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S. Miller, OGC, GC-34, DOE HQS
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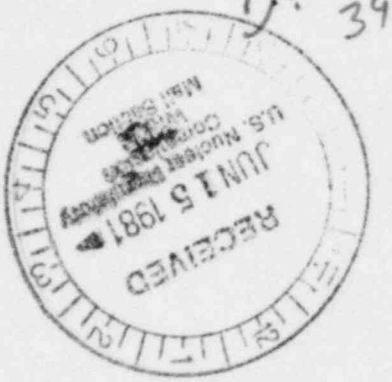

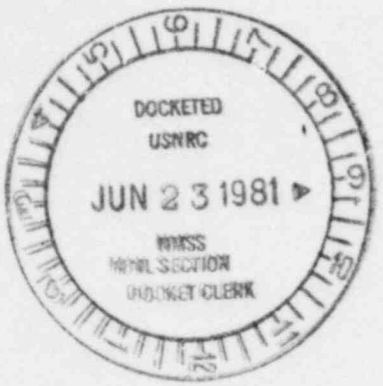

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U.S. DEPARTMENT OF ENERGY

memorandum

Albuquerque Operations Office

DATE JUN 8 1981

REPLY TO ATTN OF UMTRA:ALG

SUBJECT Remedial Action Concept Paper for Durango

TO Those on Attached List

Attached is a draft of the Remedial Action Concept Paper (RACP) for the Durango site. Your review and comments are requested at your earliest convenience.

It is not the intent of this office to distribute this document at the scoping meetings scheduled for Durango on June 30 - July 1, 1981, unless all comments have been resolved and the RACP finalized.

Please contact A. L. Gonzales at FTS 844-3941 if you have any questions on the above.

Richard H. Campbell

Richard H. Campbell, Project Manager
Uranium Mill Tailings Project Office

Attachment

DRAFT
FOR REVIEW ONLY

T Nike 6/2/81

DRAFT

REMEDIAL ACTION CONCEPT PAPER

FOR THE

URANIUM MILL TAILINGS SITE

AT

DURANGO, COLORADO

June 1981

Uranium Mill Tailings Remedial Actions Project Office
DOE Albuquerque Operations Office
Albuquerque, NM 87115

Table of Contents, List of Figures, and List of Tables to be furnished later.

1 INTRODUCTION

In November 1978, Congress enacted Public Law 95-604, the "Uranium Mill Tailings Radiation Control Act of 1978." The Act authorized the Department of Energy (DOE) to enter into cooperative agreements with the affected states and Indian tribes in order to establish assessment and remedial action programs at inactive uranium mill tailings sites. The Act stipulates that the DOE will meet the applicable radiation standards promulgated by the Environmental Protection Agency (EPA). It further states that the Nuclear Regulatory Commission (NRC) is to concur in all major decisions and to license the final disposal site. The DOE is to provide 90 percent of the remedial-action costs, and the affected states will pay the remaining costs. Exceptions to this are sites on Indian tribal lands, where 100 percent of the costs for remedial action will be borne by the Federal government.

In November 1979, twenty-five sites including the site at Durango, Colorado, were designated as eligible for remedial action. A cooperative agreement establishing the guidelines, responsibilities, and conditions for remedial action at Durango should be signed by Colorado and the DOE, and concurred in by the NRC, during calendar year 1981.

The project will be managed by the Uranium Mill Tailings Remedial Action (UMTRA) Project Office of the DOE in consultation with Colorado and with concurrence by the NRC in major decisions.

The purpose of this Remedial Action Concept Paper is to document present plans for remedial action at Durango. It has been developed by the UMTRA Project Office of the DOE and is to provide the basis for coordination with the State of Colorado, the NRC, other offices of the DOE, and local

governments. The final remedial action plan that results from this process will not be put into effect until it has been concurred in by the State and the NRC. This concept paper is a basic scoping document, and it does not imply commitment by the DOE to any specific action.

2 SITE DESCRIPTION

The Durango site (Figure 1) is located just outside the city limits of Durango, La Plata County, in southwest Colorado. The site is bordered on the east by the Animas, River, on the north by Lightner Creek, and on the southwest by Smelter Mountain. The entire site covers about 147 acres and includes two tailings piles. The large pile covering 14 acres is about 230 feet high and contains about 1,230,000 tons of tailings. The small pile is about 90 feet high and contains about 325,000 tons of tailings on seven acres. It is located slightly north of the large pile. The millsite and ore storage area, directly southeast of the large pile, cover about eight acres. The raffinate pond area is located nearly a half of mile southeast of the large pile and covers about nine acres.

The mill was built on the site of an old lead smelter by United States Vanadium Corporation (USV) in 1941 to furnish vanadium to the Metals Reserve Company, a company set up by the Federal government for the purchase of strategic materials needed during World War II. Reprocessing of the vanadium tailings for the recovery of uranium was begun by USV in 1943 for the Manhattan Project. The early mill operated until 1946, then was shut down

until 1949 when the Vanadium Corporation of America (VCA) contracted to sell uranium to the AEC. VCA leased the property, then later purchased it. Plant operation continued until March 1963 when the mill was shut down permanently. VCA retained ownership of the mill site and adjoining property until 1967, when VCA was merged into the Foote Mineral Company.

The initial milling capacity of about 175 tons of ore per day was expanded to 430 tons/day by 1956 and to 750 tons/day by 1958. Ore averaging 0.29% uranium oxide and 1.60% vanadium oxide was delivered to the Durango mill from mines of the Uravan Mineral Belt, Dry Valley Carrizo, Cove Mesa, Placerville, Hermosa Creek, Lightner Creek, and Monument Valley. The company also purchased ore from independent operators and processed ore and upgrader products from company-controlled properties. All feed material was hauled to the Durango mill by truck.

In 1976 and 1977 the Ranchers Exploration and Development Corporation purchased the entire site except for two small parcels which were deeded to the Colorado Highway Department and the La Plata Electric Co. Ranchers proposed to move the tailings to a site away from Durango and reprocess them to recover residual uranium and vanadium. However, the proposal was withdrawn when Ranchers was unable to secure a reprocessing license in sufficient time to capitalize on a favorable contract for the sale of the recovered uranium.

3 REMEDIAL ACTION OBJECTIVES

The objective of the remedial action project at Durango is to carry out a cleanup program which results in the disposal of the tailings in a manner complying with EPA standards. Draft standards are summarized in Tables 1 and

2. Final standards for tailings disposal sites and for open lands and structures are expected to be issued in late 1981. It is proposed that the uranium mill tailings, as well as contaminated soils and materials at the Durango processing site and all vicinity properties, be combined at a disposal site to be designated at a later date. The final disposal site will be owned by the Federal government and licensed by the NRC.

By combining and stabilizing all tailings and contaminated materials at one disposal site, potential health effects caused by exposure to the tailings will be minimized, and all contaminated areas (except the disposal site) will be cleaned up sufficiently to be released for unrestricted use.

4 EPA STANDARDS AND NRC REGULATIONS

The EPA has promulgated interim standards for the cleanup of inactive uranium processing sites and associated vicinity properties (45 FR 27366-27368, April 22, 1980). These standards apply to open lands and structures in which elevated radiation levels occur because of the presence of residual radioactive materials from a designated inactive processing site. The numerical criteria are outlined in Table 1 below.

Table 1. EPA interim standards for remedial action cleanup

Type of radiation	Remedial Action (RA) standards
External gamma radiation (EGR) in dwellings	RA required if EGR greater than 0.02 mR/hr above background
Radon daughter concentration (RDC) in dwellings	RA required if RDC greater than 0.015 WL including background
Ra-226 concentration on open lands	RA required if Ra-226 greater than 5 pCi/gm

Legend

mR/hr = milliroentgen per hour

WL = working level, or RDC per liter of air that results in eventual emission of 1.3×10^5 MeV of alpha energy

pCi/gm = picocuries per gram

Table 2. EPA draft standards for tailings disposal sites

ELEMENT CONCENTRATION IN SOURCES OF UNDERGROUND DRINKING WATER		
Element	Maximum permissible concentration in ground water	
Arsenic	0.05	milligram/liter
Barium	1.0	milligram liter
Cadmium	0.01	milligram/liter
Chromium	0.05	milligram/liter
Lead	0.05	milligram/liter
Mercury	0.002	milligram/liter
Molybdenum	0.05	milligram/liter
Nitrate nitrogen	10.0	milligram/liter
Selenium	0.01	milligram/liter
Silver	0.05	milligram/liter
Combined radium-226 and radium-228	5.0	pCi/liter
Gross alpha particle activity including radium-226 (but excluding radon and uranium)	15.0	pCi/liter
Uranium	10.0	pCi/liter
RADON FLUX LIMIT FROM DISPOSAL SITE		
Maximum permissible radon flux emitted from disposal site	2	pCi/m^2-second

Legend

pCi = picocuries
m^2 = $(meter)^2$

The EPA has also proposed standards governing the disposal of residual radioactive materials from inactive uranium processing sites (46 FR 2556-2563, January 9, 1981). The proposed disposal standards place limits on the amounts of certain elements and substances that may be released from the final disposal site. In addition, the disposal of the radioactive material must be carried out in such a manner that there is a reasonable assurance that the limits in the proposed standards will be maintained for at least 1000 years. The proposed standards impose the following limits:

1. Averaged over a year, the Radon-222 flux at the surface of the site may not exceed 2 picocuries/meter^2-second.
2. Concentrations of contaminants in underground sources of drinking water are limited to the values shown in Table 2. Material released from a disposal site shall neither cause the concentrations of the specified elements in underground drinking water to exceed the levels in Table 2 nor result in any increase in their concentrations in water which exceeded those levels before the remedial actions. These limitations apply to underground drinking water beyond 1.0 kilometer from a disposal site that was an inactive processing site and beyond 0.1 kilometer from a new disposal site.
3. Materials released from disposal sites should not cause an increase in the concentration of any toxic substance in any surface waters. In general, "surface waters' means any bodies of water on the earth's surface that the public may traverse or enter or from which food may be taken.

The NRC does not expect to issue regulations that specifically address the cleanup and disposal of residual radioactive materials at inactive uranium processing sites. Instead, certain of the rules and criteria that apply to the licensing of active uranium mills will be used by the NRC staff to the maximum extent practicable both in deciding whether the NRC concurs with UMTRAP remedial actions and in deciding whether or not to license an UMTRAP disposal site. The NRC's criteria for disposal of tailings are detailed in 45 FR 65533-65535, October 3, 1980. The following is a summary of the NRC criteria that are most applicable to disposal of tailings and other contaminated materials from designated inactive processing sites.

1. The disposal site should be remote from populated areas.
2. Proliferation of small disposal sites should be avoided.
3. Hydrogeologic and related environmental conditions at a site should favor the long-term isolation of contaminants from humans and the environment; there should be no need to rely upon active maintenance to achieve isolation.
4. The prime option for tailings disposal is placement below grade.
5. Methods, such as liners or dewatering, should be employed to reduce the seepage of toxic materials into ground waters.
6. Sufficient earth cover, but not less than 3 meters, should be placed over the tailings to reduce the radon-222 exhalation to not more than 2 picocuries/meter^2-second above natural background levels.
7. A full self-sustaining vegetative cover or a rock cover should be established on the earth cover to reduce the potential for significant wind and water erosion of the earth cover. A rock cover is mandatory in arid and semi-arid regions where it is unlikely that vegetation will be fully self-sustaining.

5 REMEDIAL ACTION OPTIONS

The major options available for carrying out remedial action at Durango are to take no action, to perform stabilization in place, or to transport the tailings to a new disposal site and decontaminate the former processing site. This last option can further be broken down into disposal with or without reprocessing. A discussion of each option follows.

Option 1: No Action

This option consists of performing no remedial action, i.e., allowing the present situation to continue with no corrective action. This is not considered to be a viable option and is included only for comparison with the other options.

Option 2: Stabilization in-place

This option consists of decontaminating vicinity properties contaminated with tailings by consolidating all off-site contaminated materials at the Durango tailings site (after that property has been acquired by the State of Colorado). The vicinity properties would include all open lands, homes, commercial buildings, and other locations where radiation levels are higher than the EPA criteria due to the presence of tailings contaminated from the inactive processing site.

Next, all tailings and contaminated materials would be stabilized at the site. The buildings on the site would be demolished, and contaminated portions buried with the other materials.

Stabilization in place would include moving the small pile to the south of the large pile, recontouring and moving the upper portion of the large pile

to the south, construction of a retention dike system, emplacement of a soil cover to reduce the radon flux to the prescribed EPA limit, and a riprap cover for protection against erosion. Furthermore, a grouted cut-off or an alternate procedure may be required to prevent groundwater contamination.

The site would then become the disposal site and therefore, with the installation of a security fence and appropriate monitoring devices, would remain under restricted access. Upon completion of the stabilization, the State of Colorado would transfer ownership of the site to DOE, and the NRC would issue a license for the disposal site. All vicinity properties would become available for unrestricted use.

Option 3: Decontamination of the Durango Site and Transfer of the Tailings to a New Disposal Site (Repository)

This option consists of selecting a disposal site other than Durango. All contaminated materials and tailings at both the vicinity properties and the Durango inactive site would be transported by truck, slurry pipeline, or conveyor to a new disposal site. This new disposal site could be one of the locations discussed in suboptions 3A, 3B, or 3C below. In each of the suboptions, the State of Colorado would acquire both the inactive site in Durango and the new disposal site. The Durango site would be used as a temporary storage area for the tailings and other contaminated materials from vicinity properties until the new disposal site is available for the receipt of radioactive materials.

The methods and procedures for transporting the tailings and other materials from Durango to the new disposal site would be selected on the basis of potential health effects, environmental and safety concerns, accessibility, and cost. Schedules and routes would be established to minimize their impact on the surrounding communities.

The impoundment system would be either partially or completely below grade. A liner consisting of natural soils and/or synthetic materials would be used if the host rock material was not adequate by itself to minimize seepage and contaminant transport. A dike system would be constructed to retain that portion of the tailings located above grade. Following dike construction and emplacement of the tailings, a cover would be installed. The cover would consist of soil, asphalt, rock, or a combination thereof to provide the most efficient and economical cover system. The next phase would be for the long term control of surface erosion and would consist of either revegetation or the installation of riprap. In the final step of the remedial action, a security fence and monitoring system would be installed at the disposal site, and access would be restricted. Colorado would transfer ownership of the disposal site to the DOE, and the NRC would issue a license for the site.

The site selection process for a new disposal site was initiated in 1980 when the Colorado Department of Natural Resources entered into an agreement with the Colorado Department of Health to cooperate in the evaluation of candidate site areas for the disposal of the Durango uranium mill tailings. The intial site screening and evaluation was performed by the Colorado Geological Survey and its consultants. The Colorado Geological Survey identified nine potential disposal sites to the State Site Selection Committee in December of 1980. These nine sites were located within a 30-mile radius of the tailings pile and had been evaluated only on the basis of geotechnical considerations. It was the responsibility of the multidisciplined State Site Selection Committee to consider such additional factors as reclamation potential, transportation considerations, land use, land ownership, socio-economic impacts, environmental concerns, local opposition or support

for particular sites, and the need for future maintenance. Based on the results of the Committee's review and evaluation, three of the nine sites were recommended to the Department of Energy as candidate disposal sites. All three of the sites were located on privately owned land. An additional site was identified by the Committee and included in its report as a site subject to further study by the DOE. Evaluation of the four sites by DOE and its contractor, Sandia National Laboratories, resulted in one of the sites being eliminated from further consideration. Additional information which was made available subsequent to the issuance of the draft report indicated that the geologic setting, ground and surface water, resource potential, and economics all raised serious questions as to the suitability of the site. The DOE determined that it would be prudent to eliminate the site and concentrate the investigation on the remaining three candidate sites.

An important factor which will influence the viability of candidate dispoal sites is the decision for or against reprocessing. The influence of this decision on each of the three potential disposal sites will be discussed at that specific suboption.

Suboption 3A: Disposal Site at Bodo Canyon

This option would involve transfer of the land from the Colorado Division of Wildlife to the Colorado Department of Health with replacement and/or mitigation land being furnished to the Division of Wildlife. Furthermore, this exchange process would require approval from the Nature Conservancy and the Bureau of Heritage and Outdoor Recreation, U.S.A. The viability of this land exchange process is uncertain and may pose an obstacle in the disposal of the tailings in Bodo Canyon. The Bodo Canyon area is bordered by Smelter Mountain on the north, Carbon Mountain on the south, the Animas River to the east, and the drainage divide between Ridges Basin and Bodo Canyon on the

west. The area is on the opposite side of Smelter Mountain from Durango, and the sites identified are about two to three road miles south-southwest of the tailings.

There were five potential disposal sites identified in the Bodo Canyon area. It is not readily apparent that any one of the sites is capable of holding the entire two million tons of material. Future analysis during site characterization and conceptual design will address the use of engineering techniques to increase the storage volume of potential disposal sites and will consider the use of multiple disposal sites within Bodo Canyon.

The Bodo Canyon area occupies a drainage basin that covers about four to five square miles and drains directly into the Animas River. Most of the area consists of fairly steep slopes that lead into small canyons or subbasins. Bedrock or thin soil over bedrock is found in most of the Bodo Canyon area; however four of the designated sites are underlain by relatively thin deposits of mixed alluvium and colluvium. A number of bedrock formations crop out in the area and include the Lewis Shale and the Cliff House Sandstone formations.

Limited data are available for the Bodo Canyon sites and there are numerous geotechnical concerns which must be evaluated. There is sufficient data available, however, to determine that Bodo Canyon would not be a suitable site for reprocessing the tailings. The major factors in that determination include areal and slope limitations, faulting, surface water hydrology, and general geomorphology.

Trucks and conveyors are feasible methods of transporting tailings to the disposal sites. An existing dirt road leads southward from the tailings piles along the east side of Smelter Moutain. This road could be improved and used as the haul route to County Road 211. County Road 211 leads into the Bodo Canyon, but it would have to be upgraded to support heavy truck traffic. A conveyor system could also be considered to transport the tailings to any site within the Bodo Canyon area but cost must be carefully evaluated to determine if this is a viable option. The most likely route for such a system would parallel the dirt road on the east side of Smelter Mountain and County Road 211. Existing unimproved roads would have to be upgraded or new roads constructed to provide access from County Road 211 to the disposal site.

Suboption 3B: Disposal at Long Hollow Site

This option would involve the acquisition of the Long Hollow Site by the State of Colorado. This site is on privately owned land and is located about ten road miles southwest of the tailings pile. The area is presently utilized as a gathering and grazing area for sheep during the Spring and Fall.

The site is situated at the head of the Long Hollow drainage in La Plata County. Topographically, the site slopes gently from east to west and from north to south. A relatively thin mantle of surficial materials blankets much of the site. Most of the surficial materials are alluvial or colluvial deposits and consist of clays with minor amounts of silt, sand, and gravel. About 600 to 800 feet of Lewis Shale underlie the entire Long Hollow Site. The Lewis Shale consists of thick sequences of laterally persistent dark gray to black shale interbedded with thin, relatively sparse siltstone, limestone, and sandstone beds.

There are no major streams, lakes, springs, or irrigation ditches on the site. The creek that drains Long Hollow is intermittent within the site area. A small stock pond is present on the north end of the site, but it often dries up in late summer or fall. The Long Hollow drainage joins the La Plata river about 13.5 miles below the proposed site.

The Lewis Shale host rock can generally produce a minor amount of poor quality water. Detailed site studies performed three years ago in support of the Ranchers Exploration and Development Corporation's proposal for reprocessing identified a shallow zone of perched water that occurs within the fractured Lewis Shale. The water-bearing zone is confined by weathered shale above and unfractured shale below, and is thought to be present only during the wet seasons. This perched water zone must be thoroughly evaluated during site characterization and could present a problem for below grade disposal.

The first underlying potential aquifer that may be an important source of water is the Cliff House Sandstone. It lies about 600 to 800 feet below the ground surface. A test well drilled by Ranchers encountered only very minor amounts of water in the Cliff House Sandstone as well as the two underlying formations (Menefee and Point Lookout Sandstone). This scarcity of ground water, though beneficial from an environmental standpoint, may make reprocessing difficult.

Transport of the tailings to the site could be accomplished by one of three methods. First of all, a conveyor system could be used, but the economics may preclude this. Secondly, if the tailings were to be reprocessed, a slurry pipeline could be an economical and efficient method. If the tailings were not to be reprocessed, it would be undesirable to increase their moisture content. The introduction of additional water to the

tailings, although not detrimental to their safe disposal, would result in a more costly design and construction as well as a delay in project completion due to dewatering requirements.

The third method of transport is by truck; there are two possible haulage routes for truck transport. One access route would westerly two miles on Highway 160 to County Road 141, better known as Wildcat Canyon, then southwesterly about eight miles on the County road. Total haul distance using this route is about ten miles. The route through Wildcat Canyon is narrow and winding, and the added truck traffic could make the route fairly hazardous. An alternate route would be south one mile to County Road 211, then west about six miles through Ridges Basin to County Road 141, and then three miles southwest. The route through Ridges Basin would have to be improved considerably to serve as a suitable transport route.

Suboption 3C: Disposal at Pine Ridge Site

This option would involve the acquisition of the Pine Ridge Site by the State of Colorado. This site is privately owned and is located about seven road miles southwest tailings pile. The area has been used primarily for sheep and cattle grazing; however, residential development within one and a half miles of the site is planned for the near future.

The site occupies the valley floor of an intermittent stream at the head of the drainage into Wildcat Canyon. A thin layer of surficial materials, primarily alluvium and colluvium, blankets much of the site. Existing test hole data and field examination indicate that the surficial materials are predominantly clay and slightly gravelly clay, occasionally interbedded with sand. The Pine Ridge site is underlain by about 50 to 100 feet of Lewis

Shale. Although there are no test holes on the site, it is possible that there is less than 50 feet of Lewis Shale beneath portions of the site. The site is situated near the base of the formation and the Cliff House Sandstone and Menefee formation are the next stratigraphic sections. It is probable that economically significant coal beds in the Menefee formation underlie the site. These potential coal beds are shallow enough that subsidence could occur above underground workings and disrupt the tailings repository. Furthermore, if the Pine Ridge site was selected for the disposal site, future extraction of underlying coal beds would probably be precluded. Other mineral resources in the area would not be affected by the site.

The size of the drainage basin above the site is about one to two square miles. Wildcat Canyon joins Lightner Creek about 4.5 miles below the site, and Lightner Creek merges with the Animas River about two miles downstream from that point. There are no major streams, lakes, or springs on or near the site. All drainages on the site are ephemeral. Two small stock ponds are on the site and would probably have to be moved for the project.

The first potentially important aquifer underlying the Pine Ridge site is the Cliff House Sandstone. Although no drill hole or water well data exist on the site to confirm the depth of this formation or its aquifer characteristics, it is estimated that the top of the Cliff House Sandstone ranges from 50 to 100 feet below the land surface. It is possible that the Cliff House Sandstone contains little or no water. Ground water may occur in the underlying Menefee formation or Point Lookout Sandstone.

Transport of the tailings to the site could be accomplished by one of three methods. As in the case of the Long Hollow site, conveyor transport is possible but economically impractical, and a slurry pipeline could be used if the tailings were to be reprocessed.

As for truck transport, there are two possible haulage routes. One route is via Highway 160 two miles west-southwest about five miles along the County Road. This route through Wildcat Canyon is narrow and winding, and the truck traffic could make it fairly hazardous. An alternate route through Ridge Basin could be used. Access for this route would be south from the tailings pile about one mile to County Road 211, and then west about six miles through Ridges Basin to County Road 141. This route through Ridge Basin would have to be improved considerably to serve as a suitable route.

6 FACTORS FOR EVALUATION OF OPTIONS

~~In the assessment of the options for disposing of the Durango tailings, a process has been developed that~~ The following factors will be used as the basis for determining the preferred choice at Durango. These factors are directed toward meeting the requirements of the EPA standards. These factors include, but are not limited to, the following:

1. Vulnerability of the proposed disposal site to catastrophic natural phenomena (seismic disturbance, floods, land or rock slides, avalanches, extreme erosion, mine subsidence, etc.)
2. Economics of the decontamination, transportation, and stabilization alternatives, including costs for site acquisition, rights of way, construction, transportation, impoundment system, cover materials, etc.
3. Present and forecast population density surrounding the potential disposal sites.
4. Potential health effects from transporting the tailings, i.e.,

comparing the health effects of stabilizing the tailings in place at Durango with the effects of transporting the tailings to alternate disposal sites by various means.

5. Hydrology of the disposal site area, e.g., depth of groundwater table, proximity to acquifers and streams, groundwater flow rates, quality of uppermost groundwater, and potential for flowing artesian wells.
6. Characteristics (geochemical, physical, etc.) of the surrounding soils and rocks.
7. Type and condition of underlying strata.
8. Meteorological data at the sites.
9. Differences in long-term maintenance and surveillance requirements among the various sites.
10. Land use potential of disposal sites for other activities (mineral recovery, agriculture, industrial development, wildlife refuge, transportation corridor, etc.)
11. Topography of disposal site area.

7 EVALUATION OF THE OPTIONS

This section is concerned with the assessment of the various disposal site options for the Durango tailings. It should be emphasized that the assessment of each option is preliminary, and more detailed analysis will have to be conducted and included in the Environmental Impact Statement before a final decision is made. The purpose of this assessment is to make a preliminary identification of options that appear either to be qualified or

unqualified for implementation. The environmental impact studies to be conducted in compliance with the National Environmental Policy Act must be completed before a final course of action can be selected from any of the options.

Option 1: No action

This option involves no remedial action. Radon exhalation and external gamma radiation at the Durango tailings piles currently exceed the draft EPA Standards and Public Law 95-604 requires the completed remedial action at Durango to be in compliance with EPA standards. This inconsistency necessitates the rejection of this option.

Option 2: Stabilization in Place

This option involves using the existing inactive mill site as the disposal site for all contaminated material that is now already there as well as the material brought there during the cleanup of vicinity properties. Stabilization in place through reshaping of the pile and construction of a ring dike could be carried out in a manner which meets EPA standards over the short term. The cost of this option is not expected to be much lower than the costs of the other options. Although there would be no cost for transporting the tailings, the haulage cost for construction materials for the dikes, cover material, and riprap could cancel that saving. Furthermore, although the health risks from tailings transportation would be reduced, the additional risk from the construction material haulage and subsequent truck traffic could outweigh that health risk reduction. This cost and risk comparison is only speculative at this time and until further investigation is carried out to include the location of suitable cover and construction materials, a meaningful comparison cannot be made.

Notwithstanding the present lack of detailed information, it is questionable whether the existing inactive mill site could be used as a final disposal site and meet the EPA's Standards for the required time of at least 1000 years. The site is located in a populated area and the population within three miles of the pile is more than 12,000. Future development in the Bodo Industrial Park and general growth in the Durango area could result in a population of more than 20,000 within ten years. Flooding of the Animas River, high intensity rainfall, and seepage from the pile must all be thoroughly analyzed to determine the long term effect on the quality of surface waters.

These concerns will be addressed during the environmental impact investigation; however, stabilization in place may risk disruption of the tailings containment and quality degradation of the Animas River in the far future.

Option 3: Decontamination of the Durango Site and Transfer of the Tailings to a New Disposal Site

This option includes the mining and transfer of the tailings and other contaminated material from the inactive mill site and the vicinity properties to a specially engineered and designed disposal site. Following the remedial action, the Durango site would meet the EPA standards and would be available for unrestricted use. The potential for long term adverse environmental and health impacts would be eliminated from the area. There would be short term impacts, however, from demolition, excavation, and haulage activities. These include possible air quality degradation from suspended particulates, an increase in radon gas released, noise from construction equipment, and increased truck traffic in the area. Care would be taken to mitigate such impacts through appropriate engineering and construction practices.

The transport of the contaminated material to a carefully selected site and their disposal by methods using the latest engineering and construction technology, yield a high probability of achieving the EPA Standards for at least 1000 years. The Bodo Canyon sites appear to offer economical and suitable disposal options if the tailings are not reprocessed. As indicated earlier, the major items requiring further study include geomorphologic processes, faulting, surface water hydrology, and areal/slope/volume limitations.

Long Hollow appears to be a suitable site for reprocessing and disposal of the tailings; however, transportation costs, availability of water for reprocessing, and the extent of the perched water zone must be thoroughly investigated. As for the Pine Ridge site, land development activities and the minimal depth of shale could preclude reprocessing. Furthermore, the potential mineral resources conflict and site hydrology require additional evaluation.

This assessment of proposed options is based on preliminary data, and may change based on future investigations. Site characterization and related studies for the Environmental Impact Statement will ensure that the final disposal of the tailings meet all applicable standards and criteria.

8 PROPOSED ACTION

As noted in Section 7, one of the options should be selected as a proposed action in the environmental impact statement prescribed by the National Environmental Policy Act (40 CFR 1502.14). This does not imply a final selection of that option or suggest that other options will be considered less seriously. At this time it appears that one of the suboptions of option 3,

Decontamination of the Durango Site and Transfer of the Tailings to a New Disposal Site, will be designated as the proposed action in the EIS.

9 ENVIRONMENTAL, HEALTH, AND SAFETY CONCERNS

While several major considerations are involved in determining the preferred remedial action option, the following concerns warrant special consideration since they will broadly affect health, safety, and environmental quality during and after remedial action.

9.1 TRANSPORTATION

The movement of tailings from the inactive processing site to a disposal location could affect health and safety. For example, if trucks are used, the truck drivers and the equipment operators who load and unload the trucks would all be exposed to contaminated materials. Strict quality control must be exercised to prevent spills of tailings from the trucks. The times and routes of operations and the number of trucks must be restricted to limit noise and congestion. During the loading and transportation phases of the project, there may be an increased release of radon-222.

9.2 SITE SELECTION

The tailings disposal site which is selected must be in a location that is isolated from human populations and will not be disturbed by floods, seismic disturbances, and other natural phenomena. The meteorological, hydrological, and mechanical characteristics of the site must be conducive to long-term stability of the tailings and the associated contaminants.

9.3 RADON REDUCTION

The primary health risk from uranium tailings is the potential for lung cancer caused by the daughter products of the radon emanating from the tailings pile. Therefore, a cover must be designed and placed over the tailings to reduce the radon flux to a value below the EPA standard for at least 1000 years. Designing and constructing such a cover is of major environmental importance.

9.4 GROUND WATER CONTAMINATION

In areas where there is potential for ground-water contamination, a barrier system must be designed and emplaced to prevent migrations of contaminants from the tailings to the groundwater. A major concern is assuring long-term compliance with EPA standards for groundwater contamination.

10 FUTURE ACTIVITIES, COSTS, AND SCHEDULES

This Remedial Action Concept Paper for Durango is only the preliminary plan of action. The remainder of the paper describes the major activities to be performed and the costs and schedule of the project.

10.1 DATA GATHERING

Detailed data (meteorological, seismic, hydrological, geochemical, physical, etc.) are required for the potential disposal sites. DOE contractors will visit the disposal sites for suboptions 3A, 3B and 3C and will gather and accumulate all data necessary to make informed recommendations

for a disposal site selection. Some additional data are also required at the inactive site in Durango.

10.2 ACQUISITION OF THE DURANGO SITE

Since all options except option 1 require acquisition of the Ranchers Exploration and Development Corporation's property, the State of Colorado with DOE and NRC concurrence will negotiate with the owner of the site to buy the property. Acquisition of the Durango site is planned for FY 1982.

10.3 DECONTAMINATION OF VICINITY PROPERTIES

For remedial actions to begin at the vicinity properties, there must be the following actions:

1. A cooperative agreement must be signed by Colorado and the DOE.
2. Sufficient State and Federal funds must be appropriated or earmarked for the remedial actions.
3. The DOE must officially designate the vicinity properties.
4. A temporary storage site must be identified for holding contaminated materials until a permanent disposal site is selected. The most feasible storage site seems to be the inactive Mill Site.
5. Vicinity property owners must grant permission to conduct detailed radiological surveys of their properties and to perform remedial actions.
6. A contractor must be selected by the DOE to design the vicinity property remedial actions at Durango.
7. A Radiological and Engineering Assessment Report must be prepared, reviewed, and approved for each vicinity property.

8. An engineering design must be prepared for the remedial action at each vicinity property.
9. Construction contractors must be selected to perform remedial action at vicinity properties.

Once all the above actions are completed, remedial actions can commence on vicinity properties. This is expected to occur in early 1983.

10.4 ONSITE REMEDIAL ACTIONS

To implement remedial actions at the Durango site, the following activities must be completed:

1. Preparation of an Environmental Impact Statement (EIS). An EIS for the Durango tailings site is to be prepared by a DOE contractor, Sandia National Laboratories, with the assistance of Dames & Moore (a Sandia Contractor). The final EIS cannot be issued until the final EPA standards have been promulgated. If they are issued in 1981, the EIS can be issued in late November 1982.
2. Acquisition of the disposal site. The State of Colorado, with DOE concurrence, will acquire the preferred disposal site following the issuance of the final EIS.
3. Selection of a contractor to provide architect-engineer and construction-management services. The Remedial Action Contractor (RAC) will be selected by the DOE by the Spring of 1982. The RAC will use the information developed under the UMTRAP technology development program, the Remedial Action Plan, the draft EIS and to develop detailed designs and issue subcontracts for moving the tailings to a new disposal site.

4. Onsite remedial action efforts. An outline of the remedial action process at Durango is shown in Figure 4. It is expected that remedial actions to decontaminate the Durango site will be undertaken in 1984.

10.5 BUDGET ESTIMATE

The preliminary budget estimate for this program is 45 million dollars through FY 1988. This estimate is in 1981 dollars. Of the total cost, about 70 percent is estimated to be for the remedial action itself with the remaining 30 percent being the cost of environmental analysis, engineering, site acquisition, and maintenance and surveillance activities.

10.6 PUBLIC PARTICIPATION

The Durango Task Force will hold public hearings and meetings periodically so that current information can be provided to the community, as well as to allow the populace to help determine the best alternative for remedial action on the Durango and vicinity property contaminated material to provide for the exchange of current information and to assure that the local populace has ample opportunity to participate in the decisions affecting the cleanup of the Durango tailings site and the associated vicinity properties.