FINAL COMPLETION REVIEW REPORT

FCR THE

REMEDIAL ACTION

AT THE

GUNNISON, COLORADO

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT SITE

September 1997

DIVISION OF WASTE MANAGEMENT U.S. NUCLEAR REGULATORY COMMISSION

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GUNNISON, COLORADO, UMTRA PROJECT SITE FINAL COMPLETION REVIEW REPORT

INTRODUCTION

The abandoned uranium mill tailings site at Gunnison, Colorado, is one of the 24 abandoned uranium mill tailings sites to be remediated by the U.S. Department of Energy (DOE) under the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). UMTRCA requires, pursuant to Section 104(f)(1), that the U.S. Nuclear Regulatory Commission concur with the DOE's determination that the remedial action has been properly completed. This final Completion Review Report (CRR) documents the NRC staff's basis for its concurrence decision with respect to DOE's Certification Summary for the successful completion of construction of the Gunnison site.

1.0 BACKGROUND

1.1 UMTRCA

Title I of UMTRCA provides for remedial action at abandoned uranium mill tailings sites and associated vicinity properties. The purpose of this legislation is to protect the public health and safety and the environment from radiological and non-radiological hazards associated with the process related materials at these sites.

UMTRCA directs DOE to select and perform remedial actions at 24 abandoned uranium mill tailings sites to ensure compliance with the general environmental standards promulgated by the Environmental Protection Agency (EPA) under Section 275(a) of the Atomic Energy Act of 1954, as amended by UMTRCA. UMTRCA also requires DOE to obtain NRC's concurrence with DOE's selection and performance of the remedial actions. Following completion of the remedial actions, UMTRCA authorizes NRC to license the long-term custody, maintenance, and monitoring of the disposal sites to ensure continued protection of the public health and safety and the environment. Appendix B includes a more detailed discussion of this legislation.

1.2 CONCURRENCE PROCESS FOR THE SELECTION OF DOE'S REMEDIAL ACTIONS

To document its selection of the remedial action to be implemented at a particular site, DOE develops and issues a Remedial Action Plan (RAP) under its Uranium Mill Tailings Remedial Action (UMTRA) Project. The RAP describes the series of activities and presents the design proposed by DOE to provide for the long term protection of the public and the environment. Usually this involves cleanup of the processing site, adjacent windblown areas, and vicinity properties in addition to stabilization of the residual radioactive materials. In addition, DOE issues a Remedial Action Inspection Plan (RAIP), which establishes the quality control program of testing and inspection that will be employed for the remedial action. In accordance with UMTRCA Section 108(a)(1), the NRC staff reviews and concurs with the RAP and the RAIP, and any subsequent modifications. By its concurrence in the remedial action selection, the NRC staff concludes that the planned remedial actions will comply with EPA's applicable standards in 40 CFR 192, Subparts A, B, and C. The basis for the concurrence in DOE's selection of remedial action is documented in a Technical Evaluation Report (TER).

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1.3 CONCURRENCE PROCESS FOR THE PERFORMANCE OF DOE'S REMEDIAL ACTIONS

The remedial action work is performed by DOE contractors under Federal procurement regulations. During construction, DOE inspects and documents activities in accordance with the UMTRA Project Quality Assurance Plan, the RAIP, and the RAP. In addition, the NRC staff conducts independent inspections during construction, as determined necessary.

Upon completion of the remedial action, DOE compiles construction records and prepares a Completion Report (CR) to document that remedial actions were performed in accordance with the RAP or RAP modifications, and the RAIP. Based on this information, DOE certifies that all provisions of the RAP have been satisfied and, therefore, that the remedial actions comply with the applicable EPA standards in 40 CFR 192.

Based on its review of DOE's documentation, and on its site visits and observations, NRC makes a concurrence decision with regard to DOE's remedial action completion determination for each site, and then documents the basis for this concurrence decision in the CRR. By its concurrence in the remedial action performance, the NRC staff concludes that the remedial action has been completed in accordance with the NRC approved design. NRC's concurrence with DOE's completion determination fulfills the Commission's responsibility under UMTRCA Section 104(f)(1).

1.4 GUNNISON PROCESS SITE

The Gunnison uranium mill tailings site is located south of the city limits of Gunnison, Colorado, adjacent to the Gunnison County Airport (Figure 1.1). The 61 acre site is on the floodplain between the Gunnison River and Tomichi Creek. During the mill's operation from 1958 to 1962, about 540,000 tons of ore were processed by an acid leach method. The 35 acre rectangular shaped pile contained approximately 459,000 cubic yards (cy) of residual tailings averaging nine feet deep (Figure 1.2). The total volume of contaminated materials including subpile, mill yard, ore storage, windblown, and vicinity property materials, was estimated to be 718,000 cy. Reclamation of the process site included mill buildings demolition, establishment of access roads, installation of permanent fencing, removal of contaminated materials, and a soil cleanup verification program. DOE has deferred groundwater contamination cleanup to a separate process.

1.5 GUNNISON DISPOSAL SITE

The objective was to consolidate and stabilize the Gunnison mill tailings in a naturally contoured embankment that would meet the EPA standards. Tailings and other contaminated material were transported by truck to the disposal site located so ren miles east of Gunnison just south of the Gunnison County Landfill (Figure 1.1). The Gunnison disposal site is located on 92 acres of land with the tailings embankment comprising 29 acres in the middle of the property (Figure 1.3). The topography in the vicinity is broken by steeply sloped erosional gullies (Figure 1.4) and is sparsely vegetated. The site is located on an alluvial slope upland, away from active stream channels. Interbedded Tertiary alluvial gravels and volcaniclastic deposits underlie the disposal site.











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The remedial action performed by DOE (DOE, 1997) consisted of the following major activities:

- The Gunnison disposal site was prepared for receipt and disposal of materials by constructing drainage control features and a wastewater retention basin. A dedicated haul road was constructed to connect the process site to the disposal cell. The below grade section of the disposal cell was excavated.
- 2. A total of 742,465 cy, approximately 1.14 million tons, of contaminated materials were placed in the disposal cell (Figure 1.4) with demolition and organic debris distributed in the lower lifts. The disposal cell covers 29 acres (DOE, 1997), with the top of the embankment 10 to 38 feet above the pre-existing topography. The disposal cell was built with 33 percent grades on side slopes and a top slope of 2.5% percent from the center ridge toward the side slopes.
- 3. The relocated contaminated materials were buried under an 18 inch thick radon barrier, containing 5% bentonite, to attenuate radon emissions. A 6 inch layer of select fill and a 73 inch thick frost barrier protect the radon cover. The contoured embankment is topped with rock riprap for erosion protection. A diversion ditch on the north side of the embankment intercepts storm runoff from 17 acres of upland drainage. The ditch diverts runoff to the west and east of the disposal cell.

The NRC was not involved with the actual remedial action activities which were performed by the DOE contractors. However, DOE obtained NRC concurrence with the site construction design and a few significant modifications known as Project Interface Documents (PIDs). NRC also performed on-site construction reviews to monitor the progress of the construction activity (see Appendix A).

1.6 FINAL COMPLETION REVIEW REPORT ORGANIZATION

The purpose of this CRR is to document the NRC staff review of DOE's Gunnison Site CR (DOE, 1997). Section 2 of this report presents the analysis of remedial action construction. This section is organized by technical discipline and addresse, engineering and radiation protection aspects of the remedial action. Appendix A provides a listing of NRC staff visits to the Gunnison site. Appendix B provides a detailed description of the requirements of UMTRCA and the resulting phased process of the UMTRA project.

2.0 ANALYSIS OF DOE REMEDIAL ACTION PERFORMANCE

2.1 PREVIOUS ACTIONS

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NRC staff, based on its review of the RAP (DOE, 1992a-c) with associated page changes (DOE, 1993a-b), and the RAIP (DOE, 1993) concurred that the remedial action, as designed, would meet the applicable EPA standards. This concurrence was based on technical findings that there is reasonable assurance that the selection of the remedial action would meet the standards for long-term stability, radon attenuation, water resources protection, and cleanup of contaminated land and buildings.

Staff reviews included assessments in the areas of erosion protection, water quality, geology, geotechnical stability, and radon attenuation. The NRC concurred on the final RAP and the RAIP on September 16, 1993. The basis for the NRC staff's concurrence in DOE's selection of remedial action at the Gunnison site is documented in a Technical Evaluation Report (TE::) issued in September 1993 (NRC, 1993).

2.2 REVIEW OF REMEDIAL ACTION PERFORMANCE

NRC staff's primary objective in reviewing DOE's certification of remedial action completion is to determine whether the remedial actions have been performed in a manner consistent with specifications provided in the RAP, RAP modifications, and the RAIP, and if not, that deviations to these specifications still result in compliance with the EPA standards. In support of this action, the NRC staff participated in site reviews (See Appendix A), field observations, assessments of on-site data and records, and review of DOE Site Audit Reports. During remedial action construction activities, there were conditions encountered which required modifications of the original remedial action plan. These conditions and the associated design changes were submitted by DOE and were concurred in by the NRC staff. These are listed in Volume I of the CR and are reflected in the as-built conditions presented in the CR.

The following sections present the results of the review of remedial action performance by individual technical discipline. Note that for the Gunnison remedial action completion review, the pertinent technical disciplines are: 1) geotechnical engineering, 2) surface water hydrology and erosion protection, 3) radiation protection, and 4) groundwater resources protection.

2.2.1 Geotechnical Engineering Review Results

The NRC staff reviewed the Gunnison final CR (DOE, 1997) to determine whether the geotechnical engineering aspects of the remedial action were completed in accordance with: (1) the applicable construction specifications in the RAP; (2) all RAP modifications; (3) the RAIP; and (4) the final design. Items reviewed included descriptions of construction operations, as-built drawings, laboratory and field testing data, Remedial Action Contractor (RAC) inspection reports, and DOE and RAC Quality Assurance Audits. In addition, the review was based on staff observations and review of records during on-site inspections.

During its revie w, the N 2 J staff noted the following:

- 1. Appropriate tests (gradation and Atterberg limits) and inspections were performed by DOE or its agents to ensure that the proper material type was placed in each phase of construction. Placement and compaction of construction materials were routinely inspected by DOE or its agents to ensure that the moisture and density requirements were met, and that the soil moisture was uniform throughout the compacted lifts. The loose thickness of the lifts was verified periodically by DOE or its agents to ensure compliance with the specification requirements for each particular type of material.
- DOE or its agents conducted laboratory and field testing in accordance with acceptable test procedures and with trained and qualified personnel. Records indicating acceptable calibration of measuring and testing equipment are provided in the DOE final CR.

- The final CR shows that frequencies of material testing and inspection comply with the frequencies specified in the RAIP and in the NRC Staff Technical Position on Testing and Inspection Plans (NRC, 1989).
- Continuous inspections by DOE or its agents confirmed that the volume of organics included in the construction materials was limited to the range specified in the RAP.
- The radon barrier layer was continually inspected by DOE or its agents to ensure that the specified lift thicknesses and compaction levels were achieved.
- 6. The material type, placement, and compaction methods specified for the radon barrier layer resulted in the desired permeability and density of the barrier.
- As-built drawings adequately document that the completed remedial action is consistent with the NRC-approved design.
- Final slope, elevation and compaction operations of the foundation soil and capillary break were adequately inspected to ensure that the final conditions were consistent with those stated in the RAP and final design.

Based on the above observations, and on the results of on-site inspections (see Appendix A) performed by NRC staff during construction, the NRC staff concludes that the geotechnical engineering aspects of construction were performed in accordance with the specifications identified in the RAP and RAIP.

2.2.2 Surface Water Hydrology and Erosion Protection Review Results

NRC staff reviewed the surface water hydrology and erosion protection aspects of remedial actions at Gunnison to ensure that they were constructed in accordance with the applicable construction specifications as stipulated in the RAP, RAP modifications, RAIP, and the final design. Areas of review included construction operations, laboratory and field testing, and quality assurance audits. In addition, the review was also based on NRC observations of the remedial actions and review of records and testing during NRC onsite inspections.

The remedial action design included erosion protection in several specific areas, including: (1) riprapped top and side slopes and diversion channels; and (2) a riprap toe adjacent to the side slope. The top and side slopes and diversion channels of the cell were designed to prevent long-term erosion and gullying of the cell cover. The buried riprap toe was placed to prevent erosion and migration of gullies toward the cell.

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The NRC staff reviewed each of these features and determined that testing, placement, and configuration complied with specifications in the RAP, RAP modifications, and the RAIP. The review was partially based on NRC staff observations and review of onsite records during the remedial actions, as well as assessment of the verification results presented in the DOE CR. In addition, the NRC staff reviewed records of the placement of riprap on the top and side slopes of the cell.

During the review, the NRC staff noted the following:

- 1. Tests (gradation and durability) and inspections were performed by DOE or its agents to ensure that erosion protection materials were properly selected. The review of the documentation indicated that placement of materials was routinely inspected by DOE or its agents to ensure that the rock size and gradation specifications were met. Likewise, the thickness of the rock layers were verified periodically by DOE or its agents to ensure compliance with the specifications for the particular type of material.
- Laboratory and field testing was conducted by DOE or its agents in accordance with specified test procedures.
- Testing and inspection frequencies for materials used at the site for erosion protection were documented by DOE as complying with the frequencies specified in the RAIP.

Based on NRC staff of cervations and review of onsite records during remedial actions, as well as assessment of the verification results presented in the CR, the NRC staff concludes that the required durability and gradation tests were performed during the remedial action. Based on these tests, the riprap is of adequate quality and has been acceptably placed. The NRC staff concurs the remedial action has been adequately completed at Gunnison, with respect to erosion protection.

However, during the completion of the project, DOE informed the staff that there may be a potential for the larger rock to fracture over a long period of time. DOE geologists and QA/QC representatives indicated that the larger Type C and Type D rock could be subject to fracturing, resulting in the rock layer not meeting gradation specifications at some future time. The staff reviewed information provided in the CR and concludes that DOE took adequate measures to minimize this possibility. However, some uncertainty remains, and there may be a potential for the rock to fracture over a long period of time. To assure that unacceptable fracturing does not occur, the staff recommended that DOE provide specific measures for monitoring the rock in the Long-Term Surveillance and Maintenance Plan (LTSP) (DOE. 1997). These measures should include specific provisions for determining if the rock is tracturing and for establishing action levels for future repair. The staff has reviewed DOE's proposed changes to the LTSP and concludes that the changes are acceptable.

2.2.3 Radiation Cleanup and Control

The NRC staff reviewed radiation cleanup aspects of remedial actions at the Gunnison site to ensure that residual radioactive materials were cleaned up in accordance with specifications in the RAP and the final design. Areas of review included contaminated material excavation, cleanup verification procedures and data, and application of supplemental standards. In addition, the construction data for the disposal cell cover were reviewed to ensure compliance with the RAP design for limiting radon releases (see Section 2.2.1), and the final radon attenuation calculation was reviewed to ensure compliance with the long-term radon flux standard in 40 CFR 192.02. The review was based primarily on the staff's assessment of information presented in the Gunnison CR.

The criteria for site cleanup and radon attenuation design were established in the RAP and concurred in by NRC staff as providing assurance that the processing site and disposal cell would meet the EPA requirements of 40 CFR Part 192. The soil radium (Ra-226) cleanup at the processing site and on adjacent lands must comply with the applicable EPA standards (<0 CFR 192.12) such that the average Ra-226 levels above background in each 100 m² area do not exceed either 5 pCi/g in the top 15 cm of soil, or 15 pCi/g in any underlying 15-cm layer. A supplemental cleanup standard for thorium (Th-230) was proposed in the RAP, based on the UMTRA Project Generic Thorium Protocol. DOE also stated in the RAP that uranium concentrations were assessed and referenced the "Gunnison, Colorado, Subpile Study Report," dated August 1994. The report indicates that the area around test pit 16 would be excavated to remove most of the soluble uranium that was a potential source of ground water contamination.

T¹ 3 soil cleanup plan also included the application of the cobbly soil procedure as discussed in the "Site-Specific Analysis of Radiological and Physical Parameters for Cobbly Soils at the Gunnison, Colorado, Processing Site," January 1994. There were no buildings remaining on the processing site, therefore, cleanup criteria were not specified and verification of building cleanup was not required.

The RAP final radon attenuation (barrier) design was based on construction of a compacted clayey (5 percent bentonite by weight) soil radon barrier 18 inches thick and a frost protection layer 73 inches thick. The NRC evaluation of the RAP stated that the measured diffusion coefficient and moisture test results for the bentonite-amended barrier material should be incorporated into the final radon flux analysis in the CR. A flux calculation was provided in the CR incorporating final test data on the radon barrier, as discussed below.

During the review, with respect to the above criteria and commitments, NRC staff noted the following:

- 1. Soil Cleanup: Appendix J of the CR indicates that all tailings contaminated areas were cleaned according to DOE UMTRA Project procedures. Appendix K provides discussion and data on the cleanup (supplemental standards) of Th-230 indicating that the UMTRA Project Generic Thorium Protocol was followed. The NRC staff was concerned about the extent of elevated Th-230 remaining in/near the water table, but the owner of the property (State of Colorado) has indicated that measurements will be required of future site owners to reduce the notential long-term health risks (primarily due to radon).
- 2. Cleanup Verification: The CR indicates that standard DOE UMTRA Project procedures for soil verification were appropriately applied at the Gunnison processing site, and the quality control program complied with plan criteria. The data indicate that all samples met the EPA soil Ra-226 standards (2,910 samples averaged 2.3 pCi/g). Measurements for Th-230 were conducted and are summarized in the Remedial Assessment section of CR Volume I. For example, 1,488 samples had estimated 1000-year Ra-226 values less than or equal to 15 pCi/g plus background and 479 grids received one foot of select fill to control potential radon diffusion from the elevated Th-230 in the water table. The highest 1000-year Ra-226 value was 178 pCi/g. Appendix K also includes acceptable health risk analyses based on the potential radon flux, within the 1000-year design period, resulting from the residual Th-230. Considering the cost to excavate the Th-230 material from the water table and to redesign to disposal cell to accommodate this extra material, compared

to the minor health benefit resulting from complete excavation, NRC staff concluded that the cleanup based on the supplemental standard for Th-230 was as low as is reasonably achievable.

 Radon Flux: Long-term radon flux estimates for the disposal cell were provided in CR calculation 643-01-03. The calculation indicated that the top layer of contaminated materials was the cobbly subpile/offpile material, so DOE calculated the bulk radioactivity for this layer, as allowed by the approved procedure.

The radon flux model utilized average measured Ra-226 and emanation fraction parameter values for as-placed contaminated materials, sampled at 21 locations on the cell. Also, measured long-term moisture and diffusion coefficient values were used for radon barrier material. This resulted in an average long-term radon flux of 9.1 pCi/m²s from the top of the radon barrier. In its design ana¹ysis, DOE conservatively did not consider the radon attenuation capability of the thick frost protection material.

Radon flux measurements on the radon barrier averaged 0.09 pCi/m²s. Based on this information and the findings discussed under Sections 2.2.1 and 2.2.2 of this CRR, that the integrity of the radon barrier will not be significantly degraded for the design life of the cell. NRC staff concludes that there is adequate assurance that the long-term radon flux standard of 20 pCi/m²s will be met.

Based on the above evaluations, the NRC staff concludes that commitments and requirements stated in the RAP were fulfilled and that data in the CR provides assurance that the soil cleanup and disposal cell cover radon control standards have been met at the Gunnison site.

2.2.4 Water Resources Protection Review Results

The NRC staff reviewed the construction activities conducted during the performance of remedial actions that relate to ground-water resource protection. During its review, the NRC staff noted the following:

 Document No. 3885-GUN-S-01-00763-03 of the RAP provides a subcontractor well abandonment specification and identifies fifty-one wells at the processing site and twenty wells at the dispose site scheduled for abandonment. The abandoned wells are documented on as-built drawings GUN-PS-10-0203 and GUN-PS-10-0204 for the processing site; and as-built drawing GUN-DS-10-0302 for the disposal site (DOE, 1997). DOE identified ten wells at the processing site which could not be located for abandonment. DOE indicated that these wells were less 10 feet in depth. DOE also identified one piezometer at the disposal site which could not be located for abandonment; however, this piezometer was not included in the original abandonment schedule.

Based on the above observation, the NRC staff concludes that the ground-water protection aspects of the remedial action were completed in accordance with the design and procedures identified in the RAP, and the RAIP.

3.0 SUMMARY

NRC staff reviewed geotechnical engineering, surface water hydrology and erosion protection, and radiation protection aspects of the remedial action performed at the Gunnison disposal site for the abandoned Gunnison Uranium Mill Tailings Site. The purpose of this review was to determine whether DOE had performed remedial actions at the site in accordance with specifications in the RAP, RAP modifications, and other supporting project documents, and thus with the EPA standards in 40 CFR Part 192, Subparts A-C. Based on its review of the final CR and on observations made during periodic on-site construction visits, the NRC staff concludes that DOE performed remedial action at the Gunnison disposal site in accordance with the EPA standards. Therefore, NRC concurs with DOE's certification of completion of the Gunnison remedial action.

4.0 REFERENCES

- U.S. Department of Energy (DOE), Washington, D.C., Remedial Action Plan and site Conceptual Design for Stabilization of the Inactive Uranium Mill Tailings Site at Gunnison, Colorado, Remadial Action Selection Report, Final, and attachments 1-5. 1992(a).
- U.S. Department of Energy (DOE), Washington, D.C., Uranium Mill Tailings Remedial Action Project (UMTRAP), Gunnison, Colorado-Information for Bidders, Volumes I-VIi, 1992(b).
- U.S. Department of Energy (DOE), Washington, D.C., Uranium Mill Tailings Remedial Action Project (UMTRAP), Gunnison, Colorado-Design Calculations, Volumes I-VI, 1992(c).
- U.S. Department of Energy (DOE), Washington, D.C., Uranium Mill Tailings Remedial Action Project (UMTRAP), Gunnison, Colorado-Remedial Action Selection Report page changes, August 4, 1993(a).
- U.S. Department of Energy (DOE), Washington, D.C., Uranium Mill Tailings Remedial Action Project (UMTRAP), Gunnison, Colorado-Remedial Action Selection Report page changes, September 10, 1993(b).
- U.S. Department of Energy (DOE), Washington, D.C. Final Completion Report, Gunnison, Colorado, Volumes 1-4, February 1997.
- U.S. Nuclear Regulatory Commission, Washington, D.C., Final Technical Evaluation Report for the Remedial Action of the Gunnison, Colorado, Uranium Mill Tailings Site, September, 1993.
- U.S. Nuclear Regulatory Commission, Washington, D.C., NRC Staff Technical Position on Testing and Inspection Plans During Construction of DOE's Remedial Actions at Inactive Uranium Mill Tailings Sites, January, 1989.
- U.S. Department of Energy (DOE), Washington, D.C. M.K. Ferguson. Remedial Action Inspection Plan, Review D, UMTRA Project, August, 1993.
- U.S. Department of Energy (DOE), Washington, D.C. Long-Term Surveillance Plan for Gunnison, Colorado Disposal Site, UMTRA Project, April, 1997.

APPENDIX A

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NRC CONSTRUCTION SITE VISITS TO THE

GUNNISON UMTRA PROJECT

GUNNISON DISPOSAL SITE

DATE	STAFF, DISCIPLINE	PURPOSE
August 14, 1990	 D. Gillen, Geotechnical Engineering T. Johnson, Erosion Protection A. Fan, Hydrogeology 	Site Visits For TER Preparation
August 19, 1991	M. Layton, Hydrogeology Alan Mullins, Project Management Roy Miller, Health Physics D. Gillen, Geotechnical Engineering D. Rom, Geotechnical Engineering	Site Visits For TER Preparation
November 16, 1992	D. Gillen, Geotechnical Engineering D. Rom, Geotechnical Engineering	On-Site Construction Review
September 1, 1993	D. Rom, Geotechnical Engineering	On-Site Construction Review
May 18, 1994	T. Johnson, Erosion Protection R. Carlson, Civil Engineering D. Rom, Geotechnical Engineering	On-Site Construction Review
July 10, 1997	H. LeFevre, Project Management T. Johnson, Erosion Protection	On-Site Construction Review

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APPENDIX B UMTRCA, THE EPA STANDARDS, AND THE PHASED UMTRA PROJECT

Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA) defines the statutory authority and roles of the DOE, the NRC, and the EPA with regard to the remedial action program for inactive uranium mill tailings sites.

The Standards

UMTRCA charged the EPA with the responsibility for promulgating remedial action standards for inactive uranium mill sites. The purpose of these standards is to protect the public health and safety and the environment from radiological and non-radiological hazards associated with radioactive materials at the sites. UMTRCA required that EPA promulgate these standards by no later than October 1, 1982. After October 1, 1982, if the EPA had not promulgated standards in final form, DOE was to comply with the standards proposed by EPA under Title I of UMTRCA until such time as the EPA had promulgated its standards in final form.

The final EPA standards were promulgated with an effective date of March 7, 1983 (48 FR 602; January 5, 1983); see 40 CFR Part 192 - Standards for Remedial Actions at Inactive Uranium Processing Sites, Subparts A, B, and C. These regulations may be summarized as follows:

- The disposal site shall be designed to control the tailings and other residual radioactive materials for up to 1000 years, to the extent reasonably achievable, and, in any case, for at least 200 years [40 CFR 192.02(a)].
- 2. The disposal site design shall provide reasonable assurance that radon-222 from residual radioactive material to the atmosphere will not exceed an average release rate of 20 picocuries per square meter per second, or will not increase the annual average concentration of radon-222 in air, at or above any location outside the disposal site, by more than one-half picocurie per liter [40 CFR 192.02(b)].
- 3. The remedial action shall be conducted so as to provide reasonable assurance that, as a result of residual radioactive materials from any designated processing site, the concentrations of radium-226 in land averaged over any area of 100 square meters shall not exceed the background level by more than 5 picocuries/gram averaged over the first 15 centimeters of soil below the surface and 15 picocuries/gram averaged over 15 cei. Simeter think layers of soil more than 15 centimeters below the surface [40 CFR 192.12(a)].
- 4. The objective of remedial action involving buildings shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL, and the level of gamma radiation shall not exceed the background level by more than 20 micro roentgens per hour [40 CFR 192.12(b)].
- 5. The portion of the EPA standards dealing with groundwater requirements, 40 CFR 192.20(a)(2)-(3) were remanded by the Tenth Circuit Court of Appeals on September 3, 1985. Based on this court decision, EPA was directed to promulgate new groundwater standards. EPA proposed these standards in the form of revisions to Subparts A-C of 40 CFR Part 192 in September 1987, and the final groundwater standards were promulgated January 11, 1995.

Before the groundwater standards were final, as mandated by Section 108(a)(3) of UMTRCA. the remedial action at the inactive uranium processing sites were to comply with EPA's proposed standards until such time as the final standards are promulgated. DOE performed remedial action at the inactive processing sites in accordance with NRC's concurrence with the remedial action approach based on the proposed EPA groundwater standards (52 FR 36000; September 24, 1987). Delaying implementation of the remedial action program would be inconsistent with Congress' intent of timely completion of the program. Modifications of disposal sites after completion of the remedial action to comply with EPA's final groundwater protection standards may be unnecessarily complicated and expensive and may not yield commensurate benefits in terms of human and environmental protection. Therefore, the Commission believes that sites where remedial action has been essentially completed prior to EPA's promulgation of final groundwater standards, will not be impacted by the final groun ster standards promulgated January 11, 1995. Although additional effort may be appropriate to assess and clean up contaminated groundwater at these sites, the existing designs of the disposal sites should be considered sufficient to provide long-term protection against future groundwater contamination. NRC does not view UMTRCA as requiring the reopening of those sites that have been substantially completed when NRC concurred with the selection of reinedial action in accordance with applicable EPA standards, proposed or otherwise in place at the time such NRC concurrence was given.

DOE Selection (Design) Phase

For each site, UMTRCA requires that DOE select a plan of remedial action that will satisfy the EPA standards and other applicable laws and regulations, and with which the NRC will concur. For each site, this phase includes preparation by DOE of an Environmental Assessment or an Environmental Impact Statement, and a Remedial Action Plan (RAP). The RAP is structured to provide a comprehensive understanding of the remedial actions proposed at that site and contains specific design and construction requirements. To complete the first phase, NRC and the appropriate State or Indian tribe will review the RAP and then concur that the RAP will meet the EPA standards.

The Performance (Construction) Phase

In this phase the actual remedial action (which includes decontamination, decommissioning, and reclamation) at the site is done in accordance with the RAP. The NRC and the State/Indian tribe, as applicable, must concur in any changes to the concurred-in plan that arise during construction. At the completion of remedial action activities at the site, NRC concurs in DOE's determination that the activities at the site have been completed in accordance with the approved plan. Prior to licensing (the next phase), title to the disposed tailings and contaminated materials must be transferred to the United States and the land upon which they are disposed of must be in Federal custody to provide for long-term Federal control. Disposal sites on Indian land will remain in the beneficial ownership of the Indian tribe.

NRC concurrence in the DOE determination that remedial action at a processing site has been accomplished in accordance with the approved plan may be accomplished in two steps where residual radioactive material is not being moved from the processing site to a different disposal site. The Uranium Mill Tailings Remedial Action Amendments Act of 1988 allows for a two-step approach for Title I disposal sites. The Amendments Act will allow DOE to do all remedial actions, other than groundwater restoration, for the first step of closure and licensing. The second step, which can go on for many years, will deal with existing groundwater restoration. When groundwater restoration is completed, the Long-Term Surveillance Plan required under

the licensing phase will be appropriately amended. For sites that are being moved, licensing will occur in one step. There is no groundwater restoration at the disposal site and the processing site will not be licensed after completion of remedial action.

The Licensing Phase

Title I of UMTRCA further requires that, upon completion of the remedial action program by DOE, the permanent disposal sites be cared for by the DOE or other Federal agency designated by the President, under a license issued by the Commission. DOE will receive a general license under 10 CFR Part 40.27 following: (1) NRC concurrence in the DOE determination that the disposal site has been properly reclaimed, and (2) the formal receipt by NRC of an acceptable Long-Term Surveillance Plan (LTSP). NRC concurrence with DOE's performance of the remedial action indicates that DOE has demonstrated that the remedial action complies with the provisions of the EPA standards in 40 CFR part 192, Subparts A, B, and C. This NRC concurrence may be completed in two steps as discussed above. There is no termination date for the general license.

Public involvement has been and will continue to be provided through DOE's overall remedial action program for Title I sites. The local public will have an opportunity to comment on the remedial action or closure plans proposed and implemented by DOE and to raise concerns regarding final stabilization and the degree of protection achieved. NRC fully endorses State/Indian tribe and public input in all stages of the program. At the time the LTSP is submitted, the NRC will consider the need for a public meeting in response to requests and public concerns.

The Surveillance and Monitoring Phase

In this phase, DOE and NRC periodically inspect the disposal site to ensure its integrity. The LTSP will require the DOE to make repairs, if needed.

One of the requirements in the EPA standards is that control of the tailings should be designed to be effective for up to 1000 years without active maintenance. Although the design of the stabilized pile is such that reliance on active maintenance should be minimized or eliminated, the NRC license will require emergency repairs as necessary. In the event that significant repairs are necessary, a determination will be made on a site specific basis regarding the need for additional National Enviroumental Policy Act actions, and health and safety considerations based on 10 CFR Parts 19, 20, and 21.

CERTIFICATION SUMMARY URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT GUNNISON, COLORADO

The U.S. Department of Energy certifies that the remedial action performed in Gunnison, Colorado, for the Uranium Mill Tailings Remedial Action Project is complete and meets all design criteria and technical specifications outlined in the surface Remedial Action Plan, as required under Public Law 95-604. The undersigned request that the U.S. Nuclear Regulatory Commission concur in this certification.

U.S. DEPARTMENT OF ENERGY

Juan D Williams Contracting Officer Contracts and Procurement Division

7/17/97 Date

U.S. DEPARTMENT OF ENERGY

George

Director Environmental Restoration Division

July 17, 1997 Date

The U.S. Nuclear Regulatory Commission hereby concurs with the U.S. Department of Energy's completion of surface remedial action for the Uranium Mill Tailings Remedial Action Project located in Gunnison, Colorado.

U.S. NUCLEAR REGULATORY COMMISSION

Joseph J. Holonich, Chief Uranium Recovery Branch Division of Waste Management Office of Nuclear Materials Safety and Safeguards

apt 11, 1997

Date

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