United States Department of the Interior

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IN REPLY REFER TO:

L7619 (RMR-PSE)

MAY 10 1994

Secretary
U.S. Nuclear Regulatory Commission
Washington, DC 20555
ATTN: Docketing and Services Branch

Dear Sir or Madam:

The National Park Service (NPS) has reviewed the Notice of Intent to Prepare an Environmental Statement (EIS) for the Reclamation of Atlas Corporation's Uranium Mill Facility at Moab, Utah, that was published in the *Federal Register* on March 30, 1994. We are pleased that a decision was made to prepare an EIS, and we look forward to participating as a cooperating Agency in the EIS preparation.

As you know, NPS manages five units of the National Park System that will be affected by decisions regarding the reclamation and closure of the Atlas Moab Tailings Impoundment. These units include Canyonlands, Arches, and Grand Canyon National Parks and Glen Canyon and Lake Mead National Recreation Areas. As we indicated in our comments on the Environmental Assessment, we believe that an unlined 11-million ton uranium mill tailings pile over the shallow alluvial aquifer immediately adjacent to the Colorado River for the next 1,000 years represents a significant, long-term threat to the resources and public use and enjoyment of downstream units of the National Park System. In particular, we are very concerned about flooding and ground-water induced threats to the Colorado River resulting from permanent disposal of uranium mill tailings at the Moab site.

The enclosed comments provide a more thorough explanation of the concerns that we have with respect to this licensing activity. We look forward to our meeting with Nuclear Regulatory Commission officials in Washington, D.C. on May 16, 1994.

Our contact for this project is Mr. Noel Poe, Superintendent, Arches National Park, who can be reached at (801) 259-8161.

Sincerely,

Robert M. Baker
Regional Director
Rocky Mountain Region

Enclosure

cc: (all w/enc.)
Director, Uranium Recovery Field Office, Nuclear Regulatory Commission, Lakewood, Colorado
U.S. Fish and Wildlife Service, Region 6, Regional Director, Denver, Colorado
Director, Utah State Office, Bureau of Land Management, Salt Lake City, Utah
Environmental Protection Agency, Region VIII, Denver, Colorado, Mr. Wilson

COMMENTS

Notice of Intent to Prepare An Environmental Impact Statement
Reclamation of Atlas Corporation's Uranium Mill Facility
at Moab, UT
Nuclear Regulatory Commission (ER 94/0289)

National Park Service
May 9, 1994

GENERAL COMMENTS

Alternatives

The EIS should include an in depth assessment of alternatives ranging from in-place reclamation to offsite relocation of the Moab Atlas tailings. We are concerned about the lack of information available to characterize alternative locations for tailings disposal. Information should be presented in the EIS in sufficient detail to determine viability of other disposal sites. Failure to document this information biases the EIS towards leaving the tailings in place. Detailed designs should be completed for each alternative site so that an accurate comparison of alternatives is possible. The feasibility of transporting the pile to a pre-existing waste disposal facility (such as Envirocare in Toole, Utah) should also be discussed.

In additional to alternative sites, the EIS should consider alternative methods for relocation of the tailings pile (truck, rail, slurry pipeline, etc.).

Additional Studies Needed

As indicated in the specific comments provided below, we believe that a number of additional studies are needed so that the impacts of permanent placement of tailings at the Moab site may be comprehensively understood. Additional surveys and studies are also needed at alternative disposal site(s) so that the implications and feasibility of these site(s) and the impacts of transporting tailings to these sites may be adequately analyzed. Based on the need for these additional surveys and studies, we find the schedule proposed in the NOI (paragraph f) extremely optimistic. We recommend that the schedule be modified to include these additional surveys and studies before proceeding with EIS preparation. Without this information, a comprehensive assessment of the various alternatives and associated impacts cannot be carried out.

The following studies are needed to fully analyze an appropriate range of alternatives.

- Core drilling of the existing impoundment to determine the accurate depth of tailings, extent (depth) of underlying contaminated soils, and chemical makeup of tailings liquor;
- Core drilling of lands, whether public or private, surrounding the tailings and mill site to determine the extent of contamination;
- Detailed, accurate modeling of possible erosion of the existing impoundment from Moab Wash and the Colorado River for the projected 1000-year life of the Moab Atlas tailings site;

- An analysis of possible impacts resulting from seismic events on the existing site as well as alternative sites;
- Same core drilling and modeling assessments as listed above for all alternative impoundment sites;
- Detailed engineering methods and safeguards employed if NRC chooses a removal alternative;
- Analysis of all available methods of transport of tailings to alternative sites including truck, train, slurry, etc.;
- Analysis of health impacts on employees and visitors to Arches National Park from blowing dust resulting from capping or removal efforts.

Cost Comparisons

A detailed cost comparison is essential to a well-reasoned analysis of alternatives and their effects. This analysis should consider all factors contributing to each alternative, including such things as flood damage repair and 1000-year maintenance.

Cumulative Effects

The effects of the proposal must be added to other actions proposed for the area and the cumulative effects assessed. For example, how do county landfill proposals and this proposal interact? How will haul trucks, park visitors, and other area residents and visitors interrelate?

The impact analysis should also consider the effects of cumulative events (e.g. 500-year flood, earthquake of 3.5, etc.) on the pile.

Economics

Although an adequate EIS analyzes economic factors associated with each alternative, we caution that economics and the relative solvency of the Atlas Corporation should not be the driving factor in choosing a preferred alternative.

Issues Eliminated From Detailed Study

We disagree with the decision not to assess tailings impoundment impacts to aquatic or terrestrial biota. The NOI states this analysis is not important because past water monitoring efforts "...identified no contamination in the Colorado River." Monitoring results and associated environmental information offered in the 1993 Environmental Assessment (EA) and Finding of No Significant Impact do not constitute adequate study for the EIS. Monitoring of aquatic and terrestrial biota in addition to river sediments and many other parameters (detailed below) are necessary components of the EIS. More information on our concerns can be found in the specific comments.

Technical Advisory Group

Because of the high level of controversy surrounding this action and the fact that in similar circumstances, uranium mill tailings adjacent to the Colorado River have been moved to upland and/or engineered sites, we recommend that NRC consider the formation of a Technical Advisory Committee to provide advice to NRC and its EIS contractor(s) in regard to additional surveys and studies that are needed, identification and analysis of alternatives, and other technical aspects of the EIS.

SPECIFIC COMMENTS

Evaluation of Impacts to Aquatic Biota

In paragraph (c) Identify and eliminate from detailed study issues which are not significant or which are peripheral or which have been covered by prior environmental review, the NOI states that "Extensive water monitoring has identified no contamination in the Colorado River; therefore, there are no effects on river biota, and they will not be assessed." As indicated previously in our EA comments, the results of water quality sampling in the Colorado River are not definitive relative to assessing impacts to local aquatic biota or sediments. Thus, river biota (particularly biota in the immediate vicinity of the tailings pile) and the local riparian ecosystem should be studied *in the field* and analyzed. This information is needed in order to carry out adequate assessments of the short- and long-term impacts to river biota and the associated riparian ecosystem. We are particularly concerned about existing and potential impacts to threatened and endangered species living in and along the river corridor such as razorback suckers, Colorado squawfish, humpback chubs, peregrine falcons, and bald eagles that may be affected by this discharge of contaminants. This concern should be addressed in detail in the EIS. We recommend that the U.S. Fish & Wildlife Service and the National Biological Survey be contacted in regard to these studies and assessments.

Leachate from the Tailings Entering Alluvial Ground Water and Flowing toward the Colorado River

There is a need to have an independent review of ground water quality data that have been collected, including review of QA/QC and sampling protocols to insure that the data are valid. Previous analyses of impacts of leachate moving through the alluvial aquifer focused on radioactive constituents. There is a need to also look at heavy metal concentrations and organic solvents that may occur in the leachate. These constituents may have more impact and/or be more mobile than the radioactive constituents.

Event-based sampling procedures should be initiated to identify periods when contaminant concentrations may be highest in the alluvial aquifer or more discharge may be occurring from the aquifer to the river. These events might include periods when Moab Wash is flowing and flushing alluvial ground water toward the river. Also, the effect of high and low flows in the Colorado River should be investigated because the water level and flow direction of alluvial ground water are directly affected by river stage. As part of these analyses, the information requested by NRC of Atlas Corporation on March 2, 1994, with respect to hydrogeologic characterization and aquifer testing data of the tailings would be particularly important.

NRC has previously used mass-balance calculations to determine the theoretical increase of radiological contaminants in the Colorado River. The results derived from this method are only indicative of the contaminant concentrations after complete mixing of the river and the contaminant plume has occurred. The ground water plume entering the river from the tailings pile most likely travels several hundreds or thousands of feet downstream before it is vertically and horizontally mixed with the river. We believe that it is necessary to focus field investigations and modeling efforts on the near-shore area below the tailings to determine if radioactive hot spots or other contamination exist in the water, sediments, or biota.

In addition, we have no information (conceptual or quantitative) on the causes of leaching of contaminants to the alluvial ground water or to the river. Right now that problem is controlled by mitigative ground water pumping and land-surface disposal

of pumped water. How does the leaching occur? Is leaching precipitation-induced (this is a very arid site where ground water recharge is typically almost non-occurrent except in fluvial washes) or is it induced by shallow ground water fluctuations? Given this information, to what extent will tailings "capping" eliminate the leaching and associated ground water contamination problem? Will the remediation pumps remain in place and operable? If so, who will be responsible for operating and maintaining them? The costs of ground water remediation (particularly over the long-term) should be carefully analyzed.

The previous EA indicated that the projected date for completion of the ground water corrective program is December 1998. What is the basis for this projected completion date? Will not the de-contamination have to be completed prior to capping? What will prevent the wells from being re-contaminated with leachates and, if so, how will they be de-contaminated? This matter should be comprehensively addressed in the EIS.

As a related ground water matter, it is likely that the Colorado River is a regional discharge area for bedrock aquifers. If this is the case, then ground water from those aquifers would have an upward flow component toward the river and any leachate emanating from the tailings would be prevented from entering the bedrock aquifers. Instead, it would be carried toward the river in the alluvial aquifer. This scenario was not documented in the previous EA, so we do not know if this is the case or if there are other hydrogeologic conditions that need to be considered. Regional ground water flow studies are needed, or should be referenced, to allow determination of environmental impacts. Needed information includes: 1) head differentials between bedrock and alluvial aquifers and the river, 2) identify local and regional ground water recharge and discharge areas, and 3) effects of periodic water table fluctuations and capillary ground water rise in flushing chemical constituents from the bottom of the tailings pile.

As an additional point with respect to ground water, tailings are deposited to a depth of 3965 feet msl. Normal river elevation is 3960 feet msl. High flows in the spring will likely result in higher river stages, recharging the alluvial aquifer, and allowing ground water levels to rise up into the bottom of the tailings pile. Capillary rise from the water table will be another mechanism for continual wetting and flushing of contaminants from the tailings pile. Even with the top of the tailings pile covered and "capped," the bottom of the tailings pile will be open to the ground water environment and will be a perpetual source of leachate. The previous EA dismissed the importance of seasonal and daily fluctuations in ground water under/in the tailings pile with the comment that the tailings base is of "low permeability." Data should be presented to document this "low permeability." The effect of constant flushing of the base material over hundreds of years is not addressed. Is the base of sufficient thickness and competence to retain its integrity after going through thousands of high/low water cycles? This issue should also be addressed in the EIS.

Alternative Concentration Limits for Ground Water Quality Beneath the Tailings Pile

According to modeling conducted by Atlas, EPA's Maximum Concentration Limit for uranium beneath the tailings pile is and will be exceeded. As such, NRC will have to grant Alternative Concentration Limits (ACLs) for ground water beneath the pile. It is our understanding that ACLs have only been approved for remote areas where water quality degradation would have minimal impact. We question if it is appropriate to allow any incremental degradation of water quality at the Moab site due to its immediate proximity to the Colorado River and thus to the drinking water supply of

several million people who divert Colorado River water downstream. The utilization and implications of ACLs at this site should be thoroughly addressed in the EIS.

Surface Water Runoff Control

Previous documents associated with the Moab site indicated that precipitation falling on the pile will be diverted by a series of channels to Moab Wash. At a minimum, precipitation should be drained to lined settling ponds to insure that no radioactive material enters surface or ground waters. The entire issue of surface water runoff control should be comprehensively addressed in the EIS.

Geomorphic Stability of the Tailings

The tailings pile at the Moab site is located on the alluvial fan of Moab Wash. Alluvial fans are typically aggrading sections of streams. Further limiting of the active area of the alluvial fan may increase the rate at which this section of Moab Wash aggrades, making it necessary to increase the height of riprap on the upstream side of the tailings pile to insure stability for flood events hundreds of years from now.

Velocities during large flood events on the Colorado River were estimated by computer modeling. These models assume that downstream flow occurs across the entire area of inundation. It appears likely that during a large flood, much of the inundated area (on the south side of the river) will be an eddy. Therefore, downstream flow will be concentrated on the outside of the meander, and velocities against the tailings pile will be much greater than previously estimated. A velocity of 2.5 ft/sec was measured in the Colorado River at a discharge of 5300 cfs (November, 1993), approximately the same velocity predicted for a probable maximum flood discharge of 300,000 cfs. Thus, it would appear that previous estimates of velocities, and thus needed riprap sizes, are seriously flawed.

The EA states that the normal elevation of the river is 5 feet below the bottom of the tailings and that river elevation controls (and equates to) the ground water elevation under the tailings. During spring runoff, the river always rises more than 5 feet. During the 1993 spring runoff, water was against the tailings pile. What is the discharge associated with the "normal elevation" of the river? Nowhere in the EA was there information on the relationship between Colorado River stage and discharge or information on the saturation frequency of the tailings by river-controlled ground water. This information should be supplied in the EIS.

The EA also stated that a probable maximum flood on the Colorado River would crest at over 20 feet over the elevation of the tailings. No information was provided on the extent of inundation of more common floods such as the 100-year flood or the 500-year flood. Also, we point out that the EA stated that Colorado River floods are of short duration because they are caused by short, high-intensity storms. This is incorrect. Colorado River floods stem from Rocky Mountain snowmelt and can last as long as several months. Finally, we have no information on the number of inundations possible over a 1000-year time frame. Given past incidents (cited by NRC) of contaminants leaching to ground water and to the Colorado River, it would seem prudent to evaluate inundation frequencies of the tailings and to translate that occurrence into the effect on contaminants leaching and the associated impacts to Colorado River water quality and associated biota.

Catastrophic Failure

Catastrophic failure of the tailings impoundment at the Moab site and proposed alternative sites and resultant effects should be comprehensively addressed in the EIS. In particular, the EIS should address potential contamination from such a failure on Colorado River delta deposits in Lake Powell. Clays in the delta could capture radionuclides, which could then become wind-borne contaminants with changing lake levels. The EIS should state that Lake Powell will effectively function as the "ultimate sink" for any release of tailings from the Atlas tailings pile. Related to this concern, the EIS should include a comprehensive assessment of short-term and long-term risk associated with permanent disposal of tailings at the Moab site and other proposed sites.

Faulting and Earthquakes

The fact that the Moab tailings pile is located on the Moab Fault should be thoroughly assessed in the EIS. The previous EA briefly discussed the Moab Fault, however, no mention was made of ground water flow through it. Faults often provide preferred routes for ground water flow. What potential exists for leachate from the tailings pile to travel down the fault to contaminate lower aquifers, or along the fault to contaminate more distant areas of the Moab Valley?

The previous EA made a statement that very little risk from future seismic activity is postulated and then referred to the 1953 tremor. When the future seismic activity was evaluated, did the study consider a time frame up to 1,000 years in the future? The details of this study must be stated. More specifically, relying on recorded earthquakes is far too short a temporal baseline from which to extrapolate. Additional evidence from disruption of Quaternary and Pleistocene strata should be sought to determine how active the Moab Fault actually is.

Impacts of Transporting Tailings to an Alternate Site

Impacts associated with moving the tailings to any alternative site will need to be addressed in the EIS. Such impacts include mobilization of radioactive dust, release of radon gas during moving, potential for spills, transportation accidents, and worker safety.

Water Resources Monitoring

The EIS should clearly indicate the water resources monitoring program proposed for the Moab site and proposed alternative sites. The monitoring plan described in the previous EA was deficient. For example, it fails to include sufficient wells to adequately measure movement of contaminants in the shallow alluvial ground water system away from the pile. Further, there was no discussion of what action would be taken if such movement of contaminated water occurred; what mitigation has already occurred; who will be responsible for long-term monitoring; and how the monitoring program will be funded. These issues should be comprehensively addressed in the EIS.

Riprap Source Areas

The specific areas from which riprap will be obtained need to be addressed in the EIS, as well as the effects of hauling riprap to the reclamation site.

Socioeconomic Effects

The EIS should consider the effects of a catastrophic failure of the pile on the multi-million dollar tourism industry associated with the Colorado River ($10-20 million). Adverse public perception may outweigh actual adverse effect to resources (i.e., people think Lake Powell is polluted and unsafe), with a disastrous effect to the tourism industry.