the DOE now has seven (7) years in which to accomplish the remedial actions.

THE ACT

The UMTRA project had its formal beginning in November 1978 when Congress passed the Uranium Mill Tailings Radiation Control Act, PL 95-604. The key DOE requirements of the Act are summarized by the following seven points.

1. DOE is to enter into cooperative agreements with the affected states and Indian tribes to accomplish the needed remedial actions at abandoned uranium mill tailings sites and associated contaminated vicinity properties.
2. The Government (DOE) will cost share on a 90/10 percentage basis with the states except on Indian lands where the Federal Government will bear 100% of remedial action costs.
3. Remedial action by the DOE will meet standards to be issued by the Environmental Protection Agency.
4. Following remedial action, the disposal sites will be licensed by the Nuclear Regulatory Commission.
5. The DOE will investigate the feasibility of reprocessing the tailings.
6. Title to the repository sites will vest in the DOE.
7. The project will be completed seven years from the time the EPA standards are promulgated.

The Act listed twenty-two inactive mill tailings sites. Three additional sites which met qualifications established by the Act were added by DOE in response to Federal Register notices of August 17 and September 5, 1979, and one site was later dropped from the list when it was determined that it did not fully meet the established criteria. The DOE is required to establish a priority for each site in consultation with the EPA. DOE is also responsible for conducting a public participation program under the provisions of the Act.

EPA STANDARDS

As required by the Act, the EPA has recently promulgated Standards for Remedial Actions at Inactive Uranium Processing Sites.² These final standards, listed in Table I, apply to the control of tailings piles, the cleanup of buildings and the cleanup of land. The latter two categories are directed primarily to the cleanup of properties in the vicinity of the processing sites, i.e., properties that were contaminated either by erosion of tailings or by tailings removed from the site for use, usually, as construction materials. In addition, the EPA standards provide for use of supplemental standards for locations meeting one or more of six (6) listed criteria.

Table I. EPA standards for remedial actions at inactive uranium processing sites.

STATE	PROCESSING SITE	TAILINGS (10 ⁶ TONS)	NO. OF VICINITY PROPERTIES
ARIZONA	*MONUMENT VALLEY	1.100	15
	*TUBA CITY	0.800	13
COLORADO	DURANGO	1.555	120
	GRAND JUNCTION	1.900	5,000
	GUNNISON	0.540	5
	MAYBELL	2.600	-
	NATURITA	.344	12
	NEW RIFLE	2.700	265
	OLD RIFLE	0.350	-
	SLICK ROCK (NC)	0.037	3
	SLICK ROCK (UC)	0.350	-
IDAHO	LOWMAN	0.090	8
NEW MEXICO	AMBROSIA LAKE	2.600	26
	*SHIPROCK	1.650	13
NORTH DAKOTA	BELFIELD	.050	-
	BOWMAN	.071	-
OREGON	LAKEVIEW	0.130	18
PENNSYLVANIA	CANONSBURG	0.414	100
TEXAS	FALLS CITY	2.500	2
UTAH	GREEN RIVER	0.123	8
	*MEXICAN HAT	2.200	-
	SALT LAKE CITY	1.880	103
WYOMING	CONVERSE COUNTY	0.187	15
	RIVERTON	0.900	18

* PROCESSING SITE ON NAVAJO TRIBAL LANDS

The EPA had previously published a set of interim standards⁴ in April of 1980 for cleanup of tailings and these interim standards have been used by the DOE prior to availability for the final standards, for remedial action at vicinity properties in Salt Lake City, UT, and Canonsburg, PA.

In recognition that some of the low and medium priority processing sites are in remote locations, the EPA has requested comments by May 5, 1983⁵ as to whether standards should be less restrictive for such sites and as to whether standards should place reliance on controlled access and/or buffer zones rather than physical control of the tailings with thick covers and the like. Since a number of the low and medium sites are in remote locations it may be more appropriate to implement more site specific standards.

THE PROJECT DESCRIPTION

To meet the requirements of the Act, the DOE has established the UMTRA Project Office at its Albuquerque Operations Office in Albuquerque, New Mexico. The UMTRA Project Office was established with the following mission:

In accordance with PL 95-604, the National Environmental Policy Act (NEPA) and EPA standards, eliminate or minimize potential health hazards from uranium decay products by providing remedial actions at 24 sites and approximately 6000 vicinity properties to stabilize and control tailings in a safe and environmentally-sound manner.

To accomplish this mission, the DOE project office must conduct technology development on long-term uranium mill tailings stabilization and disposal systems. The Agency must also establish and maintain effective state and local public relations leading to the negotiation of cooperative agreements with the affected states and Indian tribes, coordination with those governing bodies the project office remedial action plans and construction activities, as well as the dissemination of public information on the project. The documentation of environmental impacts through the development of Environmental Impact Statements (EIS's) and Environmental Assessments (EAs) play a key role in meeting the project mission. Finally, the DOE must perform the required remedial actions at the sites. This requires the evaluation of remedial actions, formulating remedial action plans, developing the required engineering designs, acquisition of the sites, performance of the required construction activities and follow-on maintenance and site surveillance.

The locations of the twenty-four sites at which remedial actions will be performed are shown in Fig. 1. Also shown is an additional location, Edgemont, South Dakota, which has been added to the project for the cleanup of approximately one-hundred vicinity properties as part of the FY 1983 Funding Authorization Bill for the Nuclear Regulatory Commission.⁶ As seen from Table II, there are approximately 25 million tons of tailings and up to 6000 vicinity properties which must be addressed by the project.

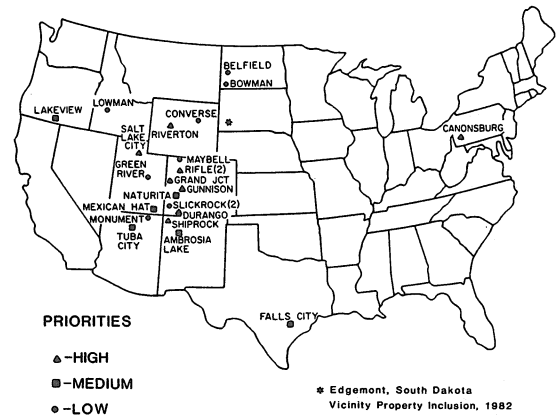


Fig. 1. Location of 24 UMTRA Project sites plus the Edgemont, South Dakota vicinity property site.

Table II. UMTRA Project 24 processing sites located in ten states contain 25 million tons of tailings and involve about 6000 vicinity properties.

CONTROL OF TAILINGS PILES:	
1. LONGEVITY.....	Up to 1000 years to the extent reasonably achievable, but at least 200 years.
2. RADON EMISSIONS FROM DISPOSAL SITE.	20 pCi/m ² s, or 0.5 pCi/l in air outside the disposal site: equivalent to about 96% reduction.
3. WATER PROTECTION.....	Use existing state and federal standards: apply site-specific measures where needed.
CLEANUP OF BUILDINGS:	
1. INDOOR RADON DECAY PRODUCTS.	Shall not exceed 0.03 WL to the extent practicable, achieve 0.02 WL
2. INDOOR GAMMA RADIATION.....	Unchanged.
CLEANUP OF LAND:	
1. SURFACE.....	5 pCi/g in the 15 cm surface layer.
2. BURIED.....	15 pCi/g in any 15 cm layer below the surface layer.
EXCEPTIONS:	
1. PROCEDURE.....	Supplemental standards (may be applied on generic or site-specific basis).
2. APPLICABILITY.....	Same as proposed; criteria also provided to avoid cleanup of small amounts of tailings and inaccessible tailings posing minimal hazards.

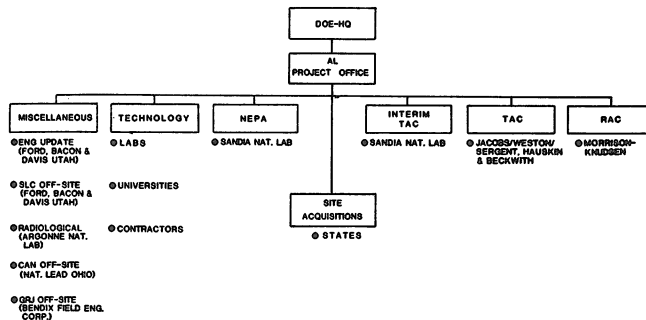


Fig 2. The acquisition structure of the UMTRA Project Office showing key activities and participants.

The flow of activities for the sites and the vicinity properties is provided graphically in Fig. 3. Remedial action at the vicinity properties means the removal of the contaminated materials such that the property meets the EPA standards. Contaminated materials removed from the vicinity properties are taken to the associated tailings site and stabilized as part of the remedial action performed on the site. The remedial action for the sites can mean stabilization of the tailings in-place or relocation is possible. Stabilization of the tailings will be accomplished by covering the piles with appropriate cover materials to reduce radon emissions and to control wind and water erosion in order to meet EPA standards. In some cases, it may be necessary to use subsurface liners or other means to assure isolation of the tailings from ground water.

To assist the DOE in accomplishing this task, the project office has contracted for a Technical Assistance Contractor (TAC) and a Remedial Action Contractor (RAC). Jacobs Engineering Company of Pasadena, California, was selected in December 1981, as the TAC and Morrison-Knudsen of Boise, Idaho, was selected project RAC in August of 1982. In addition, Sandia National Laboratories in Albuquerque has been supporting the project since 1979 through development of the required NEPA documents. There are numbers of other contractors and national laboratories providing support to the project; however, the three mentioned above form the key elements of the project. The NEPA work at Sandia, the development of the EIS's and EA's will be essentially completed by the end of September 1983. Jacobs, in the TAC role, is supporting the project office in such important areas as:

- o Development of Remedial Action Plans and design criteria
- o Preparation of preliminary design and bid packages
- o Project control system
- o Quality assurance
- o Health and Safety
- o Site licensing criteria
- o Site maintenance and surveillance

In the role of RAC, Morrison-Knudsen's responsibility to the project will include:

- o Performance of site engineering design
- o Award subcontracts for the performance of site remedial actions including the vicinity property work
- o Management of site and vicinity property work

The definitized contract with Morrison-Knudsen has not been signed, but that is expected to happen by early April. Using EPA's proposed interim standards, some vicinity property clean-up work has been undertaken in the last two years at Salt Lake City, Utah, and Canonsburg, Pennsylvania. These activities have been performed respectively by Ford, Bacon, and Davis, Inc., and NLO, Inc. The acquisition structure of the UMTRA Project is shown in more detail in Fig. 2, which highlights the key elements of the project along with the major organizations.

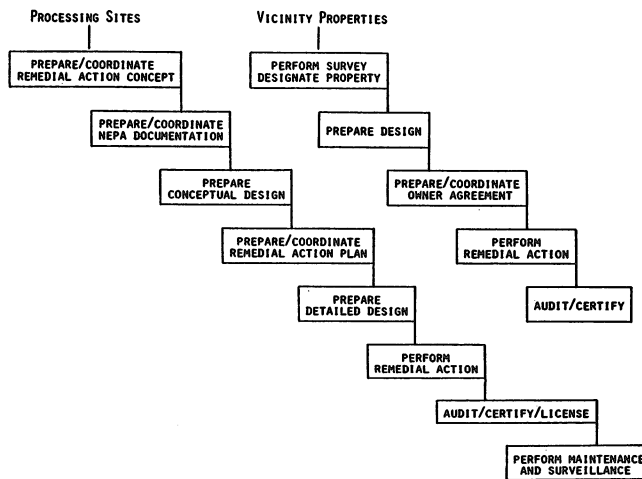


Fig. 3. The UMTRA Project activities flow diagram shows the sequence of key activities for both the processing sites and the vicinity properties.

The current project Master Site Schedule and Baseline Resources Plan are shown respectively in Fig. 4 and Fig. 5.

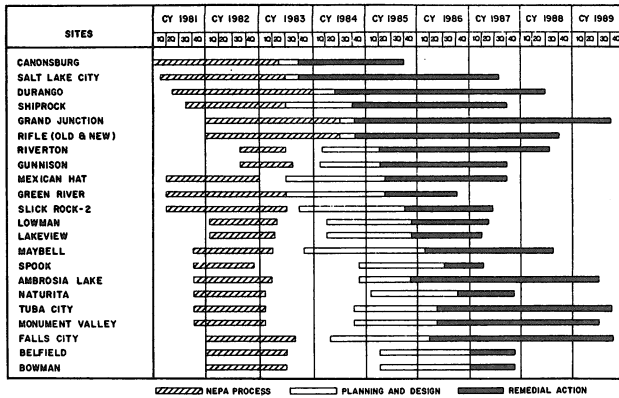


Fig. 4. The UMTRA Project Master Schedule shows the flow of the project for all 24 sites from the start of NEPA activities through the completion of remedial action.

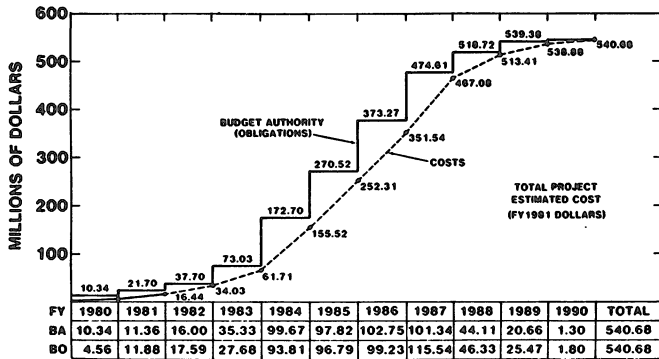


Fig. 5. The Baseline Resource Plan for the UMTRA Project shows the current projected funding throughout the 7 year life of the project.

Both of these have been left in a draft form pending issuance of the EPA standards: now that that has occurred, finalization and submission to DOE Headquarters for approval is expected to take place within the next few months. As a result of more detailed planning recently completed it is expected that the total estimated cost of \$540 million can be somewhat reduced.

PROJECT STATUS

With the promulgation of the EPA standards in January, and the pending mobilization of Morrison-Knudsen, the UMTRA project will be in a position to begin site activities. Remedial action work is currently scheduled to begin at both Canonsburg, Pennsylvania, and Salt Lake City, Utah, sites in October 1983.

Public hearings were held in January on the Canonsburg Draft Environmental Impact Statement (DEIS); the EIS will be published in June with a Record of Decision in July. The public hearings for Salt Lake City DEIS will be held in mid-March with a Record of Decision anticipated sometime in August. In addition, the project office expects to continue work on the Salt Lake City and Canonsburg vicinity properties and begin work at Grand Junction, Colorado, and possibly Edgemont, South Dakota. Funding for this fiscal year is currently at \$20.8 million which should allow the project to make good progress.

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