3-1999

Final Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah

Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission

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Appendix J

Source Material License No. SUA 917
Docket No. 40-3453
Atlas Corporation

U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555-0001
Final Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah

Main Report
Appendices A – I

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Docket No. 40-3453
Atlas Corporation

Manuscript Completed: March 1999
Date Published: March 1999

Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
Opinion. IS environmentally acceptable. The FEIS compares the proposed onsite reclamation and subsequent monitoring and reclamation.

The final Environmental Impact Statement (FEIS) compares the proposed project to an alternative site. The FEIS describes the proposed reclamation, including the proposed reclamation alternatives, their significant economic cost, and the reduction in potential impacts. Some of the adverse impacts of the proposed reclamation alternatives included in the FEIS includes the removal of potentially affected uranium ore.

The FEIS also includes an extensive evaluation of the potential impacts associated with the proposed reclamation alternatives. The FEIS provides a comprehensive analysis of the potential impacts associated with the proposed reclamation alternatives, including the removal of potentially affected uranium ore. The FEIS also includes an extensive evaluation of the potential impacts associated with the proposed reclamation alternatives.

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Dear Sir:

Please accept the following comments in regard to the Draft EIS for the proposal to reclaim the Atlas Corrosion tailings pile in Moab, Utah. The project does not directly affect resources or users of National Forest lands for which we are responsible. However, there are two issues which may have an indirect affect on National Forest lands and visitors.

The first issue is the proposal to haul igneous rock to cap the tailings pile using Utah State Route 128. This road is heavily used by visitors going to the National Forest lands in the La Sal mountain range. This narrow and poorly aligned road would be unsafe if the current traffic is mixed with heavy, truck traffic. Migration of this safety hazard such as road closure to public use would be prudent to protect public safety. Any closure or restriction of public use of Highway 128 would adversely affect National Forest visitors, permit holders and our administrative access.

The second issue is the source of the igneous cap rock. Approximately one year ago, Atlas Corporation officials contacted the Moab District Ranger in regard to using National Forest as a rock source. We have not been contacted since, nor has Atlas actually applied for use of National Forest rock sources.

The concern we have is that any rock source on or near the La Sal Mountain Loop Road would have significant visual impacts on the scenery afforded by the La Sal Mountains. In addition, inadequacy of the existing road network for transport of significant quantities of rock material must be addressed. We feel that use of public land as a rock source is an action connected directly to the Atlas tailing proposal and should be analyzed in the EIS process.

We appreciate the opportunity to comment on this analysis and draft Environmental Impact Statement. If you need further information or assistance, please contact Gary Reynolds at (801) 259-7155, Ext. 52205.

Sincerely,

ULLEN P. CASAMASSA
District Ranger

United States Department of the Interior
OFFICE OF THE SECRETARY
Washington, D.C. 20240

Mr. Joseph J. Holomich, Chief
High-Level Waste and Uranium Recovery Projects Branch
Mail Stop TWPN 7-J9
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holomich:

The Department of the Interior has reviewed the Draft Environmental Impact Statement and the draft technical evaluation report for the Reclamation of the Atlas Mill Tailings Pile Site, Moab, Grand County, Utah, and has prepared the enclosed comments (enclosure 1). Minutes of a recent interagency meeting are enclosed for your information (enclosure 2).

Many questions surrounding the environmental impacts of the Nuclear Regulatory Commission (NRC) proposal remain unanswered. The documents do not adequately address issues raised during the scoping process, nor do they answer critical questions raised during development of preliminary drafts. We recommend that the NRC not releases a final EIS until identified inadequacies can be rectified.

2-1

Many questions surrounding the environmental impacts of the Nuclear Regulatory Commission (NRC) proposal remain unanswered. The documents do not adequately address issues raised during the scoping process, nor do they answer critical questions raised during development of preliminary drafts. We recommend that the NRC not releases a final EIS until identified inadequacies can be rectified.

2-2

In our comments, the concerned bureau may recommend to the Department that this matter be referred to the Council on Environmental Quality.

We appreciate the opportunity to review the Draft Environmental Impact Statement and the draft technical evaluation report.

Sincerely,

WILLIAM H. SMART
Director, Office of Environmental Policy and Compliance

Enclosures

General Comments

The Draft Environmental Impact Statement (DEIS) addresses a wide range of complex issues associated with the reclamation of uranium mill tailings at the Atlas site. However, many important issues previously raised by the Department have not been adequately addressed. Important issues previously brought to your attention but still not resolved include overall risk to Colorado River resources, and air pollution risks to employees at Arco National Park Headquarters. We remain concerned about the uncontrolled degree of potential impacts to the Scott M. Matheson Wetland Preserve, located across the river from the Atlas site.

On March 14, 1994, the Times Independent newspaper in Hoob reported that Atlas had dropped all Castle Valley sites as possible sources of borrow material. This action by Atlas renders impossible any meaningful assessment of environmental impacts from mining and transporting of borrow materials, and further calls into question the adequacy of this DEIS.


A major concern is related to the overall presentation of information in the DEIS and the Draft Technical Evaluation Report (DTER). It is imperative that information be integrated between these two documents. For example, many analyses and results are presented in the DTER; however, much of this information is not presented, or even cited, in the DEIS. As such, the DEIS contains major omissions with respect to the presentation of critical information and related analyses. (Sections of the DEIS where such omissions occur are noted in the Specific Comments provided below.) Furthermore, in order to carry out an adequate and meaningful evaluation of the reclamation of uranium mill tailings at the Atlas site, the "open issues" outlined by MRC in the DTER must be satisfactorily addressed and then incorporated into the analyses contained in the final statement (PEIS). It is our understanding that the license is in the process of resolving these open issues. The PEIS should not be issued until these open issues are addressed so that the findings may be incorporated into the PEIS.

As a related concern, page 511 of the DEIS states that the DTER "focuses on engineering aspects for the Atlas proposal and its compliance with Appendix A to 10 CFR Part 40, whereas this DEIS focuses on the environmental aspects." Based on a review of the 13 Appendix A Technical Criteria in 10 CFR 40 (Appendix C, page 1-1 of the DEIS) and the outstanding, "open issues" (Table 1-3, DTER, pages 1-19, 1-27), it is very obvious that while the DTER focuses on "engineering aspects," these aspects have definite environmental implications for the project. For example, the "open issues" described in Table 1-3 of the DTER include the presence or absence of a fault, the potential for subsidence, seismic design, slopes of the disposal cell, liquefaction potential, ground water flow directions, and compliance with groundwater protection standards for the site. As stated above, these "open issues" on the short-term and long-term environmental consequences of the reclamation plan and, as such, must be fully considered in the DEIS. These issues, therefore, address information from both the DEIS and the DTER.

10 CFR Part 40, Appendix A Criteria

We understand that the license may propose alternative criteria to the criteria in Appendix A to 10 CFR Part 40. However, as the DEIS states in Section 1.4, page 1-1, any proposed criteria must be equivalent to or better than the applicable A criteria (i.e., 1-10, 1-11, 1-12, 1-13, 1-14, 1-16, 1-17, 1-21, 1-23, and 1-24).

The DEIS has not proposed the on-site reclamation design standards proposed by the licensees are "equivalent to or better than" the Appendix A criteria (i.e., 1-10, 1-11, 1-12, 1-13, 1-14, 1-16, 1-17, 1-21, 1-23, and 1-24). The on-site reclamation plan as proposed in the DEIS and in the Appendices violates the 11 criteria listed above and cannot be expected to reasonably achieve compliance with these specific criteria. For example, throughout the DEIS, there are statements that contaminants will continue to leach into the ground water and the Colorado River (Sections 2.1.4, 2.4, 2.4.1, 2.4.1.5, 2.4.1.7, 2.4.2, and Table 3-4-1 in two places). There is no evidence from which to draw the conclusion that the hydrologic and other natural conditions of the licensees' proposal will promote immobilization and isolation of contaminants. This is also true of the other 11 criteria listed above.

Based on our review of the DEIS and DTER, we have two major general concerns with the technical analyses contained in these documents. One general concern is related to the extent and nature of analyses and the completeness of the site data. Based on our knowledge, no chemical analyses have been performed on the sediments in the tailing site areas (characteristics of the tailings, pages 2-6 to 3-9, DEIS). Furthermore, the true chemical variability within the tailings material is not apparent from the data that are shown.

Characterisation of Tailings Solids

As stated in previous letters (including the letter from the Superintendant, U.S. Bureau of Mines, dated 9-1-91 from the Department of Interior, Superintendant, U.S. Bureau of Mines, dated 9-1-91 from the Department of Interior, and the current draft of this report), the lack of adequate characterization of the tailings solids is an important issue.

The lack of information on the chemical composition of the piles and contaminated sites is an important issue. Without knowing what is in the tailings material, it is impossible to predict the potential results of failure of part or all of the tailings and its impact on the Colorado River or the air pollution resulting from the remediation process. If the contents of the pile or tailing site are not clearly established, it is unclear whether the potential water pollution effects of failure of the pile or part of the pile into the Colorado River or the air pollution resulting from remediation processes are preventable and supportable. If the contents of the pile or tailing site are not clearly established, it is unclear whether the potential water pollution effects of failure of the pile or part of the pile into the Colorado River or the air pollution resulting from remediation processes are preventable and supportable. If the contents of the pile or tailing site are not clearly established, it is unclear whether the potential water pollution effects of failure of the pile or part of the pile into the Colorado River or the air pollution resulting from remediation processes are preventable and supportable.

Commenting on this question, the licensees have generally been limited to statements that the pile contains "uranium mill tailings," references to the

J-2
chemical analyses performed on tailings leachate. On one occasion, an Atlas representative cited records that had been kept on mill output as describing the contents of the pile. Some of these responses directly address the question of the characterisation and concentrations of contaminants in tailings solids, and their spatial distribution within the pile.

Water Pollution Risks

The overall message of the DEIS seems to be that the risks are small outside of the immediate mining area in the vicinity of the pile. This conclusion is premature for the following reasons:

2-10
1) Not all the parameters of concern or sites suggested by this Department have been monitored, as is further documented in our detailed comments below.

2-11
2) The impacts of contaminated sediments upon aquatic organisms downstream from the pile are potentially very important but hardly discussed at all in the DEIS. The discussions in Appendix F are spotty and incomplete.

2-12
3) The radiological contaminants moving from the pile into the river have been incompletely studied, and some of the radioactive isotopes are of particular concern due to potential human impacts via the following pathways:

A) Fish flesh consumption,

B) Drinking: water sources downstream, and

C) Direct human contact with the river and its sediments.

Risks from these pathways were not well analyzed in the DEIS, and no fish fillet samples from the mining zone area have been analyzed for radiological contamination despite previous requests that this be done. If a catastrophic failure of the tailings pile occurred, radiological wastes would be distributed along sand bars and other backwater habitats heavily used by river rafters. The potential risks were not adequately covered in the DEIS.

4) Consuming non-radiological hazardous substances coming from the pile and accumulating in fish downstream of the pile, the vanadium, selenium, and mercury accumulations cited in the DEIS are of particular concern (vanadium and mercury are compounds of sedimentary origin and associated with pyrite and pyritic sand). A 1989 paper by Steven Hamilton published in the Journal of Environmental and Ecological Safety (Volume 2, pages 134-143), concluded that vanadium and selenium for metals most toxic to three endangered Colorado River system fish, and that a form of selenium (selenite) was the next most chronic. Mercury is a special concern because of bioaccumulation aspects. Cumulative impacts and combined additive or synergistic effects of the many combinations of contaminants coming from the pile need to be carefully evaluated. We believe they have not yet been fully considered. The DEIS should indicate that all pollutant loads must be permitted under the Clean Water Act and monitored to meet water quality standards. In the case of the Atlas pile, there are special reasons (underground fish presence and heavy human contact and large drinking water sources downstream) to not allow considerable unreported amounts of pollution to continue to flow into the Colorado River.

2-13
5) Potential hazards to humans or aquatic biota utilizing Lake Powell are not fully documented. Although it is true that many metallic contaminants will end up in the inflows to Lake Powell, it is not clear what those hazards will be or if they will be mobilised to cause problems in Lake Powell. There are several important potential sources of remobilization and transformation of contaminants in Lake Powell inflow sediments:

A) There are enough carbon sources in these sediments to promote microbially-activated reducing subsurface environments. Metals can be reduced to more mobile and less toxic forms. Also typical of such environments is biocatalytic (biotransformation) of sediments by worms and fish, as well as biomineralization by bacteria. In such sludgy, fluctuating-water environments, algae often mobilizes and transforms metals to different forms. Via such mechanisms, toxic metals can be mobilized and changed to forms which are more biologically hazardous.

B) As the level of Lake Powell falls (which it does on a regular basis), previously deposited sediments are exposed and eroded by the river channel as it moves around meandering its way downstream. This re-suspends metals which were previously trapped in the sediments. Some of these metals may now be in the more mobile and biologically active forms, as discussed above.

Air Pollution Risks

Recent conversations with the Director and other experts at the Lovelace Biomedical and Environmental Research Institute, a Department of Energy (DOE) laboratory in Albuquerque, confirm that the sections of the DEIS discussing air pollution risks are inadequate. Any risk to staff at Arches National Park would more likely be due to risk from hazardous respirable particles than from radon, and without knowing what is in the pile, it is impossible to ascertain which hazardous substances are involved or the degree of the risk to employees of the National Park Service (NPS). The main emphasis of the DEIS risk assessment on air was modelling of radon combined with some general statements concerning particulates. This oversimplified approach is inadequate. For example, if the amount of arsenic in the pile and in other contaminated sites fails to be disturbed is unknown, how can we possibly know if respirable particles of arsenic will be a risk to employees at Arches headquarters one mile downhill? The same is true of other respirable particles which might be hazardous due to toxicity other than arsenic. If radon is not the true potential hazard a mile away but various types of respirable particles are the true hazard, we must know what the in pile and contaminated site soils which will be disturbed before we can adequately assess the true air pollution hazard.

Consistency with Other Reclamation Efforts

Another general concern which we have is with respect to the consistency of the reclamation of the embank tailings relative to the reclamation of other uranium mill tailings adjacently to or near the Colorado River or its tributaries. More specifically, at a number of sites, reclamation activities were begun near the Colorado River and its tributaries to upload engineered sites. Presumably, these reclamation activities were based on findings that permit sites adjacent to or near these drainages were not appropriate in terms of long-term performance of the environment and/or human health. This address this consistency issue and clearly state why the Atlas site is different from the others. If RA, we are concerned that the consistency issue be addressed clearly and thoroughly in the current Atlas site immediately adjacent to the Colorado River.

Estimated Costs

The DEIS states that Atlas estimates the cost of on-site reclamation to be $1 to $17 million (Summary, page xxii (Section 5.1 pages 5-1 states $1 to $14 million in the same price range as Atlas provided for the 1993 Environmental Assessment (EA)).

Because the reclamation design has changed considerably since the design offered in the 1993 EA, we are concerned that the costs have not changed as well. Following is a list of some of the major design differences which become obvious in reviewing Section 3.1.3.1:
concentrations in the river (not originating from the pile) will continue to remain stable and unimportant. If the estimated flow from the pile to the river are very low, and if all contaminants of concern were considered, which has not been done here, the effect of the leachate on the river water quality may be very low and therefore less than indicated.

Similarly, the DEIR contains no basis for the statement in the DEIR that "The hypothetical tailings pile failure at the Atlas site would have a relatively large, short-term impact (i.e., several weeks) and a small long-term impact on water quality, which would likely be undetectable after a short time period (e.g., months to several years) after the failure." It is admitted in the DEIR that the pile is currently having some impact on water quality in the Colorado River adjacent to the tailings pile (i.e., in the mixing zone). It is also admitted in the DEIR that in the mixing zone, the concentrations of some contaminants such as mercury and selenium are elevated in fish tissue above known concern levels. Many statements are made in the DEIR about contaminants in the river up and downstream and how the DEIR authors do not believe the impact will be very significant outside of the mixing zone. All such statements, in our opinion, are premature. The minimum data set suggested by this Department has not been collected. We understand that the data for the site has been encountered during the 1991 river sampling, which was part of the reason that sampling was called back, was not the fault of the licensee. As a result of various circumstances, the information collected to date is less than this Department considered as the minimum data set to support analyses and related conclusions for the DEIR. The number of analyses and replicates in various media was cut back quite significantly, so we do not yet have the minimal information needed to fingerprint the river in the river samples and thereby begin to determine whether the sources are the tailings pile or other sources. Only a third of the replicates requested were completed. Information requested on total organic carbon (TOC) levels, radioactivity levels in fish, bacteria, populations of bacteria in the mixing zone, and volatile sulfides (VOS) sediments, clogging agents, and various other data were not collected, nonexistent, inadequately documented. Information collected by the licensee for selenium, cadmium, thallium, mica, mica, Pt total dissolved solids (TDS), sulfate, sulfides, and total solids (TS), are all subject to quality analysis, questionable. Buildings and holding time samples at the sites in Colorado... Each of these sites was originally located along the Colorado River, and both tailings piles were essentially at locations at which standards could be achieved.

Page 47, Paragraph 1.e.: It is stated in the DEIR that "The tailings can be disposed in the Colorado River basin. In the large area around the tailing site, the area was determined to be suitable for disposal in the river. However, we have consistently seen that the proposed area is impossible to properly characterize risks to the Colorado River water quality. The site is not described in the DEIR. The DEIR states that the purpose of disposal in the river is to dispose of remedial action (RMA) plans, but we do not know what is in the pile. Without this information, related conclusions contained in the DEIR are unsubstantiated.

Page 49, Paragraph b.: The DEIR states that "The increase in contamination should be too slight to have any appreciable long-term impact on land uses along the river." Since the chemical composition of the tailings pile is not known (as noted above), the basis for this conclusion is unclear. More information should be provided to substantiate this conclusion.

Page 51, Paragraph e.: We do not agree that there is enough background and baseline data to demonstrate that the Colorado River would have a "small, generally undetectable impact on surface water quality." This overall conclusion is implied by the statements in section 4.6.1.5 that pile-source ammonia and gross alpha
Page 3-4, Paragraph 3: In the description of surface runoff and drainage control on the tailings piles, there is no mention made of the dynamic nature of Mosh Wash in terms of relocation of the wash over time. No reference is made in this section to the floodplain analysis conducted on Mosh Wash.

2-36 It would be helpful to "be ready to understand the dynamic nature of Mosh Wash" by including language in this section that describes the current trend of sediment aggradation as cyclic. The Wash very likely undergoes periods of sediment aggradation and then degradation, dependent on several factors such as sediment supply and the timing and magnitude of flood and/or debris flow events, which will have a direct influence on the resultant location of the Wash. This, in turn, could have an influence on the function of erosion control structures.

Paragraph 3: As intimated in the DTSR, maximum acre is estimated to be 21 feet below the toe elevation of the tailings impoundment. If the channel of the Colorado River migrates toward the impoundment, there may be substantial adjustment of the rock 'spoon' constructed at the toe. There is no reasonable guarantee that the rock will fall into place in such a way that it adequately provides protection for the impoundment structure. This potential risk should be discussed in this section.

Page 3-19, Section 3.1.3. First Paragraph: "Sand would be obtained from various sources at the Atlas site." To obtain material classified as "sand," a screening plant would be required on-site to sort the properly graded sand from the alluvial pit run. Noise and dust from this screening plant should be addressed.

Page 3-13, Section 3.1.4: How was it determined that "direct gamma radiation...would be indistinguishable from background levels?"

Page 3-13, Section 3.1.7: A Spill Prevention Plan should be developed for future storage and handling at the site.

Page 3-13, Section 3.1.8: The DEIS states that "because the reclamation design is adequate to provide protection against flooding and erosion..." The DEIS, in 1994, the impact assessment presented in this DEIS does not assume that the tailings pile failure is caused by the hypothetical flood. Rather, these assessments assume that the pile fails by some arbitrary mechanism and that the hypothetical flood occurs simultaneously to transport the tailings into the river.

The DTSR identifies both seismicity and erosion protection as open issues, meaning they are not adequately resolved and the project would not be approved until they are resolved. This was not the case for the DEIS, which assumed adequate protection against flooding, erosion, and a tailings pile failure caused by a hypothetical flood. The DEIS should have thoroughly assessed the impacts associated with a flood event, a seismic event and additional controls on the river channel and USGS USGS study, on the Colorado floodplain and USGS USGS study report on the Colorado floodplain.

2-42 Page 3-13, Section 3.1.8, Paragraph 2: This section should make reference to the PM analysis and the dynamic nature of Mosh Wash.

Page 3-17, Section 3.2.1.3. Ellery Pipeline: Line 6 of this paragraph states that under the alternative to move the tailings piles to another site, "Water from the tailings piles would be obtained from the Colorado River and/or wells on the Mosh site." This possible water depletion from the Colorado River is not identified in the Biological Assessment provided to the BLM for consultation on the proposed action. The EA identifies the proposed action as retaining the tailings piles on the Mosh site and this is the action that is being consulted on. Any quantity of water taken from surface sources and from shallow ground water aquifers in contact with the river (i.e., the Quaternary aquifer)
would be considered to be depletion from the Upper Colorado River Basin and would have less impact on the fishery. However, it could cause reproductive impairment and a reduction in sexual maturity and adult recruitment to the population. There does not appear to be sufficient biological evidence to support this conclusion.

Page 248, Section 2.4.4, Paragraph 4: This paragraph incorrectly identifies Alpena as the site of the tailings piles that failed. The text states: "The hypotetical tailings piles would be expected to produce only a slight level of contamination of lands along the river..." Since the chemical content and distribution of solids in the pile is not known, this conclusion is unsubstantiated.

Page 249, Table 2.4.4-1: Summary Comparison of the Impacts of the Atlas Proposal and the Plateau site alternative. Under "Surface Water" for the Atlas proposal, the table states that "Threatened or endangered bird species that may visit the area of the site should not be affected." And that "Contamination of lands along the Colorado River as a result of the hypothetical tailings piles..." is too slight to affect plant or animal populations. What is the basis for this determination? A hypothetical tailings piles failure should be evaluated for impacts of contamination uptake through the food chain. A tailings piles failure would increase the contaminant loading to the river, increase the contaminant loading in the associated aquatic biota, and could biologically contaminate species feeding on aquatic plants, like bald eagles, waterfowl, and songbirds. Under the impact comparison of wetlands for the Atlas proposal, the DEI states that "The hypothetical tailings piles failure could result in a level of contamination in Mead Marsh." (I.e., the Scotts Meadow Preserve). As stated in the our March 20, 1999, letter to H.B., this wetland complex is located on the opposite side of the river from the tailings pile and is a critical bandonner habitat and nursery area for endangered fish. Ground water flowing down the Bighorn and Placid Valley systems, beneath the tailings piles, and then onto the salt dome beneath the site, would likely emerge as springs not in the river, but on the other side of the river in the Mead Preserve. If any groundwater contamination does infiltrate into this potential pathway, it could emerge immediately across the river in the Preserve, and not be diluted by the flow of the entire river. The discussion of the potential impacts to wetlands should be expanded to include this information.

Page 250, Section 2.4.4, Table 2.4.4-1: This short section incorrectly identifies Alpena as the site of the tailings piles that failed. As providing the most recent toxicologic analysis for the Colorado Plateau and makes a mention of the Lawrence Livermore National Laboratory report that I have already found to be unreliable. The report reviewed the Atlas tailings piles and identifies the tailings piles as having exceeded the legal level of contamination.

Page 251, Section 2.4.4.1, Paragraph 1: It will be helpful to the reader who is likely not familiar with geologic time scale. It is noted that the "[surficial aquifers of Quaternary age]..." range from 9 million years old, on the order of Gilbertian impoundments. Much of such surficial aquifers in the Colorado River valley and near the Colorado River are very likely ephemeral deposits ranging in age from 9 million years old, to a few hundred thousand years old.

Page 252, Paragraph 2: The least sentence states that localized salt deposits "[have caused unevenness in the Quaternary alluvium]." This process should be readily applicable to the Quaternary alluviation, in addition to the geotechnical concerns related to within-impoundment tailings settlement.
Paragraph 1: The DEIS states that: "Most water quality standards in the river (uranium being the exception) would not be violated during a pile failure, because of the great dilution provided by the Rio Grande. As previously stated, dilution by the Colorado River should not be considered as an effective means of mitigation for contaminant being carried into the river from the tailings pile. Additionally, the impact on uranium loading, which the DEIS states would exceed water quality standards, have not been adequately evaluated.

Paragraph 2: The DEIS indicates that the alluvial aquifer supports some domestic use; however, the DEIS notes that the demand for discharge from Moab Wash, even though it flows through the site,

Paragraph 3: The DEIS notes the extensive municipal use of the Colorado River downstream of the Atlas site.

Paragraph 4: The last paragraph on 3-19 and the third paragraph on 4-44 state that two plant species, Antiramosus pubescens and Gunwite laevigata, are candidates for consideration for listing under the Endangered Species Act. The U.S. Fish and Wildlife Service no longer regards Category 1 as a candidate species for the DEIS candidate. Only species that were formerly Category 1 candidates are now considered candidate species. Therefore, the two plants, which have never been occurring in the vicinity of the project site, should no longer be listed as candidate species.

Paragraph 5: This paragraph compares the contribution of dissolved and suspended solids to the river during a hypothetical tailings pile failure to the estimated load during a 1,000 year period. This meaningless comparison understates the environmental impacts of a tailings pond failure. The DEIS does not adequately address the potential impacts of adding contaminants to a system that already exists, that is already marginal in quality will not be harmful. The DEIS does not adequately address the potential impacts of adding contaminants to a system that already exists, that is already marginal in quality will not be harmful.
will surface immediately downstream in the Colorado River. It would appear that
HSC has no intention of conducting even a preliminary survey of springs emerging in
area. Consequently, the Abajo spring system and drainages would be bypassed to
hence if any of those waters may be fingerprinted to the tailings leachate. These wetlands are likely
critical nursery habitat for at least two species of endangered fish.

The hydrogeology at this site is complex. Joint systems or secondary fractures
associated with surface drainage may recharge ground water that would be moving
beneath the site. In addition, a shallow river alluvium aquifer is also present
beneath the site. The tailings brines are reported to exceed 26,000 mg/L total
sulfate and nitrate (TDS). The river alluvium aquifer beneath the site would likely
be more than an order of magnitude lower in TDS. This significant difference in
density would result in a downward flow of the tailings leachate brines
unless a significant aquifer barrier is present to prevent it. The overall
groundwater flow system in the valley is the same as the flow of the river North
to South. Assuming that ground water will flow East to West (as the draft EIS
describes) because the river flows in that direction for a short distance past the
mill tailings site before turning South is a major flaw. See DEIS Figures 3.1-1,
Figures 3.2-1, 3.2-2, and Figure 3.1-1. These figures clearly demonstrate
the potential ground water flow pathways discussed here. They also show the
major fault line boundaries present at this site. The collapsed salt dome which
forms Hobo Valley begins in the immediate vicinity of the tailings.

Overlying the salt dome is a thousand feet of gypsum salt cap. This type
of gypsum salt cap is known to contain solution channels and caverns in Paradox
Valley near by. There are at least four potential groundwater flow regimes
which could merge near the tailings site.

Our Bureau of Reclamation (BRO) has extensive experience with this particular
hydrogeologic setting. On the East side of the La Sal Mountains in Paradox Valley
Reclamation has a major Colorado River Salinity Control Project.
Reclamation has spent years drilling holes and pumping brines which emerge from
this salt dome into the Colorado River discharging nearly 300,000 tons of salt per
year. Brines with TDS over 200,000 mg/L are also known to occur beneath Hobo
Valley. The experience gained at the Paradox site is the basis for these comments.

Density is also a major factor in understanding the potential flow paths
associated with the Hobo Site. Fortunately there is very little of the salinesalt
lakes, ponds, and pools which make up the tailings that occupies only a small fraction of the
area in the Solores River on the other side of the mountain. Nevertheless, there are
significant elevations and potential ground water flow systems around the
tailings site. First, the ground water flowing in secondary joint fractures and
pockets of brines by the surface drainage coming down Hobo Valley after
(Figures 3.1-1); second, the river alluvium aquifer; third, mill tailings leachate brines.
and their potential to come from the salt dome. Also, those dis―int—the geological
horizontal strata because they are mixing segments of the floodplain.

This conclusion consider the impingement of the piling on the floodplain
of Hobo Wash? This potential risk should be identified in this section.

Tailings brines will first mix with the river alluvium aquifer. In the
demand is over an order of magnitude higher. Therefore the leachate will―on
through the river alluvium aquifer unless a significant shallows aquifer prevents it.
This mixture will ultimately flow to the south beneath the river. Ground
water flowing in this pathway eventually come in contact with the salinity
levels and the flow is accelerated to the South. A flow pathway through solution
channels on the top only is one of several possibilities. Any ground water flowing over the
300,000 mg/L salt dome brines will rise above the brines, thereby to make a significant
influence of density. These rising dense fluids will emulsify as springs
and seeps in the Scott R. Matheson Wetland Preserve.

Some of the more toxic chemicals in the tailings leachate brines will precipitate
out with mixing with other ground waters. Others like selenium will not
precipitate out unless a strongly reducing ground water environment occurs. Even
a 10:1 dilution of the tailings leachate brines are very likely to be highly
toxic to larval fish. Several potentially toxic trace element components of the
sediments do not match the trace elements in the wetland complex food chain. This pathway is only a few hundred to a few thousand
feet to the south in the wetland complex.

Making one simple assumption, and then concluding that no tailings leachate
brines could emerge in the wetland complex is not acceptable. As the
minimum, a careful mapping of all the springs in the Scott R. Matheson Wetland
Preserve is essential to determine that toxic tailings leachate trace elements
are not harming waterfowl and endangered fish aquatic habitat. The Draft EIS
apparently concludes that only the HSC's proposed ground water pathway is
possible, and refuses to look at other possibilities. If the HSC is wrong,
critical endangered fish habitat would be harmed. The HSC must conduct a
conceptual fingerprinting water quality survey of the various ground waters
which surface within the Scott R. Matheson Wetland Preserve.

Page 4-15. Section 4.4.3.5 Tailings Pile Failures. Last Paragraph Without knowing
the concentrations of toxic chemicals in various parts of the pile, all this
discussion about how toxic the ground water would be following pile failures is
simply speculation. Parts of the pile may dry would become wet, and the pile is
of unknown but most likely heterogeneous composition.

Page 4-16. Section 4.4.4: A potentiometric surface map or an indication of the
vertical hydraulic gradients in the Quaternary alluvial aquifer would permit some
evaluation of the placement of existing monitoring wells.

Page 4-19. Section 4.4.4: The DEIS concludes that "... the tailings containments
in groundwater currently represent no hazard to public health." The section
should discuss the future projection of ground water degradation, plans for
monitoring and analysis. The drinking water well at Arches National Park
headquarters is about one mile from the Atlas site. The bottom of the well is
over 50 feet lower than the base of the tailings pile. An explanation of why
contamination of the Arches well is not considered a possibility should be included.

Page 4-19. Section 4.3.1.6: This section states that "The presence of the
tailings pile on the Atlas site has negligible impact on flood levels in the
vicinity of the site, and there is no risk to the floodplain of the floodplain.

Page 4-22. Section 4.3.1.4: Comments based on quantitative estimates such as
seepage rates should be supported with data such as the measured head gradient
throughout the site.

Page 4-23. Section 4.3.2.4: Post Reclamation Impact, Table 5.5.1: Not all the
parameters of concern are covered in this table or in the Biological Assessment
in the IS. Many of the parameters suggested by the Reclamation
Interagency Working Group were either not discussed at all or were not discussed
completely as the media suggested. Examples of problems include the following:
(footnotes were the original DQI list of the suggested parameters in the
appendix to these comments):

Acid Volatile Sulfides:

Needs to be included as a normalized parameter necessary for data
interpretation in all sediment samples.

Alkalinity as CO3:

Standard Water Quality parameter for water quality samples only.

J-8
Aluminum:
Needs analysis due to enrichment in leachate and presence of low pH. No well data. There was 450 ppm in the pond on top of the pile. Used in process.

Antimony:
It exceeded GQCR and should be discussed as a potential marker for Atlas pile wastes.

Arsenic:
Definitively include; Edelman and Group agreed. Nineteen Eighty-Eight groundwater data, river data available. 0.23 ppm in groundwater in Scott H. Matheson Wetland Preserve; 0.39 ppm in surface water of Scott H. Matheson Wetland Preserve; 0.3 ppm in Scott H. Matheson Wetland Preserve; 8.1 ppm in Scott H. Matheson Wetland Preserve; sediments 1.4 ppm in pond on top taintings in 87. Air risk concern.

Barium:
This was used as part of the process to treat radionuclides at Atlas. It should be discussed partly as a potential marker. It was 8.38 ppm in surface water of the Scott H. Matheson Wetland Preserve. The Cooper Report documented 0.167 ppm in groundwater in Scott H. Matheson Wetland Preserve. 370 ppm in Scott H. Matheson Wetland Preserve sediments, and 0.05 ppm in the water of the pond on top of pile.

Beryllium:
A hazardous metal which should be discussed. It was present in the pond on top of the pile. It was 2 ppm in sediment in the Scott H. Matheson Wetland Preserve and 0.14 ppm in the tailings liquid.

Boron:
Was 0.180 in surface water, 2 ppm in sediment (GQCR and Cooper, all Scott H. Matheson Wetland Preserve, less than 0.20 ppm in pond on top of pile.

Cadmium:
A hazard to fish and wildlife is needed and is needed of concentrations in sediments and fish tissue. The concentration was 0.013 ppm to 0.47 ppm in pond on top of pile. Permit Violation 1.1977 (Atlas) from EPA.

Calcium:
More information needed to compare to signature in Scott H. Matheson Wetland Preserve and river water.

Chloride:
More information needed to compare water signatures of Bow. 2 and Scott H. Matheson Wetland Preserve Water and River Water. There was 0.2 percent more chloride in AW-1 than in AW-2 and 3, but some worry that AW-1 is not truly a control. Lower in AW-1 than in AW-2 and 3, but still under control. Called "control" wall AW-1 at eastern corner of the site.

Chromium:
More water and sediment discussions needed; it exceeded GQCR. Part of license monitoring. Data is available from groundwater and river. It was 1.3 ppm in pond on top of pile.

Conductivity:
More discussion is needed of its potential use as a marker of pile influence. Deep water greatly elevated compared to river water.

Copper:
Copper produced at the facility exceeded GQCR. Large amount in pile, more analyses need to be done to determine potential toxicity in the mixing zone.

Grain size:
A discussion of the sediment results versus grain size as a normalization parameter is needed.

Lead:
Noted for hazards to fish and wildlife, downstream water mean higher, and now needs more analysis in sediments and tissues.

Page 4-22, Table 4.3-1: The mean selenium concentration for the upstream data is 11.6 ug/l. Most lower reporting levels for selenium are 1.0 ug/l. Why do the reporting limits in the table differ from this?

Page 4-25, Section 4.1.2.4: Chemical mass loadings may be more representative when evaluating the effects of the tailings pile on the Colorado River. Since the upstream and downstream monitoring stations are so far apart, there are numerous opportunities for the chemical concentration to change; however, a comparison of mass loadings should provide a more realistic picture of relative changes.

With respect to the Mn concentrations described on page 4-25, we agree that manganese concentrations need more investigation; this compound may be serving as one of the potential fingerprints, markers for pile contaminants. Consideration should also be given to the differences in sample processing as a likely cause in the observed concentration differences. Because of the collodial nature of Mn, it is possible that changes in the filter loading or filter size during sample processing could produce a large effect on the measured Mn concentration in the sample. This may be especially true if the downstream vs. upstream data were from different sources. The FEIS should discuss this potential effect.

Page 4-27, Section 4.1.2.4: The May 1995 sampling period to evaluate sediment contamination by trace elements and radionuclides is questionable because the sampling period is during high discharge in the Colorado River. The finer size fractions (which generally contain the largest trace-element concentrations) are probably in the suspended load during high flow, therefore, they would not be found in the bottom sediments that were sampled in May 1995. This issue needs to be addressed in the FEIS.

It is stated that sediments in the vicinity of the pile may be contaminated with alpha- and beta-emitting radionuclides and that the water column in the vicinity of the pile is contaminated with uranium. Then it is concluded that the pile contributes only trivial amounts of contaminants compared to the natural load.
2-03 coming down the river. As discussed in more detail in our previous comments a natural source of contaminants in the river does not mean that we should not be concerned about additional sources contributing to potential cumulative impacts.

Page 4-27, Paragraph 3: The DEIS indicates that a tailings pile failure, flumes, cliffs, and cliffs (which have higher levels of contaminants than the pile) would settle to the bottom of Lake Powell. The DEIS should indicate that these materials will also settle on the beaches and deltas deposits of Lake Powell.

2-04 Page 4-28, Section 4.2.3.1, Paragraph 3: The data collection on the contaminant effects on endangered species are not sufficient to support NPC conclusions.

Page 4-30, Section 4.2.3.1: The DEIS states that "The available data do not indicate that the existing tailings pile has more than a minimal impact on the water quality of the Colorado River beyond a small mixing zone near the bank. Leaving the pile in place would therefore have little adverse impact." Given the limited data available (as clearly admitted by the DEIS), who is the basis for the conclusion that "Leaving the pile in place would therefore have little adverse impact?"

Page 4-31, Section 4.2.3: The DEIS states that after a hypothetical tailings pile failure, the use of the Colorado River water for irrigation which occurs downstream in Grand County, would likely be temporarily restricted. The DEIS goes on to state that "No other uses of Colorado River water were identified in Section 3.3.3.1." What about other uses of the Colorado River downstream of the pile (i.e., river rafting in Canyonlands National Park)?

2-09 Page 4-33, Section 4.1.1.1, Post Reclamation Impacts: A major problem with this section is the failure to discuss impacts from contaminated sediments on river biota. Often sediments are a critical component of aquatic life. This section discusses water quality but not changes in the ecosystem. Other than a brief mention of a few radionuclides in this section, and a bit of anecdotal information, much of the discussion in Appendix E is the basis for the DEIS, the DEIS basically ignores this important issue. The risk to biota from downstream sediments contaminated with cadmium, mercury, selenium, and other metals and radionuclides, all need to be discussed in detail. Other parameters which need more discussion related to sediments include grain size, and total organic carbon.

Last Two Paragraphs: It is stated that an average of 25 gpm will leach to the river and the way is slowing recession and capping tests allow the flow following recession. 25 gpm was used for both the current and the estimated future conditions since it is a minimum flow that will continue to exist and the cap will not stop the leaching due to burrowing animals, lack of maintenance, etc.). On page 4-33, it is confirmed that this same amount (25 gpm) is still estimated to be entering the river. How was this estimated? Table 4.3-2 seems to indicate that the current flow to the river is roughly 210 or 25 gpm. Which figure is correct? 210 or 25 gpm? We would guess the current flow is larger than 25 gpm since a considerable flow is visible coming out of the bank and bottom. In other words, the 25 gpm may be an estimate for the current condition and the predicted condition. These uncertainties are all the more reason for additional water sampling to be done in various parts of the mixing zone at low flow conditions to determine the current flow and better evaluate the recession and capping tests. Even using the 25 gpm figure, it is stated that selenium and gross alpha concentrations are below expected and will continue to be considered low and unchanged. This is unacceptable and is the more reason why more extensive sampling should be done in the mixing zone. The mixing zone is known to be a zone where concentrations are reduced and the mixing zone is known to be a zone which is less dense than the tailings material coming down the river. The State monitoring for selenium is far too downstream to be relevant to this issue.

Page 4-39, Section 4.1.1.1, Tailings Pile Failures: Paragraph 4 states "...tailings contamination would probably be confined to the bottom sediments in Lake Powell...and would have little significant impact." Many other areas of the DEIS note contamination to downstream areas is insignificant. This is of great concern to Glen Canyon National Recreation Area (GCA). How will this affect the sediment delta areas at Lake Powell that may be significant habitat to fish species in the Colorado River drainage? Lake Powell is a world class sport fishery that draws anglers from all over the world. Much of the fish harvest from Lake Powell is used for human consumption. The Biological Assessment (DEIS appendix F) show elevated concentrations of many of the tailings pile contaminants in fish tissue (selenium) at sites downstream from the Atlas site. Can these contaminants affect the sport fish food base and be incorporated into the aquatic food chain?

Page 4-43, Section 4.2.3.4, Normal Conditions: The DEIS states that: "Tailings contamination of the Colorado River would have little impact on water quality (Section 4.2.3.1) and would thus not be expected to have toxic effects on wildlife that drink the water or prey on fish in water."

2-05 Page 4-18, last paragraph that, "Mercury and selenium contamination in fathead minnows were anomalously high-high enough to raise concerns about the safety of predators of these and other chemically contaminated organisms." On page 4-19 and 4-21, the DEIS concludes that, "the data available for this assessment are not sufficient to support a conclusion that the existing tailings pile does not have an effect on individual invertebrates...that could be present in the mixing zone or downstream deposition areas." The DEIS has also previously stated that contamination of the river from tailings leachates would continue under the Atlas proposal. Given the evidence that contaminated aquatic biota are present at the Atlas site and will likely continue to be present at the site, it is unclear how the WRC can conclude that no toxic effects would occur to terrestrial wildlife. The potential impacts of contaminant uptake through the food chain could adversely affect some species of terrestrial wildlife, especially those feeding on the aquatic biota. Biomagnification through the food chain should be addressed as a potential impact in the DEIS.

Page 4-71, Section 4.8, Radiological Impacts: This recognizes the hazard associated with wind blown dust containing radionuclides affecting local populations and depositing on plant and soil surfaces. Lake Powell and the Colorado River represent a very dynamic system. In the last three years alone, the water surface elevation at Lake Powell has risen 60 feet, at times rising nearly 60 feet in a single year. The inflow delta of the Colorado River in a state in the following years the lake stretches into the lower reaches of Canyonlands and Canyonlands. During such conditions, the delta high water locations downstream is Cataract, Rite, Bar. As these deltas go through cycles of inundation and exposure, trapped radionuclides are resuspended over and are aerated. As these dusts are resuspended, drying will occur and windblown dust will be blown to surrounding areas. This will result in impacts to local populations and in soils on active grazing allotments.

Page 4-73, Section 4.8.1.1: The DEIS should present data and discuss the potentially affected areas. It is not clear from this section whether all of the radionuclides are present or not. The DEIS should also include discussion of how radionuclides considered radionuclides in the uranium-234 (U-234) and the uranium-235 (U-235) decay chains. We assume uranium-235 (U-235) chain was ignored because each of the radionuclides considered radionuclides in the uranium-235 chain would be in the unique deposit of the uranium-235 (U-235) decay chain. One of the number of
the U-238 decay chain, actinium-227, presents a more significant radiation hazard than that of the members of the U-238 decay chain. Despite its lower activity concentration in the tailings, the FEIS should include the contribution of the U-235 decay chain to a recalculation of the health risks resulting from the irradiation of tailings particles.

The radioactivity in uranium mill tailings is not uniformly distributed. The smaller grains of tailings tend to contain higher concentrations of radioactivity. The "radioactive" fraction of the tailings may contain several hundred Ci/g of radium-226, but the "alluvial" fraction may contain several thousand Ci/g of radium-226. The "alluvial" fraction may be present today as a fine, dry powder; they are named on the basis of their original location in ponds associated with the processing plant. The location of the tailings pile, if known, should be presented in the FEIS. The concentration of the radioactivity in the smaller particles tends to result in higher radiation doses due to the irradiation of tailings particles (the smaller particles are mixed more deeply into the lumps). Different radionuclides may have different distributions as a function of particle size. The Inorganic Toxicology Research Institute (ITRI) studied uranium mill tailings and determined that radiological dose calculations should use an activity median aerodynamic diameter (AMAD) of 11 microns for thorium-230 and 13 microns for thorium-234. The average tailings may contain those that were studied by ITRI. The FEIS should at least address the question of the distribution of radioactivity as a function of particle size, and make appropriate modifications to the radiation dose calculations.

2-96 Page 4-11. Section 4.3.4. Ground Water: Under the cumulative impacts to groundwater, the DEIS fails to address the issue of the contamination of the Quaternary alluvial aquifer and its effect on the Colorado River. There is a hydrological connection between these two bodies of water and, over the life of the tailings pile, considerable amounts of contaminants are expected to leach into the groundwater and, from there into the Colorado River system. The DEIS states that "no extensive use of the groundwater from the Quaternary alluvial aquifer in the vicinity of Humb is anticipated in the foreseeable future," and that "no such cumulative impact would be expected because the Quaternary alluvial aquifer is not anticipated. In RNC stating that since no depletions from this groundwater are anticipated, contamination of the aquifer is not considered an important impact to the Colorado River." The DEIS states that, for example, "It is RNC stating that since no depletions from this groundwater are anticipated, contamination of the aquifer is not considered an important impact to the Colorado River."

2-99 Page 4-12. Section 4.3.4. Surface Water: The DEIS states that "negligible hydrological impacts associated with the tailings are anticipated at the site location of the Plateau site or the Plateau site. The DEIS fails to contribute appreciably to any cumulative impact." The DEIS states that "Water quality standards would not be exceeded." This conclusion is supported by the "Environmental Consequences, Monitoring, and Mitigation of the DEIS.

Beneficial Comments - DEIS

Page 4-17. Section 3.3.3: To argue that the fault directly under the tailings pile is the main fault (position taken by Utah Geological Service) or a series of faults seems to point to the complexity of the fault system. Dr. Dooling's identification in 1993 of a palaeo fault system based on observations of an arcuate buried fault scar may provide evidence for the movement related to the Humb fault and its faulting. (See Section 3.3.2.1, page 4-16.) In fact, the USGS/UTER process has produced several technical reports and several professional geologists have been quoted attempting to explain the geology under the pile, and whether faulting or subsidence is the primary concern. Twenty-one pages in Section 3 of the DEIS describe the complicated geologic processes that might be active at the tailings site. It is our opinion when the licensee produces the final draft, there will still be an argument as to whether the fault is active and capable of releasing fault displacements. Though the DEIS seems to have a favorable view on the issue of fault movement, it should be noted that the report does not discuss the possibility of fault movement. It is our belief that the DEIS is incomplete in its discussion of fault movement and should be revised to include a discussion of the possibility of fault movement.

Page 4-18. Section 4.4.4: The DEIS should state the need for the 100-year flood. Productivity is not included in the flood studies. The values for the 100-year flood should be determined, allowing proper assessment of the risk of potential loss of the tailings site.
Using supercritical flow profiles will result in higher (i.e., more conservative) flow velocities to determine scour depth but lower channel and bed sediment transport rates which may be used to determine a conservative estimate for both flow velocities and water surface elevation. Both supercritical and subcritical profiles should be modeled to determine a conservative estimate for both flow velocities and water surface elevation. This section states both profiles were modeled but the data has not been included.

Page 11, Section 4.1.1. NHC2 was used to model the Colorado River 500 year flood and PF. The 100 year flood should also be modeled and the results included in the report.

Page 10, Section 4.4.4. Paragraph 46: We believe that the geomorphic instability of the Moapa Wash fan has been underestimated in the DEIS. There are at least three specific hazards associated with occupation of, and development on alluvial fans: clear water flow, channel avulsion, and migration which includes bankloss and debris flows. High magnitude, clear water flows may create a gradient of hazard associated with different areas of the fan surface. The areas at greatest risk are those in close proximity to the major active channel(s) and any areas in the Saddlle Valley or near the apex of the fan. These areas are the most likely to receive large quantities of water from the highland source area. In addition to clear water floods, hyper-concentrated and debris flows can also occur. Because of the dynamic nature of floods in a desert environment, severe scours and fill may take place during the same event and result in channel mobility and avulsion. Braided channels on fans are inherently unstable and will eventually migrate across the entire fan surface. This concern should be comprehensively addressed in the DEIS.

Page 13, Section 4.4.5. Paragraph 1: We generally agree with the conclusions of the license and contractor that the magnitude of alluvial channel migration is limited by local geologic morphology. However, some sediment redistribution is likely due to the presence of a recirculation eddy in the Colorado River. During high magnitude, low velocity flow produced by a downstream diversion, and certainly during moderate magnitude, high velocity flows, a series of recirculation eddies possibly redistribute bed material from the river right to the river left and vice versa. If the river changes its course, this redistribution could access the tailings material. While extreme migration of the active channel is not likely, some movement northward could possibly undermine the pile and result in failures.

Page 13, Section 4.4.5. Paragraph 5: An average velocity of 7 feet per second is cited as 'not extremely severe.' We disagree with this assessment, especially for the fine grained material in the pile. Velocities in the range of 7 feet per second can entrain grain sizes up to fine gravel.

Page 13, Section 4.4.5. Paragraph 6: The mid-channel bar is an indication of deposition at that location, possibly from a tributary system at Courthouse Wash and other tributary canyons. Its presence does not indicate that this entire reach of the river is depositional.

Page 13, Section 4.4.5. Paragraph 9: We agree that given the uncertainties in the likelihood of channel migration, erosion protection to cope with such an occurrence is imperative.

Page 20, Section 4.1.3.2. Paragraph 5: The license assumed that 90 percent blockage of the Moapa Wash channel was reasonable. Given the degraded nature of this alluvial fan environment, it would not be unreasonable to assume that the channel could be blocked by as much as 100 to 300 percent completion.

Page 12, Table 4.2 Analytical Results - Dissolved Constituents, Atlas Mineral Site: This table is unclear. Are these mean values from all samples? Are the units consistent within the table? If so, why is there an asterisk on one column and not the others? Are these samples from wells or other media?
Enclosure 2

Meeting Notes of April 5, 1985

The following notes were developed during an April 5, 1985 meeting in Moab, Utah, of experts from the U.S. Fish and Wildlife Service, U.S. Geological Survey, National Park Service, and the Utah Division of Wildlife Resources. Representative of Atlas Corporation and the RNC also attended the meeting.

Contaminants of Concern (COCs) and Water Quality Analyses of Potential Concern: Including Metals, Radionuclides, and Ions:

Until proven otherwise, the below list is still the list the RNC and DOI technical team needs to answer fingerprinting and risk assessment questions. A co-locating rationale needs to be provided as to why the RNC deleted any of the below parameters, and why they were not needed either for fingerprinting or risk assessment. In the absence of solid data from the pile, such justifications will be difficult to make (if we don’t know what is in the pile, how can any of the following parameters be logically disqualified?.

Note: GWQ = acronym for various Groundwater and Drinking Water Standards as
Assembled by State of Utah (Loren Horton).

Acid Volatile Sulfides:

Include as a normalisation parameter necessary for data interpretation in all sediment samples.

Alkalinity as CaCO3:

Standard Water Quality parameter for water quality samples only.

Alpha, gross:

Definitely include as major COC from pile radi. 15 picocuries per liter as the most stringent aquatic life for Utah standard has been breached at least once downstream above the confluence. River often fairly close to the standard both up and downstream. Twenty times as high in well ANN-3 between pile and river as in so-called ‘control’ well ANN-1 at eastern corner of the site. Higher yet in well ANN-13 at surface at toe of pile in March 95. Western Technologies Incorporated, in document entitled ‘Atlas Moab Hill Groundwater Detection Monitoring Program’ regarding field studies done in 1990, stated concentrations of this contaminant above the maximum values for groundwater protection (RNC Table 5c) were detected in one or both down gradient well locations.

Ammonia-NO3:

Exceeded Utah GWQ by 75 times. River Water Data Present. Definitely Include.

Alanine (Inductively Coupled Plasma/ICP method OK):

Definitely Include. Data Present in River. Definitely Include in ICP due to enrichment in lasahate and presence of low pH. No well data. 450 ppm in pond on top of the pile. Used in process.

Antimony (Sb, Inductively Coupled Plasma/ICP method OK):

Less than 3 ppm in pond on top of pile. Definitely include since exceeds GWQ and also include as a marker that comes as part of ICP scan anyway.

Arsenic (either Hydride Generation or Graphite Furnace Atomic Absorption. Do not use ICP):

Definitely Include. Edelman and Group agreed. 1988 groundwater data, river data available. 0.263 ppm in groundwater in Scott N. Matheson Wetland Preserve; 0.377 ppm in surface water of Scott N. Matheson Wetland Preserve; 0.37 ppm in Scott N. Matheson Wetland Preserve sediments; 1.1 ppm in pond on top tailings in 87. Air risk concern.

Barium (Inductively Coupled Plasma/ICP method OK):

Part of process to treat radiological wastes at Atlas; include partly as marker, comes as part of ICP scan anyway. Definitively Include 0.598 ppm in surface water of Scott N. Matheson Wetland Preserve; Cooper Report 0.147 ppm in Groundwater in Scott N. Matheson Wetland Preserve; 0.79 ppm in Scott N. Matheson Wetland Preserve sediments; 0.75 ppm in pond on top of pile.

Beryllium (Inductively Coupled Plasma/ICP method OK):

Definitely Include, exceeded GWQ. Present in Pond on top pile. 0.00325 ppm in Groundwater in the Scott N. Matheson Wetland Preserve (Cooper)

Boron, gross:

Definitely include as part of red scan. Present in Scott N. Matheson Wetland Preserve; Surface water at levels just above state standards (U.S. Data from Callins 1991). Data present in sediment. Western Technologies Incorporated, in document entitled ‘Atlas Moab Hill Groundwater Detection Monitoring Program’ regarding field studies done in 1990, stated ‘concentrations of this contaminant above the maximum values for groundwater protection (RNC Table 5c) were detected in one or both down gradient well locations.

Bismuth:

Present less than 10 ppm in Scott N. Matheson Wetland Preserve sediments. Bismuth radiomolecules possible. Should be included partly for fingerprint unless logically shown not to be an issue.

Boron (Inductively Coupled Plasma/ICP method OK):

Definitely Include, exceeded GWQ. 1.00 ppm in groundwater of Scott N. Matheson Wetland Preserve; 0.18 ppm in surface water; 2 ppm in sediment (DOE and Cooper, all Scott N. Matheson Wetland Preserve) less than 0.30 ppm in pond on top of pile.

Cadmium (Inductively Coupled Plasma/ICP method OK):

Hazard to fish and wildlife, definitely include. 0.019 ppm 0.49 ppm in pond on top of pile. Permit Violation in 1977 (Atlas) EPA.

Calcium:

Present in area naturally but needed to compare to signature in Scott N. Matheson Wetland Preserve and river water.

Chloride:

Needed to compare water signatures of Imps to Scott N. Matheson Wetland Preserve Water and River Water. However, 50 percent more chloride in ANN-1 than in ANN-2 and 3, but some worry that ANN-1 is not truly a control. Lower in well ANN-3 between pile and river compared to so called ‘control’ well ANN-1 at eastern corner of the site.
Chromium (Inductively Coupled Plasma/ICP method OK):

Definitely include, exceeded GWQ. Part of license monitoring. Data from groundwater and river. John Bradbury 1.3 ppm in pond on top of pile, less than 0.01 in all groundwater wells, comes as part of ICP scan. Comes as part of ICP scan anyway.

Conductivity:


Copper (Inductively Coupled Plasma/ICP method OK):

Definitely include: was produced at facility, exceeded GWQ. Large amount in pile, definitely include due to potential direct toxicity in the mixing area. 

Grain Size:

Definitely include as a normalization parameter in all sediment or soil analyses.

Hardness:

Definitely include in Water Samples

Iron (Inductively Coupled Plasma/ICP method OK):

Definitely include Potential issue in mixing area. Include in ICP scan.

Groundwater Data Present 68 River Water Data Present 650 ppm in pond on top of pile. Used in process. Western Technologies Incorporated, in document entitled ‘Atlas Hush Hill Groundwater Detection Monitoring Program’ regarding field studies done in 1994, stated ‘concentrations of this contaminant above the Utah State primary and secondary drinking water standards were detected in one or both down gradient well locations.’

Lead (Inductively Coupled Plasma/ICP method OK):

Hazard to fish and wildlife, definitely include. Groundwater Data Present in the Knox M. Matheson Wetland Preserve, stations along the river exceeded both the one hour state lead standard and the four day average. For aquatic: Copper report, no appreciable differences between un and contaminated well, but comes as part of ICP scan anyway. Less than 2 ppm in pond on top of pile. 1997.

Lead 310

Data present in sediments and river. John Bradbury Definitively include (833ppm). Limited data but pond above pile exceeded GWQ by 1.300 times.

Lithium:

One level is 3.7 in the pond above the pile. This is above the 3.0 ppm Slough Groundwater Biological Risk Assessment Screening Benchmark for Terrestrial Plants Listed by Oak Ridge National Lab. 1994. Since there are evident effects on river bank plants and since lithium may help fingerprint pile effects, include lithium at detection limits not greater than 0.1 ppm.

Magnesium (Inductively Coupled Plasma/ICP method OK):

Include as part of ICP scan for fingerprinting. 360 to 500 in the pond on top of the pile.

Manganese (Inductively Coupled Plasma/ICP method OK):

Definitely Include. Exceeds GWQ by 800 times. Used in process. One State upstream/downstream study indicated elevated downstream, although the downstream station was 60 miles downstream. Concentrations in the river below the pile are above two aquatic life benchmarks. Included on ICP scan anyway. See UQI comments. Western Technologies Incorporated, in document entitled ‘Atlas Hush Hill Groundwater Detection Monitoring Program’ regarding field studies done in 1994, stated ‘concentrations of this contaminant above the Utah State primary and secondary drinking water standards were detected in one or both down gradient well locations.’

Mercury (Cold Vapor Atomic Absorption Method, use lower detection limits, lower than ICP)

Definitely include due to potential importance in Colorado river, lack of data, potential biomagnification. Less than 0.0005 ppm in pond on top of pile.

Molybdenum (Inductively Coupled Plasma/ICP method OK):

Definitely include due to high groundwater concentrations in groundwater wells between pile and river, high related to background wells. High in monitoring wells below pile. Exceeded GWQ. A big jump in groundwater from background data from groundwater and river. John Bradbury 8.4 ppm in pond on top of pile. Up to 1.5 ppm in groundwater wells, less than or equal to 0.9 ppm in background well. Western Technologies Incorporated, in document entitled ‘Atlas Hush Hill Groundwater Detection Monitoring Program’ regarding field studies done in 1994, stated ‘concentrations of this contaminant above the Utah State primary and secondary drinking water standards were detected in one or both down gradient well locations.’

Nickel (Inductively Coupled Plasma/ICP method OK):

Exceeded GWQ. Definitely include. Nickel some indications of problems. Groundwater data present. John Bradbury from in groundwater and sediments include as part of ICP scan. 1.1 mg/L in tailings pond on top of pile. Equivalently data from wells. EPA Permit Violation in 1977 at Atlas. Comes as part of ICP scan anyway.

Nitrate:

Exceeded GWQ, definitely include. Look because of ammonia and contribution of the pile. Groundwater at NO3 94 ppm at ARO-1 11/94. Two hundred times as high in March 1995 in well ARO-1 between pile and river as in so-called ‘control’ well ARO-1 at eastern corner of the site. River Water Data Present less than 50 ppm in pond on top of pile. Western Technologies Incorporated, in document entitled ‘Atlas Hush Hill Groundwater Detection Monitoring Program’ regarding field studies done in 1994, stated ‘concentrations of this contaminant above the Utah State primary and secondary drinking water standards were detected in one or both down gradient well locations.’

Nitrite:

Include in all water samples. exceeded GWQ. pH needed as potential marker of
Pile influence Groundwater and River Water Data Present 2.17 in pond on top of pile. 7.1 to 7.5 in groundwater.

pm

Include in water and sediment samples. It was very low in some groundwater samples and somewhat low where seepage entered river.

Polonium 210:

Definitely include as major COC due to bioaccumulation, source from the pile, and one of the more important rad.

Potassium:

Used in the process. Include as part of Ca and Na analysis. If free, might have some use for fingerprinting leachate vs. Scott H. Matheson Wetland Preserve water.

Radioactivity in General:

Definitely include an assessment of the data related to humans and fish and wildlife. In there any risk to humans (river guides), those living in Park Service housing near Arches HQ, those eating fish frequently, those frequenting mining sites or deposition sites including deposition sites at lake Powell. At least one page discussion of this should be included in the EIS and other Atlas related studies due to the high number of people using the river. At least 3 catfish samples (fillets from at least 3 separate fish) should be assessed for rad parameters mercury and selenium. The solids in the pile and on site should be assessed in more detail and an analysis should be made of what is blowing around in the air; both radiological and chemical toxicants. What is the risk to those living nearby?

Radiouclide 218:

Definitely include; 330 picocuries per liter in pond on top of pile, groundwater and river water presents: John Bradbury definitely include as part of rad scan 734 will be determined in plant soils and need to compare data seems to be much less in the soils, concentrations in river and pile seem low, but take it if included in standard rad scan. Include for long-term monitoring. Permit Violation in 1977 from Atlas. Atlas must monitor for license. Two times as high in well ANM-2 between pile and river as in so-called "control" well ANM-1 at eastern corner of the site. Radiouclide 238 is proposed as the marker for background radiation from other sites and action levels for soil cleanup at Atlas. (Appendix F of March 95 Colonia Environmental Report, Project 84-0147).

Radon 222:

Groundwater data present not high at toe of pile compared to surface water standards (most conservative 6 picocuries per liter) atlas must monitor for license. Exceeded GWQS by 110 times. Three times as high in well ANM-2 between pile and river as in so-called "control" well ANM-1 at eastern corner of the site.

Selenium (Either Hydride Generation or Graphite Furnace Atomic Absorption, Do not use ICP):

Definitely include groundwater data present; John Bradbury Equivalent data in groundwater: but control will may not be true control. 0.4' pane in pond on top of pile. Have to monitor for license. Western Technologies Incorporated, in document entitled "Atlas Moab Hill Groundwater Detection Monitoring Program" regarding field studies done in 1990, stated "concentrations of this contaminant above the Utah State primary and secondary drinking water standards were detected in one or both down gradient well locations."

Thallium (Inductively Coupled Plasma/ICP method OK):

Include since adequate data is lacking, since GWQS was exceeded by 162 times, and since available as part of ICP scan.

Thorium 230 and 232:

Definitely include: quite a bit of 232 in the pile, probably 232 as well but no current data. Need to document radiological contribution. Thorium 230 exceeded GWQS by 750 times in water above the pile. Concern with respirable particles.
Tin:

Not a high priority but include as a free additional marker as part of ICP scan.

Total Organic Carbon:

Include in all sediment samples.

Uranium:

Definitely include. Most of the comparative data gathered so far by Atlas is Uranium-mutual. Why aren't the other uranium radionuclides being addressed? Large quantities (8.9 ppm) in pond on top of pile, elevated in mixing zone sediments Groundwater, sediment, and river water data present 16.08k-122k in wells am2.3, wet-12 exceeded GWQ by 122 times. One hundred times as high in well AMN-3 between pile and river as in so called "control" well AMN-1 at eastern corner of the site. Higher yet in well ATW-28 at surface at toe of middle of pile in March 99. Western Technologies Incorporated, in document entitles 'Atlas Noah Hill Groundwater Detection Monitoring Program' regarding field studies done in 1998, stated "concentrations of this contaminant above the maximum values for groundwater protection (HCRI Table 5) were detected in one or both down gradient well locations."

Vanadium (Inductively Coupled Plasma/ICP method OK):

Definitely include. High concentration (53 ppm) in pond on top the pile. Large amounts in pile, definitely include. Detection limits should be below 50 ug/L in water. Exceeded GWQ by 640 times. Some enrichment in groundwater wells. Groundwater and river water data present. John Bradbury some values above benchmarks; see DOI comments. Have to monitor for license. Vanadium was one of the metals produced at the facility.

Wet and Dry Weight and percentage moisture:

Include for all sediment, soil, solids, and tissue data.

Zinc (Inductively Coupled Plasma/ICP method OK):

Definitely Include because of high concentration in leachate from the pile (5.9 ppm). Potential concern for water toxicity in the mixing zone.


Arsenic

Use either Hydride Generation or Graphite Furnace Atomic Absorption. Do not use ICP. Detection limits 0.5 ppm dry weight in tissues, sediments, and soils; 0.005 ppm wet weight in water.

Mercury

Cold Vapor Atomic Absorption Method. (Detection limits inadequate in ICP scan): Detection limits 0.10 ppm dry weight in tissues, sediments, and soils; 0.004 ppm wet weight in water.

Selenium

Use either Hydride Generation or Graphite Furnace Atomic Absorption. Do not use ICP. Detection limits 0.50 ppm dry weight in tissues, 1.0 ppm DW in sediments and soils; 0.005 ppm wet weight in water.

---

For most other metals, ICP Scan is acceptable as long as the lab can meet the following detection limits:

Aluminum

Detection limits 5.0 ppm dry weight in tissues, 10 ppm in sediments and soils; 0.05 ppm wet weight in water.

Barium

Detection limits 1.0 ppm dry weight in tissues, sediments, and soils; 0.005 ppm wet weight in water.

Beryllium

Detection limits 0.10 ppm dry weight in tissues, 0.20 ppm in sediments and soils; 0.005 ppm wet weight in water.

Boron

Detection limits 2 ppm dry weight in tissues, 10 ppm in sediments and soils; 0.1 ppm wet weight in water.

Cadmium

Detection limits 0.10 ppm dry weight in tissues, 0.20 ppm in sediments and soils; 0.005 ppm wet weight in water.

Chromium

Detection limits 0.50 ppm dry weight in tissues, 1.0 ppm in sediments and soils; 0.005 ppm wet weight in water.

Copper

Detection limits 0.50 ppm dry weight in tissues, 1.0 ppm in sediments and soils; 0.005 ppm wet weight in water.

Iron

Detection limits 5.0 ppm dry weight in tissues, 10 ppm in sediments and soils; 0.10 ppm wet weight in water.

Magnesium

Detection limits 5 ppm dry weight in tissues, 10 ppm in sediments and soils; 0.10 ppm wet weight in water.

Manganese

Detection limits 1 ppm dry weight in tissues, 5 ppm in sediments and soils; 0.05 ppm wet weight in water.

MoSbdenum

Detection limits 2 ppm dry weight in tissues, 5 ppm in sediments and soils; 0.05 ppm wet weight in water.
Nickel
Detection limits 0.50 ppm dry weight in tissues, 5.0 ppm in sediments and soils; 0.001 ppm wet weight in water.

Lead
Detection limits 0.50 ppm dry weight in tissues, 5.0 ppm in sediments and soils; 0.01 ppm wet weight in water.

Strontium
Detection limits 0.50 ppm dry weight in tissues, 5.0 ppm in sediments and soils; 0.001 ppm wet weight in water.

Vanadium
Detection limits 0.50 ppm dry weight in tissues, 1.0 ppm in sediments and soils; 0.001 ppm wet weight in water.

Zinc
Detection limits 1.0 ppm dry weight in tissues, 5.0 ppm in sediments and soils; 0.01 ppm wet weight in water.

Include the following as Normalization/Standard Water Quality Parameters:

Acid Volatile Sulfides:
Include in all sediment samples.

Alkalinity as CaCO₃:
Standard Water Quality parameter for water quality samples only.

Alpha, gross:
Include in at least some water and sediment samples using NRC protocols, to see if radiological parameters could be elevated.

Beta, gross:
Include in at least some water and sediment samples using NRC protocols, to see if radiological parameters could be elevated.

Grain Size:
Definitely include as a normalization parameter in all sediment or soil analyses.

Hardness:
Definitely Include in Water Samples

Total Organic Carbon:
Include in all sediment and soil samples

Wet and Dry Weight and percentage moisture:
Include for all sediment, soil, sand, and tissue data.

Ref: 892-TX
Joseph J. Holonich, Chief
High-Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop: TVPM 7J-9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0002

RS: Draft Environmental Impact Statement, Atlas Site,
      NUREG-1531, January 1994
Rating NO-2

The Region VIII Office of the U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah, and offers the following comments for your consideration. Based on our concerns that the impacts which could be occurring to the Scott Methane Wetland Preserve from groundwater migrating from the site, we have environmental objections to the proposed action unless these impacts can be avoided. In addition, there are a number of unanswered 'open issues' that relate to the choice among alternatives. Therefore, we will list the DEIS for the Reclamation of the Uranium Mill Tailings at the Atlas Site in the Federal Register as a rating of NO-2 meaning we have environmental objections to the proposed reclamation in place and there is inadequate information which should be added to the Final EIS. We do note that provided NRC could demonstrate that the proposed action would avoid significant impacts to the wetlands preserve, EPA could amend its rating to that of SC, meaning we have environmental concerns with the proposed action.

The Draft Technical Evaluation Report (DTER) and the Draft Environmental Impact Statement (DEIS) have been prepared to summarize NRC's review of Atlas Corporation's reclamation plan for its uranium mill tailing pile near Moab, Utah, and to address potential environmental impacts associated with tailings pile reclamation or other permanent tailings disposal. The DEIS compares and contrasts on-site reclamation with that of alternately transporting the tailings to the plateau site, some 15 miles northwest of Moab, for ultimate disposal. The Uranium Mill Tailings Radiation Control Act of 1978 as amended in concert with its attendant regulations and parallel NRC regulations requires uranium tailings disposal in an environmentally acceptable and stable manner over the long term. Cost estimates
for the on-site and plateau alternative range from $11-17 million to $40-$150 million respectively. The plateau alternative conveys several desirable features such as remoteness from population, aesthetic improvement, increased stability in terms of water-related erosion, reduced impact potential to area groundwaters, and reduced ecological risk.

We realize that cost and other associated factors weigh into your decision concerning the ultimate management of the tailings. We request that you remain open to all tailings management alternative throughout the decision process and respect our comments as enclosed.

If you have any questions of this matter, please contact Mr. Lon Heela of my staff at (303) 312-6224.

Sincerely,

Carol L. Campbell
Director
Ecosystem Protection and Remediation

Enclosure:

Detailed Comments by the Region VIII Office of the EPA on the Draft EIS for the Uranium Mill Tailings at the Atlas Site, seven pages

cc: w/enclosure

Walter Dabney, National Park Service, Moab
Joel Berwick, DOH, Grand Junction
Henry Judd, Utah DEQ, Salt Lake City
Bill Hadden, Grand County Council, Moab
Susan Linmar, PWS, Salt Lake City

U.S. Environmental Protection Agency
Region VIII

General and Document Specific Comments To:
Draft EIS, Atlas Site, MUNRO-1331, January 1996
Draft TEP, Atlas Site, MUNRO-1532, January 1996

GENERAL COMMENTS:
Connection between the NRC's limitations under 10 CFR Part 40 and CNQ's directive to consider reasonable alternatives

Pursuant to procedures NRC adopted for terminating uranium mill licensees under UMTA for Title II facilities, the costs are responsibility of the private company. The estimated higher costs of $40 to $150 million for relocating the tailings to the plateau site is considered beyond the financial means of Atlas. However, according to CNQ, pursuant to 40 CFR Section 1503.14, an agency should examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the applicant is capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. Also, CNQ directs agencies to consider alternatives that are outside the legal jurisdiction of the lead agency if it is reasonable (See Section 1504.2(d)). "Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA's goals and policies." (See Section 1505.1(a)). We compliment NRC for its inclusion in the Draft EIS of the plateau site alternative despite its significantly higher cost, but recommend that this alternative be further explored based on the following technical considerations even if it is determined to be beyond the financial means of the licensees.

Connection between the Draft EIS and the upcoming Groundwater Corrective Action Plan

The EIS process would be better served if a draft of the proposed Groundwater Corrective Action Plan (GCAP) would be presented to the extent that information is available as part of the Final EIS process and distributed for public review. To provide comparative alternatives analysis, a rough draft of the GCAP should also be developed for the alternative plan of removing the tailings pile to the proposed plateau site. These alternative GCAPs, albeit preliminary, need to be presented in the Final EIS to provide for comparative analyses prior to
Estimated Costs should be updated

The DEIS states that Atlas estimates the cost of on-site reclamation to be $13 to $16 million. (See page 5-1). The
reclamation plan fails to specify the GCAP Plan and the LTSP.
Although NMC’s procedures do not require the licensees to provide an
itemised cost estimate until the licensees’ reclamation plan is approved, a current and correct estimate of the cost of
reclaiming the tailings pile in place is essential for comparison
between alternatives. NMC should update the estimated costs to
include the GCAP and the LTSP for both the proposed plan and the
plateau site alternative.

DOCUMENT SPECIFIC COMMENTS:

1. DEIS, Section 3.1.1.1

3-10 This section and the DTER discusses the tailings cap design, but it does not provide specific details as to the
effectiveness of the cap in preventing infiltration into the pile. While the DEIS and the DTER indicates that the
proposed clay liner on top of the pile could be compacted to a
permeability of 10-7 cm/sec, there is no information regarding the total yearly flux represented by this action.
The potential flow into the pile via the side slopes is also of
concern. The inflow via the side slopes, especially on the
side adjacent to the river is not quantified. The rational for not requiring an impervious liner on the side
slopes is not discussed. A more detailed evaluation of the
adequacy of the liner design is needed. Some discussion
regarding the use of a synthetic liner, such as an asphalt
sealer should also be discussed.

2. DEIS, Section 3.1.1.1

3-11 The DTER indicates that differential compaction of the pile
is an open issue. Because of the high moisture content of
the tailings pile and the nature of the material there is
potential for differential setting of the pile as it is
loaded with cover material. There is no discussion
regarding the potential adverse impact on the cover, such as
cracks in the clay liner allowing excess infiltration.

3. DTER, Section 3.1.1.1

3-12 The information and analysis in the DEIS and the DTER does not
adequately characterise the material under the tailing pile. Information in these documents is insufficient to
verify that the NMC estimate that only 800,000 tons of
underlying material would need to be removed. Based on
experience at other mining mill sites, this estimate is most
likely low. A detailed discussion which provides actual
data on the underlying material is needed. It appears that
additional wall borings are needed to adequately
characterise the material under the site.

4. DTER, Section 3.2.1.3

5-12 This section indicates that after removal of the pile, the
site would be cleaned up for unrestricted use. There is no
discussion regarding the almost certain need for placing
significant amounts of soil cover into the excavation
footprint resulting from removal of the material underlying
the pile. There is no information regarding the sources of
fill and final soil cover for the reclamation. This section
needs additional analysis and discussion regarding the
surface reclamation.

5-13 This section implies that ground-water cleanup after removal
would be passive, natural flushing. The rationale for such
an option has not been adequately spelled out in either the
DEIS or the DTER. Removal of the pile and the major portion
of underlying contaminated soils will not eliminate a large
amount of contaminated material which has moved into the
saturated zone over the years. This material and any new
soil cover will have a much higher permeability than the
existing pile. Thus, the rate of flux through the footprint
area in response to a summer rainstorm will be much higher
than presently experienced. This will most likely result in
a significant violation of standards in the river.
Installation of a ground-water extraction system appears to
necessary and should be discussed.

5. DTER, Section 3.4.1.2

3-18 This section and the DTER do not provide sufficient details on
the existing ground water flux through the site in
response to movement of water from upgradient during the low
flow period and from the river during high flow stages in
the river. There is no discussion of additional flux into
the pile as a result of recharge associated with high flow in
Moab Wash. Additional analysis and discussion is needed
to quantify this element of the site hydrology.

3-19 There has been speculation that ground water flow may be
moving from the site into the Scott Matheson Wetlands
Preserve on the opposite side of the river. Although the
potential flow into the wetlands area via fractures appears
to have been discounted, there is reason to believe that
contaminant flow may occur in the alluvium as a result of
flow involving the fresh ground water in the alluvium, the
dewater tailings fluid and the very danna beds located at
depth. This issue has not been adequately addressed in the
DEIS and DTER. This issue should be further investigated by
carrying out some modeling using reasonable values of ground water flux and associated fluid densities for the fresh water, the brine from the Paradox Formation and the fluid from the tailings. Additionally, EPA believes that samples should be obtained from the springs in the wetlands or from temporary wells points in that area to determine if the water contains constituents which may be typical of mill tailings. This activity should be completed prior to completion of the Final EIS as information derived may signal the need for additional ground water remediation activities or challenge the ability to meet ground water remediation requirements.

6. **DNRIS Section 3.1.6.2.**

This section discusses EPA drinking water standards for total dissolved solids (TDS), sulfate and iron as the related to the water in the alluvial aquifer. As written the language implies that the aquifer contains levels of these constituents such that use for drinking would not be permitted. This is not the case as the standards for chloride, TDS and iron are only recommended (secondary) standards. This section should be modified to explain that the constituents mentioned are only covered by secondary standards (40 CFR 143). The use of such water for drinking with this level of contaminants would not be prohibited.

7. **DNRIS Section 4.4.5.**

The review of this section and the associated DTR does not adequately explain or justify the use of ANW-1 as a background well. The ground water flow path is from the north west to the south east, which would appear to eliminate ANW-1 as a true upgradient well. The presence of historical tailings near ANW-1 would also bring the usefulness of the well into further question. Even if the lake is able to demonstrate that the well has not been affected by the historical tailings and ore storage areas, the available information on ground-water flow relative to the tailings pile indicates that a new back round well should be located north of the tailings pile on the south west side of Moab Wash. It is recommended that this section be changed to require establishment of another background well on the north east side of the pile near the intersection of HWY 273 and the Main Highway. A well in this location is critical to the development of information to quantify the actual flux moving through the site from the Moab Wash alluvium.

8. **DNRIS Section 4.4.6.1**

This section discusses the ground water contamination which is present: leaching the site and entering the river. The limited data indicate that ground water discharge to the river may create a problem during low flow. Of special concern is the period immediately after the pile is reclaimed. The loading of the pile as a result of the cap will squeeze additional fluid out of the tailings into the alluvium. This additional load has not been quantified, but it may result in surface water quality problems at low flow. It appears that the preferred corrective action is to allow passive cleanup. This may not be adequate immediately after the pile is reclaimed. EPA recommends looking at additional options, such as installation of some nearby vertical wells into the alluvial material at the base of the pile to facilitate drainage of contaminated fluids exiting the tailings. These wells would minimize potential problems associated with movement of the underlying Paradox brine interface and extracting flow out of the river. These options should be discussed in the DNRIS.

9. **DNRIS Section 4.4.1.1**

There is a discussion regarding the potential movement of fluids into the pile during high flow of the river. There is no information regarding the volume of this influx and the resulting contaminant flux out of the pile back into the river during the low flow period. During very high flows this could be a significant impact. Would a synthetic liner on the lower part of the sump adjacent to the river be effective at reducing infiltrations to the pile during major events where the river would come in contact with the pile?

10. **DNRIS Section 5**

This section provides a discussion of the costs associated with reclaiming the pile in place, but there is no discussion regarding the approximate cost associated with installing a ground-water remediation system at the site, which is sufficient to eliminate contaminant flux into the river during low flow periods. A detailed discussion of this element is needed.

There is also no discussion regarding the potential cost of cleaning up the site ground water and surface water if the pile is moved. Because of the likelihood that significant material presently underlying the pile will have to be removed, a contaminated pond fed by ground water and inflow from the river will most likely be left in the footprint of the pile. To adequately remediate the site, it will be necessary to: 1) remove as much of the contaminated soil as
Mike Fliegel  
March 1, 1996  
Page 2

Should you have any questions regarding our comments or would like to discuss the open issues identified, please call myself or Loren Morton of my staff at (801)336-4250.

Sincerely,

[Signature]
William J. Sinclair, Director  
Division of Radiation Control

Enclosure

WJS-LBM-1m

cc:  Dianne R. Nelson, Executive Director, UDEQ  
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Mike Layton, NRC  
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Gary Hazen, Moab  
Lois Oliver, Castle Valley Town  
Zach Frankel, Utah Rivers Council  
Suzanne Winters, State Science Advisor

U.S. Nuclear Regulatory Commission  
"Draft Environmental Impact Statement  
Related to Reclamation of the Uranium Mill Tailings  
at the Atlas Site, Moab, Utah"  
NUREG-1531

Source Material License No. SUA 917  
Docket No. 40-3453  
Atlas Corporation  
January, 1996

April 26, 1996

J-23
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conclusion part.

The main conclusion is that the results of the experiments are encouraging. The experiments were conducted under various conditions, and the results showed that the method is effective in improving the performance of the system. The results are consistent with previous studies, which suggests that the method is a promising solution to the problem. The findings of this study are expected to have implications for future research and development in the field.

References

4-18 A. Summary of License Termination (Item 1) - the DEIS here should be modified to explain that the License cannot be terminated without Atlas satisfactorily completing groundwater corrective action at the facility.

4-18 B. Future Use of Nearby Groundwater (Item 6c) - a false statement is made that "No significant use of groundwater from this aquifer in the vicinity of Moab is anticipated in the foreseeable future." This statement ignores the fact that the same shallow aquifer underlying the Atlas tailings piles supplies runoff water for the Arches National Park visitors center. Furthermore, no significant analysis is included in the DEIS regarding future use of groundwater resources; despite the fact that NRC requirements regulate pile design to be stable for 200-1,000 years.

4-18 C. Future Impact on Colorado River (Item 6d) - an unjustified conclusion has been made in the statement that "After reclamation under the Atlas proposal, tailings leaches would continue to enter the Colorado River and have a small, generally undetectable impact on surface water quality." Recent DEQ water quality sampling has found current adverse impact to the Colorado River, immediately below the Atlas tailings pile (see details in attending DRC DT Ter Comments). Furthermore, no performance assessment has been conducted by Atlas to demonstrate that the final engineered cover will allow the Colorado River to regain and maintain State in-stream water quality standards in the future. Consequently, it is currently unknown if the proposed on-site cover design will provide sufficient controls to protect Utah ground and surface water resources.

4-18 D. Conclusions on Environmental Costs and Benefits (Item 7) - in light of the errors, misstatements, and contradictions made in the DEIS, along with the many open issues identified in the attending DRC DT Ter Comments, it appears that the NRC's preliminary conclusion that the Atlas proposal is acceptable is unjustified. The NRC must reconsider this conclusion after thorough and complete resolution of the State's open issues and concerns.

6. Atlas Groundwater Corrective Action Plan: Lack of Requirements and Progress (Section 1.1.1) - statements made in this section mislead the public to believe that Atlas can or will complete groundwater corrective action by December, 1998. While we agree that the license may require Atlas to complete groundwater corrective action by December, 1998; this requirement is insinuous and without consequence because it failed to require the Atlas to complete their permitted groundwater and to meet the groundwater protection standards found in the License. This constitutes a failure to enforce the requirements of 10 CFR 40 Appendix A, Criterion SD (see attending DRC DT Ter Comments). Consequently, the current license does little to protect Utah ground and surface water resources.

4-19 Based on our review of uranium concentrations in downdraft monitoring wells, decreasing trends are apparent. However, the existing concentration is still orders of magnitude above the EPA groundwater standards for uranium mills. Consequently, it appears that much longer periods of time, beyond December, 1998, will be needed for natural groundwater flushing to meet these standards. Elevated concentrations of other more retardant tailings contaminants may take even longer to recede and meet applicable groundwater standards.

NRC staff have determined that several active methods of groundwater cleanup are feasible at the Atlas facility (DT Ter, p. 5-21). It is important to note that two years have now passed since Atlas suspended its efforts to reduce head in the tanks (DEIS, p. 1-3). This lack of action to require active groundwater cleanup methods suggests that NRC and Atlas consider covering the tanks as a viable groundwater cleanup methodology. This reinforces the State request that Atlas be required to conduct a performance assessment and demonstrate that the proposed cover design will adequately protect Utah's ground and surface water resources.

7. Regulatory Authority for EPA NPDES Permits (Table 1.4:1) - this reference in the table needs to be corrected to reflect the primary agreement between Utah and the U.S. EPA that makes DEQ the primary contact for surface water quality protection for the EPA National Pollutant Discharge Elimination System.

8. State Concerns Regarding Proposed Engineering Design (Section 2.1) - our concerns regarding the Atlas proposed cover design are detailed in the attending DRC DT Ter Comments. We do not believe that the Reclamation Plan can be approved without adequate resolution of State concerns and open issues listed therein.

9. Construction of Reclamation Requirements (Section 2.1.2.2) - in the opening statement of the paragraph for post-reclamation requirements, the DEIS states that groundwater corrective action is a part of pile reclamation. This reinforces the State's view that the Atlas Reclamation Plan and GWGAP should be considered together at this time.

10. Borrow Areas and Transport of Borrow Materials (Section 2.1.3) - critical consideration needs to be given to the possibility of using what is called the "cobble site" or another source of alluvial gravel as the only source of rock armor for the pile. Since the cobble site is an existing rock source, it may produce rock that would suffice as rock armor.

11. Error in Natural Groundwater Flushing and Cleanup (Sections 2.2.2.2.5 and 4.4.6.1) - in the opening statement of the paragraph for post-reclamation requirements, the DEIS states that the Atlas groundwater could be cleaned up in 25 years. Unsubstantiated Atlas claims have already determined that at least 75 years would be needed for the polluted groundwater to reach EPA groundwater standards for uranium mills (March, 1990 Western Technologies Inc., p. 40). Consequently, the State should revise these statements accordingly.
Review of the April 28, 1988 EnecoTech report shows that it was commissioned by the NRC (Denver Uranium Recovery Field Office). Consequently, it appears the little that we do know about the Atlas tailings was brought about by the NRC and not Atlas.

As a result of this long-standing deficiency, Atlas should now be required to complete additional sampling and analysis of the tailings leachate in order to provide a statistically valid determination of the its contaminant characteristics, both radiologic and non-radiologic. During this characterization samples should also be collected of the tailings solids to adequately characterize their radiologic and non-radiologic characteristics.

This information is important to performance assessment studies requested above, and determination of whether or not the proposed on-site cover design can adequately protect State groundwater and surface water resources. We do not believe that the Reclamation Plan or the on-site cover design can be approved without resolution of this issue.

REFERENCES

Blanchard, P. J., 1990, "Ground-Water Conditions in the Grand County Area, Utah, with Emphasis on the Mill Creek - Spurthill Valley Area", a USGS study completed in cooperation with the Utah Department of Natural Resources (DNR), DNR Technical Publication No. 100, 69 pp.


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April 26, 1996
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ATTACHMENT 2 Available Records from Utah State Engineers Office for Groundwater Wells Completed in 1940, 1958, and 1978 at Arches National Park Headquaters.


ATTACHMENT 6 Figures 1 and 2. Base Map for DRC Hydrogeologic Cross-Section and Hydrogeologic Cross-Section: Arches National Park to Colorado River.

to salt-dissolution subsidence. Geologic boreholes should be installed deep enough to adequately determine and identify the bedrock formations found below the pile. In addition, Atlas should be required to resolve the inconsistencies found in the August, 1995 Cooksley Geophysics Report thru careful correlation of their seismic data with existing surface and subsurface geologic information. The tailings pile final engineering design and reclamation plan cannot be approved without prior resolution of these issues. These are open State issues.

2. Woodward-Clyde Structural Model B: Need for Re-evaluation and Single Model (Section 2.4.1.1 and 2) - review of structural model B provided in the January 29, 1996 Woodward-Clyde Report shows it largely unsupported by surface and subsurface geologic information now available. For example, cross-section C-C' of this report fails to acknowledge surface geologic mapping compiled by the UGS (Doucill, et. al., August, 1995), and seismic information provided in the August, 1995 Cooksley Geophysics Report, both of which suggest that the Moab Moab Fault should run thru the plane of the section. Furthermore, bedrock interpretations presented in this cross-section are un-supported in that none of the wells depicted therein were drilled deep enough to intercept bedrock. In addition, Figure 2-13 of this same report fails to recognize the apparent strike of the buried scarp between perimeters B-2(14) and well ATP-2 near the central area of the pile's south side slope.

Consequently, Atlas should either abandon or otherwise discount structural model B as a subsurface model for the site, or be required to collect additional subsurface geologic information to justify it. Based on the site's geologic inconsistencies and discrepancies listed above, Atlas should be required to collect additional subsurface information. Final engineering design for the tailings pile must be based on a single, well documented subsurface geologic model for the site. NRC final approval of pile design or the reclamation plan should not be undertaken without prior resolution of this issue. This is an open State issue.

3. Subsidence: Shortcomings of Recent Atlas Studies (Section 2.4.1.3) - recently Atlas conducted soil trenching studies of alluvium at the mouth of Courthouse Wash. After review of January 29, 1996 Woodward-Clyde Report, wherein this study was documented, several open issues still remain regarding potential future land subsidence under the tailings pile, these are (Attachment 1):

A. Failure to Recognize and Investigate All Subsidence Mechanisms - we agree with the January 29, 1996 Woodward-Clyde Report that regional down-cutting by the Colorado River is a component needed to estimate land subsidence near the tailing site. Such down-cutting may be used to estimate age of terrace gravels near Courthouse Wash and infer a portion of local land subsidence experienced in the past. We also agree that bedrock knick points found at the Portal and Maumonny Spring have and continue to control local river down-cutting. However, inherent in the January 29, 1996 Woodward-Clyde approach is the assumption that rates of local land subsidence and river down-cutting have been the same over geologic time. This assumption appears erroneous in that the presence of the Holocene-age marsh south of the tails pile and the thick alluvial deposits found near the pile suggest that Moab Valley is subsiding at a rate greater than the river's down-cutting. Therefore, because local land subsidence has outpaced river down-cutting, Atlas must consider other mechanisms.

We also agree that the water level elevation of the Colorado River would form a local base level for tributary streams, such as Courthouse Wash. However, deposition of alluvial sands and gravels occurs below the river's water surface, and is therefore a separate mechanism that must be considered in addition to down-cutting by local tributaries.

Both the thick alluvium accumulations near the site (over 410 feet near well ATP-1) and the proximity of the Holocene-age marsh are likely explained by the deposition or in-filling of sediment as the underlying salt is dissolved away by the river. This process is called aggradation, and is a significant component of land subsidence that Atlas should consider.

Unfortunately, the January 29, 1996 Woodward-Clyde Report failed to adequately investigate salt dissolution and aggradation in the manner of local land subsidence. As a result, Atlas should be required to investigate the age and rate of accumulation of these alluvial gravels in order to estimate past and future land subsidence near the tails pile.

B. Lack of Age Constraints - age estimates for local alluvial deposits were extrapolated by the January 29, 1996 Woodward-Clyde Report from alluvium found at the south end of Spanish Valley, located many miles to the south. However, Atlas should be required to provide age dates of alluvial materials at the tails pile site in order to determine local material age. If for some reason it is technically impracticable to gather this information, Atlas should be required to utilize a conservatively short age to derive local land subsidence rates.

C. Determination of Local Maximum Alluvium Thickness - the rate of local land subsidence is based on the total or maximum thickness of alluvium at or near the tails pile. Existing geologic borehole information where thick alluvium accumulations have been found, have failed to locate the top of bedrock, caprock, or salt formations which would in turn define the base and maximum thickness of local alluvial materials. Without this information, it is difficult to quantify the upper-bound or maximum rates of subsidence that should be used in evaluation of long-term slope stability and engineering containment integrity.

Unfortunately, the January, 1996 Woodward-Clyde Report relied on the August, 1995 Cooksley Geophysics Report to estimate the total depth of local alluvial
frost calculations are representative or conservative of the entire climatologic record available. Consequently, the NRC should complete a comparison of the temperature data used by Atlas with the total record available, as to determine if the data used are representative or conservative of local historic conditions. Any approval of the final engineering design would be premature without this evaluation.

B. Moisture Content and Density - the Berggren frost depth prediction model is sensitive to moisture content, as well as other input factors (Aitken and Berg, 1968). Consequently, it is important to justify the moisture assumptions made for both the sandy soil above the clay radon barrier and the underlying clay. The Canonic report states that the moisture content and density variables used in the frost depth model were taken from geotechnical testing results provided in the 1992 Reclamation Plan (bid, p.2). It appears that these results came from uncompacted native soils in the vicinity of the facility, and not final engineered materials that will be constructed over the embankment.

It is also apparent that no compaction specifications have been required by NRC for either the sandy soil or clay radon barrier layers, hence the final field densities of these materials are uncertain. Although Atlas has stated they will derive their clay from a Mancos Shale outcrop north of the site, they have not identified a final borrow source for the clay, nor determined the moisture retention properties of either the native clay material or its compacted, engineered equivalent (DTER, p. 6-8). Without determination of these construction parameters, it is unclear how the frost modelling conducted could have been representative or conservative of final field conditions. Consequently, NRC should resolve these issues in order to adequately justify the final engineering design they will approve.

C. Long-Term Moisture Content of Cover Materials - to date Atlas has not conducted any moisture retention testing of the clay radon barrier borrow materials that will be used in the cover, nor have these tests been conducted on soil samples which meet required engineering specifications (DTER, p. 6-8). Nor has Atlas conducted any infiltration testing to predict the long-term moisture content of the radon barrier cover materials after embankment construction. Consequently, it is uncertain if the one-time geotechnical test results provided in the Atlas 1992 Reclamation Plan, and used in the March, 1995 Canonic Environmental frost predictions are representative or conservative of the long-term moisture performance of the cover. Because the Berggren frost model is sensitive to moisture content, a conservative evaluation of frost depth penetration would include evaluation of frost penetration depth under simultaneous dry and cold conditions. The NRC should explain how the moisture content used in the frost penetration models was representative or conservative of long-term moisture conditions in the cover materials.

NRC should resolve these concerns and justify why Atlas’s frost predictions, and their dependent data inputs are representative or conservative of the long-term field conditions that will exist in the cover materials. These are open State issues.

8. Desiccation of Clay Radon Barrier (Section 3.4.1) - the DTER outlines quality assurance criteria for which will allow as much as 48 hours pass before additional lifts are added to the clay radon barrier. This approach is a concern due to Utah's arid climate, which dictates careful moisture control of earthen materials during construction; particularly for swelling clays such as found in the Mancos Shale Formation. Such swelling clays are very prone to shrinkage cracking during drying. Our construction experience suggests that a 2-day interruption in clay lift placement, without prior field testing for moisture content, is too long and may result in shrinkage cracks and poor hydraulic and radon containment performance. This concern is heightened by the fact that the Atlas radon barrier design calls only for a thin layer of clay, only 8 to 12 inches thick, which will be more prone to desiccation cracking and less forgiving of construction flaws.

As consequence, NRC should require Atlas to either significantly increase the thickness of the clay radon barrier, or conduct daily field moisture and density measurements on every lift of the clay radon barrier. Such testing should be completed on working areas within a lift on a frequency of at least one test for every 100 foot by 100 foot grid. Areas of a lift which fail to meet the moisture specifications should be reworked until they meet the construction criteria. Each lift of the radon barrier should be visually inspected in the field for signs of desiccation cracking before placement of any new lift or overlying material. Areas observed with cracks in the clay radon barrier should also be reworked before placement of overlying materials. This is an open State issue.

Comments on Surface Water Hydrology and Erosion Protection (Section 4.0)

9. Discontinuity of Rock Wall (Section 4.5.1.2.2) - page 4-17 of the DTER describes how the rock wall across the northern toe of the tailings embankment will extend to the southeast and merge with the rock apron required to protect the pile from erosion by the Colorado River. However, review of the March, 1995 Canonic report does not show any continuity between the rock wall and the rock apron (see Sheet 4/10, Drawing No. 82-067-ES9). NRC should require revision of this engineering plan to reflect the design described in the DTER. This is an open State issue.

10. Undisplaced Riprap Sources (Section 4.5.3) - our initial concerns for this section of the DTER focused on use of the igneous rock outcrop from Round Mountain in Castle Valley as a riprap source. However, recent correspondence from Atlas to Castle Valley residents has indicated another source of riprap has been located (March 8, 1996 Atlas letter from Richard Blumho). Despite this recent development, our concerns regarding this section are listed below in the event that Atlas returns to its original plans for Round Mountain.
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Note: The table above shows the format of data to be collected on the given dates.
The September, 1978 USPHS/NPS report includes a well completion diagram and rudimentary geologic log. Little information is provided in the 1978 USPHS/NPS report regarding the authors of either the completion diagram or the geologic log. However, the 1978 geologic log should be considered suspect, in that DRC staff field and comparison of recent geologic mapping by the UGS (Duell et al., August, 1995, Plate 1) has found the 1978 well had been drilled into an outcrop of Navajo Sandstone. Furthermore, the U.S. Geological Survey has determined that the 1978 well at Arches Headquarters is completed across the Navajo Sandstone (Blanchard, 1990, Table 8, well D-25-212106c-1). As a result, the Navajo Sandstone identified in the 1978 log at a depth of 160 feet may be a minor lithologic change in the Navajo Sandstone, or possibly the basal contact with the underlying Kayenta Formation. In any case, more credence should be given the well completion diagram than the geologic log in the USPHS/NPS report.

DRC staff analysis of pump test recovery data from the 1978 Well indicates the Glen Canyon Group has a permeability of 6.40E-2 cm/sec (see Attachment 4, p. 5). This is an even higher permeability than that measured in the pump and recovery tests completed in the 1940 and 1958 wells by the USGS. It is also interesting to note that all three wells at Park Headquarters are located on the down-thrown hanging wall of the Moab Fault (see Attachment 6, Figure 1). Furthermore, the 1978 well is located in closer proximity to the Atlas tailings pile and the extreme fracturing seen in Glen Canyon Group outcrops north of the Atlas site.

DRC staff recognize that the above pump test and recovery well data analyses are only estimates of actual field permeability in that the solution methods used are for classic darcian aquifer systems with primary granular permeability. Actual field conditions suggest that secondary fracture flow to the wells is a significant factor that must be considered in this analysis. The geologic log of the 1958 well reinforces this conclusion (Attachment 3, pp. 8 and 10-11), as does field observation of the fractured Glen Canyon Group outcrops. However, more sophisticated pump test solutions for dual porosity systems, or aquifers dominated by both granular and secondary fracture permeability, require additional input parameters in order to bound the permeability solution (Moonch, 1984). These additional aquifer characteristics include fracture block thickness, fracture and formation storage coefficients; values which are not readily available. Consequently, these sophisticated analysis could not be completed without use of assumed input values; variables which at this time could not be justified. Consequently, DRC staff chose to use conventional pump test solutions, while recognizing that their results are likely only order of magnitude type of estimates of the true field permeability.

Notwithstanding, comparison of the USGS and NPS pump and recovery test results shows some very interesting information. First, the lowest permeability measured in the Navajo Sandstone at Park Headquarters, 3.14E-4 cm/sec (1958 well recovery data), is higher than...
the median alluvium permeability reported in the DTGR (2.47E-4 cm/sec, p. 5-4). Second, the highest Navajo Sandstone permeability value found at Arches Headquarters, 1.87E-2 cm/sec (observation data from 1940 well), is 75 times greater than the median permeability, and more than twice as permeable as the highest permeability reported for the alluvium at the tailings embankment (DTGR, p. 5-4). Third, the highest Glen Canyon Group permeability measured at Arches Headquarters, 6.40E-2 cm/sec (recovery data from 1978 well), is 259 times greater than the median permeability, and 8 times greater than the maximum permeability reported by Atlas for the alluvium (DTGR, p. 5-4).

As a result, the permeability of the Navajo Sandstone and other Glen Canyon Group formations near the Atlas facility may be on the order of 1.0E-2 cm/sec or greater. This value is considered representative for the following reasons:

A. Multiple Test Results - two separate pump tests from Arches Headquarters wells have indicated Glen Canyon Group permeability values on the order of 1.0E-2 cm/sec or greater. Such data included multiple well pump test completed in 1958, and single well recovery test from 1978 well.

B. Greater Proximity of Atlas Site to Fractured Glen Canyon Group Outcrops - the bedrock permeability values suggested by the USGS and NPS pump tests were derived from wells completed nearly a mile removed from the Moab salt diapir. Bedrock formations located in closer proximity to the Moab salt antecline have likely been subjected to greater faulting and subsidence in response to salt tectonics and dissolution. Consequently, outcrops and subcrop of the Navajo Sandstone or other Glen Canyon Group formations near and under the tailings pile will likely exhibit greater permeability than the pump test and well recovery results seen at Park Headquarters.

C. Greater Density and Intersecting Sets of Joints and Faults - surface geologic mapping completed by the Utah Geologic Survey indicates that a higher density of fracturing (joints and faults) occurs in the Glen Canyon Group outcrops southeast of Park Headquarters and immediately north of the Atlas facility (Doelting, et. al., Plate 1). These outcrops also exhibit two distinct sets of fractures: 1) a northwest striking set, and 2) an easterly to northeastally trending set of joints and faults. This greater density and intersecting arrangement of fractures was likely caused by past salt tectonics and dissolution, and has likely resulted in terrains more permeable than apparent near Park Headquarters.

Based on these observations, it appears that the permeability of the Navajo Sandstone and/or Glen Canyon Group formations near the Atlas facility is likely on the order of 1.0E-2 cm/sec or greater. It is also important to note that this permeability corresponds with regional values for fractured regimes in the Glen Canyon Group, see Table 1 above.

These permeability conclusions suggested by nearby pump tests contradict assumptions made previously by Atlas that all bedrock under and adjacent to the facility was impermeable. Based on this earlier assumption, Atlas claimed that the shallow alluvial aquifer underlying the site is hydraulically isolated from the underlying bedrock formations (Western Technologies, March, 1989, p. 5). However, our findings now suggest that the Glen Canyon Group formations near the Atlas facility are more permeable than the shallow alluvium. This in turn suggests a high likelihood of hydraulic connection between the shallow alluvial aquifer beneath the tailings pile and mill site facilities, and the underlying Glen Canyon Group formations.

The NRC must revise their interpretation in the DTGR regarding the permeability of bedrock units beneath and adjacent to the Atlas facility to reflect both quantitative and qualitative tests and measurements made and reported by other federal and state government agencies. Atlas should also be required to investigate the possibility of hydraulic interconnection between bedrock formations and the shallow alluvium. These are open State issues.

15. Need to Characterize Extent of Fresh/Saline Groundwater Flow System Interface (Section 2.4) - we agree that deep saline groundwater found below Atlas may form a basal no-flow boundary to the uppermost aquifer. Such a freshwater/saline interface could constitute a basal no-flow boundary for the shallow aquifer, which contaminant plumes from the tailings pile can not travel. However, such a freshwater/saline interface is not a fixed, physical boundary, but a transient hydraulic barrier that will rise and fall in response to changes in head in either of the flow systems. A similar conclusion has been reached previously by Atlas (Western Technologies, March, 1989 Report, p. 6).

Unfortunately, NRC files show that Atlas has only confirmed the presence of this deep brine system at two points at the facility, in wells ATP-1 and 2 at the southeastern margin of the tailings pile (Dames & Moore October 27, 1982 Report, p. 7). In well ATP-1 Atlas found the brine interface at an elevation of approximately 3,880 feet (ibid.). In well ATP-2 it was found about 8 feet lower at an elevation of 3,872 feet (ibid.), suggesting the deep brine flows toward the Colorado River. This is consistent with regional groundwater studies which suggest groundwater in the Glen Canyon Group and younger formations also flows toward the river (Blanchard, Fig. 9). Consequently, it appears that the deep brine found near the site may be simply a density stratification phenomenon of the same general groundwater flow system, with fresh groundwater in the Glen Canyon Group becoming saline after encounter with the Paradox Salt Formation at depth. Atlas should be required to investigate this possibility in development of a sound hydrogeologic model for the facility. Such studies should be carefully coordinated with other investigations needed for geologic model purposes, see discussion above.

If this conceptual model is correct, it would suggest that the fresh groundwater/saline interface is limited in its horizontal extent, i.e., found only in close proximity to subcrop of the Paradox Salt Formation. It is the case, the source of the deeper saline water
could simply be explained by deeper groundwater flow paths resulting in dissolved and dissolving the Paradox Salt. Such a case could explain the presence of the buried scarp found in subcrop south of the tailings pile, and have significant implications on rates of land subsidence, an NRC open issue identified in Section 2.4.1 of the DTTR, and discussed above.

As a result, the NRC should require Atlas to make efforts to develop a justifiable and sound hydrogeologic model for the facility. This includes determination of the lateral extent of the freshwater-brine interface across the facility. These efforts should include the drilling of deeper groundwater monitoring wells and groundwater resistivity logs at the facility. Nested monitoring wells that allow ongoing monitoring of groundwater quality may also be needed. This is an open State issue.

16 Confusion of Regional Bedrock Groundwater Flow Directions (Section 5.2.4) - review of the DTTR shows confusion exists about regional groundwater flow directions in bedrock near the Atlas site (DTTR, p. 5-9). As discussed above, bedrock units of hydrogeologic interest are those Triassic and Jurassic-age formations found in the immediate vicinity of the site. However, the DTTR suggests that bedrock units on the Atlas site are equivalent to Blanchard's "lower groundwater system", and that groundwater therein flows to the southwest. This NRC correlation is flawed, in that Blanchard's "lower groundwater system" are those Mississippian-age and older formations found 1,000' of feet below the Atlas site and hydraulically isolated by the Paradox Salt Formation (Blanchard, 1990, p. 18).

The correct interpretation would be to correlate the Triassic and Jurassic-age bedrock formations near the Atlas facility to the "upper groundwater system" of Blanchard (ibid.). Accordingly, groundwater in the Glen Canyon Group in the "upper groundwater system" flows to the southeast and discharges to the Colorado River (Blanchard, 1990, Figure 16). This is an open State issue.

18 Hydraulic Connection of Bedrock and Shallow Alluvium (Section 5.2.4) - we agree that groundwater in the Glen Canyon Group on Poison Spider Mesa west of the Atlas facility is not hydraulically connected to the shallow alluvium under the tailings emplacement thanks to the underlying position of the thickest, shaley, Chinle and Moenkopi Formations aquitards in the mesa's escarpment. However, we cannot agree with NRC statements that the shallow alluvium is hydraulically isolated from all bedrock formations at the Atlas facility (DTTR, p. 5-9). Such a conclusion contradicts the following findings:

A. High permeability found in the USGS pump tests of the Glen Canyon Group in Arches National Park.
B. That Glen Canyon Group's highly fractured nature in outcrop immediately north of Atlas millsite, and

C. USGS finding of regional discharge of the Glen Canyon Group aquifer to the Colorado River.

Furthermore, a hydrogeologic cross-section prepared during DRC staff shows that hydraulic head in the 1978 Well at Arches National Park had a higher head than the Colorado River (see Attachment 6, Figure 2). Hence, groundwater in the shallow bedrock in Arches National Park discharges to the Colorado River. This conceptual model agrees with regional USGS interpretations (Blanchard, Figure 9) and mandates hydraulic connection between the shallow bedrock alluvium units.

As seen in the DRC hydrogeological cross-section, the initial water level found in the 1978 Arches National Park Headquarters well, completed in the Navajo Sandstone, indicates a static water table elevation of 3,966 feet AMSL at a distance of about one mile northeast of the Atlas facility (4.080 ft - 114 ft, Blanchard, 1990, Table 8). This is about 14 feet higher than the river's elevation in April, 1994 (3,951.6 feet AMSL, Smith Environmental Technology Corporation Report, Fig. 11, and 7.8 feet higher than the static water level reported in shallow alluvial monitoring well ATP-3 found about 500 feet north of the tailings embankment (3,957.6 feet AMSL, ibid.). Previous Atlas studies have also concluded that groundwater in both bedrock and alluvium near the Atlas site discharges to the Colorado River (EnecoTech February 25, 1988 Report, p. 17).

In light of this evidence, the NRC should revise its statements in the DTTR and acknowledge discharge of the shallow bedrock aquifer to the Colorado River, and hydraulic connection between said aquifer and the shallow alluvium under the Atlas tailings embankment and millsite. This is an open State issue.

18 Need for Additional Monitoring Wells Near Southern Property Boundary (Section 5.2.4) - we agree with the NRC Open Issue 13, that Atlas has not justified the groundwater flow directions depicted south of the tailings pile in the July, 1994 Canyone Environmental Report (Fig. 4). We have also reviewed the recent Atlas response to NRC Open Issue 15 (February, 1996 Smith Environmental Technologies Corporation). From review of the February, 1996 water table contour map (ibid., Fig. 1), it appears Atlas has made improvement in acknowledging the lack of groundwater recharge and hydraulic head from Poison Spider Mesa, west of the tailings pile. However, at this time several important issues must be considered and resolved:

A. Transient Limitations of Existing Well Configuration - the existing monitoring well network south of the tailings pile appears to be aligned approximately along a single equipotential line (Atlas wells AMM-3, MW-1-R, ATP-2-S, MW-2-R, and MW-3). This configuration lends itself well to triangulation with parameters near the top of the pile to the north to determine leachate flow directions across the pile's side slope area. However, it provides very little benefit for determining groundwater flow directions between the toe of the pile and the Colorado River. Consequently, Atlas should be required to install additional monitoring wells south
Water level data collected during installation of the 1978 Arches National Park drinking water supply well shows the uppermost bedrock aquifer at that location had a hydraulic head of 3,966 ft amsl (Blanchard, 1990, Table 8). This is about 81 feet lower than the 1989 tailings pond elevation and 63 feet lower than the 1994 pond elevation. As a result, there is a potential that hydraulic head from the tailings pile could have caused a local reversal of hydraulic gradient, forcing leachate contaminants to travel in a northerly direction, see DRC hydrogeologic cross section in Attachment 6 (Figure 2).

Available hydrogeologic data found during our review contradicts previous Atlas statements. In 1982, Atlas claimed that groundwater pumping at Arches Headquarters could not induce ground water flow from the tailings site because "... the bottom of the Arches well is about 10 feet above the elevation of the water table at the Atlas site..." (Dames and Moore October 27, 1982 Report, p. 12). However, our review shows this statement is in error in that the bottom of the 1978 Park Headquarters well is about 50 feet lower than the lowest water table elevation at the facility (compare Blanchard, Table 8 and Atlas well ATP-1-5 in Canonie Environmental July, 1994 Report, Figure 4). Furthermore, the base of the 1978 Park Headquarters well is below the Colorado River's reported water level (see Attachment 6, Figure 2)

As a result, there exists a possibility that head in the tailings pile could have driven leachate contaminants northward across the boundary of Arches National Park. To date, Atlas has not been required to investigate this possibility.

This possibility is supported by several lines of evidence, including:

A. **Long Tailings Existence** - the Atlas tailings pile has existed since 1956, resulting in 40 years for the leachate mound in the pile to alter local groundwater flow directions. Radial flow away from the leachate mound could have taken contaminant in many directions, including northerly toward Arches National Park.

B. **Lack of Groundwater Water Quality Data** - to confirm water quality conditions in the shallow aquifer north of the tailings pile. Although head monitoring may continue in small handful of alluvial monitoring wells installed north of the pile, our review of the Atlas report at the NRC shows Atlas has performed little if any groundwater quality monitoring north of the tailings pile since abandonment

C. **Sediment Water Quality Data - Unjustified Flow Directions** - Atlas reports shown that five alluvial monitoring wells are currently found north of the tailings pile, ATP-3, TH-26, TH-2, TH-22, and TH-25 (compare February, 1996 Smith Environmental Technologies Corporation Report, Fig. 1 with July, 1994 Canonie Environmental Technology Corporation Figure 1). However, this interpretation is unjustified in that additional water level data would be required north of Atlas wells ATP-3 and TH-25 to support this conclusion. Consequently, Atlas should be required to instill additional monitoring wells along their northern property boundary and/or inside the Arches National Park boundary to confirm this conclusion.

Another equally valid interpretation of groundwater flow north of the tailings pile is also apparent. Triangulation of water levels collected in April and May, 1994 in Atlas wells ATP-3, TH-26, TH-21, and TH-25 suggests northerly flow toward Arches National Park (see head data found in February, 1996 Smith Environmental Technologies Report, Figure 1). This interpretation would place the easterly flowing groundwater trough at a location further north, thus allowing leachate contaminants from the tailings pile to invade Arches National Park.

To add to this problem, little historic water level data is available from the 1978 Arches National Park Headquarters well. For this reason, Atlas should be required to characterize hydrogeologic conditions near its northern property boundary through installation of additional monitoring wells and piezometers. If tailings contaminants are found at the northern Atlas property boundary, Atlas should be required to install additional monitoring wells inside Arches National Park to define and characterize the horizontal extent of their contamination. Head measurements at these locations should then continue for the foreseeable future in order to establish and monitor groundwater conditions in this area. and document the control of leachate contaminants.

E. **Lack of Bedrock Permeability Characterization** - previous Atlas hydrogeologic studies have assumed that all bedrock formations under the facility are impermeable and form no flow boundaries (Western Technologies March, 1989 Report, p. 5). However, Atlas has never been required to confirm this critical assumption. DRC analysis suggests that the Glen Canyon Group is very permeable, see discussion above. As a result, leachate from the tailings could have flowed through the underlying alluvium, entered permeable underlying bedrock formations and been driven northward and encroached upon National Park Service property.
F. Apparent Uranium Concentration Increase in Well ATP-3 - despite the data quality assurance concerns raised below, uranium concentration data from well ATP-3 suggest increasing uranium concentrations may have been present in this well since the second quarter of 1983 (see Attachment B, Chart 1). Such increases should raise concerns on the part of NRC to investigate the possibility of northward flow of leachate contaminants toward Arches National Park. A lack of additional compliance monitoring wells between the tailings pile and the National Park. Instead, the NRC approved discontinuance of groundwater quality monitoring in well ATP-3 in 1988 (DTER, p. 5-10). It is also interesting to note that after shutdown of the mill in 1984, the uranium concentrations Atlas found in well ATP-3 were below the action level. Atlas should have been required to explain this concordance before removal of well ATP-3 as a "background" groundwater monitoring point.

Once again, Criterion 1 of 10 CFR 40, Appendix A requires that uranium tailings sites be evaluated to determine if hydrologic and site conditions will "...contribute to immobilization and isolation of contaminants from ground-water sources". Accordingly, future wells should be sited to minimize the release of contaminants from the tailings pile. The public drinking water supply well at Arches National Park Headquarters is completed in this shallow groundwater system.

Based on our review of the NRC file materials and Atlas reports, we have concluded:

1. Significant evidence exists which suggests that historic operation of the Atlas tailings site may contain contaminated groundwater beneath Arches National Park.
2. To date, Atlas has not been required to evaluate or characterize the presence, concentrations, and lateral extent of tailings contaminants in the shallow aquifer north of the tailings embankment, and
3. Such potential may have already adversely impacted groundwater quality, and may thereby limit future uses of groundwater in the shallow bedrock aquifer north of the tailings pile.

Consequently, it appears that Atlas has not satisfied Criterion 1. Accordingly, NRC should require Atlas to demonstrate that contaminants from both the tailings pile and the former mill site will not pose an adverse impact on the groundwater supply both north and south of the tailings pile. This demonstration should include characterization of hydrogeologic conditions, local groundwater levels, and lateral extent of groundwater contaminants north of the tailings pile. Such characterization can only be completed after installation of additional monitoring wells north of the pile and collection of pertinent hydrogeologic and groundwater quality data. This is an open State issue.

20. Lack of Characterization of Hydrogeologic Conditions under Former Mill Site (Section 2.2.2) - review of NRC dockets files has shown that historically little if any characterization of hydrogeologic conditions under the mill site has been required of Atlas. In fact, after review of all the Atlas hydrogeologic reports found in the NRC dockets files, only one monitoring well could be located in the mill site proper (see "Boneyard" well in March, 1989 Western Technologies Report, Figure 3.4). Consequently, little is known regarding hydrogeologic conditions around the mill site and east of the tailings pile.

This lack of hydrogeologic information combined with the type and age of the Atlas facility causes concern regarding the potential for 40 years of historic operations to have polluted groundwater quality. Such historic facilities that raise concern include, but are not limited to: unlined ore storage areas, unlined wastewater ponds, and unlined stormwater catchment basins that may have received inadvertent spills of hazardous materials. As a result, Atlas should be required to characterize hydrogeologic and groundwater quality conditions under the former mill site.

The former mill site is located east and downgradient of the tailings pile (February, 1996, Smith Environmental Technologies report, Figure 1). Consequently, hydrogeologic characterization of the mill site area is an important part of defining the lateral extent and concentrations of tailings contaminants that can be released to the environment. In light of the known release of tailings contaminants to shallow groundwater near the southern and southeastern margins of the tailings pile, it is reasonable to expect similar contaminant releases under the mill site area east of the pile.

Furthermore, 10 CFR 40, Appendix A, Criterion 6(7) requires Atlas to:

"...address the non-radioactive hazards associated with the wastes in planning and implementing closure. The licensee shall ensure that hazardous areas are closed in a manner that minimizes the need for further maintenance. To the extent necessary to prevent threats to human health and the environment, the licensee shall control, minimize, or eliminate post-closure escape of non-radioactive hazardous constituents, leachate, contaminated rainwater, or waste decomposition products to the ground or surface waters or to the atmosphere."

It is clear that without hydrogeologic characterization of the mill site and determination of the lateral extent and concentration of tailings contaminants in this area, Atlas will not be able determine the necessary measures to control non-radioactive contaminants from the tailings pile. Consequently, without proper resolution of this issue Criterion 6(7) cannot be satisfied, nor the Reclamation Plan approved. This is an open State issue.
A. Lack of Reporting of Error Terms and Lower Limits of Detection (LLDs) - 20 samples were found lacking these values with the reported groundwater results (see Attachment 8, below). Consequently, the reviewer cannot determine if the reported result is above the LLD, or if the measurement had sufficient counting precision to be reliable.

B. Excessively Low Error Terms - reported in great excess of the reported concentrations (4 samples: 6/15/82, 7/28/82, 8/30/82, and 9/21/82). In all four cases identified, the associated error term was many orders of magnitude greater than the reported value.

C. Excessively High LLD Values - that exceeded applicable groundwater quality standards (1 sample, dated 9/20/84). As a result, the reviewer could not determine if the reported value was above or below the applicable groundwater quality standard.

D. Failure to Investigate Erratic Results - review of Atlas uranium results from well ATP-3, expressed in units of pCi/L, shows highly erratic laboratory results. In one case, two samples collected from well ATP-3 within seven (7) days of each other, however, Atlas reported results that were different by a factor of 247% (21 vs. 8.5 pCi/L, 11/3/82 and 12/9/82, respectively). Based on groundwater flow velocities expected in the vicinity of well ATP-3, there appears to be no physical field cause for this difference. Unfortunately, both NRC and Atlas failed to recognize this large discrepancy and investigate its cause. It is also interesting to note how the erratic nature of the data diminished after closure of the mill in 1984, see Attachment 8, Chart 1.
Use of standardized or certified analytical methods for both radiologic and non-radiologic contaminants.

- Use of certified analytical laboratories.

2. Require Atlas to submit and implement a detailed groundwater sampling quality assurance/quality control plan which complies with all requirements of the EPA RCRA TSCD (1986).

After completion of this review, monitoring wells, piezometers, and/or groundwater quality data found not to meet these criteria should be removed from consideration, and Atlas required to replace them as necessary. See discussion below regarding groundwater corrective action monitoring plan. This is an open State issue.

21. Suspect "Backflow" Conditions in Well AMM-1 (Section 5.2.2) we agree with NRC Open Issue No. 16 that Atlas well AMM-1 may be located in an area previously impacted by facility operations, and hence may not represent background conditions. This is based on the following facts:

A. Proximity of Well AMM-1 - to the former ore storage pad. In fact, the well is located only about 400 feet northeast of the storage pad.

B. Open Air Storage - the former storage pad was of an open-air type construction where the ore was subjected to precipitation, which in turn could leach contaminants and carry them to the underlying water table.

C. Late Installation - well AMM-1 was not installed until September, 1988, about 32 years after facility went into operation (Western Technologies, October 31, 1988 Report, p. 6). Consequently, the water quality encountered upon installation of the well could have already been impacted by historical operation of the facility, see discussion below.

Review of the recent Atlas response to NRC Open Issue No. 16 shows that all of these facts were ignored in their evaluation (February, 1996 Smith Environmental Technologies Report). Consequently, additional discussion follows.

Review of the former mill site facilities from previous Atlas reports shows prior to installation of well AMM-1, Atlas operated at least one water clarification lagoon for the mill's water supply system, located approximately 800 feet southwest of the ore storage pad in question. This lagoon had a water surface elevation of 3,972.5 ft above mean sea level (Dames & Moore October 27, 1982 Report, Figure 1 and Western Technologies March, 1989 Report, Figure 3.4). Based on our understanding of the facility, it is assumed that this water clarification lagoon existed since initial operation of the mill. Unfortunately, no information has been made available on the type of liner that may have existed under it.

However, based on era in which the lagoon was constructed, little of any liner is expected to have been installed beneath it. Furthermore, no information has been provided regarding its historical maintenance. Consequently, it is reasonable to assume that if any liner existed in the water clarification lagoon during operation of the facility.

Because the lagoon provided intake water for the Atlas mill, it is reasonable to expect near constant head conditions in it. Any leakage from the lagoon could provide a constant source of artificial recharge to the shallow aquifer and could have easily altered local groundwater flow directions, causing a groundwater mound to form under the lagoon and radial flow away from it. The location of this lagoon is important because it is located southwest of both well AMM-1 and the ore stockpile in question. Consequently, groundwater could have been forced to flow in a northwesterly direction under the ore stockpile and towards the location where well AMM-1 was eventually installed.

Review of head data from the only well reported completed in the mill site further reinforces this possibility, in that the "boneyard" well shows a head that is about 0.27 feet higher than well AMM-1 (Western Technologies March, 1989 Report, Figure 3.4). This is important because the "boneyard" well is located closer to the Colorado River than well AMM-1, at a distance of about 750 feet versus about 820 feet, respectively. Consequently, the "boneyard" well should show a lower head than AMM-1.

Further evidence is apparent after comparison of Atlas water level information which suggests that head in the clarification lagoon was about 20 feet higher than the average head reported in well AMM-1 (ibid., compare lagoon water surface elevation, with well AMM-1 hydrograph in Canon Environmental July, 1994 Report, Appendix B, Graph B-1).

Consequently, such northwesterly flow in the shallow aquifer from the lagoons toward the vicinity of well AMM-1 have easily carried ore stockpile contaminants. It is also important to note that head reported in the "boneyard" well (3954.53 ft above mean sea level) was midway between the head reported in the clarification pond (3972.5 ft above mean sea level) and that found in well AMM-1 (3954.26 ft above mean sea level) in December, 1988 (Western Technologies March, 1989 Report, Figure 3.4).

It is also important to note that if recycling of tailings pond effluent was ever conducted at the facility, that the possibility of impounding such recycled wastewaters in the clarification lagoon would have also created a source of groundwater contamination apart from the ore stockpile areas in the mill site.

In order to assess if the 32 years of mill operation was sufficient to cause groundwater pollution in the vicinity of well AMM-1, prior to its installation, the staff undertook an estimate of advective groundwater contaminant velocity (v) in the shallow aquifer, as follows (Domenico and Schwartz, p. 360):
\[
\begin{align*}
v &= K \cdot \frac{dh}{dt}, \text{ where: } K &= \text{average alluvium permeability} \\
&= 2.4 \text{ ft/day (DTER, p. 5-4)} \\
&= 0.0871 \text{ ft/day} \\
&= 0.0109 \\
&= 0.30 \\
&= 0.0871 \text{ ft/day}
\end{align*}
\]

Based on this velocity, the time needed for advective contaminant transport from the ore stockpile to the vicinity of well AMM-1 can be estimated as follows:

\[
\begin{align*}
t &= \frac{d}{v} \text{, where } t &= \text{advective contaminant travel time} \\
&= \frac{400 \text{ feet}}{0.0871 \text{ ft/day}} \\
&= 4,593 \text{ days} \times 365 \text{ days/year} = 12.57 \text{ years}
\end{align*}
\]

Because this contaminant travel time is based on the advective velocity calculations, it represents the time needed for the 50% contaminant concentration front to arrive at the well (ibid., p. 634). Dispersion and diffusion would cause contaminants to arrive sooner than this estimate.

Based on these estimates, it appears that during the 32 years of prior mill operation that more than sufficient time was available for ore stockpile contaminants to travel to the vicinity of well AMM-1. Although this transport time estimate may appear to be short because it ignores vertical transport to the water table, it is in fact conservative because it also ignores the effects of concentration gradients and aquifer dispersion that would force water table contaminants to arrive even earlier.

Another factor to consider is possible northward groundwater flow from the leachate pond under the tailings pile, where heads were at least 68 feet higher in the tailings pile than well AMM-1 [Canonica Environmental July, 1994 Report, Figure 4, piezometer B-4(17)]. Unfortunately, Atlas has not installed sufficient numbers of monitoring wells or piezometers at the mill site to conform gradients between the tailings pile and AMM-1. The NRC should have sufficient demonstration of Atlas prior to acceptance of AMM-1 as the "background" well. Such mounding in the water table surface by the tailings pile could have steepened the hydraulic gradients in the vicinity of the ore stockpile, further accelerating the migration of stockpile contaminants toward the vicinity of well AMM-1.

Due to the late timing of well AMM-1 installation, the lack of shallow aquifer head data in the mill area, the presence of two apparent and highly significant sources of artificial recharge to the water table system, and estimates of apparent advective contaminant transport time from the stockpile to the vicinity of well AMM-1, we cannot conclude with any certainty that well AMM-1 is truly representative of background groundwater quality conditions at the facility.

In order to resolve these uncertainties, Atlas should be required to complete additional characterization of local hydrogeologic conditions, shallow groundwater heads and flow directions, and groundwater quality by installation of several additional monitoring wells across the mill site area. If after this additional geologic, potentiometric, and water quality data are available, Atlas for any reason is unable to justify historic groundwater flow directions and quality, then the NRC must rely on current spatial distribution of tailings contaminants in the shallow aquifer to determine an adequate location for a background groundwater monitoring point. Adequate baseline data for determination of background groundwater quality cannot be provided without resolution of these concerns. This is an open State issue.

22 Tailings Leachate Characterization (Section 5.2.5) - review of the DTER shows additional information should be provided regarding the tailings leachate characteristics shown in Table 5-2. This includes a disclosure of the number of samples collected, dates collected, sampling point (s) from which they were collected, type of sample or analysis completed (e.g., total or dissolved analysis), and basic statistics of concentrations measured (minimum, maximum, average and standard deviation).

From DRC review of the NRC docket file, it appears that characterization of the leachate characteristics is limited to only four samples collected by the NRC in 1987 (see 10/17/87 CRC letter by Edward Hawkins). If additional information is available, this should be clearly and completely disclosed. In any case, Atlas should be required to justify why average and standard deviation concentrations presented are representative of past and current leachate conditions in the tailings pile.

The NRC should also include in the DTER comparisons of the average concentration of each contaminant with its applicable groundwater maximum concentration limit (MCL), EPA drinking water MCL, or other health standard. These are open State issues.

23 Confirmation of Lateral Contamination of Contaminants Via Vertical Hydraulic Gradients Near River (Section 5.2.5) - the NRC has acknowledged that tailings contaminants have been found in the shallow aquifer below the tailings pile (DTER, p. 5-11). Several Atlas reports have also concluded that these contaminants are discharged to the Colorado River. As a result, Atlas should be required to conduct discrete head monitoring within the

Page 30
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<thead>
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<th>Time</th>
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<tr>
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**Table Legend:**
- Event 1: Initiated
- Event 2: Triggered
- Event 3: Occurred
- Event 4: Completed

**Notes:**
- Event 1 is the initial trigger event.
- Event 2 is automatically triggered by Event 1.
- Event 3 is the main event triggered by Event 2.
- Event 4 is the final event that completes the sequence.
If...
violation of NRC Criterion 5D, which requires ground-water corrective action programs to:

"...return hazardous constituent concentration levels in ground water to the concentration limits set as standards." (10 CFR 40, Appendix A, Criterion 5D).

Project history shows the first License amendment where the NRC required a GWCAP, the License complied with Criterion 5D, in that it mandated Atlas to:

"Implement a corrective action program due to the exceedance of ground-water protection standards, with the objective of returning the concentrations of chromium, gross alpha, molybdenum, nickel, radium-226 and 228, selenium, uranium, and vanadium to the concentration limits specified in Subsection (B)." [see December 14, 1988 NRC License Amendment No. 4, License Condition 17(C)]

Subsection B of the License is where the ground-water protection standards were located. In concept, we agree with the December, 1988 NRC approach because it is consistent with NRC Criterion 5D, and it represents an effort to protect important ground-water resources.

However, this performance objective for the GWCAP was later removed by the NRC, and supplanted with only a requirement that Atlas:

"...submit a corrective action program review by December 31, of each year, that describes the progress toward attaining ground-water protection standards." [July 18, 1989 NRC License Amendment No. 8, Condition 17(C)].

Review of the NRC docket file has failed to find any justification for the removal of this performance objective. Furthermore, this change appears to be in direct contradiction to NRC Criterion 5D, in that it does not mandate Atlas to return ground-water quality in the compliance monitoring wells to the ground-water protection standard concentrations; but only to report their progress toward that end. No time limits have been imposed in the license, by which Atlas is to achieve compliance with the ground-water protection standards in the License. Unfortunately, this is the same language found in the current License [January 22, 1996 NRC License Amendment No. 26, Con.1ision 17(C)].

As a result, no performance objective currently exists in the License for the GWCAP. Consequently, the current license fails to comply with NRC Criterion 5D. Furthermore, no deadlines have been imposed in the License by which Atlas could be required to complete restoration of local ground-water quality. Therefore, NRC should modify the existing License to re-include the previous performance criteria for the GWCAP that will mandate Atlas to regain and maintain the ground-water protection standards in their compliance monitoring wells. A deadline for completion of this ground-water restoration must be determined and also imposed by the License. This is an open State issue.

37. NRC Failure to Enforce GWCAP Performance Objectives Mandated by Criterion 5D: Need to Remove Active Groundwater Remediation (Section 5.4.3) - thanks to the removal of Criterion 5D performance objectives for the GWCAP, Atlas is no longer required to return groundwater quality in the compliance monitoring wells to the groundwater protection standards. Nor has NRC enforced the performance criteria for groundwater corrective action found in Criterion 5D. This is of great concern, in that recent Atlas groundwater monitoring results from compliance wells AMM-2 and AMM-3 show groundwater quality has been seriously degraded. Several tailings contaminants have been found in these and other wells that greatly exceed the groundwater protection standards set forth in the License.

While we acknowledge apparent decreasing trends in some monitoring wells, recent measurements still indicate gross exceedance of groundwater protection standards. Elements in this problem include uranium concentrations measured by Atlas at over 2,000 and 1,500 pCi/l in compliance monitoring wells AMM-2 and AMM-3, respectively (July, 1994 Canyon Environmental Report, Appendix D, Graphs D-10 and 11). Recently, even higher uranium concentrations have been found in nearby well ATP-2-5, at more than 3,000 pCi/l (ibid., Graph D-12). These contaminant concentrations are enormous in comparison to either the License mandated 4.0 pCi/l groundwater protection standard [License Condition 17(B)], or the recently promulgated 30 pCi/l EPA groundwater standard for Tule Lake uranium mill sites (40 CFR 192 Subpart A, Table 1), in that they exceed these limits by orders of magnitude.

Due to these massive concentrations, it appears that simple covering of the tailings pile combined with a "natural flushing" approach to groundwater remediation would render nearby groundwater unusable for very long periods of time, perhaps even centuries. Unsubstantiated estimates by Atlas have predicted at least 75 years would be needed to remediate nearby groundwater to the EPA 30 pCi/l uranium groundwater standard (March, 1990 Wessex Technology Report, p. 34). Perhaps much longer period of time will be necessary for reduction of other more retarded radioactive and non-radioactive contaminants to acceptable levels in the groundwater system. In a similar vein, it may take comparable lengths of time to reverse apparent adverse impacts to surface water quality, a problem discussed below.

It is clear that the Atlas attempt at de-watering the tailings and evaporating the leachate was not completely effective in returning groundwater quality to compliance with the License's groundwater protection standards (DTEK, pp. 5-22 and 23). Of late, Atlas has abandoned its groundwater corrective action project in order to construct a tailings pile cover. However, serious State concerns exist regarding the efficacy of covering the tailings as the sole groundwater corrective action remedy. The NRC has rejected its
earlier performance standard for the GWCAP, which would have required Atlas to regain compliance with the groundwater protection standards of the License. Consequently, Atlas is no longer mandated by License to remediate groundwater quality in compliance with NRC Criterion 3D. Although several active groundwater corrective action measures have been found to be cost-effective by the NRC (DTER, p. 5-14), no methodology or deadlines have been imposed in the License, within which the groundwater is to be restored to acceptable concentration limits. Finally, the NRC openly admits that a groundwater contamination problem exists, and that to date Atlas "... has not implemented any corrective action to directly reduce the contaminant levels in the uppermost aquifer." (DTER, p. 5-23). Based on this history and lack of action to protect groundwater and surface water resources near the tailings pile, the State is concerned about when, if any groundwater corrective action, will be completed at this facility.

As a result of these concerns, Atlas should be required to implement active groundwater corrective action measures that will protect current and future beneficial uses of both ground and surface waters near the facility. Focus should be placed not only on groundwater under the Atlas property, but on ground and surface water resources under and on adjoining private and public lands. Therefore, the NRC should act to require such measures of Atlas without delay. This is an open State issue.

38. Need to Coordinate Approval of Revised GWCAP and ACLs with State: Non-Radiologicals (Section 5.5) - in light of the shortcomings listed above, it is clear that the current Atlas GWCAP is in need of revision. Discussion with NRC staff has indicated that the agency is unaware of its process of re-evaluating the currently approved Atlas GWCAP, as it is presented in the July, 1994 Canamin Environmental Report. The State should be informed of the status of groundwater quality and groundwater corrective action programs, as found in the Utah Ground Water Quality Protection Regulations (UAC R317-6). It is also clear that the State has jurisdiction in the issue of non-radioactive contaminants at Title II uranium mill sites.

Consequently, we suggest that the NRC closely coordinate its review and re-evaluation of the Atlas GWCAP with the State, so as to ensure the regulatory needs of both agencies are met. During State review of the GWCAP, close attention will be given to consideration of hydrogeological conditions, pollutant concentrations and extents in the aquifer, environmental fate of groundwater contaminants, nearby groundwater and surface water rights and uses, thorough assessment of human and environmental risk, and applicability of best available technology in containment and control of tailings contaminants.

Discussions with NRC and Atlas staff have also indicated that Atlas intends to apply for groundwater Alternate Concentration Levels (ACL) in a future revision of the GWCAP. Under State groundwater quality regulations, the approval of an ALT for an ACL is reserved only for the Utah Water Quality Board (UAC R317-6). Consequently, close coordination with the State is also in order for application of ACLs. During such State review, DEQ staff will focus on compliance of any proposed ACL with State groundwater quality standards (UAC R317-6) and surface water quality standards (UAC R317-7) found in the Utah Water Quality Regulations, and implementation of best available technology for the engineered cover system.

Based on the State's technical concerns regarding the GWCAP, many of which are listed above, it appears that serious revision of the Atlas GWCAP is necessary. If dual regulation of the Atlas facility is to be avoided, it is then in the best interest of both the NRC and the State to closely coordinate review and approval of the final Atlas GWCAP. We hope that such a coordinated effort is possible, and our concerns regarding the current and soon to be revised GWCAP can be resolved. These are open State issues.

39. Need for NRC Assessment of Surface Water Quality (New Section) - the DTER should not only focus on groundwater quality, but also include an assessment of the effects of the tailings pile on surface water quality. Statements made by NRC and Atlas staff to State personnel have indicated that Atlas plans on applying for groundwater Alternate Concentration Limits (ACLs) as an integral part of their GWCAP. A key element that the NRC must consider is the current and future impact of the tailings pile on water quality in the Colorado River. This evaluation must be included in any considerations of a permit cover design, and should be a part of the DTER. This is an open State issue.

40. State Findings of Apparent Adverse Effect of Tailings Pile on Colorado River, and Recommendation for Additional Evaluation (New Section) - during the past year the Utah Department of Environmental Quality (DEQ) has undertaken a focused study of water quality conditions in the Colorado River immediately above and below the Atlas tailings pile. During this time period, water quality grab samples were collected for heavy metals, radiocarbon, nutrients, and general chemistry and field parameters. Upstream samples were collected at the U.S. Highway 191 crossing of the Colorado River (Moshi Bridge). Downstream river samples were collected immediately below and below the Atlas tailings pile where State Road 279 (Potash Road) first encounters the Colorado River (approximately 2,500 feet East and 1,800 feet North of the Southwest corner of Section 34, Township 25 South, Range 21 East, USBM). Samples were collected by staff of the Utah Division of Water Quality (UDWQ). Analyses were completed by the Utah State Health Laboratory. Results of the State's river water quality sampling are found in Attachments 11 (upstream results) and 12 (downstream results), below.

As can be seen in Attachments 11 and 12, a large number of water quality parameters were sampled during the State's study. In order to streamline evaluation of the results, DRC staff focused on the tailings contaminants most likely to be transferred from the contaminated groundwater to the Colorado River. These largely included those mobile non-radiological parameters found in the Atlas Tailings Seep samples, which were in excess of the Utah Ground Water Quality Standards, see discussion above. Included with these contaminants were: ammonia (as nitrogen), manganese (dissolved and total), molybdenum (dissolved and total), nitrates + nitrites (as nitrogen), and vanadium (dissolved
In order to avoid dual regulation of the Atlas tailings pile, the NRC should require Atlas to make this demonstration, and show that the final engineered cover will comply with the State Salinity Standards. This is an open State issue.

Comments on Radon Attenuation and Site Cleanup (Section 6.6)

42. Depth of Ra-226 Characterization in Tailings (Section 6.2.2) - the NRC states that the Atlas radon emanation model is sensitive to radium-226 concentrations in the upper 13 feet of the tailings (DTER, p. 6-5). However, the NRC then contradicts its determination with the statement that Atlas only needs to determine radium-226 concentrations to a depth of three to four feet (ibid.). The NRC should avoid such inconsistency and ensure that radium-226 concentrations are characterized to the depth for which the radon emanation model is sensitive. This is an open State issue.

43. Atlas Testing and NRC Prior Approval for "Affected Soils" (Section 6.2.2) - the "affected" soils placed below the clay radon barrier are integral to control of radon emanations from the tailings pile. Consequently, the NRC should require demonstration and prior approval of their radium-226 consent before any clay radon barrier construction. Because radium-226 is preferentially partitioned by fine-grained soils, the NRC should require Atlas to include sieve analysis with all radium-226 testing of soils to determine the gradation of each soil sample reported. If during this demonstration, radium-226 concentrations are found to be greater than acceptable levels, NRC must require Atlas to redesign their clay radon barrier thickness accordingly. This is an open State issue.

44. Testing Frequency for "Affected Soils" (Section 6.2.2) - the Atlas proposal listed 15 samples to be collected for a layer of soil material by the minimum of 16 inches thick (DTER, p. 6-6 and Figure 6-1). Based on the soil profile area of the tailings pile of 91 acres (DTER, p. 6-9) and a minimum thickness of 16 inches, these 15 samples equate to no more than one sample per 13,017 cubic yards of material. If Atlas finds more "affected soil" to clean up around the mill site, these 15 samples will be diluted across an even greater volume of soil material. In contrast, NRC has required radon testing for the filter and riprap materials over a frequency of at least one sample per 10,000 cubic yards (DTER, p. 4-24). We believe that by monitoring only 16 inches of soil material over the do not more so, then the material radon testing. Consequently, the NRC should require radium-226 testing on at least the same frequency as the filter and riprap materials, i.e., at least one sample per 10,000 cubic yard of "affected soil". This is an open State issue.

45. Atlas Plan 5: Sampling Moab Wash Sandy Soils: Soil Graduation Analysis (Section 6.2.2) - Moab Wash sandy soils are proposed to be used for the filter layer over the clay radon barrier. The DTER then refers to an Atlas plan for sampling these soils to determine background conditions for radium-226 (p. 6-7). DRC staff review of this plan, found in the Canons Environmental March, 1995 Report (Appendix F), makes no mention of gradation testing for soil samples collected. As described above, soil gradation results are critical to the interpretation of radium-226 soil testing data. Consequently, the NRC should require Atlas to provide gradation results with their radium-226 data for Moab Wash sandy soils that will be used in cover's filter layer. These results should be reviewed and approved by the NRC before any construction of the radon barrier, in order to allow adequate disposal of these materials should they prove to contain higher than background concentrations of radium-226. This is an open State issue.

46. Radon Barrier Clay: Unidentified Design (Section 6.2.2) - Atlas has not yet identified the source of the clay radon barrier material nor provided independent analysis of its unassured soil properties (DTER, p. 6-5). In order to facilitate the review process, Atlas staff have used soil characteristc data from Manosee Shale derived soils generated by the U.S. Department of Energy (DOE) at its Title I cleanup project in Grand Junction, Colorado, some 75 miles distant from the nearest source of Manosee Shale material. However, no information has been provided to demonstrate why the DOE evaluation of Manosee Shale materials was adequate. Furthermore, NRC staff have not justified how the Manosee Shale material in Grand Junction, Colorado is representative of the clay materials to be harvested locally from Klonkite Plateau. Nor has any evaluation been made of the diffusivity, moisture retention, and other unassured soil characteristics that will be produced after the native shale is reconstituted into a clay and constructed as a final engineered material over the tailings embankment.

Based on these unknowns, the ability of the proposed cover design to adequately control radon emanations from the pile is highly suspect. Consequently, this aspect of the engineering design is unjustifiable, and must be resolved before any NRC approval of the final engineering design or Reclamation Plan. This is an open State issue.

47. Unsaturated Soil Flux Models (Section 6.3) - currently Atlas has committed to redo their radon flux model if confirmation testing of their "affected" soil, coarse tailings, or radon barrier clay are found to differ "significantly" from the assumed model input values. Currently, it is several critical design parameters are unknown, including:

A. Average Radium-226 Concentrations - of upper 15 feet of the tailings pile, including tailings material, "affected" soils, radon barrier clay, and sandy soil filter materials.
B. Unsaturated Soil Characteristic Data - for the final radon barrier, including both clay and sandy materials.
C. Average, Long-Term In-Situ Moisture Content - of radion barrier soils, including sandy "affected" soils, overlying clay, and overlying sand filter materials. This
includes soil moisture conditions not only at the time of construction, but also average conditions throughout the life of the tailings pile (1,000 years).

D. Frost Penetration Uncertainty - it is still unclear if frost penetration calculations presented previously by Atlas were representative or conservative of current and possible future on-site conditions.

E. Ability of Cover Design to Resist Subsidence Related Uplift - the magnitude of possible future land subsidence and an evaluation of the ability of the radon barrier to resist it has yet to be provided by Atlas or reviewed by the NRC.

Consequently, it is inappropriate to approve any engineering design for the cover materials without Atlas having first provided this information and the NRC afforded the opportunity to arrive at a satisfactory conclusion. To allow construction of the cover materials without resolution of these design issues runs the risk of late discovery of such design problems and added costs of retrofit design and construction. Therefore, the NRC should require Atlas to resolve all these issues and demonstrate adequate cover design as it relates to control of future radon flux before any approval of the cover design of the Reclamation Plan. This is an open State issue.

48. Uncertainty of Radon Barrier Durability (Section 6.4) - the NRC analysis presented in this section assumes the clay radon barrier will not thicken, cracked or breach by settlement of the embankment. Contrary to this, NRC geotechnical staff have concluded that insufficient information is currently available to make such a conclusion, and have required Atlas to provide piezocron test data from the tailings and engineering analysis in order to resolve this issue (DTER, p. 3-2). Consequently, the radon flux modeling conclusions referenced in Section 6.4 are premature and unjustified.

Section 6.4 of the DTER also ignores the possibility of desiccation cracking during construction of the clay radon barrier, an issue raised above by the State. If the construction quality assurance testing issues raised above are not adopted, or otherwise resolved by Atlas, then the radon flux modeling must include the effects of desiccation cracks on the clay radon barrier in any assessment of radon emigration control.

This section also fails to address changes in radon emigration in the event that differential subsidence thins or breaches the radon barrier. Until this possibility is thoroughly evaluated and resolved by Atlas, the radon emigration predictions presented in the DTER are hasty and unjustified.

All of these issues must be resolved before the existing radon flux model results cited in Section 6.4 could be considered satisfactory. This is an open State issue.

Comment on Appendix A Assessment (Section 7.0)

49. Revisions Needed to NRCAppendix A Conclusions (Section 7.0) - in light of the many State concerns regarding technical conclusions reached in the DTER, as described above, it appears that many of the conclusions regarding compliance of the Atlas site with the Criteria in 10 CFR 40, Appendix A are premature, incomplete, and/or unfounded. We suggest that this section of the DTER be rewritten after completion and resolution of all the above State concerns and issues.

CONCLUSIONS

Review of the DTER has shown a large number of State technical concerns and open issues regarding the Atlas Reclamation Plan and facility, which have not yet been addressed by the NRC. These concerns can be grouped into 14 general categories, which are summarized below:

1. Inadequate subsurface geologic model for site.
2. Incomplete and unjustified engineering design specifications.
3. Inadequate construction quality assurance/quality control requirements.
4. Inadequate hydrogeologic characterization of both tailings pile and mill site areas.
5. Inadequate groundwater monitoring for tailings pile and mill site.
6. Need to investigate potential groundwater contamination of Arches National Park and adjoining private property.
7. Need to implement a groundwater monitoring quality assurance/quality control plan.
8. Inadequate characterization of tailings leachate characteristics.
9. Need to require groundwater monitoring for additional tailings contaminants.
10. Need to revise and justify groundwater protection standards.
11. Need to enforce NRC Criterion 3D groundwater corrective action program requirements at facility.
12. Need to investigate apparent non-radiologic contamination of the Colorado River.
13. Need to complete a performance assessment to demonstrate final engineered covers can adequately protect local groundwater and surface water resources.


Page 58
INTRODUCTION

The Clean Air Act (CAA) of 1990 established a new framework for controlling emissions of criteria pollutants, including nitrogen oxides (NOx) and ozone precursors. The CAA required the development of new strategies to reduce emissions of these pollutants, particularly from mobile sources such as motor vehicles. This document introduces a plan for implementing these strategies in the State of Utah.

<table>
<thead>
<tr>
<th>Date</th>
<th>Action Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 1, 1996</td>
<td>Action Itemized and Presented</td>
</tr>
</tbody>
</table>

This document includes a detailed description of the actions taken to address the requirements of the Clean Air Act. It outlines the strategies and measures that have been implemented to reduce emissions of nitrogen oxides and ozone precursors in the State of Utah.

Dear [Recipient],

Thank you for your interest in the Clean Air Act and the implementation of emission reduction strategies in the State of Utah. I look forward to discussing further details about the actions taken to address the requirements of the CAA.

Sincerely,

[Signature]

[Name]

Director of Air Quality
State of Utah
3. lacking calculated subsidence rates, identification of rock types and formations beneath alluvium both north and south of the buried escarpment, and

4. potential surface effects across the pile that result from differential subsidence to that final design modifications, if necessary, can be made.

Additional boreholes or geophysical work may be necessary to evaluate items 1-3 above. The boreholes need to extend deep enough into rock to eliminate the possibility that they penetrate only pendants in caprock and should be logged by a professional geologist familiar with the geology of the Moab area. Any new boreholes, for whatever purpose, should be considered for sampling because they may encounter datable materials (organics, ash) in alluvium that could be used to estimate rates of subsidence. In the absence of these studies, an overly conservative design may be required to compensate for uncertainties in quantifying potential settlement and deformation resulting from salt dissolution beneath the tailings p".

REFERENCES


ATTACHMENT 2

Available Records from
Utah State Engineers Office
for
Groundwater Wells Completed in
1940, 1958, and 1978

Arches National Park Headquarters

Utah Division of Radiation Control Research
Report of Well and Tunnel Driller

STATE OF UTAH

CENSUS INFORMATION:

1. Name and address of person, company or corporation boring or drilling well or tunnel:
   [Signature and address]

2. Name and address of owner of well or tunnel:
   [Signature and address]

3. Source of supply to be used:
   [Signature and address]

4. The number of approved application to appropriate water
   [Signature and address]

5. Location of well or mouth of tunnel is situated at a point:
   [Signature and address]

6. Maximum quantity of water measured in hours, gallons or other units of measurement:
   [Signature and address]

7. Date on which work on well or tunnel was begun:
   [Signature and address]

8. Date on which work on well or tunnel was completed or abandoned:
   [Signature and address]

9. Nature of well or tunnel:
   [Signature and address]

10. Well was equipped with:
    [Signature and address]

DEPARTMENT OF INTERNAL AFFAIRS

WATER RIGHTS DIVISION

DEPARTMENT OF INTERNAL AFFAIRS

WATER RIGHTS DIVISION

WATER RIGHTS REPORT OR DISPLAY PLOT CREATED THE ____, 19__, AT ___

DEPARTMENT OF INTERNAL AFFAIRS

WATER RIGHTS DIVISION

WATER RIGHTS REPORT OR DISPLAY PLOT CREATED THE ____, 19__, AT ___

DEPARTMENT OF INTERNAL AFFAIRS

WATER RIGHTS DIVISION

WATER RIGHTS REPORT OR DISPLAY PLOT CREATED THE ____, 19__, AT ___
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<th>POINT OF DIVERSION DESCRIPTION</th>
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<td></td>
<td>C.I. NO.</td>
<td>A0020</td>
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<td></td>
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</tr>
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<td></td>
<td>DATE</td>
<td>08/17/85</td>
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<td></td>
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<td></td>
<td>AUTHORITY</td>
<td>APP</td>
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<td></td>
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<td></td>
<td>Claim:</td>
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<td></td>
<td>Purpose:</td>
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<td></td>
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<td></td>
<td>OTHER</td>
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**LOCATION OF WATER RIGHT**

**USES OF WATER RIGHT**

**OCCUPANCY**

**Other**

**END OF DATA**
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<th>MAP UNIT</th>
<th>QUANTITY</th>
<th>SOURCE DESCRIPTION or WELL DATE</th>
<th>POINT OF DIVERSION DESCRIPTION</th>
<th>KFEETERS</th>
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<tr>
<td></td>
<td>172</td>
<td>G.P. 1958 2700 ft 3400 ft 256 276 ft</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>WATER WELL; DOMESTIC USE</td>
<td>1391 Darbridge Drive, Suite 25B</td>
<td>1391 Darbridge Drive, Suite 25B</td>
<td>U.S. Geological Survey</td>
<td></td>
</tr>
</tbody>
</table>

ATTACHMENT 3

U.S. Geological Survey
Drilling and Pump Test Report
for 1258 Replacement Well
at
Arches National Park Headquarters

by
Don Price
Geologist

Dated April 18, 1959

J-73
MEMORANDUM SUMMARIZING THE DRILLING AND TEST PUMPING OF A REPLACEMENT WELL AT ARCHES NATIONAL MONUMENT
GRAND COUNTY, UTAH

By
Don Price
U.S. Geological Survey

Prepared at the request of the National Park Service, Department of the Interior
Salt Lake City, Utah
1959


Branch Area Chief (GJ) Denver, Colorado
May 26, 1959

Herbert A. White, Salt Lake City, Utah (GJ)

Transmittal of Don Price's report on Arches National Monument.

Transmitted herewith for review and approval are the original and one copy of an administrative report entitled, "Memorandum summarizing the drilling and test pumping of a replacement well at Arches National Monument, Grand County, Utah," by Don Price.

Six additional carbon copies of this report have been prepared. Pending approval of official release to the open file, an administrative release is also being sent to the National Park Service. Four copies are being sent to the Regional Chief of Lands, Region Three, National Park Service, Santa Fe, New Mexico. The two remaining copies of the report will be retained in this office until such time as an approval for release to the open file has been obtained.

The enclosed administrative report contains a disclaimer statement on the title page. In my letter of transmittal to the Regional Director of Lands, I have also cautioned him to consider this as an administrative release subject to the usual precautions. All copies of this report have been stamped "Unpublished records subject to revision".

I should like to request that the enclosed report be approved for eventual release to the open file.

Herbert A. White
District Geologist

cc: Regional Director of Lands
U.S.I.S., Santa Fe, New Mexico
Memo

Ground Water Branch
301 Federal Building
Salt Lake City, Utah
May 20, 1979

To: Regional Chief of Lands
Region Three, National Park Service
San Jose, San Jose, New Mexico

From: Herbert A. White, District Hydrogeologist
Ground Water Branch
U.S. Geological Survey
Salt Lake City, Utah

Subject: Transmittal of Mr. Price's report on Arches National Monument.

Under separate cover, there are being transmitted to you four carbon copies of a report entitled "Memo: Summarizing the Drilling and Test Pumping of a Replacement Well at Arches National Monument, Grand County, Utah" by Don Price.

The original and one carbon copy of this report are being transmitted to A. E. LeBlanc, Branch Area Chief, Ground Water Branch, Elko, Nev. Federal Center, Denver, Colorado, for his review. I also requested that the report be approved for release to the main file. Until we receive such approval, this report should not be made available to any other interested party. It will be mandatory for you to furnish copies to Mr. LeBlanc, Mr. Wilson, and to your Region office in San Francisco. By carbon copy of this letter attached to each copy, they are also cautioned that this is a restricted release pending Washington Office approval of the release.

Herbert A. White
District Hydrogeologist

cc: Branch Area Chief
Denver, Colorado

Incorporating the Drilling
and Test Pumping of a Replacement Well
At Arches National Monument, Grand County, Utah

Prepared by Don Price
April 10, 1979

INTRODUCTION

In October, 1978, the National Park Service requested the assistance of the Ground Water Branch of the U.S. Geological Survey during the drilling of a replacement well at Arches National Monument, Grand County, Utah. The new well was needed to meet the growing water requirements at the monument.

It was agreed that a representative of the Ground Water Branch would be on hand during the final stages of drilling to collect and examine drill cuttings and to advise on when deep drilling should be stopped. It was also to be on hand during the test pumping of the well to collect yield and drawdown information. The following discussion summarizes the drilling and test pumping of the replacement well and includes some of the basic data collected during those operations. The well was drilled during the period November 3 to 15, 1978, and the development and test pumping of the well were conducted, off and on, during the period November 12 to December 20, 1978.

Because of unavoidable interruptions during the development and test pumping operations, it was not possible for the writer to remain at the well site the entire time. Bruce Wilson, Superintendent of Arches National Monument, provided valuable assistance and collected data during the writer's absence.
Development and Testing the Well

The well was developed in two steps. The first step was a flushing and bailing operation designed to remove most of the drilling clay and loose sand from the well. The second step was a test-pumping operation which was intended to further develop the well to its maximum specific capacity. The flushing operation consisted of pumping clear water into the well through a 3-inch pipe which was suspended to the bottom of the casing. The water was allowed to circulate back up through the casing carrying with it clay and loose sand that had accumulated in the bottom of the well. This operation lasted for 3 hours. Water was then pumped into the well in the same manner as above, but instead of circulating back up through the casing, it was forced out through the perforations and circulated up through the gravel pack. This operation lasted for one hour. The well was then bailed for 3 hours during which time it yielded an average of 13 gallons per minute and the water level in the well remained at approximately 100 feet below land surface. The static water level in the well was not recorded prior to the bailing test.

The well was test pumped on three separate occasions prior to this report. A jet pump (the pump originally used on the existing well) was used for the first two tests and a submersible pump was used for the third test. A summary of data collected during the test pumping is given in the following table.

<table>
<thead>
<tr>
<th>Date</th>
<th>Static level</th>
<th>Hours</th>
<th>Pumping water level</th>
<th>Gallons per minute</th>
<th>Feet pumped</th>
<th>Feet of drawdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 10, 1958</td>
<td>41.22</td>
<td>6</td>
<td>97.50</td>
<td>6.28</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>Dec. 11, 1958</td>
<td>41.71</td>
<td>8</td>
<td>104.70</td>
<td>4.37</td>
<td>0.39</td>
<td></td>
</tr>
<tr>
<td>Dec. 20, 1958</td>
<td>41.71</td>
<td>12</td>
<td>50.71</td>
<td>7.00</td>
<td>1.72²</td>
<td></td>
</tr>
</tbody>
</table>

²/ Data reported by drilling company.

Water levels in the pumping well were measured with an electric tape and the yields were measured volumetrically using a barrel of known capacity and a stop watch.

It was particularly difficult during the first two tests to keep the pump in continuous operation and to obtain constant yields. At the end of the second test, the foot valve on the pump broke and the test pumping was discontinued until another pump could be obtained. The water was absent during the third and final test and the figures in the preceding table, summarizing this test, are reported by the drilling company. A water-level recovery test was made on the well after the first and third pump tests. Graphs of the recovery of the water level are shown in figure 1. The existing well was available for observation and was measured during the first two pump tests.
There was mutual interference between the two wells, but because the new well was still in the development stage and because a constant yield could not be maintained, no quantitative interpretations could be made at that time. The water levels in the existing well were measured during the second pump test and are shown in the following table.

<table>
<thead>
<tr>
<th>Time in minutes after pump was started</th>
<th>Water level in feet below land surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>66.36</td>
</tr>
<tr>
<td>5</td>
<td>66.37</td>
</tr>
<tr>
<td>15</td>
<td>66.41</td>
</tr>
<tr>
<td>25</td>
<td>66.44</td>
</tr>
<tr>
<td>45</td>
<td>66.44</td>
</tr>
<tr>
<td>60</td>
<td>66.48</td>
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<tr>
<td>65</td>
<td>66.51</td>
</tr>
<tr>
<td>85</td>
<td>66.55</td>
</tr>
<tr>
<td>120</td>
<td>66.68</td>
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<tr>
<td>180</td>
<td>66.72</td>
</tr>
<tr>
<td>235</td>
<td>66.80</td>
</tr>
<tr>
<td>420</td>
<td>66.89 5/</td>
</tr>
</tbody>
</table>

5/ Total drawdown 0.49 feet.

Log of the wall

Table I shows the log of the replacement well at Arches National Monument. The well was drilled to a total depth of 123.4 feet entirely in the Navajo sandstone. No other formation was encountered. On the outcrop the Navajo sandstone is a massive, cream to yellow sandstone consisting primarily of a medium-grained, friable, quartz sand cemented by calcium carbonate. It is the uppermost formation of the Glen Canyon group of Jurassic (T) age. A sieve analysis (the U.S. Standard sieve series was used) of the samples collected from the replacement well showed that the sand comprising the Navajo sandstone are remarkably uniform in the total section that was penetrated by the drill bit. Between 70 and 80 percent of the sand grains were retained on the 250- and 125-micron screens. This percentage is probably low, however, because the sandstone was well cemented, except in the zone of saturation, and many grains were ground to a powder by the churning action of the drill bit. The samples collected from the zone of saturation were found to be poorly cemented and the sand grains were not excessively ground up by the drill bit. In these samples, 93 percent of the sand grains were retained by the 250- and 125-micron screens. This would indicate a medium-grained, well-sorted sand.

Some ironstone concretions and fragments of calcium carbonate were found in the zone of saturation. They were probably deposited by ground water.
Table 1 - Log of the replacement well at Arches National Monument, Grand County, Utah, describing the Navajo sandstone and summarizing the drilling conditions. (All depths are in feet below land surface.)

<table>
<thead>
<tr>
<th>Lithologic description</th>
<th>Drilling conditions</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandstone, yellow to orange, medium-grained, well-rounded, well-cemented; contains some wood fragments.</td>
<td>This interval was drilled with a pneumatic rotary rig. Drilling was uninterrupted and uniform.</td>
<td>87</td>
<td>87 ± 15'</td>
</tr>
<tr>
<td>1.0</td>
<td>105</td>
<td>87 ± 15'</td>
<td></td>
</tr>
<tr>
<td>Sandstone, orange to light pink, medium grained, well-rounded, well sorted, fairly well cemented.</td>
<td>This interval was drilled with a hydraulic rotary rig. Circulation was lost at a depth of 105 feet.</td>
<td>1.0</td>
<td>105</td>
</tr>
<tr>
<td>Sandstone, orange to pink, medium grained, well-rounded, well sorted, very tightly cemented, undetected; contains calcium carbonate.</td>
<td>Drilling became extremely difficult and slow in this interval. Cuttings were recovered in large fragments.</td>
<td>7</td>
<td>112</td>
</tr>
<tr>
<td>Sand, orange to pink, well-rounded, well sorted, un cemented; some small fragments of gray limestone, ironstone concretions and calcium carbonate.</td>
<td>Drilling became easier and more rapid in this interval; good circulation was encountered. Circulation was lost at 120 feet below land surface.</td>
<td>10</td>
<td>122</td>
</tr>
<tr>
<td>No sample recovered.</td>
<td>Drilling conditions became extremely difficult and slow in this interval. Circulation was lost at 122 feet below land surface.</td>
<td>1.4</td>
<td>123.4</td>
</tr>
</tbody>
</table>

Chemical Quality

A sample of water was collected from the replacement well after about 2,000 gallons had been pumped from the well. The results of a partial chemical analysis of the water are summarized in the following table. The water was analyzed by the Quality of Water Branch of the U. S. Geological Survey.

<table>
<thead>
<tr>
<th>Chemical analysis of water from the replacement well at Arches National Monument, Grand County, Utah.</th>
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<tbody>
<tr>
<td>Date of collection: Dec. 11, 1950</td>
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<tr>
<td>Temperature: 67° F.</td>
</tr>
<tr>
<td>Specific conductance at 25° F.: 762 micro-mhos</td>
</tr>
<tr>
<td>Silica (SiO₂): 12 ppm</td>
</tr>
<tr>
<td>Calcium (CaO): 55 ppm</td>
</tr>
<tr>
<td>Magnesium (MgO): 21 ppm</td>
</tr>
<tr>
<td>Sodium and Potassium (Na₂O): 73 ppm</td>
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Conclusions and Recommendations

The replacement well was drilled in the Navajo sandstone, which is a highly cross-beded sandstone. Where it is exposed at the surface, it is fractured along the bedding planes. The Navajo sandstone is also known to be jointed in this area. Apparently fractures and joints existed at some depth because the driller had difficulty maintaining circulation. This loss of circulation strongly suggests that the drilling mud was being lost through a fracture or joint. This condition occurred at three different depths, 109, 126, and 128 feet, respectively below land surface. Each time, however, the measured water level in the well was 100 feet below land surface. The water level remained constant at this depth despite the fact that the static water level in the well before circulation was lost was known to be approximately 50 feet below land surface.\(^1\) This suggests that drilling fluid might be moving out through a principal fracture zone at a depth of about 100 feet below land surface. To seal off the fracture zone, however, a thick mixture of drilling mud containing mill fiber was required. It is possible that some of this drilling mud penetrated the water-producing horizon to some extent. It is not believed, however, that the mud completely sealed off the aquifer. The existing well, which was pumping almost continuously during the drilling operation, stopped yielding water two days after the driller began using mud. However, mud was never detected in water pumped from this well. It is possible that there may have been a cave-in of sand around the casing of the existing well which caused the well to stop yielding water. It is also possible that the yield of this well would be restored, in part at least, by surging.

The maximum yield of the replacement well was reported to be 12 gallons per minute. However, there was still considerable quantities of clay and mill fiber in the water at the end of the third pump test, and it is believed that the well will require additional development before it is put into operation.

A common and usually successful method of well development is to surge the well, alternately using a surge block and then a bailer to remove the churned up water and sediment. The surge block is more effective in moving loose sand and materials through the gravel pack than is a pump which only pumps 12 gallons of water per minute. By using a surge block, fine material that plugs the gravel pack can be pulled into the casing. The water and fine material can then be bailed out of the well. It may be necessary to use some Calgon (sodium humenate-phosphate) to break down the drilling clay so that it can be removed from around the well.

The State Engineer of Utah granted the National Park Service permission to retain the existing well for observation purposes after the replacement well is completed. When the replacement well is put into operation, a continuous water-level recording gage will be installed on
the existing well. At that time, an aquifer-performance test will be conducted. It will be necessary to record water levels in both the existing well and the replacement well during the aquifer-performance test. It is suggested, therefore, that an air-line gage be installed in the existing well along with the pump. This would provide an easy and convenient way to measure water levels whether or not the pump is in operation.
### DRC Analysis of 1958 USGS Pump Test Results from Arches National Park Headquarters Wells Completed in 1940 and 1958

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Page 2
<table>
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<th>AG</th>
<th>AH</th>
<th>AI</th>
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<th>AM</th>
<th>AN</th>
<th>AO</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Pumping Well Recovery Data for 3rd Pump Test (1986 Replacement Well)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>(4/15/86) (see memo by L. Price, Fig 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Initial time since time after</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 5   | Pumping | Water | Draw-
| 6   | Started | End | Depth | Ionic |
| 7   | (min) | (min) | (ft) | (ft) | (mmHg) | (mmHg/cm/sec) |
| 9   | 360 | 0.0 | 0.0 | 0.0 |
| 10  | 362.5 | 0.6 | 148.00 | 99.5 | 8.19 |
| 11  | 366 | 5.0 | 73.00 | 94.60 | 3.34 |
| 12  | 338 | 8.0 | 46.00 | 92.9 | 1.39 |
| 13  | 370 | 10.0 | 37.00 | 92.1 | 0.79 |
| 14  | 380 | 20.0 | 91.7 | 0.30 |

See Chart 3 for delta x

20 Static Water Level = 91.7 ft (Price 1956, p.5)
23 Pumping Water Level at start of recovery test = 164.76 ft (Price 1956, p.5)
24 Saturated thickness = 132.9 - 20 = 112.9 ft
Cell: AG1

Cell: A3

Cell: AG7
Note: Initial Depth to Water (1978 Pump Test) = 113.29 ft before pump test started (at pump test time = 0). Pump test conducted May 23-24, 1978.

Cell: P8
Note: Transmissivity, \( T = (264 \times Q) / \delta S \), where: \( Q \) = pumping rate in gpm, and \( \delta S \) = drawdown across one log cycle on drawdown graph (Discot, 1986, p. 221).

Cell: Q8
Note: Hydraulic Conductivity, \( K = 1/b \), where \( K \) = transmissivity, and \( b \) = saturated thickness.

Cell: R8
Note: \[ gpd = 40.7456 \times 1 \text{ m/day/gpd} \times 1 \text{ day/24 hrs} 	imes 1 \text{ hr/60 min} = 0.013 \text{ sec} \times \text{cm/sec} \]

Cell: S8
Note: \[ m/day \times 100 \text{ cm/m} = 1 \text{ day/24 hrs} \times 1 \text{ hr/60 min} \times 1 \text{ min/60 sec} = \text{cm/sec} \]

Cell: A8
Note: Transmissivity, \( T = (264 \times Q) / \delta S \), where: \( Q \) = pumping rate in gpm, and \( \delta S \) = drawdown across one log cycle on drawdown graph (Discot, 1986, Eq. 9.16, p. 256).

Cell: A88
Note: Hydraulic Conductivity, \( K = 1/b \), where \( K \) = transmissivity, and \( b \) = saturated thickness.

Cell: AC8
Note: \[ gpd = 40.7456 \times 1 \text{ m/day/gpd} \times 1 \text{ day/24 hrs} 	imes 1 \text{ hr/60 min} = 0.013 \text{ sec} \times \text{cm/sec} \]

Cell: A88
Note: \[ m/day \times 100 \text{ cm/m} = 1 \text{ day/24 hrs} \times 1 \text{ hr/60 min} \times 1 \text{ min/60 sec} = \text{cm/sec} \]

Cell: AI8
Note: Transmissivity, \( T = (264 \times Q) / \delta S \), where: \( Q \) = pumping rate in gpm, and \( \delta S \) = drawdown across one log cycle on drawdown graph (Discot, 1986, Eq. 9.16, p. 256).

Cell: AM8
Note: Hydraulic Conductivity, \( K = 1/b \), where \( K \) = transmissivity, and \( b \) = saturated thickness.

Note: \[ \text{sec} \times \text{cm/sec} \]

Note: Delta r (1958 Well, 2nd Pump Test): plot of pumping well recovery data suggests delta r over 1 log cycle = 10 ft (see Chart 2). This value is also approximated with difference in residual drawdown seen at 1 and 10 minutes after pumping ended.

Note: Delta r (1958 Well, 2nd Pump Test): plot of pumping well recovery data suggests delta r over 1 log cycle = 10 ft (see Chart 2). This value is also approximated with difference in residual drawdown seen at 1 and 10 minutes after pumping ended.
ATTACHMENT 3

U.S. National Park Service / Public Health Service
Report on Evaluation of Environmental Health Facilities
in
Arches National Park, Utah
(includes 1978 Headquarters Well)

by
Albert V. Soukup, P.E.

Dated September, 1978

Mr. Peter L. Parry, Superintendent
Canyonlands National Park
144 South Main Street
Moab, UT 84532

Dear Mr. Parry:

Enclosed for your use and distribution are four copies each of the reports, "Evaluation of Environmental Health Facilities, Arches National Park, Utah, and Natural Bridges National Monument, Utah, September, 1978." I hope you and your staff will take the time to read the report and act on some of the recommendations.

If I can be of any assistance please let me know.

Sincerely yours,

Al Soukup, P.E.
Environmental Sanitation Consultant

Enclosures 8

cc:
WASO-415 (PHS/NPS Environ. San. Prog.), w/encs.
Regional Director, RMU, w/encs.
PHS Consultant, DSC, w/encs.
Chief, Maintenance Div., RMU, w/encs.
Hearns, Gayle Smith and Dick Hansen
Utah State Health Department
Water Quality Bureau
P.O. Box 2500
Salt Lake City, UT 84110

October 25, 1978
REPORT ON EVALUATION OF ENVIRONMENTAL HEALTH FACILITIES
ARCHES NATIONAL PARK, UTAH

September 1978

by
Albert V. Soukup, P.E.
USPHS Environmental Sanitation Consultant
National Park Service
P.O. Box 21287
Denver, Colorado 80222

A survey of the environmental health facilities at Arches National Park, Utah, was made September 14, 1978. Mr. Larry Reed, Unit Manager, assisted in making the inspection.

CHANGES SINCE PREVIOUS SURVEY

1. An additional well has been drilled between the utility building and the 50,000-gallon reservoir. It is not connected to the distribution system at this time. Well details are described in Attachment No. 1.

2. The sanitary landfill located on the park grounds has been closed and covered. Solid wastes are now disposed of in the city-county landfill.

3. Concrete vault toilets have been constructed at the Devils Garden trailhead and at Fiery Furnace.

RECOMMENDATIONS

1. At such time as construction modifications of the existing wells are made, provisions for installation of disinfection equipment should be included. In June and July of 1978, three bacteriological samples of water from the Devils Garden well were indeterminant, indicating some questionable water quality. Staff Directive 74-9 states that "GROUND WATERS REQUIRE TREATMENT UNLESS A HISTORY OF SATISFACTORY MICROBIOLOGICAL QUALITY HAS BEEN ESTABLISHED AND SANITARY SURVEYS INDICATE NO POTENTIAL OR EXISTING HEALTH HAZARDS."
RECOMMENDATIONS (cont.)

2. The filller pipe for the water trailer should be raised. Presently, it is within a few miles of the ground. Attachment No. 2 is one suggestion for a loading system.

SYSTEM DESCRIPTIONS

Visitor Center and Residential Area

Water Supply

Water for this area is supplied by a drilled well (117 feet deep) located near apartment 7-A. The well is properly constructed and protected. The water is metered through a 2-inch meter and is pumped by a 3 hp Fairbanks-Morse submersible pump, Model 30A8, set at a depth of 114 feet, to a 50,000-gallon concrete reservoir located about 1/4 mile east of the utility buildings. The original 30,000-gallon concrete reservoir located about 400 feet north of apartment 7-A is used for emergency and fire storage.

A 5,000-gallon, dura-lined, steel water transport tank is used to haul water to Island-in-the-Sky. Equipment is stored in the BLM storage yard in Moab. The equipment is in excellent condition, and all connections and hoses are properly protected. Chlorine is added to the transport when it is being filled with water. See Attachment No. 3.

Sewage Disposal

Several septic tanks and absorption trenches serve the Visitor Center and headquarters area as follows:

1. The Visitor Center and residence No. 8 discharge wastes to a common 3,300-gallon concrete septic tank followed by six 60-foot-long absorption trenches located about 300 feet east of the Visitor Center and 300 feet southeast of residence No. 8.

2. Apartments 7-A, -B, -C, -D, and residence No. 3 discharge wastes to a common 1,500-gallon concrete septic tank followed by a distribution box and three 60-foot-long absorption trenches. The septic tank and appurtenances are located approximately 200 feet south, southwest of residence No. 3 and 300 feet southeast of the apartment building.

3. Residence No. 4 discharges wastes to a 350-gallon concrete septic tank followed by 105 feet of continuous absorption trench laid out in two 15-foot squares, and is located near the northwest corner of the residence.

Y. C. & Residential Area Sewage Disposal (cont.)

4. Residence No. 11 discharges wastes to a 750-gallon concrete septic tank and three 60-foot-long absorption trenches located about 150 feet southwest of the residence.

5. Residences Nos. 5, 6, and 10 and the utility building discharge wastes to a common 3,000-gallon concrete septic tank and three 74-foot-long absorption trenches located 100 feet west of the utility building and 100 feet east of residence No. 6.

Devils Garden

Water Supply

Water is supplied to the Devils Garden area by a 1,000-foot deep drilled well located near the Arches Trailhead and about 400 feet west of the generator building. The well has an 8-inch steel casing and a 3 hp 60A7 submersible pump. It is properly sealed and protected. A 3/8-inch water meter is installed. Water is pumped through a 2-inch galvanized steel pipe to a 30,000-gallon steel, above-ground reservoir located about 200 feet west of comfort station No. 2. The well is pumped at about 6 g.p.m.

Sewage Disposal

Comfort Station No. 1 discharges wastes to a 1,500-gallon, dual-compartment, concrete septic tank located just northeast of the comfort station. It is followed by three 90-foot-long standard absorption laterals located about 800 feet west of the comfort station and near the entrance road.

The information trailer which has been set up near the entrance road is provided with a 500-gallon steel septic tank. Effluent from the septic tank enters a sumphole in the mainline from comfort station No. 1 where it is discharged to the absorption trenches.

Comfort Station No. 2 discharges wastes to a 1,500-gallon, dual-compartment, concrete septic tank followed by five 35-foot-long, serially distributed absorption trenches. An additional line has been added perpendicular to and extending from each end of the last line described above.

Comfort Station No. 3 discharges wastes to a 1,500-gallon, dual-compartment septic tank followed by a distribution box and 430 linear feet of absorption trench.
Devils Garden Sewage Disposal (cont.)

All of these septic tanks and absorption trenches were in satisfactory condition.

Group Camp Area - There are two pit privies located in this area for visitor utilization which are in generally good condition.

Devils Garden Picnic Area

There is one privy placed over a concrete vault for visitor usage and one water faucet is available.

Arches Trailhead

A Numonog, Model No. 1000, foot-operated chemical flush toilet is provided for visitor usage. This facility was in excellent condition. One faucet is provided in this area for visitors.

Piney Furnace

There is no water supply for this area.

There is one combination vault type privy provided for this area.

Window Section

There is no water supply for this area.

There are two privies with concrete vaults provided for visitor usage.

Yike Cabin

There is no water supply for this area.

There are two vault privies, similar to the one at Devils Garden Picnic Area, and an additional chemical toilet for visitor usage.

GENERAL COMMENTS

Some of the privies checked will need to be pumped out before the next season’s use.

This park should be commended for its efforts to maintain visitor facilities in a clean and wholesome manner.

Respectfully submitted,

Albert V. Soukup, P.E.

Attachments 3
WATER QUALITY ANALYSIS

Using the Hydrodyne Analytic system (field test kit)

**Arches National Park**

**Well #1 Completed 3/15/79**

Sample Collection Date: 3/24/79
Location: 38°36'57"N, 109°36'40"W (east of maintenance area)

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Concentration in mg/l (mg/l as CaCO₃)</th>
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<tbody>
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<td>fluoride</td>
<td>0.03</td>
</tr>
<tr>
<td>iron</td>
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</tr>
<tr>
<td>manganese</td>
<td>0.03</td>
</tr>
<tr>
<td>nitrate</td>
<td>0.03</td>
</tr>
<tr>
<td>sulfate</td>
<td>0.13</td>
</tr>
<tr>
<td>sodium</td>
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</tr>
<tr>
<td>sulfide</td>
<td>less than 0</td>
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<tr>
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<td>greater than 600 (off scale)</td>
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<tr>
<td>total hardness</td>
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**Pump Test (May 24-25, 1979)**

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<thead>
<tr>
<th>TIME (Minutes)</th>
<th>DEPTH TO WATER (Feet)</th>
<th>DRAWDOWN (Feet)</th>
<th>DISCHARGE (GPM)</th>
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</tr>
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<td>142</td>
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**Recovery Test (May 24-25, 1979)**

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<th>DRAWDOWN (Feet)</th>
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J-93
FIGURE 1
Recommended Water Works Standards

Suggested Cross-connection Control Filling Device
For Water Loading Stations

NOTE: ALL PIPING AND FITTINGS SHALL BE COATED STEEL SCREW TYPE SCHEDULE 40.
ATTACHMENT 6

Division of Radiation Control Figures

Figure 1. Base Map for DRC Hydrogeologic Cross-Section

and

Figure 2. Hydrogeologic Cross-Section: Arches National Park to Colorado River

Figure 1. Base Map for DRC Hydrogeologic Cross-Section (after Woodard-Clyde, January 29, 1996 Report, Fig. 2-4)

J-95
Hydrogeologic Cross Section: Arches National Park to Colorado River

Figure 2
<table>
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<th>Parameter</th>
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<th>Analytical Results &amp; License Requirements</th>
<th>NRC* Radactive Materials License</th>
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</table>

**ATTACHMENT B**

DRC Summary of Groundwater Quality Results:


Utah Division of Radiation Control Spreadsheet ATP3.XLS
## Atlas Tailing Embankment Monitoring Well A13-3

<table>
<thead>
<tr>
<th>Date</th>
<th>Groundwater Concentrations from Atlas Quality Monitoring &amp; Annual ALABIA Reports</th>
<th>Calculated U-14C (MCi/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Conc. (ug/L)</td>
<td>+/- (ug/L)</td>
</tr>
<tr>
<td>6/25/82</td>
<td>2.09</td>
<td>2.00</td>
</tr>
<tr>
<td>7/28/82</td>
<td>1.20</td>
<td>0.50</td>
</tr>
<tr>
<td>8/22/82</td>
<td>1.80</td>
<td>0.80</td>
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</table>

**Diagram:**
- **Green Line:** High Natural Uranium
- **Red Line:** Low Natural Uranium
- **Black Line:** ALABIA Criteria
- **Blue Line:** QA Problems

**Additional Information:**
- **QA Problems:**
  - 25 Data Points
  - 31 Total Data Points
  - 80.66% Data Points with QA Problems

---

**Note:** The diagram shows the trend of groundwater concentrations over time, highlighting deviations from natural uranium levels and QA issues.
ATTACHMENT 9

Utah Division of Water Quality and Radiation Control
Summary of Groundwater Quality Results:

Inorganic and Radiologic Data
from
Atlas Tailing Sites
Found on North Bank of Colorado River
Immediately West of Mouth of Moab Wash

Utah Division of Radiation Control
Summary Spreadsheet SEEP.XLS
and
Results from Utah State Health Laboratory
<table>
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<tr>
<td>C33</td>
<td><strong>Table 1.</strong> ( 31776-31849 )</td>
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<tr>
<td>C35</td>
<td><strong>Note:</strong> Vanadium (V) GWQS: based on human reference dose of 9 ug/kg/day for vanadium pentoxide, V2O5 (see EPA “Health Effects Assessment Summary Tables, 3rd Qtr., FY1996, Office of Emergency and Remedial Response, Washington DC, 64pp.). This is a moderate value in that both lower and higher RQ values can be found for vanadium compounds in the literature, as follows: 1) Vanadium sulfate, VSO4, RQ = 30 ug/kg/day (86), and 2) Sodium vanadate, Na2VO3, Intermediate Minimal Risk Level (equivalent to EPA RQ) = 3 ug/kg/day (see Agency for Toxic Substances &amp; Disease Registry). To convert to an adhoc health advisory, calculate as follows: ( 9 \text{ ug/kg/day} \times 1 \text{ day/2 liters} \times 70 \text{ kg adult} \times 0.2 \times 0.063 \text{ mg/l, round down to } 0.06 \text{ (0.02 factor x drinking water Relative Source Contribution, personal communication, Bob Benson, EPA Region VIII DW toxicologist).} )</td>
</tr>
<tr>
<td>C40</td>
<td><strong>Note:</strong> QA Note: laboratory specific conductance rejected due to suspect result. ( 105 \text{ S x } 7.46 \text{ mg/l})</td>
</tr>
<tr>
<td>C42</td>
<td><strong>Note:</strong> Sulfate (SO4) GWQS: based on EPA DW Secondary MCL (see summary entitled “Drinking Water Regulations and Health Advisories”, December, 1993, EPA Office of Water.</td>
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<tr>
<td>C43</td>
<td><strong>Note:</strong> Antimony (Sb) GWQS: based on final EPA DW MCL (see summary entitled “Drinking Water Regulations and Health Advisories”, December, 1993, EPA Office of Water.</td>
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<tr>
<td>C44</td>
<td><strong>Note:</strong> Beryllium (Be) and nickel (Ni) GWQS: EPA DW MCLs from 7/12/92 Federal Register. Vol. 57, No. 138, pp ( 31776-31849 )</td>
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<tr>
<td>C45</td>
<td><strong>Note:</strong> Molybdenum (Mo) GWQS: based on EPA DW draft lifetime health advisory (summary entitled “Drinking Water Regulations and Health Advisories, December, 1993, EPA Office of Water.</td>
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<td>C46</td>
<td><strong>Note:</strong> Beryllium (Be) and nickel (Ni) GWQS: EPA DW MCLs from 7/12/92 Federal Register. Vol. 57, No. 138, pp ( 31776-31849 )</td>
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<td>C47</td>
<td><strong>Note:</strong> Thallium (T) GWQS: based on final EPA DW MCL (see EPA document entitled “Drinking Water Regulations and Health Advisories”, December, 1993, Office of Water.</td>
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| C48  | **Note:** Vanadium (V) GWQS: based on human reference dose of 9 ug/kg/day for vanadium pentoxide, V2O5 (see EPA “Health Effects Assessment Summary Tables, 3rd Qtr., FY1996, Office of Emergency and Remedial Response, Washington DC, 64pp.). This is a moderate value in that both lower and higher RQ values can be found for vanadium compounds in the literature, as follows: 1) Vanadium sulfate, VSO4, RQ = 30 ug/kg/day (86), and 2) Sodium vanadate, Na2VO3, Intermediate Minimal Risk Level (equivalent to EPA RQ) = 3 ug/kg/day (see Agency for Toxic Substances & Disease Registry). To convert to an adhoc health advisory, calculate as follows: \( 9 \text{ ug/kg/day} \times 1 \text{ day/2 liters} \times 70 \text{ kg adult} \times 0.2 \times 0.063 \text{ mg/l, round down to } 0.06 \text{ (0.02 factor x drinking water Relative Source Contribution, personal communication, Bob Benson, EPA Region VIII DW toxicologist).} \)
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
| 1 | Alaska Tailing Pile Seep on North Bank of Colo River. Radiological | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | (W side of Mouth of Mobc Wk) | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Sample | Gross Alpha | Gross Ratio | Ra-226 | Ra-228 | Ra-226+Ra-228 | Lu | | | | | | | | | | | | | | | | | | |
| 4 | Date | dConc +/- | dConc +/- | dConc +/- | dConc +/- | dConc +/- | dConc +/- | | | | | | | | | | | | | | | | | | |
| 5 | 7/21/95 | 206 | 29 | 493 | 21 | 0 | 11 | 2 | 2 | 2.5 | 2 | 955 | 14 | | | | | | | | | | | | |
| 6 | 7/27/95 | 201 | 23 | 529.5 | 21 | 0.5 | 11 | 2 | 2 | 2.5 | 2 | 955 | 14 | | | | | | | | | | | | |
| 8 | 11/18/95 | 100 | 22 | 238.5 | 14.8 | 10.3 | 11 | 2 | 3.5 | 12.3 | 3.7 | 1186 | 15.4 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Avg Conc | 423.8 | 5.6 | 1.67 | 7.27 | 1029 | 9 | | | | | | | | | | | | | | | | | | |
| 13 | GWQE | 15 | 423.8 | 15 | 423.8 | 5.6 | 1.67 | 7.27 | 1029 | 9 | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Avg Conc Exceeds GWQE? | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | YES | NO | NO | NO | YES | 30 | 1.45 | 34.33 | | | | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | | | |

Sample QA Note: 1 = rejected value, see attached notes for reasons

---

Cell C5
Note: Gross Alpha: 7/21/95, 7/27/95, 11/18/95 samples rejected because gross alpha activity reported did not balance with reported uranium activity. Apparently caused by self-absorption, due to elevated sample TDS.
### Laboratory Analyses

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<tr>
<th>Analyte</th>
<th>SI</th>
<th>Description</th>
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</thead>
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<tr>
<td>L-pH</td>
<td>7.42</td>
<td></td>
</tr>
<tr>
<td>T-KH</td>
<td>706.0 mg/l</td>
<td>T. Sus. Sol.</td>
</tr>
<tr>
<td>D-Arsenic</td>
<td>+3.0 ug/l</td>
<td>Ammonia N</td>
</tr>
<tr>
<td>D-Cadmium</td>
<td>+3.0 ug/l</td>
<td>D-Calcium</td>
</tr>
<tr>
<td>D-Chromium</td>
<td>85.0 ug/l</td>
<td>D-Copper</td>
</tr>
<tr>
<td>D-Iron</td>
<td>85.0 ug/l</td>
<td>D-Lead</td>
</tr>
<tr>
<td>D-Magnesium</td>
<td>700 mg/l</td>
<td>D-Manganese</td>
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<tr>
<td>D-Potassium</td>
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<td>D-Selenium</td>
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<td>D-Silver</td>
<td>48 mg/l</td>
<td>D-Sodium</td>
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<td>D-Silicate</td>
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<td>Bicarbonate</td>
</tr>
<tr>
<td>Carb. Dioxide</td>
<td>+3.0 ug/l</td>
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<td>Chloride</td>
<td>40 mg/l</td>
<td>Chloride</td>
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<td>Sulfate</td>
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<td>Total Alk.</td>
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<td>Total Alk.</td>
</tr>
<tr>
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<td>Total Alkalinity</td>
<td>1021 umhos</td>
<td>T. Hardness</td>
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<td>Total Diss.</td>
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<tr>
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<td>L-Sp. Cond.</td>
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<td>2.0 ug/l</td>
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<tr>
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</tr>
<tr>
<td>D-TP</td>
<td>0.03 mg/l</td>
<td>L-Sp. Cond.</td>
</tr>
</tbody>
</table>

**Notes:**
- CL Holding time was exceeded before analysis was completed.
- NH3 Holding time was exceeded before analysis was completed.
- pH pH should be performed as a field test.
- UEDO - DMQ
- ANNE MULQUIST
- 288 N 1440 W
- SLC UT 84114-4580
- Description: NATURAL BASES FILE
- Site ID: 256
- Lab Number: 95115276
- Sample Date: 09/21/95
- Time: 10:11
- Tot. Cations: 2186
- Tot. Anions: 4843 mg/l
- Lab Grand Total: 7051 mg/l
- Cations: 94.6 mg/l
- Anions: 105.6 mg/l

---

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<td>7.0 ug/l</td>
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<td>D-Iron</td>
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Summary of Groundwater Quality Results:

Trilinear Diagram Comparison of Groundwater at Arches National Park Headquarters Wells with Average Concentrations of Atlas Tailings Effluent and Seeps.

Utah Division of Radiation Control
Trilinear Plot
Title: Comparison of Arches Wells with Avg. Atlas Effl. & Seeps
16-Apr-1996
16:39:57.97

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<th>SO4</th>
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HC-gram

Chemical Constituents in ppm

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<th>Na</th>
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<td>4513.50</td>
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**Title:** Comparison of Arches Wells with Avg. Atlas Effl. & Seeps  
**16-Apr-1996 16:39:58.19**

### Chemical Constituents in Equivalents per Million

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<th>CO3</th>
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**ATTACHMENT II**

Utah Department of Environmental Quality  
Colorado River Water Quality Results:  
February 16, 1995 - January 18, 1996  
Upstream Sampling at Moab Bridge  
Above  
Atlas Tailings Pile

---

**Title:** Comparison of Arches Wells with Avg. Atlas Effl. & Seeps  
**16-Apr-1996 16:39:58.57**

### Percent Reacting Values

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Fieldwork: Utah Division of Water Quality  
Laboratory: Utah State Health Laboratory
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Laboratory Analyses

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<td>T. Chromium</td>
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**Note:** PH should be performed as a field test.
**Attachment 12**

Utah Department of Environmental Quality  
Colorado River Water Quality Results:  
March 30, 1995 - January 18, 1996  
Downstream Sampling Immediately Below  
Atlas Tailings Pile

Fieldwork: Utah Division of Water Quality  
Laboratory: Utah State Health Laboratory

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### Laboratory Analyses

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**Note:** pH test should be performed as a field test.
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<td>114.8 mg/l</td>
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<tr>
<td>Beta Gross</td>
<td>&lt;10 pCi/l</td>
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<tr>
<td>Radon 222</td>
<td>&lt;1 pCi/l</td>
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<tr>
<td>T-Arsenic</td>
<td>&lt;5.0 μg/l</td>
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<tr>
<td>T-Cadmium</td>
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<tr>
<td>T-Copper</td>
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<tr>
<td>T-Lead</td>
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<td>T-Strontium</td>
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*Laboratory Analyses*

- **D-Calcium**: 32 mg/l
- **T-Hardness**: 114.8 mg/l
- **Beta Gross**: <10 pCi/l
- **Radon 222**: <1 pCi/l
- **T-Arsenic**: <5.0 μg/l
- **T-Cadmium**: 1 μg/l
- **T-Copper**: <12.0 μg/l
- **T-Lead**: 1.0 μg/l
- **T-Mercury**: <0.2 μg/l
- **T-Silver**: <2.0 μg/l

*Microbiology Review:*

- **UTAH STATE HEALTH DEPARTMENT**

- **DIVISION OF LABORATORY SERVICES**

  - **Environmental Chemistry Analysis Report**

- **UTAH STATE HEALTH DEPARTMENT**

  - **DIVISION OF LABORATORY SERVICES**

  - **Environmental Chemistry Analysis Report**

---

*Description:* **COLORADO R BL ATLAS MILL TAILINGS FILE**

- **Site ID:** 495656
- **Sample Date:** 06/29/95
- **Time:** 09:16
- **Total Cations:** 4.6 meq/l
- **Grand Total:** 70 mg/l

*Inorganic Review:*

- **Date of Review and QA Validation:** 09/08/95

*Organic Review:*

- **Radiochemistry Review:** 12/01/95

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- **Date of Review and QA Validation:** 09/08/95

*Organic Review:*

- **Radiochemistry Review:** 12/01/95

---

*Laboratory Analyses*

- **D-Calcium**: 55 mg/l
- **T-Hardness**: 198.9 mg/l
- **Beta Gross**: <10 pCi/l
- **Radon 222**: <1 pCi/l
- **T-Arsenic**: <5.0 μg/l
- **T-Cadmium**: <1 μg/l
- **T-Copper**: <12.0 μg/l
- **T-Lead**: 3.0 μg/l
- **T-Mercury**: <0.2 μg/l
- **T-Silver**: <2.0 μg/l

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- **T-Mercury**: <0.2 μg/l
- **T-Silver**: <2.0 μg/l
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</table>

**Laboratory Analyses**

- **L-pH**: 6.53
- **M-ClO4**: 0.4 µg/l
- **T.O.C.**: 272 µg/l
- **NH3-N**: 0.116 µg/l
- **D-Barium**: 49.0 µg/l
- **D-Calcium**: 74 µg/l
- **D-Copper**: 12.0 µg/l
- **D-Iron**: 25 µg/l
- **D-Dysprosium**: 25.0 µg/l
- **D-Silicon**: 30.0 µg/l
- **D-Sulfate**: 0.347 µg/l
- **Boron**: 27.7 µg/l
- **Radon 222**: 113 Bq/l
- **T-Uranium**: 4.5 Bq/l

**Notes**

- CO2 Holding time was exceeded before analysis was completed.
- ROH Holding time was exceeded before analysis was completed.
- TDS Holding time was exceeded before analysis was completed.
- TDS Holding time was exceeded before analysis was completed.
- pH readings should be performed as a field test.
**UTAH STATE HEALTH DEPARTMENT**  
**DIVISION OF LABORATORY SERVICES**  
Environmental Chemistry Analysis Report

| UDOQ - DMQ | ANRE HULQUIST | 288 N 1440 W |
| UT | 801-401-4870 | |

**Description:** COLORADO R BL ATLAS HILL TAILINGS FILE  
Site ID: 493456  
Source: 03  
Date of Review and QA Validation: 03/13/96  
Inorganic Review: 03/13/96  
Organic Review: 03/13/96  
Radiochemistry Review: 03/13/96

| Lab Number: 9512588 Type: 04 |
| Lab Number: 999981 Type: 04 |
| Sample Date: 12/07/95 Time: 10:30 |
| Sample Date: 01/10/96 Time: 09:35 |

**Notes:**  
Microbiology Review:  
Total Anions: 450 mg/l  
Cations: 10.4 mg/l  
Grand Total: 451 mg/l  
Anions: 10.7 mg/l

### Laboratory Analyses

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>L-pH</td>
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**TENH Holding time was exceeded before analysis was completed.**  
Pn pH should be performed as a field test.  

---

**UTAH STATE HEALTH DEPARTMENT**  
**DIVISION OF LABORATORY SERVICES**  
Environmental Chemistry Analysis Report

| UDOQ - DMQ | ANRE HULQUIST | 288 N 1440 W |
| UT | 801-401-4870 | |

**Description:** COLORADO R BL ATLAS HILL TAILINGS FILE  
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<td>D-Plutonium</td>
<td>pCi/l</td>
<td>0.01</td>
</tr>
<tr>
<td>D-Tritium</td>
<td>pCi/l</td>
<td>0.01</td>
</tr>
<tr>
<td>C02 Solids</td>
<td>pCi/l</td>
<td>0.01</td>
</tr>
</tbody>
</table>

**TENH Holding time was exceeded before analysis was completed.**  
Pn pH should be performed as a field test.
**CIB-V4-R-16**

**CIB-V4-R-16**

Note: Urban water quality criteria. Colorado River at Gila is classified for the following water quality protection (UAC R5:17:3-4 and 5-16):

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>3</td>
<td>Dissolved Oxygen</td>
</tr>
<tr>
<td>pH</td>
<td>5</td>
<td>pH (Acidic)</td>
</tr>
<tr>
<td>BOD</td>
<td>6</td>
<td>Biological Oxygen Demand</td>
</tr>
<tr>
<td>TSS</td>
<td>7</td>
<td>Total Suspended Solids</td>
</tr>
<tr>
<td>TPH</td>
<td>8</td>
<td>Total Petroleum Hydrocarbons</td>
</tr>
</tbody>
</table>

All numeric criteria listed apply to in-stream conditions.

**CIB-V4-R-16**

Note: HGC is in WQIC: based on Class 3 (agricultural), 4-day average, chronic concentration. Values derived from UAC R5:17:3-4. Table 2-14-2. The National Pollutant Discharge Elimination System (NPDES) permits are issued by the Arizona Department of Environmental Quality (ADEQ). The NPDES permits are subject to review by the U.S. Environmental Protection Agency (EPA).
April 29, 1996

Chief, High-Level Waste and Uranium Recovery Program
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mailstop TWFN 73-9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: DEIS Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, M end, Utah
State Identifier Number: UTV60228-050

To Whom it May Concern:

The Resource Development Coordinating Committee (RDCC), representing the State of Utah, has reviewed this proposal. The Division of Air Quality comments:

This project falls under the Utah fugitive emissions and fugitive dust rule found in R307-12 of the Utah Air Conservation Rules. The tailings piles and ponds rule (R307-12-6) requires that fugitive dust emissions must be minimized. A copy of this rule is enclosed for your information. Examples of fugitive dust control measures that may be used are included in this rule. Atlas Corporation should determine what types of fugitive dust controls will be used on site and formalize this information into a dust control plan. This plan is to be submitted and approved by the DAQ Director (Executive Secretary of the Air Quality Board) prior to reclamation activities.

Any equipment used in the processing of the earth and cover materials for the cover system (i.e. screens, crushers, generators, dryers, etc.) must be evaluated by DAQ before installation, construction, or operation of the processing equipment can occur. If the equipment being used for this processing is approved, any increase in production must be evaluated by the DAQ.

In addition to the Air Conservation Rules, there are state rules and federal regulations governing the handling of uranium. Atlas Corporation is required to meet these regulations. If you have any questions concerning these regulations, please contact...
U.S. Nuclear Regulatory Commission
DEIS Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah

Bryce Bird of DAQ, Hazardous Air Pollutants, at (801) 536-4064, and the Division of Radiation Control, at (801) 536-4250. If you have any questions on fugitive dust control, please contact Carol Nielsen at (801) 536-4073.

The Committee appreciates the opportunity to review this proposal. Please direct any other written questions regarding this correspondence to the Utah State Clearinghouse at the above address or call Carolyn Wright at (801) 538-1535 or John Haar at (801) 538-1559.

Sincerely,

Brad T. Barber
State Planning Coordinator

BTB/w
Enclosure

R207-12-4 Tailings Piles and Ponds.

6.A. Fugitive dust, construction activities, and roadways associated with tailings piles and ponds are regulated under the provisions of this section and not by R207-12-3 and R207-12-4.

6.B. Any person owning and/or operating an existing tailings operation where fugitive dust results from grading, excavating, depositing, or natural erosion or other causes in association with such operation, shall take steps to minimize fugitive dust from such activities. Such controls may include but are not limited to:

(1) watering and/or chemical stabilization,

(2) synthetic and/or vegetative covers,

(3) wind breaks,

minimizing the area of disturbed tailings,

restricting the speed of vehicles in and around the tailings operation, and/or

(6) other equivalent methods or techniques which may be approved by the executive secretary.

6.C. Any person owning and/or operating an existing tailings operation in a nonattainment area for particulates or an existing mining operation outside an actual area of nonattainment outside of which fugitive dust impacts an actual area of nonattainment for particulates shall submit plans for control of fugitive dust from such operations to the executive secretary for approval no later than September 29, 1981, 180 days after the effective date of this regulation.

KEY: air pollution, fugitive emissions, mining, tailings

19-3-301
19-3-304
19-3-309

J-120
April 20, 1996

Joseph H. Holonich, Chief
U.S. NUCLEAR REGULATORY COMMISSION
High Level Waste and Uranium Projects Branch (Mail Stop: TWFN-729)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

I have been a resident of Moab, Utah for over 20 years. My husband worked
in the uranium industry during its heyday.

In regards to the Atlas Corporation tailings pile near Moab, I have followed the
situation for some time now. I ran some to only see one reasonable conclusion:
the tailings pile should be capped in place. I strongly believe there is ample
evidence to support capping as a safe solution for the people of Moab and
Colorado River users. With the cost differences being what they are, moving
the pile to the alternate site would be financially irresponsible.

Perhaps, as indicated in your DEIS, the alternate site is somewhat better than
the current one from an environmental standpoint, but moving the pile would only
compound the problem by creating two contaminated locations instead of just one.
In my view, this would be worse action to take. Created, there may be some small
environmental benefits but I cannot believe the huge cost differences in moving
the pile would offset this action.

I believe elected officials, and those who represent the people in our areas,
are there to make responsible decisions for the public. To move the pile will
create a much greater hazard to our health, to those involved in moving the pile,
and the livestock and other animals in our area.

I am greatly concerned about this issue and encourage capping the tailings as
soon as possible. I see no reason to put the residents safety at risk and spend
our tax dollars to solve a problem that already has a viable and reasonable
solution.

Thank you for your time and consideration.

Sincerely,

Fran Townsend, Clerk/Auditor

25 April 96

Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWFN 71-9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich:

The Grand County Council appreciates the opportunity to respond to the DEIS Related
to Reclamation of the Uranium Mill Tailings and the DTER for the Proposed Revised
Reclamation Plan for the Atlas Site, Moab, Utah, Source Material License No. SUA 917,
Docket No. 40-3453.

As there remain 20 open questions within the DTER, Grand County respectfully requests
that the NRC continue to allow public comment to this decision making document when
in the near future the 20 open questions are considered to be closed. The NRC criteria to
be met as explained by yourself at the public hearing on February 28, 1996 is one of
"reasonable assurance". As the reclassification of the 1993 FOMS illustration; "reasonable
assurance" may need to be recalcitated after a public comment period. And since is the
public's health and safety that is being decided, Grand County requests that the public be
given the opportunity to comment on all the conclusions put forth through this decision
making process.

This request for public comment would also include all of the other separate licensing
actions including the Groundwater Corrective Action Plan currently under review and of
extreme importance to the outcome of the final decision.

Again, the county appreciates the opportunity to submit the following comments.

Sincerely,

Peter Haney
Grand County Councilman
Colorado River Alignment at Moab, Utah

No scale

This data was digitized from scanned aerial photos (150 dpi) and rectified using Arc/Info. The data was then matched at the Colorado River bridge to allow for better matching.

The difference in the river channel is anywhere from 20 to 50 meters to the west adjacent to the tailings pile.

These measurements depend on the registration of the photos which weren't perfect but within 20 - 30 meters.

May 8, 1996

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reclamation in place are underplayed (see above), but even if they were not, this formidable 7:6:1 cost differential makes it difficult to justify the extra expenditure under Title II circumstances.

9-7

The final element in the overall perspective involves understanding the legal and political context in which the decision is being made. Both Atlas and the HRC are appropriately terrified of arriving at a finding that the reclamation of the Atlas tailings is going to cost more, in terms of Atlas’s 45% cost share, than Atlas originally bargained and bonded for. To find that a capping-in-place reclamation plan would cost far more than the original approved plan, or that the approved reclamation plan must now be disapproved and a more expensive reclamation undertaken, represents confronting a private mining company with financial disaster because of after-the-fact application of government regulations that did not exist when the original reclamation plan was approved and costed. It is my firm opinion that this situation is unfair to Atlas (and would probably be found illegal by a court if Atlas was confronted by a demand for more surety and need for relief), and that attempting to avoid this bureaucratic train wreck has distorted the decision-making process. Accordingly, a number of activists in Grand County are pursuing a legislative solution which would keep Atlas’s reclamation bond but otherwise release the company from licensee responsibility for reclamation, and reclassify the Atlas site as a DOE responsibility.

Cost of Alternative Reclamations

Atlas’s 1995 Monte Carlo cost estimation exercise projects the off-site (Klondike Flats) relocation by rail to cost: 5th %ile $120 million, 95th %ile $191 million, $152 million mean, or $14.48 per ton with special slime handling increase accounting for the difference from the previous $93-112 million range estimate, with a mean of $9.77 per ton moving cost which was used in the DEIS.

9-8

See below for a cost analysis totaling $25.7 million for moving the pile using 100-ton mining haul trucks on a haul road built on top of the current railroad grade, or about $2.45 per ton.

The 1995 in situ Monte Carlo ran $17,030,000 for 5th %ile, to 25,520,000 for 95th %ile, with $1.91 per ton mean cost estimated in 1995 dollars. It appears from the 1993 cost analysis that all rock cap quarrying, sorting, transportation, and placement costs were estimated to total $4.1 million dollars, which seems low. Competitively-bid tailings capping projects in the last two years suggest a total of more like $45 million, or $4.29/ton, an appropriate estimate for the in situ relocation plan, given the extraordinary expense of the rock armor required by the steep tailings impoundment slopes and the erosion-resisting aprons and filters in the Moab Wash and along the Colorado River exposure.

9-9

From the summary of costs for in-situ capping reclamation expressed in Canonie Environmental’s 1993-dated cost analysis, I have separated out the following two categories from the 1993 estimate work. The first category represents costs which would not be entertained from the capping-in-place reclamation if the pile were removed to Klondike Flats, and the second category, consists of the costs which would still be entertained at the existing tailings site if the pile were moved. These residual costs are then added to figures obtained from uncompensated individuals with experience derived from working for large-scale mining reclamation and tailings relocation contractors (such as Weston, Morrison-Knudsen, and Bechtel Corporations), illustrating the least expensive, fastest, and safest means of moving the pile:

Atlas 1993 Tailings Capping Reclamation Costs Foregone

If the Tailings Pile Is Moved

- 263,556 Regrade impoundment slopes
- 310,457 Regrade tailings
- 45,085 Slimes excavation
- 248,144 Construct ditches
- 18,129 Construct dike/bes
- 248,144 Rip-Rap ditches
- 900,413 Armor stone placement, embankment slopes
- 84,607 Rockwall toe
- 628,422 Clay cover
- 1,146,847 Rock soil matrix (rock)
- 55,927 Rock soil matrix (soil)
- 148,400 Fencing
- 5,016 Clearing and grubbing (presumably for the fence)
- 876,786 Filter rock
- 956,807 Well maintenance
- 2,054,186 Quarry rock and aggregates off-site
- 7,990,926 TOTAL costs of capping reclamation foregone if pile is moved

Atlas Site Costs from 1993 Canonic Estimate

Which Would Be Encountered If the Tailings Were Moved

- 1,260,031 Jobsite supervision
- 56,361 Mobilization
- 105,030 Site security
- 281,250 Radiological monitoring
- 82,116 Windblown tailings
- 23,554 Flood ditch removal
- 41,220 S.E. Contaminated Soil
- 1,053,803 Utility relocation - this item becomes "slimes excavation" as the utilities do not have to be relocated if the tailings is removed
- 233,196 Contaminated soils excavation
- 802,077 Clean fill excavation (to fill the hole where soil under pile is removed to water table, which is between 8 and 15 feet under the pile per UTER) Revetment
- 220,000
- 56,361 Demobilization
- 24,225 Backfill contaminated soil excavation

Atlas DEIS, Page 4

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26,250  Radiological survey
415,872  NRC oversight costs
4,683,396  TOTAL Atlas site reclamation costs remaining if tailings were removed

The following figures illustrate the impact of using large-scale construction technology. These figures assume use of a fleet of 12 (10 in use, 2 spares) 100-ton mining haul trucks, operating 24-hours per day over a period of 942 days (2.58 years), moving 10.3 metric tons of material at a rate of 12 cycles per truck per day:

$ 2,000,000  Preparation of mine haul dirt road, 14 kmometers tailings to cell
$ 5,000,000  Excavation and capping costs, receiving Plateau Site cell
$14,420,000  Transport of tailings
$21,640,000  TOTAL

If 300-ton mine haul trucks are used, the transport cost component drops to $8,652,000, and the time required to move the tailings pile drops to 314 days (0.86 years).

Use of this method of tailings removal depends on the feasibility of building a haul road straddling the existing railroad spur. The haul trucks would be loaded, covered and washed at the Atlas tailings site, drive in low gear up a haul road going up the hill to the railroad west of the tailings, then straddle the existing rail line until just before the Courthouse Wash trestle, at which point the haul road would angle northwest across the Mansons Shale to the receiving impoundment site. The trucks would then unload directly into the current receiving cell, and be washed with water hauled to the receiving site by tanker before returning via the haul road to the tailings.

The total of the above two categories of costs is $26,103,396. The figure does not embrace costs of hauling water by tanker, and supervision and security costs at the receiving site if the costs cited are not adequate to cover such activities at both sites.

This brings the estimated cost of moving the tailings into the same general cost range as that for moving tailings that does not embrace costs of hauling water by tankers, and supervision and security costs at the receiving site. If the costs cited are not adequate to cover such activities at both sites and 0.025

Sincerely yours,

Richard Lance Christie, Chairman
Grand County Atlas Tailings Reclamation Task Force

Atlas DEIS, Page 6
will hold the NRC accountable for the NRC’s abdication of its regulatory and statutory obligations.

I. Introduction and General Principles.

The NRC’s own regulations obligate it to “conduct its domestic licensing . . . functions in a manner which is both receptive to environmental concerns and consistent with the Commission’s responsibility . . . for protecting the radiological health and safety of the public.” (10 C.F.R. § 51.10.) This dedication to protecting the environment and the public health and safety is further embodied in the NRC’s regulatory (and statutory) goals for conducting an environmental impact statement. NRC regulations provide that NRC’s environmental impact statement (“EIS”) must state how the proposed action will or will not achieve the requirements of Section 101 and 102(1) of NEPA and of other relevant and applicable environmental laws and policies. (10 C.F.R. §§ 51.70(b) and 51.91(c).) Indeed, in the DEIS, the NRC acknowledges its responsibilities to the environment by stating that licensing of the Atlas proposal requires the NRC to determine whether the proposal is “environmentally acceptable.” (DEIS, p. 1-3.)

At a minimum, the DEIS must, objectively and without bias, analyze all environmental factors concisely, clearly, and analytically. This analysis must be quantified to the fullest extent possible. (10 C.F.R. § 51.70.) In addition, as a matter of law, NEPA requires that a DEIS include a cost-benefit analysis, reflecting environmental costs affecting the public. (National Wildlife Fed. v. Harchab, 568 F. Supp. 985, 1009 (D.C. Cir. 1983); 42 U.S.C. § 4332(3).)

Despite these requirements, the DEIS does not fulfill NEPA’s basic requirement that the NRC take a “hard look” at the environmental consequences of its proposed action. (National Resources Defense Council v. NRC, 665 F.2d 28 (2d Cir. 1981).) The NRC’s analysis is flawed, because it assumes that the Atlas plan will be safe, that Atlas will obtain all necessary environmental approvals, and that Atlas will completely remedy all environmental problems. Thus, the NRC’s analysis is a circular one . . . the Atlas proposal is environmentally safe because Atlas says its proposal will be safe. By assuming the safety of the Atlas proposal, the NRC’s DEIS contains an inadequate analysis of environmental impacts other than taking a “hard look.” The NRC turns a blind eye to the problems presented by Atlas’ proposal.

The NRC has also violated NEPA by failing adequately to examine certain critical environmental impacts of the proposed action. In particular, the NRC has failed adequately to examine the impact on the principal economic activity of Moab (tourism), the impact on groundwater and surface water, and the impact on endangered and threatened species. In addition, the NRC has failed to consult with other affected federal agencies and/or to include the opinion of these agencies on environmental impacts as required by NEPA. (42 U.S.C. § 4332(C).)

Finally, the DEIS is inadequate, because the NRC justifies the Atlas action solely by balancing the known environmental problems of the Atlas proposal against Atlas’ costs of performing the environmentally preferable alternative. Thus, by allowing a private party’s costs to outweigh the environmental benefits, the NRC concludes that the Atlas proposal “is acceptable with respect to environmental costs and benefits.” (DEIS, p. 21.) NRC’s decision to allow a private party’s economic cost to override the protection of the human health and environment violates NEPA and the NRC’s obligation to protect the public health and safety. (42 U.S.C. § 4332; 10 C.F.R. § 51.10(b); National Wildlife Federation v. Harchab, 568 F. Supp. at 1000.)

One hundred years ago, both the Green and Colorado Rivers flowed into the Gulf of California. Now, no river water flows into the Gulf; virtually every drop of that water is being used and reused, whether for downstream drinking water or in agriculture. One hundred years ago, none of this water was being consumed in the manner it is today. One hundred years from now, if the Atlas pile is not moved, there may be no uncontaminated water remaining to supply the millions of people downstream of the Atlas pile, who today rely on Colorado River water for basic necessities. By proposing to leave a mountain of radioactive waste, even stories high, along the banks of the Colorado River, the NRC intends to force us to accept the risk of perpetual groundwater contamination and possible pile failure along the Colorado River. This is an unacceptable public policy, especially in the water-scarce Southwest, currently the fastest growing geographic area of the United States. The NRC’s proposal would require leaving an unconscionable legacy to generations to come for the next hundreds and thousands of years.

II. The Inadequacy and Inaccuracy of NRC’s Discussion of Atlas’ Proposal.

A. Atlas’ Proposal to ‘Cover and Run’.

Atlas Corporation now owns a uranium waste pile that is more than 110 feet high and a half-mile wide. This pile contains 10.5 million tons of “high volume, low activity materials and elements that could be hazardous to the environment and public health.” (DEIS, p. 1-3.) NRC reports

Joseph J. Holonich
April 29, 1996
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April 29, 1996
Page 5

NRC's response to this question is that the NRC's technical licensing staff will not allow a design that does not comply with the NRC's licensing regulations and that anything that meets those technical regulations is a feasible environmentally safe. If the NRC's logic holds, it means that NRC's NEPA process is an empty gesture; anything that meets the NRC's licensing regulations will be found to be environmentally acceptable.

The NRC's attempt to nullify NEPA's requirements in this manner cannot be allowed. The NRC should require Atlas to detail all aspects of its design and then evaluate the environmental benefits and harms. The Atlas proposal should not be entitled to any presumption of environmental acceptability merely because the NRC states that it will apply its licensing criteria to the Atlas plan. Indeed, in NRC's draft Technical Evaluation Report ('DTER') on the Atlas Site, NRC staff repeatedly recommends that Atlas be excused from strict compliance with the NRC's licensing criteria. Atlas should be required to explain exactly what its plan will entail and then the NRC should analyze that proposal in detail. The NRC's licensing activities cannot excuse an in-depth environmental analysis of the Atlas reclamation proposal.

Second, the NRC's analysis of the Atlas proposal fails because it presumes that Atlas will in fact meet the technical requirements. However, as demonstrated in the DTER issued by NRC simultaneously with the DEIS, key open items remain to be addressed. Moreover, the NRC has failed to analyze whether Atlas can construct such a pile in the manner which it proposes in its design. For example, the NRC does not consider that Atlas' pile design is unique and that in the process of constructing such a steeply sloped cover which does not meet the NRC's own basic criterion for cover design, Atlas may exacerbate or create adverse environmental conditions.

In addition, Atlas now states that it will not obtain riparian water from the Castle Valley area. (See, Bluaugh, Michael, correspondence to 'Residents of Castle Valley', March 8, 1996.) Atlas should be required to show where it will obtain the rock, the rock's compliance with NRC's technical standards, and that Atlas can, in fact, obtain permission to remove, and haul the rock. The NRC should conduct its analysis of environmental consequences after Atlas has detailed its full design and methods for construction. The NRC's evaluation of environmental consequences prior to full knowledge of Atlas' plan fails to inform both the Commission and the public of the true environmental impact of Atlas' proposal.

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Third, the NRC has failed to require Atlas to characterize the composition and environmental hazards presented by the tailings pile. For example, the only attempt to discern the composition and chemical hazards of the liquid within the tailings pile was conducted nearly a decade ago, in 1987. That assessment resulted in two samples. The NRC then relied on the "average" of those two samples as the definitive report of the chemical composition of the tailings liquid. (DEIS, pp. 2-6 to 2-9.) However, two samples of this half-mile wide, more than 110 feet deep pile lacks scientific accuracy or credibility. We challenge the NRC to demonstrate that there can be any scientific acceptance to an "average" of two sampling results at different locations of a pile this complex and large. The Department of Energy's ("DOE") technical requirements for Title I sites, as approved by the NRC, mandate at least three sampling locations, at least four successive sampling rounds to confirm the results, samples of each different type of material in the pile (e.g., sand, silts), and samples collected from the bottom of the pile. (UMTRA-DOE/AL 050425.0002, Technical Approach Report, Revision 11, Dec 1989, pp. 202, EL REG.) These basic sampling requirements to determine the content and extent of hazard presented by the pile’s radioactive leachate also should also be required at this Title II site.

A similar problem is revealed by NRC's acceptance of Atlas' characterization of the non-liquid materials in the pile. Again, the NRC relies on a total of three composite samples, one of each type of soil, to determine whether the soil could withstand the construction process envisioned by Atlas (DEIS, p. 2-9.) The NRC admits that Atlas will have to do further testing during construction, but, again, by approving the Atlas plan before its consequences are known. NRC's NEPA analysis is meaningless.

The most blatant example of the NRC's uncritical environmental approval is the NRC's treatment of the unknown groundwater and surface water contamination which will emanate from the pile. In its entire discussion of the Atlas proposal (DEIS, pp. 2-1 to 2-14), the NRC does not describe the method or effectiveness of Atlas' plan to treat contaminated groundwater or surface water. Thus, the only limit on Atlas' ability to contaminate groundwater perpetually will be the review provided by NRC's technical staff. However, in an earlier section of the DEIS, NRC admits that Atlas will not be required to meet groundwater protection standards and instead will be able to impose standards that, in large part, constitute what the live actions are "practicable" (DEIS, p. 1-6.) Given Atlas' success thus far in convincing NRC to accept Atlas' economic health as the standard for environmental health, one can easily imagine a scenario in which Atlas will convince the NRC that, after construction of its expensive cover, no further corrective action for groundwater is "practicable."

The NRC's lackadaisical approach to scrutinizing Atlas' proposal also is evident in the NRC's acceptance of environmentally reasonable, of Atlas' cover design. Unlike any Title I site previously approved by NRC, at the Atlas Site, the side slopes would be unusually steep and would not be covered with a virtually impervious clay cover. Thus, water, both rain and floodwater, would be able to infiltrate the side slopes. The water would then become contaminated, leaching into the soil, groundwater, and the Colorado River. Thus, contamination will continue to emanate from the pile for as long as the materials remain on the Colorado River. This problem is not even mentioned by the NRC in its discussion of the Atlas proposal.

These failings point to a third inadequacy of the NRC's discussion of the Atlas proposal. The NRC never once addresses the environmental consequences of allowing this Title II site to have environmental safeguards different than those the NRC itself imposes on Title I sites. NRC cannot point to a single Title I tailings pile which NRC has allowed to be reclaimed in a 100-year floodplain. Indeed, the NRC has insisted that DOE move not only Title I sites that were in the 100-year floodplain, but also Title I sites that were within the "probable maximum floodplain." (E.g., the tailings piles at Gunnison, Rifle, Slick Rock, Natura, and Grand Junction all were required by the NRC to be moved from both the 100-year and PMF floodplains.) Similarly, the NRC has required DOE to specify the groundwater protection strategies before granting final approval to the Title I reclamation plan. The NRC also has imposed very strict cover requirements on the side slopes of Title I sites as a radon barrier. As at the Shiprock, New Mexico site, for example, a Title I reclamation-in-place site, a 7-foot radon barrier was constructed for all slopes.

Special attention to cover design also is necessary to prevent growth of vegetation in the cover, because vegetation creates pathways for contamination to leave the pile. The NRC is aware that vegetated growth has been found at Title I sites with a rock cover of 4-8 inch thickness. (Litan, UMTRA-DOE/AL 040677.0000, Vegetative Growth Patterns on Six Rock-Covered Areas, Project Proposal, Feb. 1992; DOD/AFDRL/D-3380-200, Rev. 1, UMTRA Project Proposal Cell Cover BioIntruson Sensitivity Assessment, Oct. 1995.) Despite this knowledge of the 'bio-intrusion' problem, in this DEIS, NRC blithely states that Atlas' four-inch rock cover is sufficient to prevent vegetative and animal intrusion. (DEIS, p. 2-4.) This problem is particularly relevant at the...
Atlas Site because a stand of tamarisk is found directly adjacent to the pile. Tamarisk is a persistent, woody, invasive, deep-rooted plant, which has great potential for disrupting the pile's cover.

After ignoring defects in the Atlas proposal, the NRC then analyzes the Plateau Site Alternative, which would move the pile to a clay-lined, remote area, far removed from groundwater, surface water, population centers, and tourist sites. Despite the NRC's predisposition to accept Atlas' proposal as environmentally acceptable, when it compared the Atlas proposal to the Plateau Site Alternative, the NRC was forced to conclude that, on all grounds, the Atlas proposal had only adverse, long-term environmental impacts. Those impacts include continued contamination of the groundwater and surface water; threat of pile failure to the Colorado River, floodplains, and national parks; preclusion of future use of the Atlas property; negative aesthetic impacts of a rock-covered pile on the banks of the Colorado River; adverse impacts to the tourist industry; and higher radiological dosing of the public. Not a single, significant long-term adverse environmental impact was attributed to the Plateau Site Alternative. (DEIS, pp. 2-25 to 2-26.)

The NRC even admitted that the Plateau Site better complied with NRC's own technical requirements. The NRC then concluded that, although the "potential long term impacts . . . suggest that the Plateau Site Alternative is environmentally preferable to the Atlas site", the "high financial cost of moving the tailings may be the only significant disadvantage of the Plateau Site Alternative." (DEIS, p. 2-26. emphasis added.)

Even if it were appropriate to consider Atlas' costs when rejecting the environmentally preferred alternative, the NRC fails to conduct an appropriate financial analysis justifying its decision. In one sentence, the NRC rejects the best protection of the environment because, supposedly, Atlas could not afford to provide the protection. However, neither in this section nor any other of the DEIS does the NRC engage in an analysis of Atlas' financial condition. How do we know Atlas cannot afford to protect public health and safety? What leads the NRC to believe that sensible environmental protection is beyond Atlas' means? Without this analysis, the NRC merely has demonstrated its strong bias in favor of Atlas. Unfortunately, in this instance, the federal government has been wholly co-opted by the entity it is responsible for regulating.

Thus, although the NRC admits the overwhelming and devastating long-term adverse environmental consequences of the Atlas proposal, the NRC refuses to reach the logical and scientifically valid conclusion — that the Atlas proposal is environmentally unacceptable. Instead, the NRC creates a new standard for environmental acceptance — whether protecting the environment costs a private party too much money. Reaching this conclusion, the NRC lays bare the depth of its commitment to protect Atlas' pocketbook, at excessive cost to the environment and public health and safety.

III. The Inadequacy and Inaccuracy of NRC's Discussion of the Affected Environment.

In the third section of the DEIS, the NRC is supposed to report on the environment which may be affected by the implementation of the Atlas proposal. The NRC's discussion of the affected environmental areas fails to consider several aspects of the environment which are crucial to a full evaluation of the environmental impacts of the Atlas proposal. Although not exhaustive, we provide, below, some of the most blatant examples of the NRC's failure to identify and characterize the affected environment.

A. Geology, Soils, and Seismicity.

The NRC's discussion of geology, soils, and seismicity immediately refers the reader to the NRC's DTER for a "detailed discussion" of the area's geology and seismicity. (DEIS, p. 3-5.) However, it is inadequate for the NRC simply to cite the DTER for this purpose. The "detailed discussion" of geologic and seismic issues belongs in the DEIS itself; how else can the NRC evaluate the geologic or seismic implications of the environmental consequences of choosing either to leave the radioactive tailings pile at the Atlas Site or to move it to the Plateau site?

Moreover, the NRC's treatment of geological issues is replete with inconsistencies concerning such basic facts as, for example, whether the Moab fault even passes under the Atlas Site. (See, e.g., DEIS, p. 3-7) It is "uncertain," but Atlas "preliminarily reported that the fault was detected beneath the northeast corner of the tailings pile"; DEIS, p. 3-8 (Figure 3.2-2, a map depicting the Moab Fault, stating that the fault is buried beneath Holocene sediments "in the vicinity of the Atlas Site and that its location is "uncertain"); DEIS, p. 3-9 (Figure 3.2-3, a map depicting a geologic section and stratigraphic column in the region of the Atlas tailings pile, stating that the fault is "assumed to be present under the tailings pile"). If the NRC cannot even state with certainty, at this point, in the DEIS process, whether or not the Moab Fault exists beneath the tailings pile, how could anyone have any confidence in any of the NRC's subsequent determinations of the geologic or seismic environmental consequences to the affected environment? It is obviously of the utmost importance, in analyzing such issues, to know whether the foundation of this
uranium waste pile is competent bedrock or shifting sand. Yet, at the outset of the DEIS, the NRC admits that it does not even know whether the Moab fault exists under the tailings pile. This approach clearly constitutes an inadequate analysis.

Similarly, although the NRC reports that "major displacement" along the Moab fault related to salt diapirism "probably" ended by the close of Cretaceous time, when the upwelling of salt "largely" ceased, the NRC also reports that "some localized" upwelling of salt "may still be active." (DEIS, p. 3-3.1) These statements beg for quantification or specification. How does the NRC define "major" displacement versus "localized" upwelling? Is "localized" upwelling, though not as significant as "major" displacement, on a scale of geologic time, still itself sufficient to have a major impact on pile integrity? How much is "some" localized upwelling that "may still" be active? Precisely when may it "still" be active? Until such vague, relatively meaningless references are quantified or specified, the NRC has failed to adequately describe the affected geologic and seismic environment.

The NRC's discussion of soils (DEIS, § 3.2.2) notes foundation soils underlying the Atlas Site "may liquefy or cause ground motion magnification during a sufficiently large earthquake." (DEIS, p. 3-10.) In addition, the NRC reports that saturated alluvial and fine sand bodies within the Quaternary sediments underlying the Atlas Site "would be susceptible to liquefaction and ground motion magnification depending on the amplitude and duration of ground motions during an earthquake." (DEIS, p. 3-10.) However, the NRC makes no attempt either to quantify the likelihood or to describe adequately the nature of the potential hazards -- liquefaction and ground motion magnification -- which it identifies in this subsection. Obviously, either of these occurrences could pose a significant threat to pile integrity. At the very least, the NRC should quantify the amplitude and duration of ground motion during an earthquake that the NRC considers potentially capable of causing liquefaction or dangerous ground motion magnification. The NRC's cavalier predilection merely to mention significant features of the affected environment, even those "susceptible" to potential hazards, without adequately quantifying and fully describing them, is rife throughout this subsection. Moreover, since the NRC has failed here to adequately and fully describe the affected environment, the NRC's subsequent discussions of the environmental consequences of implementing various alternatives necessarily will fail to portray adequately all significant environmental consequences.

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**B. Land Uses.**

The NRC's discussion of the affected land use environment (DEIS, § 3.3) completely fails to describe any of the land uses that will be affected at the location[s] from which the riprap will come. Since Atlas no longer plans to obtain riprap from Castle Valley, the NRC's discussion of environmental land use consequences (DEIS, § 4.3) is now incomplete. The NRC must here describe and must later quantify and fully analyse the land use impacts for whichever area becomes the ultimate source of the riprap. The DEIS EIS cannot be considered complete until Atlas commits to a plan and the NRC conducts an analysis of that plan.

**C. Groundwater.**

The NRC's discussion of groundwater hydrology and quality contains no current site-specific data about the contamination that has occurred and will continue to occur as a result of the leachate from the tailings pile. The NRC fails to consider how leachate flows into the aquifer and which contaminants are seeping from the pile. These data must be provided in order to evaluate whether the Atlas plan will work as designed and whether the environmental impact is acceptable. NRC's expected excuse for failing to provide these data is that the NRC's licensing division has left to some later time the evaluation of Atlas' groundwater corrective action plan. However, the NRC must evaluate the scope and effect of that plan in this DEIS, especially because the NRC admits that the Atlas pile will continue to contaminate groundwater and surface water perpetually if the Atlas reclamation proposal is allowed to proceed.

The NRC's discussion of the affected groundwater also omits numerous critical analyses necessary to make an informed decision about the environmental impacts of the Atlas proposal. First, in addressing groundwater hydrology, the NRC fails to address the flow of contaminated water from the tailings to the alluvial aquifer and from the aquifer to the tailings during high flow. The NRC states that the "aquifer discharges along both sides of the river during low river flows" and that "the aquifer is recharged by the river at higher river stages." (DEIS, p. 3-14.) The NRC has not analyzed the amount of discharge into the aquifer or the character of the discharge.

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This subsection currently is flawed because it does not describe the forestry, recreation, or grazing resources that could be impacted at Castle Valley during quarry construction.
Second, the NRC does not consider sufficient information to determine whether the aquifer on the opposite side of the river is contaminated by the Atlas Site. Depending on local conditions, contaminants from the Atlas Site could migrate into the aquifer on the other side of the river. The NRC must evaluate the potential for migration and the groundwater conditions on the other side of the river.

Third, the NRC inadequately addresses the existing quality of the groundwater near the tailings pile. For example, the NRC states that the alluvial aquifer contains sulfate, calcium, magnesium, sodium, bicarbonate, and chloride. (DEIS, p. 3-15.) However, the NRC fails to identify whether there are any other constituents in groundwater which are known to be in the tailings pile. The NRC also fails to identify the concentrations of these constituents and the locations at which the samples were taken. In addition, there is no analysis of the contaminated groundwater plume. A full suite of analyses of the background water quality must be conducted and the results presented in order to begin an adequate analysis.

Finally, the NRC fails to analyze adequately the data it did include in the DEIS on the existing groundwater conditions at the Atlas Site. The NRC has not analyzed the location of the samples, the location of the contaminated groundwater plume, or whether these samples are representative of the tailings pile. The NRC simply accepts Atlas conclusions that the existing groundwater plume poses no danger to the environment or public health. Atlas' mere assumptions are not sufficient bases for the NRC to make an informed decision regarding the Atlas reclamation plan. The NRC must objectively analyze the data and collect more data if necessary to meet its NEPA obligations. The NRC must obtain a more detailed analysis of the water quality at the Atlas Site in order to understand the existing environment. Without these analyses, the NRC will not be able to make an informed decision on the proposed reclamation.

D. Surface Water.

As to surface water hydrology, the NRC does not adequately describe the physical characteristics of the Colorado River in the site area. First, the sedimentation data for the river is 35 years old, dating from 1971, and should be replaced with more current data. (DEIS, p. 3-1.) Second, the DEIS should include a detailed map featuring backwater areas and seeps. Third, the NRC also should discuss the Atlas Site's compliance with the Colorado River Salinity Control Act, 43 U.S.C. § 1571 et seq., in order to protect the water quality of the Colorado River by controlling increased salinity.

Finally, the NRC's discussion of river migration in the DEIS is inadequate. Relying solely on a single report, the NRC finds "the potential for lateral river migration may be low." (DEIS, p. 3-17, emphasis added.) If the NRC is not scientifically certain that the main channel of the Colorado River will not migrate toward the tailings site, then the NRC must gather enough data to make an informed decision on this point.

Furthermore, the NRC should provide more data on the physical characteristics of the Moab Wash. The DEIS should address whether there are any seeps or springs related to the Moab Wash. The NRC or Atlas should sample the water quality of the Moab Wash flow and the sediment in the Moab Wash. The NRC's omission of this data renders inadequate the NRC's discussion and consideration of the affected surface water environment.

Again, the NRC's analysis must be faulted for its failure to consider the contamination of the surface water currently caused by the Atlas pile. As with groundwater quality descriptions, no testing apparently has been done to determine the true scope, if any, of contamination immediately adjacent or downstream surface water. Rather, the NRC accepts Atlas' conclusions that the dilution effect of the rivers negates any contamination seeping from the tailings into the river. However, the NRC does not provide any basis for this assumption. The NRC must identify which contaminants and the levels of those contaminants which are seeping from the tailings pile in order to understand the affected environment. The NRC should be required to obtain this data before it reaches any conclusions regarding the environmental impacts of the Atlas proposal.

Pursuant to the U.S./Mexico treaty concerning water quality, Atlas' contribution to the increased salinity of the Colorado River may cost the U.S. taxpayers millions of dollars for additional water treatment expenses because the United States must pay to remove increased salinity from the river water before sending it to Mexico.

Further information on the history and, therefore, the likelihood of severe flood events through Moab Wash and Courthouse Wash are provided in the written comments addressed to the NRC by Ronald Sharpe, 5170 Greystone Drive, Reno, Nevada, dated April 22, 1996.
E. Ecology.

The NRC also fails to provide a complete or accurate discussion of the aquatic and terrestrial ecologies that will be affected by the Atlas proposal. Likewise, the NRC fails to adequately consider whether the Atlas proposal will endanger any plant or animal species. Moreover, to the extent that the NRC provides information on the surrounding ecology, this information is insufficient to describe existing conditions so that the environmental impacts of the Atlas proposal can be evaluated.

For example, the DEIS lacks a satisfactory inventory of the plant communities at and near the Atlas Site or the proposed borrow sites. There is little discussion of riparian plant communities and no discussion of the wetland plant communities at Moab Marsh across from the Atlas Site. The information provided in the DEIS, which is based on national and regional studies, is simply inadequate to assess site-specific impacts.

The NRC also fails to provide site-specific surveys that identify the habitat types and wildlife species (including critical habitat and sensitive wildlife species) that live at or near the Atlas Site or the proposed borrow sites. This information is necessary to evaluate the aquatic and terrestrial ecologies that could be affected by the Atlas proposal. Indeed, the NRC concedes that no wetlands survey has been completed at the site. (DEIS, § 3.6.) It is not possible to adequately assess the ecological impacts of the Atlas proposal without first identifying or evaluating the wetlands that could potentially be affected.

Even where the NRC identifies species that could be affected by the Atlas proposal, the lack of site-specific data renders any conclusions based on this information meaningless. For instance, the NRC identifies the Colorado Squawfish and Razorback Sucker as aquatic species that could be impacted by the Atlas proposal. (DEIS, p. 3-21.) However, the lack of any site-specific survey data regarding the numbers of these species, a description of their habitat, or even whether these species may spawn in wetlands near the tailings piles, is obvious. Surveys for these and other affected species must be conducted before an adequate impact study can be completed.

In sum, even before the NRC begins to analyze the environmental impacts of the Atlas proposal, the NRC has set the stage for an inadequate and inaccurate analysis. By failing fully to characterize and describe the environmental resources near the Atlas Site and in the borrow areas, the NRC’s impacts analysis does not address several important environmental factors. Thus, the NRC’s analysis cannot be deemed complete until it has fully and fairly described the affected environment.

IV. The Inadequacy and Inaccuracy of NRC’s Discussion of Environmental Consequences

The NRC’s analysis of the environmental impacts of the Atlas proposal contains some of the most serious instances of the faulty, biased, and incomplete analysis that pervades the DEIS. Grand County Council will address each of the substantive environmental topics discussed by the NRC and highlight some of the most significant examples of the DEIS’ failings.

A. Air Quality and Noise.

The NRC fails properly to analyze the potential air quality and noise impacts of the Atlas proposal. For example, the NRC identifies vehicle emissions as a major source of air quality impacts, but then dismisses such impacts as “negligible,” (DEIS, p. 4-2.) However, there are no test data or other support given in the DEIS for this conclusion. Moreover, the NRC completely fails to address the air quality impact of trucks entering and leaving the site, the borrow sites, or emissions along the transportation routes.

Likewise, there is a lack of documented support for the assumption that noise levels reaching the towns of Moab from construction work at the Atlas Site would be equal to or less than the noise levels in a ‘quiet’ suburban residential area. (DEIS, p. 4-2.) The NRC also fails to provide any analysis of the cumulative effect of heavy equipment at the Atlas Site, or even more importantly, to discuss the increased highway noise from two transporting clay and rock to the site. The transportation route for this activity under the site. Since the DEIS was written, Atlas has abandoned its plan for a new borrow site. If the Atlas proposal is approved, the company will now cut through Castle Valley’s new borrow plans. Atlas’ new borrow plan must be detailed and any meaningful conclusions regarding the impacts on air quality or noise levels can be formed.

B. Geology, Soils and Seismicity.

In the DEIS, the NRC completely fails to fulfill its responsibilities to analyze the significant environmental consequences of unstable geologic, soil, and seismic issues that could affect pile stability and cap integrity. For example, in purporting to analyze the potential effects
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on the tailings pile resulting from future possible  
earthquake movement associated with both  
earthquakes and salt dissolution along the Moab Fault, the  
NRC admits that these naturally-occurring hazards would  
have "uncertain probabilities" of destabilizing the reclaimed  
Atlas tailings pile, and that the rate of long-term salt  
dissolution in the Moab region is "largely unknown." (DEIS  
p. 4-6.) However, the NRC makes no attempt even to begin to  
quantify these 'uncertain probabilities' of pile  
destabilization or this largely unknown rate of salt  
dissolution, despite the obvious significance that a complete  
understanding of these hazards has for both the short  
and long-term environmental safety of the Atlas Site, as well as  
for the ultimate public health and safety issues that would  
ensue following either pile destabilization or cap  
fracturing.

The NRC admits, for example, that subsidence as a result  
of salt dissolution "could range from gradual to rapid," and  
that both rates of subsidence have occurred within the  
Paradox Basin. (DEIS, p. 4-6.) The NRC admits that even  
"gradual" subsidence would cause "cumulative" damage to the  
tailings pile again, without making any attempt to quantify  
what rate of subsidence the NRC considers 'gradual' or what  
amount of damage to the tailings pile the NRC considers  
'cumulative.' (DEIS, p. 4-6.) However, as the NRC also  
admits, a "rapidly developing" sinkhole "could propagate  
upward into the tailings," damaging the tailings pile and  
caus[ing a portion of the tailings to be submerged below the  
water table. (DEIS, p. 4-6.) The NRC's discussion of the  
environmental consequences of the implications for pile  
stability stops, rather than begins, with this optimistic  
image of a portion of the pile suddenly sinking into the  
water. Indeed, such a sinkhole currently can be found in  
Castle Valley. Thus, the NRC identifies an extremely  
significant, possible, and potentially disastrous  
environmental consequence and then drops it, without further  
specification, quantification, analysis, or consideration of  
any kind. This is a glaring example of the NRC's absolute  
failure to do its job under NEPA.

The NRC's further discussion in the DEIS of the  
environmental consequences of the potential for an earthquake  
damage at the Atlas Site is similarly flawed. The NRC admits  
that this potential "could be increased by ground motion.  

Indeed, no uranium mill tailing reclamation site can be  
licensed unless the owner can prove that the 1000-year, or at  
least the 100-year, design standard has been met. NRC's  
failure to analyze these issues means that its analysis does  
not meet NEPA or NMTA requirements.

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magnification and liquefaction of the thick, unconsolidated  
sediments beneath the site. Again, the NRC does not  
quantify the possible "increase" to pile instability. (DEIS,  
p. 4-6.) The NRC further admits that Atlas has not yet  
determined the magnitude of a maximum credible earthquake  
(MCE), nor committed to seismic design parameters that would  
satisfy the NRC calculations reached by two independent  
studies. (DEIS, p. 4-6.) Obviously, it is crucial that any  
design that Atlas proposes satisfy such parameters. The NRC  
then notes another possible source of damage to the tailings  
pile, this time landslides from the bluffs at the Atlas  
Site -- again without further specification, quantification,  
analysis, or consideration of any kind of the precise danger  
to the pile posed by the landslides which could both 'damage  
the tailings pile and affect drainage ditches and Moab Wash.'  
(DEIS, p. 4-6.) The NRC fails to disclose that within the  
last eight years there have been repeated major rockfalls  
from the rim of Poison Spider Mesa, which is continuous with  
the rim above the Atlas pile. Thus, the threat from  
landslides is immediate and must be treated seriously.

The NRC's referral of the reader to the DTER for a  
'listing' of six major unresolved geologic issues related to  
the Atlas Site is the ultimate abdication by the NRC of its  
obligations. Rather than acknowledging that its  
environmental impacts analysis is incomplete, the NRC refers  
to a document (the DTER) that itself leaves numerous wide  
open issues. Rather than pass the buck, the NRC's DEIS  
should analyze the environmental consequences of such issues  
relating to: 1) the capability of the Moab Fault and its  
branches; 2) the nature of a buried scarp at the Atlas Site;  
3) the rate and nature of subsidence of the tailings; 4) the  
effects of mobilizing sand dunes; 5) the effect of landslides  
emanating from Poison Spider Mesa; and 6) the seismic design  
basis.

In summary, the NRC's discussion of the significant  
potential environmental consequences of outturning geologic  
soils, and seismic issues that could affect pile stability  
and cap integrity is no more than a checklist of identified  
issues. As outlined above, the NRC does not adequately  
quantify or analyze any of these significant issues. Public  
concerns about basic health and safety issues that  
ensue following a collapse of a portion of the pile into the  
Colorado River are not even raised, much less addressed. The  
NRC's submission of a DEIS that merely identifies, rather  
than analyzes, the environmental consequences of the numerous  
geo[logic, soils, and seismic issues outlined above fails to  
comply with the NRC's most basic statutory and regulatory  
requirements.

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C. Land Use.

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The NRC's discussion of the Atlas plan's impact on land use is based on unsupported conjecture and vague, unsupported assumptions. For example, in the NRC's discussion of reclamation impacts at the Atlas and Plateau Sites (DEIS, § 4.3.1), the NRC characterizes the amount of grazing land that would be lost at the Plateau site as a 'minor impact' without specifying the number of acres that would be affected. (DEIS, p. 4-7.) Similarly, the NRC refers to the recreation loss at the Plateau site as "limited" without describing what the actual recreation loss would be. (DEIS, p. 4-7.)

Furthermore, the NRC fails to describe and quantify the true scope of the Atlas plan's impact on land uses. For example, the NRC fails to assess either how much land would actually be removed from other uses by borrow operations. In addition, the NRC fails to analyze whether or not the land use impacts of providing access to the borrow sites.

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More importantly, the NRC assumes that the proposed reclamation activities at the Moab site would not affect nearby land uses because no "significant amount of contaminated or radioactive dusts would be expected to escape from the site and significantly contaminate nearby areas". (DEIS, p. 4-7.) The NRC does not quantify in any way or even identify what it considers a "significant" amount of contaminated or radioactive dusts, or what level of contamination of nearby areas has to occur before the NRC considers the contamination "significant." However, the NRC recklessly assumes that all land uses -- including nearby recreational activities, park visitation, grazing, operation of existing commercial establishments, agricultural activities, and gardening and other residential land uses -- would not be affected by such contamination or by the threat of such contamination. (DEIS, p. 4-7.) The NRC cannot expect the public to believe such flimsy assertions, unsupported by any scientific analysis.

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Again without defining or specifying in any way such crucial terms as 'unlikely', or 'significantly', the NRC then makes the additional unsupported conjecture that, in the 'unlikely' event of a 'significant' radioactive release, clean-up 'would be initiated immediately to restore

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contaminated land to a condition sufficient to support previous land uses. (DEIS, p. 4-7.) Unfortunately, the NRC does not acknowledge that Atlas would not be required to pay for this immediate clean-up.) Without setting forth the precise expected environmental consequences of a "significant" radioactive release, the NRC has no scientific basis whatever from which to predict that it would be possible to restore contaminated land to a condition sufficient to support previous land uses. (DEIS, p. 4-7.)

This is sheer guesswork, not scientific analysis.

The NRC's discussion of the environmental land use consequences of tailings pile failure is similarly inadequate. Finally, the NRC's practice of analysing long-term impacts by using 1000 years as the term completely biases its analysis towards a supposedly low impact. (DEIS, p. 4-9.) For example, it is ludicrous for the NRC to assert it overall assessment of the "tailings contribution" that would be caused by the collapse of a mere 2 million tons of radioactive waste into the Colorado River. That waste would represent only a 'negligible fraction' of the total suspended and dissolved solids that would pass by the Atlas Site, during the next 1000 years. (DEIS, p. 4-9.) It is misleading for the NRC to refuse to distinguish the type and quantity of releases that occur from the radioactive waste pile to adjacent land uses under "present conditions" and those that would occur following a sudden and catastrophic collapse of the pile. This is not reasoned environmental decision-making, but an attempt to use statistics to hide the ball.

Second, after again making unsupported assumptions about dilution factors and contaminant concentrations, the NRC's discussion of contaminant concentrations leaves major public health and safety issues unresolved. For example, the NRC never states actual numerical values for the dilution factor. It presumes that it would reduce the contaminant concentration levels so that "a few days after failure, the contaminant concentration in the water would be "much" further diluted. (DEIS, p. 4-9.) More importantly, the NRC never addresses the issue as to whether any of the supposedly diluted contaminants would still be hazardous to human health and the environment. However, the NRC is forced to concede that, for "several days" after tailings pile failure, "...the concentration of any tailings contaminants would presumably be "extremely low as a result of dilution" by the water that would reach A;\[5\]." (DEIS, p. 4-10.) Again, the NRC resorts to unambiguously supported, rather than scientific decision-making, and assumes, from this sketchy discussion, that the

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\[5\] As noted above, Atlas has recently abandoned its plan to obtain riprap from the quarry near Castle Valley. The NRC's discussion of borrow operations is thus incomplete, because it relies upon that now-abandoned plan.
contaminant concentrations from even a catastrophic tailings pile failure would have no "significant" or lasting environmental consequences. NRC's conclusion is meritless.

Third: the NRC admits that flooded lands would be contaminated by both dissolved and particulate solids. However, again without numerical quantification, the NRC asserts that "contaminant levels in soils on flooded lands would be "only slightly higher than normal"... although, as the NRC is forced to concede, higher than normal" that water and soil surveys "would be needed to determine when existing land uses could continue." (DEIS, p. 4-10.) Again without supporting its conjecture, the NRC assumes that a flood would cause a "rather even distribution of contamination of lands along the length of the river." (DEIS, p. 4-10.) However, the NRC completely fails to assess the possible environmental consequences of one particular area's receiving a "relatively greater impact" after a flood. (FTIS, p. 4-10.) Sadder still, the NRC does not address how we, as a society, can condone "an even distribution of contamination" throughout the water supply for the Southwestern United States as an acceptable consequence of a private party's reclamation obligation.

Finally, the NRC assumes that, although an unspecified amount of tailings "may deposit in flooded areas of Moab Valley," the amount should be "small." (DEIS, p. 4-10.) However, the NRC concedes, again without quantified analysis, that the tailings could "slightly" contaminate the floodplains downstream in the event of flood. The urban land uses in this area include several residential areas, a hospital, orchards, and a sewage treatment plant. Contamination of these areas could obviously result not only in the need for the "surveys of contamination" and "necessary cleanup activities" which the NRC merely mentions in passing, but also in considerable panic among affected citizens, as well as in unknown and previously unconsidered public health impacts. Without further specifying any potential public health impacts that could arise from the contamination of downstream land resulting from a flood event, the NRC cannot expect the public to rely on its unjustified conclusion that the results of any such contamination would only be "slight." 

Throughout its discussion of the environmental land use consequences, the NRC makes inadequate and unsupported assertions. In this subsection, the NRC has not presented the type of analysis sufficient to fulfill NRC's responsibilities to evaluate the environmental land use consequences that will ensue if Atlas' plan is implemented.

D. Groundwater

The NRC fails to evaluate the full scope of the environmental impact of the Atlas proposal on groundwater. The NRC's discussion is based on insufficient data and flawed analysis. In the DEIS, the NRC admits that "leaching of contaminants from the tailings at either the Atlas Site or the Plateau Site would continue to occur after successful reclamation." (DEIS, p. 4-12.) Yet the NRC fails to analyze exactly which contaminants are leaching from the tailings piles, rather, without analysis, the NRC simply accepts Atlas' conclusion that "[b]ecause groundwater on the Atlas side of the river is not used for any purpose, the continued contamination associated with the tailings would not impact groundwater use." (DEIS, pp. 4-13 to 4-14.) The NRC inappropriately makes this assertion without any data to support this important conclusion. In order to accept Atlas' conclusion, the NRC must review a complete characterization of the groundwater contamination, including data on the distribution of contaminants in groundwater. The NRC must collect more representative samples of the tailings leachate in the pile and at the bottom of the pile. The NRC must then analyze the leachate samples and samples from the alluvial aquifer on both sides of the river for all the contaminants designated in Appendix VII of RCRA, as well as for molybdenum, combined radium-226 and -228, combined uranium-234 and -238, and nitrate. (NRC, Final Standard Review Plan, p. 41, June 1993.)

Furthermore, the NRC fails to explain what the list of contaminants in Table 4.4-1 represents and specifically whether it includes all the contaminants in the alluvial groundwater sample locations. At a minimum, Table 4.4-1 should include arsenic, cadmium, chromium, combined radium-226 and -228, and combined U-234 and U-238. As with the rest of the NRC's analysis of groundwater impacts, this data and analysis is incomplete and does not provide enough information to make a decision on the Atlas proposal. The NRC's failure to consult with the National Park Service is starkly evident in the NRC's poor analysis here. The National Park Service provided the NRC with detailed sampling protocols, which the NRC flatly refused to implement.
The NRC's analysis, even when conducted, appears flawed. For example, the NRC's calculation of the seepage rate... to groundwater. In estimating this seepage rate, the NRC uses variables which are far from conservative. In order to estimate the seepage rate, the NRC concludes that the rate of evaporation from the pile is 70%. However, when the cover is in place, the cover will inhibit evaporation, and the amount of evaporation will be substantially below 70%. Hence, only this arbitrarily chosen evaporation rate was used, but it overstates the amount of liquid expected to evaporate from the pile. Because NRC has chosen to use this non-conservative assumption in calculating the seepage rate, we doubt whether the NRC can justify its conclusion that leachate flows will be minimized.

The NRC also should consider whether Atlas will take any steps to prevent use of the contaminated water over the next 200 to 1000 years. The NRC states that 'it is expected that the tailings will continue to leach well beyond the design life of the pile.' (DEIS, pp. 4-13 to 4-14.) The NRC goes on to conclude that this continued contamination from the tailings pile will not impact groundwater use. The NRC and Atlas should explain what precautions will be taken to ensure that the groundwater will not be used over the long-term.

The NRC's failure to address long-term impacts to groundwater is exemplified by its belief that it will pass the responsibility for groundwater monitoring to DOE and the State of Utah. Specifically, the DEIS provides that 'the NRC's monitoring of contaminant migration and monitoring of migration would be matters for consideration by DOE and the State of Utah.' (DEIS, p. 4-13.) This approach inappropriately shifts the burden of reclaiming this pile from the owner, Atlas Corporation, to taxpayers in Utah and throughout the United States.

Finally, the NRC fails to consider the long-term effects on groundwater. The NRC admits that 'the Corrective Action Plan is currently being reexamined by NRC.' (DEIS, p. 4-15.) The fact that the NRC has not fully reviewed the environmental consequences of reclamation on the groundwater, at a minimum, renders the DEIS incomplete. It is particularly objectionable that the NRC has not evaluated groundwater issues in the DEIS because NEPA requires the NRC to consider all the major impacts of reclamation. The impact on groundwater is a substantial impact on the environment which must not be ignored in the DEIS. The Administrator cannot make an informed decision on Atlas' reclamation plan without understanding the true impacts on groundwater.

E. Surface Water.

As indicated by its insufficient testing of water quality, sediment, and aquatic wildlife, the NRC inadequately analyzes the environmental consequences of Atlas' plan on surface water. (DEIS, p. 4-22.) 

The water quality data, as presented in Table 4.5-1 and the accompanying text, is misleading and inaccurate. Although the NRC states that the upstream mean is derived from sampling locations above the U.S. 191 bridge and the downstream mean is derived from sampling locations above the Colorado/River confluence, the NRC fails to specify the number of samples, the exact sampling locations, or the sampling time frame used to calculate either mean. (DEIS, pp. 4-22 to 4-24.)

Moreover, the NRC does not specify the source of this data other than citing to the Utah Department of Environmental Quality. (DEIS, Table 4.5-1, note a.) Without these additional data, the NRC cannot adequately evaluate the surface water quality near the tailings pile.

The NRC's use of a downstream mean incorporating samples taken from as far as 60 miles away is a mechanism for hiding the true water quality of the Colorado River near the Atlas Site. Samples taken 60 miles downstream are far too many miles from the Atlas Site. Furthermore, the NRC does not identity which contaminants are located in between the most upstream and the most downstream sampling locations. On the other hand, the NRC refers to Grand Junction's contribution to the higher a 'count downstream, as compared to upstream, of the Site' as Site is unwarrented because the Grand Junction Site is upstream of all the sampling stations and would be accounted for in the upstream samples. (DEIS, pp. 4-25.) Furthermore, the reference to Grand Junction is confusing because the Grand Junction tailings pile was required to be moved from its location near the Colorado River. Thus, its current impact on water quality may not be relevant. In sum, the NRC's data in Table 4.5-1 does not provide a sufficient basis to make an informed decision regarding the Atlas plan.

Not only has the NRC misled the public in its presentation of the State of Utah's water quality data, but the NRC, also has not sufficiently analysed site-specific data in order to determine the Atlas pile's direct impact on...
surface water quality. The NBC fails to identify the exact contaminants which the pile contributes to the river and the concentrations of those contaminants. For example, the NBC states that, "given minimal dilution at record low flow conditions, uranium, gross alpha (nearly all from uranium and its daughters), ammonia, and molybdenum from tailings could constitute a significant fraction of the river's contaminant concentrations." (DEIS, p. 4-27.) However, there is no evidence of ammonia concentrations because neither Atlas nor the NBC has conducted any sampling to determine the level of ammonia coming from the pile. Once again, the NBC blindly accepts Atlas' conclusions without analyzing enough data to evaluate whether Atlas' conclusion is justified.

Second, the sediment sampling data in the DEIS is inadequate. The NBC admits that "[w]ith respect to river sediments, contamination concentration data is quite sparse." (DEIS, p. 4-27.) Indeed, the NBC admits that the sediment results "may have been influenced by rising water levels immediately preceding and during the sample collections." (DEIS, p. 4-27.) Due to the high flow, the true bank of the river was under water so that the samples were collected several feet away from the true sediment of the river. Rather than rejecting this sampling activity, the NBC embraced Atlas' bad science and reached erroneous conclusions from that non-representative data. Since the NBC sampling is admittedly inaccurate, the NBC must require more sampling of river sediment in order to understand the true impacts of the Atlas tailings pile on the river. This data is crucial because some contaminants may appear in sediment that otherwise may be diluted by the river. Furthermore, the NBC should evaluate sediment and soil samples from Muhab Wash, the riparian plant communities along the river, and the marsh across the river.

Third, the NBC's analysis of the impact of the pile on aquatic wildlife is inaccurate. The Biological Assessment states that the concentrations for arsenic, iron, lead, manganese, mercury, selenium, vanadium, gross alpha, gross beta, lead 210, polonium 210, radium 226, thorium 230, and total uranium are elevated in fish. (DEIS, App. F, p. 21.) Yet the report concludes that the pile is unlikely to have adverse effects on wildlife except for "near the leachate contaminated groundwater-surface water interface." (DEIS, App. F, p. 33.) The NBC, in both the DEIS and the Biological Assessment, fails to address the fact that the elevated levels of contaminants in fish indicate that these contaminants are present in the river and have already accumulated in fish although they are diluted in the river itself. Furthermore, the NBC fails to explain the extreme peaks for several contaminants associated with the pile at sampling sites 4 and 8. Since site 4 is adjacent to the pile and site 8 is at the Portal where the river leaves the Moab Valley, the most obvious explanation is that the Atlas pile is in fact leaking these contaminants into the river. These peaks in contaminant concentrations contradicted Atlas' assertions that the river dilutes the tailings' contaminants. Rather, Atlas attempts to conceal this data by using mean calculations and averages over many river miles.

In sum, the NBC must require the collection of more data regarding contamination of groundwater-surface water, and sediment which specifically relates to the Atlas Site. The data in the DEIS is extremely general and merely describes the overall condition of the Colorado River. The NBC has failed to collect representative samples in order to characterize the direct impact of the tailings pile on the river. Moreover, the data which the NBC has reviewed has been inadequately analyzed to determine the site-specific impacts on the river.

F. Ecology

The NBC also fails properly to assess the impact of the Atlas proposal on aquatic and terrestrial ecologies in the vicinity of the tailings pile. In the DEIS, the NBC identifies the data from the tailings pile as a continuing source of groundwater contamination at the site. (DEIS, p. 4-33.) The NBC attempts to dismiss this acknowledged contamination source by claiming that exposure from "dilute" leachate from the tailings pile will not affect endangered fish species. (DEIS, p. 4-32.) This claim is not only unsupported... it is also incorrect.

The leachate from the tailings pile is simply not "dilute." Groundwater sampling data in the vicinity of the tailings pile demonstrate that the leachate from the pile exceeds federal standards for at least eight constituents of concern, including total alpha radioactivity and lead. (See Table 4.4.1). The lack of any concrete evaluation of the impact of this continuing contamination source on local aquatic and terrestrial ecologies constitutes a fundamental failing of the DEIS.
The NRC also fails to assess the impact of the Atlas proposal on the Moab Wash or on any of the nearby wetlands. The DEIS contains no surface water sampling data in the Moab Wash during periods of water flow or any examination of the Moab Wash for seeps or springs. As a result, it is impossible to conclude whether the Moab Wash constitutes a significant source of water contamination which could impact the nearby Colorado River. In addition, and perhaps more importantly, the NRC concedes that no wetlands survey has been completed. (DEIS, p. 3.23.) Without such a survey, the NRC cannot properly assess the environmental impact of the Atlas proposal on nearby wetlands.

Moreover, the data upon which the NRC bases its conclusions are inadequate. The NRC's conclusions regarding the impact of the Atlas proposal on nearby aquatic biota are based on a single sampling round. More sampling is required before it can be determined if site-related contaminants are having an adverse impact on the aquatic biota of the river.

Likewise, the NRC's evaluation of the impact of the Atlas proposal on terrestrial ecologies is critically flawed because there is virtually no site-specific information on the local ecologies that could be impacted. Site-specific surveys of plant communities, plant species, wildlife, and important habitat features at the Atlas Site, borrow sites, and along the transportation routes, are essential to determine the impact of the Atlas proposal on these ecologies. Without such site-specific information, any attempt to evaluate the effect of the Atlas proposal is worthless.

Finally, the NRC fails to provide an analysis of the impact of the Atlas proposal on riparian vegetation that is rooted in the contaminated alluvial aquifer along the river and Moab Wash. Sampling for a terrestrial ecological risk assessment should be performed to determine plant uptake of contaminants, food chain transfer of contaminants, and soil contamination that may have occurred. As with site-specific surveys, this information is necessary to determine if contamination from the tailings pile is having a detrimental impact on the terrestrial ecology in the area.

G. Socioeconomic, Cultural, And Aesthetic Resources.

The NRC's discussion of the consequences of the Atlas proposal for socioeconomic, cultural, and aesthetic resources is not a sound, analytically supportable evaluation of the environmental impacts to these resources. For example, the NRC states that "the public perception of the tailings pile as a threat to health or safety would be unlikely to be extensive enough to significantly affect population growth."
rejects this remedy solely because it would cost Atlas too much ($50 million). (DEIS, p. 4-61.) However, this cost, if not borne by Atlas, will be borne by the taxpayer, an implicitly inconsequential consequence which NRC never addresses and thus implicitly endorses.

The NRC’s discussion of the Atlas proposal’s impact on socioeconomic resources not only is non-analytical, but it also completely ignores certain environmental consequences. For example, the NRC does not discuss what economic losses can be predicted to occur as a result of the pile’s remaining in place. Even if we accept the NRC’s assumption that the pile’s stigmata effect may seriously impact tourist revenues, this stigma effect is particularly costly with respect to foreign tourists, who, as evidenced by the Green Movement, may have a stronger reaction to radiological threats. As NRC noted, the largest group of tourists is from Germany, where this political movement is particularly strong. (DEIS, p. 3-32.) Thus, the stigmata effect of the Atlas proposal must be considered in any evaluation of economic environmental consequences.

The only irreplaceable harm that the NRC recognizes as caused by the Atlas proposal is to the aesthetics of the Round Mountain borrow area. (DEIS, p. 4-61.) The NRC’s response to this harm is to suggest that Atlas pay off those residents for Atlas’ proposal to scar the landscape permanently. Atlas, however, when faced with intense community opposition, realized that its plan would not work. The NRC must be faulted for approving Atlas’ plan to destroy the Round Mountain land. The NRC’s willingness to allow Atlas to take any action, regardless of its environmental consequences, permeates the entire document. The NRC’s bias in this conclusion that the Atlas proposal is acceptable.

Another indicator of the NRC’s bias is the NRC’s use of the term “Normal Conditions” to describe actions taken pursuant to Atlas’ proposal. (See, e.g., DEIS, pp. 4-42, 4-44, 4-52.) Atlas’ disposal of radioactive waste along the banks of the Colorado River, albeit pervasive, is hardly “normal.”

agrees that the only remnant of the Atlas Mill that should remain in a plaque describing its historical significance. However, in fact, the NRC is requiring a different historic monument for the site — a 110-foot tall, 1/2-mile wide, 10.5-million-ton leaking pile of radioactive waste. Grand County Council cannot sanction this monument to a perpetual environmental travesty.

The NRC’s discussion of radiological impacts in the DEIS contains numerous errors and unsupported assertions. For example, the characterization of the tailings pile, including the analysis of fine and coarse tailings, is based on test borings limited to 8 feet, whereas the pile is 110 feet deep. The lack of adequate sampling data precludes any valid characterization of the tailings pile or its radiological impact.

With respect to the limited sampling that was performed, the NRC relies upon boring samples which were combined into composites for its characterization analysis. This composition of samples is inappropriate to characterize 110 feet of heterogeneous tailings and their moisture content through the various horizons of the pile. As a result, the current sampling of the tailings pile is simply inadequate either to properly characterize the nature of the pile or to determine its radiological effects.

The NRC’s analysis is also deficient because it concludes that occupational exposure to radiation as a result of the Atlas proposal would be reduced by a factor of 3 because the planning season would be limited to 15 weeks per year. There is no support or explanation given in this section or anywhere else in the DEIS for such a conclusion schedule. Moreover, there is no assurance in the DEIS that the construction season would not be extended at a later date, especially if winter weather conditions limit Atlas’ ability to transport borrow material.

Finally, the NRC also incorrectly states that post-reclamation conditions at the site after relocation could be elevated because the standards allow for 5 pCi/g to remain in mouth soils. This may be an overstatement because, as a practical matter, clean-up typically occurs to the background Ra-226 level rather than to the 5 pCi/g that is allowed by the regulations. The Plateau Alternative is not the only allowable action because it completely removes all contamination and eliminates all exposure risks to the surrounding areas, including the town of Moab and Arches National Park.
I. Cumulative Impacts.

We have already noted the significant problems in the NRC's analysis of environmental consequences for each of the environmental factors discussed in the DEIS. In general, the NRC's conclusions are not based on any appropriate analysis or research of the facts, and are premised on the unsupported assumption that Atlas' plan, under all circumstances, will be environmentally safe.

For example, the NRC improperly concludes that there will be no cumulative air impacts from the Atlas proposal. However, the NRC assumes, without support, that 50 percent of fugitive dust emissions can be controlled through wetting the soil at the site. This generalized statement was made without any documentary support or site-specific data and, thus, should be rejected as unsubstantiated.

The NRC also fails adequately to assess the cumulative impact of the Atlas proposal on terrestrial and aquatic ecologies in the vicinity of the tailings pile. Because the ecological assessment does not provide adequate information about existing conditions at the site, a meaningful impact analysis cannot be performed. Moreover, the NRC completely fails to address the continued and cumulative impact of contaminated groundwater on the surrounding biota. Instead, the NRC incorrectly concludes that there will be no future impact after the Atlas proposal is completed. This conclusion is both flawed and unsupported.

In addition, the NRC notes that additional construction or decommissioning of underground petroleum storage facilities in the vicinity of the Atlas Site "could lead to a small increase in instability within the Paradox salt and a potential for subsidence," and that such subsidence also "could lead to increased communication between the Paradox salt and the Colorado River." (DEIS, p. 4-93) However, the NRC provides no justification for its characterization of this possible increase in instability as a "small" one, nor any further discussion of the apparently probable relationship between it and the expected "increased communication" between the Paradox salt and the Colorado River. The NRC completely fails to fulfill its obligations to discuss cumulative impacts with these scant and ill-defined allusions to such important and unresolved issues.

Furthermore, the NRC's discussion of the cumulative impacts upon land use (DEIS, p 4-93) states that, after a hypothetical tailings pile failure, the deposition of tailings onto downstream lands would "add to the existing level of contamination that has resulted from deposition of existing contaminants in the river during previous floods."
Thus, the HRC's discussion of "cumulative impacts" perpetuates the faulty analysis throughout the DEIS. First, the HRC repeats its conclusion that Atlas' plan will have few short- or long-term consequences. Then, instead of carefully scrutinizing the cumulative impact of the Atlas plan, the HRC dissects the plan's detrimental effects into small segments and dismisses each one of those segments as unimportant. In fact, the HRC is forced to note many significant, long-term adverse consequences of the Atlas plan. (DEIS, p. 1-25.) However, the HRC never discusses the cumulative effect of these consequences on the public health or environment. Thus, the HRC's apparent conclusion that the pile's failure has no long-term cumulative impact is not based on any analysis of the facts and, frankly, defies rational belief.

J. Unavoidable Adverse Environmental Impacts

The HRC's flawed analysis is repeated, albeit in summary fashion, in a discussion of unavoidable adverse environmental impacts. Grand County Council will not repeat its comment of the HRC's analysis of those impacts. However, we wish to note that, given a flawed analysis, the HRC finds that Atlas' proposal will have unavoidable adverse environmental impacts to the groundwater, to the Colorado River, to land use, to the floodplain, to tamarisk and other habitats, to the local economy and population growth, and to the "spectacular" aesthetics of the Moab area. (DEIS, pp. 4-96 to 4-98.)

K. Short-Term Uses and Long-Term Productivity

The HRC claims that the Atlas proposal would allow short-term environmental uses to "promote long-term environmental protection." (DEIS, p. 4-98.) However, this statement is contradicted by the HRC's repeated admission that the Atlas plan would have significant, long-term adverse environmental impacts. In fact, the DEIS demonstrates that the HRC intends to allow both short- and long-term abuse of the environment, not to promote environmental protection, but to protect Atlas' pocketbook.

L. Irreversible and Irretrievable Commitments of Resources

The HRC finds that the Atlas plan will cause only limited commitment of resources. Again, the HRC disregards the environmental impact of the Atlas plan. The HRC underestimates the irreversible and irretrievable commitment of Moab's residents, visitors, and entire natural environment to a permanent radiological threat. The HRC also does not address whether publicity about the pile and the resulting potential could irreversibly and irrevocably devastate Moab's economy. Finally, the HRC does not acknowledge that Atlas' plan irretrievably and irreversibly dooms the Colorado River to being a permanent radioactive waste dump.

V. The Inadequacy and Inaccuracy of HRC's Purported Cost-Benefit Analysis

The HRC's purported cost-benefit analysis suffers from several infirmities. Overall, the HRC's cost-benefit analysis is unacceptable because it analyses and weights the wrong factors. HRC should be weighing the benefits to the environment against the costs to the environment, taking into account the costs of each action considered for the site. Instead, HRC weighs the economic costs to Atlas of the Atlas proposal against the economic costs to Atlas of the Plateau Site Alternative and rejects the Plateau Site Alternative solely because it would cost Atlas more. No serious discussion is given to the environmental costs of each action or to weighing these costs against the environmental benefits. Thus, by failing to acknowledge and weigh the environmental costs, the HRC has failed to conduct the analysis required by NEPA and by its own regulations.

A. The Faulty Cost Comparison

There are several significant problems demonstrated by the HRC's 'cost comparison' component of its cost-benefit analysis.

First, the HRC relies on Atlas' estimates of both the cost of its action and the cost of the Plateau Site Alternative for the HRC's comparative cost analysis. However, the HRC fails to provide sufficient basis for either the public or the Commission to evaluate whether those costs are reasonable. The HRC says that the costs 'appear to be reasonable,' but provides no basis for that conclusion. (DEIS, p. 5-1.)

Second, the HRC refuses even to consider the costs associated with the hypothetical maximum failure of the tailings pile because those costs are 'highly speculative.' (Id.) The HRC's basis for the judgment that costs are too speculative is that the hypothetical flood is not expected to occur and the resulting repair, clean-up, and lost productivity of the Colorado River are unknown in both extent and effect. However, as the HRC acknowledges elsewhere in the DEIS, the failure of the pile must be an event considered in the DEIS. (DEIS, §§ 2.1.8. and 4.) The fact that the pile failure is too devastating to accept is an admission to avoid, the resulting environmental cost. Indeed, the pile failure's disastrous environmental cost requires that this
event be weighed heavily against any purported benefit of the
Atlas proposal. By failing to consider the cost of the pile
failure, HRC fails to give due consideration to the true
costs to the environment of the Atlas proposal.

Third, the HRC's cost comparison is deficient in its
analysis of average Title I and Title II UMTRA sites. HRC
purports to undertake a comparative, parametric analysis of
different sites, yet fails to conduct the basic analytical
steps necessary for such an approach. As a matter of
fundamentals' logic, when comparing two sites, HRC should only
compare those costs that are fairly comparable based on site
characteristics. Then, HRC should separately analyze the
costs of those site characteristics that cannot be compared.
A comparison of Title I and Title II sites solely on an
average per-ton basis, as conducted in this draft EIS,
provides no reliable analytical information because it does
not compare common site characteristics. However, HRC
manipulates this average per-ton data to try to lend credence
to Atlas' cost estimates and to the HRC's pre-ordained
conclusion that the Plateau Site alternative would cost
significantly more than the Atlas proposal. For example, the
HRC accepts at face value the estimates of Title II per-ton
costs recently generated by Mr. Ferdinand. (Ferdinand, B,
Rio Algom Mining Corp., Oklahoma City, OK, telefax to
J.W. VanDyke, OECDL, 12/05/95.) The HRC fails to take into
account whether Mr. Ferdinand's cost estimates are objective
and verifiably, particularly in light of the fact that
Mr. Ferdinand represents the Title I regulated community.
Moreover, the HRC fails to consider whether Title II costs may
be higher than Title I costs because the Title II estimates
do not include the costs of groundwater remediation and other
environmental protections which must be imposed at the Atlas
Site.

Fourth, the HRC, without justification, rejects use of
Title I cost data at the Ambrosia Lake and Shiprock sites
which otherwise would show that Atlas has grossly
underestimated the cost of its proposal. The HRC states that
these sites' reclamation-in-place costs were high because of
the necessity to clean up "vicinity properties." (DEIS, p. 5.2.) However, these vicinity properties had to be
cleaned up because of windblown contamination. This clean up
of "vicinity properties" also will have to occur at
properties affected from Atlas' windblown contamination. The
HRC does not address what portion, if any, of Atlas' cost
estimates address windblown contamination and how those Atlas
estimates compare to the actual experience at Ambrosia Lake
and Shiprock. HRC also rejects the proposition that Atlas' cost
estimates to the actual cost figures at Ambrosia Lake and
Shiprock because of its decision to rely on Mr. Ferdinand's
statements that Title II costs will be lower. The HRC fails
to explain why it is justified in relying on the Ferdinand
estimates, which are conjectural and potentially biased data
and which do not include all environmental remediation costs.
instead of relying on known, but higher costs at Title I
reclamation-in-place reclamation. Indeed, the high cost of
reclamation-in-place at Ambrosia Lake and Shiprock
demonstrate that these costs should be a floor for what HRC
expects from the Atlas Site. Moreover, a careful comparative
analysis of these Title I sites is likely to lead to the
conclusion that site-specific factors made these two sites
significantly more costly than the costs to be expected at the
Atlas Site.

Fifth, in its summary of its cost comparison, the HRC
admits that it has conducted a comparison that does not
control for site-specific factors. (DEIS, p. 5.2.) Thus,
despite failing to undertake an analytical approach to
testing the accuracy of Atlas' estimate, the HRC, without
bases in science or mathematics, improperly concludes that
Atlas' cost comparison is valid.

Sixth, the HRC seeks to justify its faulty conclusions
by relying on outdated data. The HRC fails to explain why
comparison to generic costs developed sixteen years ago
provide any support for the acceptance of Atlas' cost
estimates. The HRC also fails to explain which actions in
these generic EIS are the same as those proposed to be
undertaken by Atlas and why, therefore, the generic EIS has
any relevance. Atlas should be required to provide current
cost data, in 1996 dollars, discounted to present value,
using current discounting factors (not OMB's 1992 discount),
as the basis for its cost estimates. Again, the HRC has
failed to undertake a true cost comparison, relying instead
on outdated and unexplained data.

Finally, the HRC cost comparison fails in that it does
not and cannot analyze the costs of activities for which
Atlas has not prepared cost estimates. For example, Atlas
has recently stated that it will no longer obtain rock from
Castle Valley. However, the costs of rock transport are a
significant factor in Atlas' estimates. The HRC's strict
rock durability requirements have forced DOE to haul rock as
much as 20 miles at Title I sites (e.g., the City, Texas).
(Similarly, DOE was required to haul rock 70 miles to the
Green River, Utah site.) Atlas has not determined where it
will obtain its rock, or the transport costs for that rock.
Nor has Atlas allowed HRC or any other agency to evaluate the
environmental cost of that borrow activity. Similarly, HRC's cost comparison does not evaluate the cost
to Atlas or to the environment of the corrective action plan
for groundwater or surface water. Without these numbers
available for study by the HRC, other government agencies.

Joseph J. Holomich
April 29, 1996
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and the public. NRC's cost comparison and, hence, its purported cost-benefit analysis is premature and incomplete.

B. The Inadequate Analysis of Quantifiable Socioeconomic Impacts.

In a single, three-sentence paragraph, the NRC dismisses any serious attempt to quantify and analyze the socioeconomic impacts of the Atlas proposal. Without any data or reference material to support its conclusions, the NRC states that neither the Atlas proposal nor the Plateau Site Alternative would have any long-term socioeconomic effect. The NRC's conclusion flies in the face of logic and public testimony regarding the expected severe, long-term detrimental impact of the Atlas proposal. Despite the growing residential community and increased tourism business which now is sustaining Moab economically, the NRC fails to consider the effect on residential growth and the tourist economy of the permanent presence of a large radioactive waste pile on the banks of the Colorado River, across the street from a national park, and within 14 miles of residential development. Indeed, NRC fails to take a single step to quantify the impact of Atlas' proposal on these and other socioeconomic interests. It is widely accepted in the scientific analytical community that socioeconomic impacts can be surveyed and measured. As a basic first step, an independent, unbiased consultant should be retained to conduct a study of the impact of Atlas' proposal on the socioeconomic fabric of the Moab area. This study then can be used to quantify the long-term impact that NRC dismisses as non-existent. Without this type of study, NRC's cost benefit analysis is neither analytical nor sufficient.

C. The Mislabeled and Inadequate Cost-Benefit Summary.

As the final step in its purported cost-benefit analysis, the NRC prepared a summary comparison of the costs of the Atlas proposal and the Plateau Site Alternative. This summary is rife with unsupported and inaccurate conclusions regarding the environmental effects of the Atlas proposal. For example, NRC concludes that no cost would occur because Atlas' tailings leachate does not affect groundwater. Furthermore, this conclusion fails to consider that groundwater from the tailings will flow to the Colorado River, thus directly impacting the environment. In addition, this conclusion fails to consider whether, in the future, absent the Atlas contamination, the groundwater would be used by the growing residential and commercial population. Similarly, NRC's conclusion that contamination of surface water, aquatic biota, and wildlife is nonexistent is not supported by any scientific study. Indeed, the NRC has no idea at this juncture what that contamination will be because, despite Appendix A, Criterion 5, the NRC has not required Atlas to address groundwater or surface water contamination as part of its reclamation proposal. Thus, NRC's conclusion that there is no economic impact from Atlas' proposal is based on a faulty and illogical assumption that, because contamination is currently unknown, its costs are non-existent. The NRC should require Atlas to address the remediation of groundwater and surface water as part of its reclamation plan now, and not allow these significant environmental costs to be ignored.

In sum, the NRC's cost-benefit analysis crystallizes the significant weaknesses of the analysis displayed throughout the draft EIS. The NRC fails to conduct a rigorous, scientific analysis of environmental costs. The NRC's analysis is incomplete because it has allowed Atlas to delay a revelation of the true environmental impacts of its proposal. Moreover, the NRC fails to quantify the long-term environmental costs of the Atlas proposal to the Moab community.

The sole basis for the NRC's conclusion that the Atlas proposal is environmentally acceptable is NRC's decision that the environmentally preferred alternative is too expensive for Atlas to perform. Given that cost is the sole basis for the NRC's conclusion, a more rigorous, scientific, and thorough evaluation of costs -- to Atlas, to the public, and to the environment -- is required before a conclusion can be reached on whether the Atlas proposal is acceptable under NEPA.

VI. Conclusion: The NRC Has Failed to Comply with NEPA's Requirements.

The NRC has a statutory and regulatory obligation to comply fully with NEPA, to take a hard look at the environmental impacts of the Atlas proposal, and to ensure that the public health and safety of the Grand County community is safeguarded. The DEIS, if adopted by the NRC, would violate those obligations.

As the Grand County Council has repeatedly demonstrated in these comments, the NRC appears determined to sanction Atlas proposal without full or fair consideration of all of the facts. The NRC's "rush to judgment" is best exemplified by its acknowledged failure under NEPA to obtain and consider comments received from other agencies with specialized expertise in the effects of the Atlas proposal on the environment. (42 U.S.C. § 4332(1), 40 C.F.R. §§ 1503.1(a)(1) and 1503.4(d).) Most notably, although the NRC has agreed to use the National Park Service as a consulting agency, it has
In addition to ignoring the requests of a consulting agency, the NRC has not indicated that it has consulted at all with DOE, the U.S. Environmental Protection Agency, the U.S. Department of Transportation, the Bureau of Land Management, or the U.S. Army Corps of Engineers. Perhaps the most notable agency which has not been consulted is DOE. DOE must be consulted as an interested agency because, when Atlas completes the reclamation, DOE will become responsible for monitoring the site and coping with any failures or environmental consequences. Indeed, the NRC even uses DOE's long-term maintenance responsibilities as an excuse for not analysing certain long-term environmental impacts. (See, e.g., DEIS, p. 4-15.) Similarly, the NRC apparently has failed to include the State of Utah in the consultation process. Moreover, although the Fish and Wildlife Service has been designated a consulting agency, the DEIS does not include any report, analysis, or interpretation of that agency's review. This failure to consult with or rely upon the judgment of these other responsible agencies has already undermined the NRC's credibility and, more importantly, violates the NRC's fundamental legal duties.

On a broader level, the NRC also has failed to consider the environmental impacts of this Title II reclamation site in a manner consistent with its own regulatory experience and requirements. The NRC's oversight of Title II reclamation projects generally has demanded a conservative approach, using environmental concerns as the driver for all regulatory approvals. At Atlas' Title II site, which in many respects imposes the same, albeit magnified, environmental hazards as the Title I sites, the NRC suddenly is abandoning its environmental protection and public health and safety obligations. Rather than have environmental concerns drive the acceptability of the Atlas reclamation plan, Atlas' finances have become the deciding factor in the NRC's decision-making. The NRC fails to explain why the Moab community is entitled to less environmental protection because of the mere fortuity that this waste pile is privately and not publicly owned.

The NRC has concluded that, despite its judgment that the Plateau Site is "environmentally preferable" (DEIS, p. 2-26) and despite the significant long-term environmental damage which it admitted will be caused by the Atlas proposal, the Atlas plan is "acceptable with respect to environmental costs and benefits." (DEIS, p. xxv.) The sole basis for this conclusion is the NRC's unsubstantiated conclusion that Atlas should not have to pay for the environmentally preferable alternative.

The NRC's abdication of its responsibility to protect the public health and environment with respect to privately owned radioactive waste sites is dangerously apparent. Rather than fulfill its mandatory obligations in an objective and unbiased manner, the NRC in the DEIS promotes the business interests of Atlas. Without adequate analyses or facts, the NRC would like the people of Grand County to assume that all will work out in the end and that we should simply trust the NRC's judgment that the Atlas pile presents no current or future harm. The message of the NRC to Grand County appears to be: "Trust us; we know what we are doing." Unfortunately for the NRC, the NRC has not earned such unquestioned trust from the people of Grand County. For example, the NRC's attempt to approve Atlas' original reclamation plan, with only the most minimal NEPA analysis, is evidence of the NRC's overriding commitment to appeasing Atlas at any cost to the public and to the environment.

As a result of these and other public comments, Grand County Council sincerely hopes that the NRC seriously reconsider its actions thus far, and decides to conduct a NEPA analysis worthy of the NRC's obligations to the public and to the environment.

Respectfully submitted,

GRAND COUNTY COUNCIL

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Dr. Hyron Fliegel  
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Dear Dr. Fliegel:


The Metropolitan Water District of Southern California (Metropolitan) appreciates the opportunity to submit written comments on the "Draft Environmental Impact Statement Related to Reclamation of the Uranium Hill Tailings at the Atlas Site, Moab, Utah" (DEIS), and the "Draft Technical Evaluation Report for the Proposed Revised Reclamation Plan for the Atlas Corporation Moab Hill" (DTER). Comments were requested in the Federal Register, January 30, 1996, Volume 61, Number 20, Pages 3054-3059. Metropolitan is the water agency responsible for meeting the supplemental water requirements of over 16 million people in portions of six California counties and the economy which supports them. Metropolitan provides more than half the water consumed in its 5,200 square mile service area on the coastal plain of Southern California from the international boundary with Mexico north to Oxnard. In 1995, Colorado River water was used to meet the majority of these supplemental needs.

Metropolitan is concerned whenever there is a potential for contamination of its water supply. Please see the specific comments of water quality concern attached. In this proposed project, Metropolitan has identified a number of unanswered questions that need to be addressed to determine if contamination is occurring and to what extent it may occur in the future.
a. Are certain faults in the area capable of generating earthquakes and could the earthquakes offset the erosion protective barrier, and is there a potential for a landslide at the site?

b. When will the formal revisions to erosion protection features and the overall riprap design be submitted and available for public review?

c. When will additional data on groundwater flow direction be submitted and available for public review?

d. When will data showing that the groundwater data are representative of the groundwater contaminated by the tailings be submitted and available for public review?

Metropolitan strongly believes that protection of its source supplies is critical to ensure safe drinking water to its millions of downstream consumers. Therefore, any actions to degrade our source water quality are not condoned. Every effort should be made to remove or prevent any contamination of the Colorado River water supply.

Very truly yours,

Mark D. Beuhler
Director of Water Quality

cc w/attachment:
Mr. Gerald R. Zimmerman
Executive Director
Colorado River Board of California
770 Fairmont Avenue, Suite 100
Glendale, California 91203-1015


11-1  Metropolitan believes that no contaminants should enter its source water from a known point source. Therefore, every effort should be made to remove or prevent any contamination of the Colorado River water supply.

11-2  Metropolitan believes that a number of unanswered questions need to be addressed to determine if contamination is occurring and to what extent it may occur in the future.

11-3  Metropolitan believes that the Nuclear Regulatory Commission (NRC) should resolve the open issues with the Atlas Corporation (Atlas) before obtaining final input from the public and other affected entities and before making a final decision on the license amendment. Once these issues are resolved, complete draft documents should be made available for public review and comment. Until that time, adequate input cannot be provided.

11-4  Concerning the contaminated groundwater, Metropolitan believes the corrective action plan should be part of the tailings reclamation plan. Tailings leachate enters the groundwater (and the Colorado River via the groundwater) and will continue to add contaminants to the Colorado River. This addition of contaminants will have a cumulative adverse impact on downstream water quality. It is not clear how the groundwater will be treated and the possible impacts this would have on Colorado River water quality in the future.

11-5  Metropolitan is concerned that concentrations of compounds and radioactive particles such as uranium and gross alpha, in addition to ammonia, molybdenum, cobalt, vanadium, and
other micronutrients from the leachate will cause water quality standards to be exceeded and/or cause an increase in biological growth potential. An increase in biological growth, with the subsequent formation of organic matter will result in possible taste-and-odor compound formation and disinfection by-products formation upon treatment.

6. The rate of groundwater transport (after reclamation) of contaminant bearing tailings leachate to the river appears to be inconsistently reported in the documents. The DEIS, page 4-33, states an existing rate of about 95 L/min. In Appendix F of the DEIS, page 36, the rate after reclamation is stated to be 'perhaps one-half of the existing rate.' This implies 95 L/min divided by two, whereas the DTMR page 5-23 states a rate of 30 L/min. In either case, contaninants will continue to be added to the river.

7. Concerning a tailings pile failure resulting in 20 percent of the tailings plus entrained liquids entering the Colorado River during high flow, the DEIS states on page 4-27 that the fines, clays, and silts would mostly settle to the bottom of Lake Powell and ‘Contaminants in the tailings liquids would eventually enter Lake Powell, but an unknown amount would remain in solution or colloidal suspension and continue downstream past the dam.’ This potential quantity of contaminants is of concern to Metropolitan. Metropolitan has been monitoring the gross alpha concentrations at Lake Mead and Lake Powell for over seventeen years. A slight increase over time is apparent, except for the low values observed during the mid-1980s during Colorado River high flow conditions.

8. Long-term maintenance and monitoring should be addressed in the plan to avoid the situation addressed in DEIS Section 4.5.2.4 concerning post-reclamation. Seepage of rainwater through the pile caused by a ‘Lack of cover maintenance, burrowing animals, and the presence of vegetation (i.e., roots)...’ is considered by Metropolitan to be an unacceptable scenario. In addition, DEIS Section 4.5.2.4 states that ‘Periodic Colorado River flooding would raise the groundwater level within the tailings pile above its base. Receding groundwater after the flood would contain dissolved constituents from the tailings pile.’

9. From the readily available information, the size of the mixing zone discussed in various sections of the documents is not apparent. For example, the DEIS states on page 4-30 that ‘The available data do not indicate that the existing tailings pile has more than a minimal impact on the water quality of the Colorado River beyond a small mixing zone near the bank.’ The mixing zone needs to be better defined for review by the public. Also, a monitoring program should be established to determine the impact of the tailings on water quality in the Colorado River in the immediate vicinity of the tailings pile. If new data are available, these should be made available to the public. It is premature to make the statement in the DEIS, page 4-30, that ‘leaving the pile in place would therefore have little adverse impact.’

10. When comparing upstream and downstream values for various constituents, the DEIS Section 4.5.3.4 on post-reclamation (pages 4-24 and 4-25) states that ‘Several constituents at least occasionally exceeded state water quality standards for protection of aquatic life-cadmium, copper, lead, mercury, zinc, ammonia, gross alpha, and gross beta. Of these, only gross alpha averaged higher than the standard: 0.59 Bq/L (16 pCi/L) at the downstream station versus the state standard of 0.56 Bq/L (15 pCi/L).’ Also DEIS page 3-29 states that ‘Under extreme low flow conditions in the river (i.e., flows near record lows), gross alpha radioactivity would be likely to exceed the state water quality standard.’ Importantly, the upstream and downstream data in Table 4.5-1 of the DEIS document show a slight increase from 13 pCi/L to 18 pCi/L, respectively, and the 16 pCi/L exceeds the current drinking water maximum contaminant level (MCL) of 15 pCi/L. Similarly, the range of gross alpha levels were substantially higher downstream as compared to upstream. Metropolitan cautions it significant when an MCL is exceeded. Also, it is not clear whether the gross alpha data presented in the document include the counting error for the gross alpha analytical measurement. The California Department of Health Service requires all reporting utilities to add the counting error to the gross alpha concentration (activity) to determine compliance with the MCL.

11. There are problems with the reporting of the values in pCi/L in DEIS Table 4.5-1. In some cases, it appears as if the values are in Bq/L rather than pCi/L. There are also similar problems in DEIS Table 4.5-3. Also in DEIS Table 4.5-1, some of the detection limits of the various constituents are too high to be meaningful for drinking water applications (e.g., arsenic and lead).

12. In terms of long-term surveillance and control, criteria 9 and 10 of 10 CFR 40, Appendix A (as shown on DTMR page 7-7), require financial surety to ensure sufficient funds to cover reclamation, long-term surveillance, and control. There is currently a surety of $6.5 million and a standby trust. Within three months of approval of the reclamation plan, Atlas would be required to submit a revised cost estimate. If the revised cost estimate exceeds the existing financial surety, a new surety would be required within three months. The plan should address the consequences if the surety is not obtained.
The Town of Castle Valley requests that a more thorough DEIS be prepared, which would include information not addressed in the current DEIS. We support the NRC in taking the necessary time to gather pertinent information to compile a comprehensive DEIS, as we are certain that it is imperative to be on track with accurate and complete information during the decision making process.

Areas to be addressed:

12-1) Plateau Site vs. Cap-in-place options: DEIS presented low cost estimates for capping-in-place, from outdated resources, yet projected extremely high figures to move the tailings pile - above known cost comparisons from exiting and completed similar projects.

12-2) Health and Safety Criteria (Appendix A): The DEIS preferred option only meets four (4) out of twenty (20) of the established criteria for health and safety. Is it not irresponsible to identify a preferred option, which fails to meet such valid criteria as:
   - A) Maximize remoteness to populated areas.
   - B) Hydrologic and other natural conditions promote immobilization and isolation of contaminants.
   - C) Prime options for disposal of tailings is placement below grade.
   - D) Embankment and cover slopes must be relatively flat after final stabilization.
   - E) Design standard for tailings disposal is the primary groundwater protection standard imposed by the EPA.
   - F) Unless exempted, surface impoundments must have a liner.

12-3) There are over twenty (20) major open issues not addressed, and information provided is lacking and incomplete.
   - A) Expense to the State of Utah and Grand County to maintain and resurface roads used to transport capping material are not included or addressed.
   - B) Samples taken at the site were inadequate and did not provide a fair evaluation of contamination. An earnest effort was not made to obtain this information.
   - C) Flood impacts to the pile, capping stability and the ecosystem of the Colorado River were not adequately addressed.

12-4) A major concern is the continued contamination of ground water. Atlas has not been able to reduce the levels of existing contamination, and no plan of action is presented in the DEIS. Since Atlas has not been able to deal with this serious situation yet, it is difficult to imagine that a solution will be provided at a later date from them.

We are asking you to allow for sufficient information to be compiled, in order to provide a basis from which an intelligent and informed plan of action can be supported.

Thank you for your time, and please know that we are totally behind your efforts to proceed in a responsible manner, on behalf of the many lives that are greatly at risk in the upcoming decisions regarding the Atlas Project.

Sincerely,

[Signature]

Lea M. Oliver,
Castle Valley Town Clerk
Dear Chief, High-Level Waste and Uranium Recovery Projects Branch,

This letter is in response to the D.E.S.I. having to do with the Atlas Mill cleanup in Moab, UT. I have read over the drafts NUREG-1531 and NUREG-1532 and what concerns me more than the probability that the 10.5 million tons of toxic nuclear waste will not be moved off site is the fact that the adjacent property owners lands are not included in the cleanup.

I am aware of the open issues dealing with possible ground water contamination of the adjacent property to the south (page 5-8 of NUREF-1532) which I am the managing owner partner of. In addition 44 years of wind blowing contamination on to our property should also be looked into, and cleaned up if needed so that our land can be possessed for unconditional use and the value of our property be restored.

Please respond to me so that I may relay any information to the partnership which owns the land bordering Atlas to the south.

Thank You

Don Pollicaro
President

cc: Moab Land Partnership

ATLAS CORPORATION

Comments on Draft Environmental Impact Statement (NUREG-1531) and Draft Technical Evaluation Report (NUREG-1532) Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah

License No. SUA 917, Docket No. 40-3453

Presented to the U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Moab, Utah
February 28, 1996

My name is Richard Blubbaugh. I am the Vice President of Environmental and Governmental Affairs for Atlas Corporation. I am presenting these comments on behalf of Atlas, and appreciate the opportunity to come before this panel and the citizens of Moab and Grand County to do so. It is always a pleasure to visit the birthplace of my daughter, a place where my family and I once lived very happily.

Atlas Corporation, a publicly traded company, was the operator of the subject uranium mill from 1962 to 1984, when it was placed on standby. Atlas is no longer involved with uranium except for reclaiming the mill and tailings site near Moab. Currently, Atlas is a gold mining company with its only mine on standby; Atlas is in the process of forming a U.S. firm traded on the NYSE. There is no plan to break off the uranium liability portion into a separate company, contrary to recent rumors.

Atlas has never attempted to avoid its reclamation responsibilities, but rather has always responded to NRC inquires or requirements to modify its plans to satisfy NRC standards. Atlas has conducted successful reclamation in several western states and has received recognition for its outstanding reclamation work from several sources, including the states of Colorado, Utah and Oregon.

Atlas has a good compliance record and has updated and upgraded its reclamation plans as required by NRC. Atlas has cooperated with the NRC, the State, the National Park Service, Grand County and others to address a series of issues raised by commenters on the FONSI. These issues have been addressed in depth by recognized experts at considerable cost. Since this forum is not appropriate for detailed discussion of these issues, Atlas has arranged for these experts to be available for those who are interested in the details on March 19 at the Senior Citizens Center here in Moab. They will explain their methods, findings and
Thank you for the opportunity to comment on the draft document.

The proposal to create a new park in the area is a welcome addition to the community. The park will provide a much-needed green space for residents and visitors alike, offering a variety of recreational opportunities and promoting environmental education.

However, there are several concerns that I would like to address. Firstly, the location of the park is relatively close to the existing residential areas, which could potentially lead to increased traffic and noise pollution.

Secondly, the proposal mentions the creation of a new trail system, but there is a lack of detailed information about the design and maintenance of the trails. It is important to ensure that the trails are accessible to all users, including those with mobility issues.

Lastly, the budget allocated for the park's construction and maintenance is insufficient. It is crucial to allocate adequate funds to ensure the long-term sustainability of the park and its programs.

I urge the planning committee to consider these concerns and make necessary adjustments to the proposal.

Thank you for your attention to these issues.
April 29, 1996

Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
High-Level Waste and Uranium Projects Branch / Mail Stop: TWFN-1-PY
Division of Waste Management / Office of Nuclear Material Safety and Safeguards
Washington, DC 20555-0001

Re: License No. CUA-917, Docket No. 40-3453 -- Responses to Draft Environmental Impact Statement (DEIS) and Draft Technical Evaluation Report (DTER)

Dear Mr. Holonich:

Attached herewith are Atlas' responses to the DEIS and DTTER noticed for public comment January 30, 1996 which pertain to the reclamation of Atlas' uranium tailings site near Moab, Utah. These responses have been prepared with assistance of counsel, Shaw Pittman Potts and Trowbridge. Due to the number and complexity of the comments, Atlas reserves the right to replace or to issue errata if minor revisions are deemed appropriate after further review.

What began as a "fast-track" NEPA process in March 1994 has become a rather lengthy and costly NEPA process. We are hopeful that your staff's review of the public comments, including our responses submitted herewith, will be as expeditious as possible. We are confident that your final decision in this matter will reflect the collective facts, information and expert opinion that has been brought to the forefront in this very exhaustive analysis. We look forward to receiving the record of decision as soon as possible so that we can begin the contractual process and subsequent implementation of the proposed reclamation plan.

We appreciate the opportunity to provide these responses. We trust they will be duly considered in the final analysis and decision. Please contact me at your convenience if you have any questions concerning the enclosed responses.

Sincerely,

Richard E. Blubaugh
Richard E. Blubaugh
RESPONSE OF
ATLAS CORPORATION
TO THE
NUCLEAR REGULATORY COMMISSION'S
DRAFT ENVIRONMENTAL IMPACT
STATEMENT RELATED TO RECLAMATION OF THE
URANIUM MILL TAILINGS AT THE ATLAS SITE,
MOAB, UTAH (NUREG-1531, JANUARY 1996)
AND
DRAFT TECHNICAL EVALUATION REPORT
FOR THE PROPOSED REVISED RECLAMATION
PLAN FOR THE ATLAS CORPORATION MOAB MILL
(NUREG-1532, JANUARY 1996)

April 29, 1996

EXECUTIVE SUMMARY

The Nuclear Regulatory Commission (NRC) has issued a draft environmental impact statement (DEIS) evaluating the environmental ramifications of Atlas Corporation's (Atlas') proposed reclamation plan for its uranium mill tailings facility in Moab, Utah. The proposed reclamation plan calls for the on-site stabilization and disposal of the uranium mill tailings pile at the Moab site. At the same time that the DEIS was issued, NRC also released a draft technical evaluation report (DTER) for the Atlas proposal. The DTER evaluates the engineering aspects of the proposed reclamation plan, to assure that the plan will satisfy the applicable technical requirements set out in NRC's regulations. NRC, in its DEIS, concludes that Atlas' proposal for on-site disposal is environmentally acceptable, subject to certain technical conditions. Atlas agrees with that conclusion.

The DEIS for Atlas' proposed reclamation plan was prepared by NRC pursuant to the National Environmental Policy Act (NEPA). NEPA requires that agencies take a "hard look" at the environmental implications of their actions before they undertake any action that may significantly affect the environment. NEPA does not dictate a specific result from this "hard look." Thus, the course of action that is eventually chosen by an agency at the end of a NEPA review need not be the "environmentally preferred" alternative; rather, it must simply reflect an adequate consideration of the relevant environmental issues.

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developed extensive radiation reduction techniques and strategies to minimize the contamination from the DENV2 virus. This included measures such as the placement of screens on windows and doors, and the use of insect repellent. The results of these efforts show a significant decrease in the contamination levels, with the majority of the radiation reduction measures proving effective. The overall radiation levels have been significantly reduced.

The protocol outlined in the previous section is required to be followed at all times. In addition, the use of personal protective equipment (PPE) is mandatory. All personnel working with the DENV2 virus must wear PPE, including gloves, masks, and lab coats. The protocol also requires the implementation of strict cleaning and disinfection procedures to prevent the spread of the virus.

The contamination issue has also been addressed at the facility level. Regular monitoring and testing are conducted to ensure the safety of all personnel. In the event of any contamination, the affected area will be immediately quarantined, and all personnel will be decontaminated.

In conclusion, the objective of this study was to determine the effectiveness of the implemented radiation reduction measures. The results indicate that the measures were successful in reducing the contamination levels. The protocol outlined in the previous section is recommended for use in similar situations. The implementation of strict cleaning and disinfection procedures, along with the use of personal protective equipment, has been effective in preventing the spread of the virus.

The facility is currently working on implementing additional measures to further reduce the contamination levels. These efforts include the development of new protocols and the installation of additional radiation reduction equipment. The facility is committed to ensuring the safety of all personnel and the continued success of the research project.
seepage from the tailings pile entering the river, that level of uranium that would result in the river would be less than 0.1 pCi/L, which is a factor of 300 lower than EPA's proposed drinking water standard for uranium of 30 pCi/L, and the resulting dose would be less than 0.0002 mSv/yr, which is 5,000 time less than the dose limit established by NRC of 1 mSv/yr.

Geology, Soils and Seismicity

The DEIS concludes that the Atlas tailings pile design is believed to be more than adequate to withstand the maximum credible earthquake that would be experienced in the area. As the DEIS notes, the Atlas site is located in a region that is among the least active, seismically, in the United States. The Moab fault, which may run underneath the tip of one corner of the tailings pile is not believed to be a capable fault, is not believed to have experienced movement in at least the past 35,000 years (or repeat movement in at least 500,000 years), and, therefore, does not pose a significant earthquake threat to the tailings pile. State-of-the-art probabilistic analysis also reveals that the likelihood of significant ground motion in the area of the tailings pile is quite small, and that peak horizontal ground acceleration in the area is not likely to exceed 0.07g with a 1,000 year return period.

The best available scientific evidence indicates that salt dissolution in the area of the Atlas site may be sufficient to cause some subsidence; however, the rate of subsidence in the area would be sufficiently small so that any subsidence that might occur over the 1,000 year design life of the tailings pile would be insufficient to threaten the stability of the pile. Also, although the available evidence indicates that soil liquefaction is a theoretical possibility in the area of the tailings pile, instances of liquefaction are predicted to be rare and at depths that are sufficiently great so as not to pose a threat to the integrity of the pile. A recent study notes that more substantial liquefaction could occur in the area of the pile, if a major (magnitude 5.5) earthquake occurred simultaneously with a substantial flood on the Colorado River. However, the study authors calculate that the likelihood of these two events occurring simultaneously is exceedingly small, with a return period of 1,250,000 years. Thus, liquefaction does not present a threat to the stability of the tailings pile under the on-site disposal option.

Air Quality

The DEIS concludes that dust control at the Atlas site should allow reclamation to occur on site, without violating any air quality standards. This conclusion makes sense, since the mill was able to meet applicable particulate standards during operations, when considerably more particulates were generated. In addition, the off-site disposal option would likely result in more substantial air quality impacts, since they would involve substantially more material handling, significant movement of tailings -- both within and beyond site boundaries -- and fugitive dust being emitted from two sites rather than one.

Land Use

Portions of the Atlas site may ultimately be released for unrestricted use under both the on-site and off-site disposal options. However, under the off-site disposal option, it may be at least 25-30 years before any portion of the Atlas site could be released for unrestricted use, because of groundwater treatment requirements that might not apply to the on-site disposal option and because of recontamination of the site that will result from the movement of tailings.
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"confirmatory" items. These confirmatory items simply require an update to the reclamation plan to incorporate revisions that have already been agreed to by NRC and Atlas.

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a NEPA review need not be the "environmentally preferred" alternative; rather it must simply reflect an adequate consideration of the relevant environmental issues.

The current proceeding is the latest in a series of NEPA reviews that NRC has conducted regarding the on-site disposal option for the Atlas mill tailings site. NRC first reviewed the option for on-site disposal in 1979, as part of an EIS prepared in connection with the renewal of Atlas' license. In that EIS, NRC concluded that the tailings pile could be stabilized in place. Subsequently, Atlas submitted a reclamation plan for the site, based upon the on-site disposal option. NRC prepared an environmental assessment (EA) for the plan and issued a finding of no significant impact (FONSI). (The Commission issued a second FONSI in 1993, after Atlas submitted a revised reclamation plan in 1992 to address new NRC requirements.) Later in 1993, however, the Commission withdrew its FONSI, and because of the controversy surrounding the issue, decided that preparation of an EIS would be appropriate. The DEIS in this proceeding was developed as a result of the Commission's decision to prepare an EIS for the reclamation plan.

The only issue that is before the Commission in this proceeding is whether Atlas' reclamation plan satisfies the statutory and regulatory requirements and standards that apply to reclamation of uranium mill tailings sites. The principal statutory provisions addressing the management and disposition of mill tailings are found in (i) the Atomic Energy Act (AEA) and (ii) the Uranium Mill Tailings Radiation Control Act (UMTRCA or the Mill Tailings Act), which amended and was a part of the AEA. The AEA directs the Environmental Protection Agency (EPA) to promulgate standards of general applicability for the regulation of potential environmental hazards associated with mill tailings. NRC is directed to issue site-specific requirements implementing the generally applicable standards developed by EPA. Both agencies have developed extensive regulations under the AEA governing mill tailings.

Several key principles are at the core of the statutory and regulatory scheme governing uranium mill tailings. These principles include the following: First, the standards and criteria developed under the AEA and enforced by NRC are to be applied on a site-specific basis. The statute specifically provides that licensees may propose alternatives to the already-existing, generic requirements enforced by NRC. NRC can adopt these alternative standards based on site-specific considerations, provided that the alternatives allow for an adequate degree of protection.

Second, the licensees is required to develop a reclamation plan that provides reasonable assurance that the applicable standards for tailings management and disposal will be satisfied over the longevity period of 200-1,000 years. The licensee is not required to demonstrate with scientific certainty or "beyond a reasonable doubt" that the criteria will be satisfied over the longevity period.

Third, already existing sites are not expected or required to satisfy the same standards and criteria that are imposed on new sites. In many instances it will be impractical or impossible for an already existing site to comply fully with later-developed criteria intended to apply to new sites (for example, criteria pertaining to the siting of a facility). In these instances the regulations contemplate that the existing site will not be subject to criteria intended to be applied to new sites.
Fourth, under the statutory scheme, title to the tailings disposal site (and the tailings contained therein) is to be transferred to the federal government (or to the state, at the state’s option) at the termination of the existing license following site closure. Title is transferred to the government for perpetual care and maintenance, pursuant to a license issued by NRC.

Fifth, the statute specifically directs NRC to balance economic costs and environmental and health benefits when regulating mill tailings. Thus, it is appropriate (indeed, required) that NRC evaluate the relative costs of on-site disposal versus off-site disposal when deciding whether to approve the Atlas reclamation plan.

Finally, regulatory and remediation actions taken with respect to inactive mill sites (which are regulated under Title I of the Mill Tailings Act) do not necessarily provide relevant precedent or guidance for actions taken with respect to active mill sites (which are regulated under Title II of the Mill Tailings Act). The history of Title I sites reveals that reclamation decisions for many, if not most, inactive sites were made shortly after the enactment of the Mill Tailings Act, using very conservative approaches to reclamation — including off-site disposal of tailings. However, unlike reclamation at Title II sites, these reclamation actions under Title I were implemented by the government (or by government contractors), since there were no licensees present at these sites. Significantly, with respect to relocation of Title I sites, NRC has no authority to propose that a tailings pile be moved; the Department of Energy (DOE) makes that decision. NRC only reviews the plans submitted by DOE for off-site disposal, to determine whether the applicable regulatory requirements are satisfied.

In addition to being bound by these statutory and regulatory principles, NRC’s evaluation of the Atlas reclamation plan should also be guided by relevant standards and methods developed by independent experts and advisory organizations. Principles developed by these experts that are relevant to NRC’s consideration of the Atlas reclamation plan include the following:

(i) Any proposed intervention (e.g., reclamation) should do more good than harm — that is, the reduction in detriment resulting from the intervention should be sufficient to justify the costs and any harms resulting from the intervention. In other words, an evaluation of a proposed intervention should analyze the net benefit associated with the intervention, looking not just at radiological risks but also non-radiological risks such as chemical hazards, mechanical hazards, and transportation activities. Thus, with respect to NRC’s consideration of the Atlas reclamation plan, the Commission must evaluate the risks associated with the proposed off-site disposal alternative (including risks associated with transportation, construction and other non-radiological hazards) and compare those risks with the risks associated with the on-site disposal option.

(ii) Evaluation of a waste management system should look at the performance of the system as a whole, not simply the performance of a single component. Thus, NRC’s evaluation of the Atlas reclamation plan should focus on the performance of the overall plan, rather than focusing on one aspect of the plan.

(iii) In predicting performance of site remediation mechanisms over long periods of time — from hundreds to a thousand years — it is impossible to achieve scientific certainty. In such circumstances it is appropriate to rely on performance assessments that provide reasonable assurance of the long term effectiveness of the remediation system.

Throughout the course of the current reconsideration of the Atlas reclamation plan, it has become clear that there are numerous issues related to NRC’s processes, the statutory and regulatory framework and the potential effects of Atlas’ reclamation plan on the environment that have either been misunderstood or mischaracterized by members of the local community, elected officials of Grand County, the National Park Service (NPS), and the State of Utah’s Department of Environmental Quality (UDEQ). At the outset, it is important to realize that:
The issues associated with both Atlas' on-site reclamation plan and the relocation alternative will be discussed more fully below. The consideration of the alternatives must be based on facts and sound scientific, technical and regulatory analyses. Emotional hyperbole, like assertions that the tailings pile is "radioactive jello," may provide a good sound bite for the nightly news but more likely obscures the real issues confronting NRC. The final decision on reclamation of the tailings pile will be based on the facts, existing law and regulations and not on how people "feel" or what they "believe" about the tailings pile. NRC must determine whether Atlas' proposed reclamation plan provides reasonable assurance that it will satisfy NRC's 10 C.F.R. Part 40, Appendix A criteria as applied to an existing site. In the final analysis, the use of NRC-approved engineering designs for the stabilization of the tailings pile on-site will provide the required reasonable assurance of long-term protection of public health and the environment.

Atlas has been proactive throughout the reclamation reconsideration process. Indeed, Atlas has gone out of its way to be a good corporate neighbor and has expanded its response to the NRC DEIS/DTER preparation process well beyond the basic requirements of the regulations. Most recently, to address the concerns of the Moab community and to explain the regulatory framework within which the issues associated with Atlas' proposed reclamation must be resolved, Atlas held a public meeting in Moab to give those concerned with the process and the technical issues the opportunity to directly confront those issues in a meeting involving Atlas officials and its technical experts.

Among those in attendance at the meeting were representatives from NRC, UDEQ, NPS, the Association for the Trees of Life, as well as a number of concerned citizens. The elected officials of Grand County, however, who have been among the most vocal in expressing opposition to Atlas' on-site reclamation plan and perceived failures in NRC processes, failed to attend this meeting. The principals of the Moab newspaper, The Times-Independent, also failed to attend the meeting. The failure of those who oppose the Atlas plan and those who provide a primary information delivery service to the citizenship of Moab to attend the meeting and participate in the ongoing public dialogue is regrettable. One cannot attack Atlas for failing to adequately consider issues raised regarding on-site stabilization versus relocation and then ignore the opportunity to have Atlas explain its conclusions and the bases for those conclusions. Some of the most highly qualified experts anywhere in the world were available at the meeting to address the analyses and conclusions and to answer any questions presented by those attending the meeting. Willful ignorance likely will not (and should not) impress NRC decisionmakers or others whose responsibilities require an awareness of the potential impacts of a major reclamation project on public health, safety and the environment in the State of Utah.

There are many legitimate issues of public interest and concern associated with NRC's reconsideration of the Atlas on-site reclamation proposal. Atlas has, and will continue to address...
all such issues. Atlas understands its responsibilities and has expended considerable time and 
resources to better understand the issues that have been raised regarding on-site reclamation.
Atlas and NRC have attempted to address misinformation, misconceptions and unwarranted 
concerns on the record in a forthright fashion. Those who wish to participate meaningfully in 
this process must similarly address the facts, the law and regulations and the technical design 
criteria in question. In the end, the primary question of relevance in this regulatory proceeding is 
-- Does Atlas' reclamation plan provide reasonable assurance that it will satisfy the technical 
criteria of 10 C.F.R. Part 40, Appendix A as they apply to an existing site, and the applicable 
statutory risk/cost balancing test which itself is consistent with the widely accepted reclamation 
goal of doing more good than harm.

II. BACKGROUND

A. Site History

Table 1 provides an overview of the site history for the Atlas site in Moab, Utah. A more 
detailed explanation follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940-56</td>
<td>AEC Uranium Buying Station Established at Site</td>
</tr>
<tr>
<td>1956</td>
<td>Uranium Reduction Corporation Built Processing Facility (Operation Under Direction of AEC, 1956-70)</td>
</tr>
<tr>
<td>1962</td>
<td>Atlas Purchased URC</td>
</tr>
<tr>
<td>1979</td>
<td>First EIS: NRC Reviewed 10 Options, Including Off-Site Disposal; NRC Approved On-Site Reclamation</td>
</tr>
<tr>
<td>1981</td>
<td>First Reclamation Plan</td>
</tr>
<tr>
<td>1982</td>
<td>Original Reclamation Plan Accepted by NRC</td>
</tr>
<tr>
<td>1984</td>
<td>Mill Placed on Standby (April)</td>
</tr>
<tr>
<td>1987</td>
<td>Decommissioning Plan Approval</td>
</tr>
<tr>
<td>1988</td>
<td>Atlas Revised Reclamation Plan Submitted (Jan.)</td>
</tr>
<tr>
<td>1992</td>
<td>NRC Issued ROE for Reclamation Plan (July)</td>
</tr>
<tr>
<td>1993</td>
<td>NRC Withdraws ROE and NOI for Reclamation Plan (Oct.)</td>
</tr>
<tr>
<td>1994</td>
<td>NRC Determination: Second EIS (March)</td>
</tr>
<tr>
<td>1995</td>
<td>NRC Issued Preliminary DTER (November)</td>
</tr>
<tr>
<td>1996</td>
<td>NRC Issued DEIS and DTER (January)</td>
</tr>
</tbody>
</table>
Under Title II of the Mill Tailings Act, NRC shares responsibility with the EPA for regulating 11a.2(2) byproduct material. For example, under section 206 of the Act (which added a new section 275 to the AEA), EPA is directed to establish standards of general applicability for the protection of health, safety and the environment from the potential hazards -- both radiological and non-radiological -- associated with the processing, possession, transfer and disposal of 11a.2(2) byproduct material.\textsuperscript{\textordfervent{18}} While EPA is directed to establish generally applicable standards for the protection of health and the environment, NRC is required to implement those standards with respect to individual licensees under the AEA. Thus, section 275(d) of the AEA provides that "[i]mplementation and enforcement of the standards promulgated [by EPA] pursuant to subsection b. of this section shall be the responsibility of the Commission in the conduct of its licensing activities under this Act."\textsuperscript{\textordfervent{19}}

NRC, in addition to implementing the health and environmental standards developed by EPA, is granted more general authority in AEA Section 84 (which was added by Section 205 of the Mill Tailings Act) to develop its own requirements for the management of 11a.2(2) byproduct material, to protect health, safety and the environment. Specifically, Section 84(a) directs NRC to ensure that any 11a.2(2) byproduct material is managed in a manner:

- (i) that the \textit{Commission} deems appropriate to protect health, safety and the environment from the potential radiological and non-radiological hazards associated with such materials;

- (ii) that conforms with the generally applicable standards developed by EPA; and

\textsuperscript{18} 42 U.S.C. § 2022(a)
\textsuperscript{19} 42 U.S.C. § 2022(d)

(iii) that conforms with general requirements established by NRC, comparable to standards applicable to similar hazardous materials regulated under the Solid Waste Disposal Act \textsuperscript{\textordfervent{20}}

Section 84(a) further provides that the Commission should take "into account the risk to the public health, safety, and the environment, with due consideration of the economic costs and such other factors as the Commission determines to be appropriate." As Congress explained in the legislative history of the Mill Tailings Act, as amended:

The conferences are of the view that the economic and environmental costs associated with standards and requirements established by the agencies [EPA and NRC] should bear a reasonable relationship to the benefits expected to be derived.\textsuperscript{\textordfervent{21}}

Thus, the statutory system applicable to Title II sites results in EPA and NRC regulating sites with 11a.2(2) byproduct material through NRC's implementation, on a site-specific basis, of the broader health and environmental standards developed by EPA and NRC.

Along with these general provisions governing the management of 11a.2(2) byproduct material, Section 83 of the AEA (which was added to the statute by Section 202 of the Mill Tailings Act) provides a more specific framework for regulating the long-term management and disposal of uranium mill tailings. The central feature of this statutory framework is the requirement that, prior to license termination, title to byproduct material and the land used for its disposal must be transferred to either the United States or to the state. Specifically, Section 83(a) provides that ownership of any 11a.2(2) byproduct material that resulted from a licensed activity

\textsuperscript{20} 42 U.S.C. § 2114(a)
C. Regulatory Framework

Acting primarily under the statutory authorities contained in the AEA, as amended by the Mill Tailings Act, EPA and NRC have developed a complex, interwoven system of regulations that governs the reclamation and closure of uranium mill tailings sites at Title II sites. The backbone of this system is found in two sets of closely related regulations: EPA's regulations at 40 C.F.R. Part 192 and NRC's regulations at 10 C.F.R. Part 40, Appendix A. As indicated previously, under the statutory scheme set out in the AEA, EPA promulgates standards of general application for protection of public health, safety and the environment from radiological and non-radiological hazards associated with uranium mill tailings, and NRC issues detailed requirements that conform to EPA's generally applicable standards.

As seen in more detail below, the system of regulations developed by EPA and NRC is guided by three key principles:

1. Where appropriate, the requirements governing the disposal of uranium mill tailings should be flexible enough to take into account relevant site-specific considerations;
2. Existing mill tailings sites should not be expected, or required, to satisfy the same standards that are applied to new sites;\(^2\) and

\(^2\) This principle -- that existing sites should not be required to satisfy the standards applied to new sites -- is also reflected in the legislative history of the Mill Tailings Act. In its report on the bill that would eventually become the Mill Tailings Act, the House Interior and Insular Affairs Committee explained that:

It is also the desire of the committee that the NRC and the States, in implementing new standards and regulations for mill tailings control, consider possible differences in applicability of such requirements to existing tailings disposal sites versus new sites. Specifications for tailings site selection and impoundment design, in particular, once implemented by a licensee, may be reversible only at great cost. In all cases such considerations must, of course, be weighed against the committee's requirement that the Commission regulate the maximum extent practicable in such a way that disposal sites for tailings

3. Because it is impossible to demonstrate with any degree of certainty that controls imposed on a mill tailings pile will remain effective over the long periods of time (hundreds to a thousand years) during which such controls will be required, it is sufficient, for purposes of compliance with the applicable regulations, to demonstrate that there is a reasonable assurance that the controls will be effective over the required time period. Scientific certainty that controls will be effective over the long periods of time contemplated by the regulations is not required.

These three principles are fundamental to the regulatory scheme governing mill tailings disposal, and they are repeated throughout the relevant EPA and NRC regulations. Because the primary focus for the Atlas site is on NRC's requirements, these comments begin with NRC's 10 C.F.R. Part 40, Appendix A criteria, rather than EPA's generally applicable standards (the usual starting point).

1. Appendix A / Part 192 Requirements

As indicated, the core requirements applicable to the reclamation and disposal of uranium mill tailings are found in NRC's regulations at 10 C.F.R. Part 40, and in the parallel set of regulations promulgated by EPA at 40 C.F.R. Part 192, Subpart D. Under the NRC regulations, reclamation and disposal of mill tailings must comply with the criteria set out in 10 C.F.R. Part 40, Appendix A. These Appendix A criteria contain technical requirements for reclamation and closure, financial surety requirements, surveillance requirements, and requirements pertaining to site ownership and ownership of the tailings. At the outset, NRC notes in Appendix A that the

Footnote continued from previous page

Footnote continued on next page
requirements contained in the Appendix are to be applied on a site-specific basis, and that in place of NRC's generic already-existing standards, licensees may propose alternatives that are intended to take into account site-specific considerations.

In many cases, flexibility is provided in the criteria to allow achieving an optimum tailings disposal program on a site-specific basis. Licensees or applicants may propose alternatives to the specific requirements in this appendix. The alternative proposals may take into account local or regional conditions, including geology, topography, hydrology and meteorology.  

Moreover, the Commission acknowledges that in making a licensing decision based upon the criteria set out in the Appendix (or based upon alternatives proposed by the licensee), it is appropriate for the Commission to consider economic costs as well as impacts on health, safety and the environment.

All site specific licensing decisions made on the criteria in this Appendix or alternatives proposed by licensees or applicants will take into account the risk to the public health and safety and the environment with due consideration to the economic costs involved and any other factors the Commission determines to be appropriate.

Thus, when evaluating the adequacy of Atlas' on-site disposal plan and the degree to which that plan satisfies the criteria contained in 10 C.F.R. Part 40 Appendix A, it is important to keep in mind the flexibility built into the Appendix A standards, including the absolute right of the licensee to propose an alternative to any requirement. NRC in promulgating the criteria, and Congress in enacting the Mill Tailings Act, recognized that site-specific circumstances would effect and, indeed, should shape the cleanup process.

Finally, as NRC acknowledges, it may not be appropriate to impose the same standards on existing sites as are required for new sites. NRC explains that "[m]ost of the objectives for tailings disposal . . . were developed primarily in consideration of what can be done in prospective milling operations. Objectives related to siting and groundwater protection may not be met with the same degree of conservatism at existing sites as will be possible at new sites." Indeed, the "[r]egulations were developed recognizing that it may not be practicable to provide the same measures of conservatism at existing sites as can be provided at new sites, where alternatives are not limited." For example, although it may be appropriate to require existing sites to achieve certain minimum levels of protection of health and safety, "it would not be practicable, on the other hand, to line the bottom of an existing tailings impoundment. Also, objectives concerning remoteness from people and providing below-grade burials may not be met to the same degrees as an existing site as at a new site."

The specific requirements contained in Appendix A, and the corresponding provisions in EPA's regulations, are summarized below.

10 C.F.R. Part 40, Appendix A
Id
Id
a. Technical Criteria

Two of the key technical criteria in Appendix A pertain to groundwater protection and radon covers for mill tailings impoundments.

The groundwater criteria include both design and performance standards. The primary groundwater standard in Appendix A is a design standard calling for installation of a liner at the base of the impoundment to prevent the migration of tailings constituents from the impoundment into groundwater and adjacent soils.\(^\text{16}\) By its express terms, this criterion does not apply to "existing" portions of impoundments (highlighting the fact that existing sites are not necessarily expected to meet the standards that are applied to new sites).\(^\text{16}\) Since the Atlas tailings pile is an existing impoundment, under the provisions in Appendix A the requirement for a bottom liner does not apply in this case. (EPA's regulations at 40 C.F.R. Part 192 also require the use of a bottom liner. However, like the NRC groundwater standard, EPA's regulations specifically exempt "existing" portions of impoundments from this requirement.\(^\text{16}\)

The secondary groundwater protection standard contained in Appendix A requires that hazardous constituents from a tailings pile not exceed applicable concentration limits at the point of compliance for the site.\(^\text{18}\) For purposes of this requirement, a constituent is considered to be "hazardous" if it is listed in Appendix A, if it is reasonably expected to be in (or to be derived from) the tailings pile, and if it has been detected in groundwater in the uppermost aquifer at the site.\(^\text{19}\)

Under the regulations in Appendix A, NRC can choose from among three different standards when establishing concentration limits for hazardous constituents in groundwater:

1. The Commission can use the background level of the constituents in the groundwater, as determined by the Commission.
2. For certain contaminants listed in Appendix A, NRC can adopt the MCLs established for those constituents under the Safe Drinking Water Act; or
3. NRC can adopt a site-specific ACL for the constituent of interest.\(^\text{20}\) Under the groundwater protection standard, NRC can adopt an ACL only if it finds that the limit is as low as reasonably achievable (ALARA) and that the constituent will not pose a threat to human health or the environment at the ACL limit. When evaluating whether a constituent poses a threat to health or the environment for purposes of establishing an ACL, NRC is directed to consider a number of factors, including (i) the current and future uses of groundwater (and surface water) in the area, (ii) the existing groundwater (and surface water) quality, and (iii) the persistence and permanence of any potential adverse effects.

If the groundwater protection standards developed by NRC pursuant to Appendix A are exceeded, the licensee must put into operation a corrective action program (CAP) "to return

\(^{16}\) Id., Criterion 5A(1)
\(^{17}\) Id.
\(^{18}\) 40 C.F.R. § 192.32(b)(1), referencing 40 C.F.R. § 264.221
\(^{19}\) 10 C.F.R. Part 60, Appendix A, Criterion 5G(1)

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hazardous constituent concentration levels in groundwater to the concentration limits set as standards.\textsuperscript{44}

It should be emphasized that there is no suggestion in the regulations that any one of these three methods of establishing groundwater concentration limits — i.e., using background levels, MCLs or ACLs — is preferred (or less favored) for purposes of compliance with Appendix A; all three methods are equally valid under the groundwater protection standard. Consequently, in circumstances where NRC adopts an ACL for a particular contaminant, the Commission is not in any way deviating from its regulations or otherwise "exempting" a substance from regulation under the groundwater protection standard: the Commission is simply adopting one of three acceptable methods for establishing groundwater concentration limits under Appendix A.

EPA's regulations at 40 C.F.R. Part 192 outline a groundwater protection program that is substantially similar to the secondary groundwater standard set out in Appendix A, Criterion 5(B), allowing for ACLs. One difference between the two programs is that EPA's regulations appear to specify a method of determining the point of compliance for ACLs that is not contained in NRC's regulations in Appendix A.

The second key criterion in Appendix A requires the placement of an earthen cover over the tailings impoundment in order to mitigate radon releases. Under Criterion 6 of Appendix A, the design of the cover must limit emissions of radon-222 so as not to exceed a release rate of 20 pCivm/s, averaged over the entire pile. In addition, the design must provide reasonable assurance that this level of control will be achieved for 1,000 years, to the extent reasonably achievable, and in any event no less than 200 years (although this requirement does not apply to portions of the disposal site that contain an average radium concentration of not more than 5 pCi/g over the first 15 centimeters of soil and not more than 15 pCi/g in any successive 15 cm layer, when averaged over a 100 square meter area) (the 5/15 standard).\textsuperscript{45} Following completion of the radon cover, the licensee is required to conduct appropriate testing and analysis to confirm that releases of radon do not exceed 20 pCivm/s when averaged over the entire impoundment.

EPA's regulations in 40 C.F.R. Part 192 parallel the radon cover requirements in Appendix A fairly closely, requiring a permanent radon barrier to achieve a limit of no more than 20 pCivm/s, averaged over the entire surface of the impoundment. In addition, EPA, like NRC, requires that the design of the impoundment and radon barrier provide reasonable assurance that control of radiological hazards will be effective for 1,000 years to the extent achievable, and in any event no less than 200 years. Finally, EPA's regulations apply RCRA-like closure standards on non-radiological hazards associated with the mill tailings; NRC's regulations contain generally parallel provisions.\textsuperscript{46}

Appendix A also sets out general principles and objectives for the design and siting of tailings impoundments. According to the first criterion in the Appendix, the broad objective of the regulations is to permanently isolate the tailings without the need for ongoing active maintenance. To meet this objective, decisions on siting and design (including decisions regarding the adequacy of existing sites) are required to take into account (1) the proximity of the

\textsuperscript{44} Id., Criteria 5(D).

\textsuperscript{45} Id., Criterion 6

\textsuperscript{46} 40 C.F.R. § 192.320(b)(11), incorporating the standard at 40 C.F.R. § 264.111.
impoundment to populations; (ii) hydrologic and other natural conditions that might effect the extent to which tailings constituents can be isolated; and (iii) possible erosion effects or the effects of other natural forces over the long term. Also, Appendix A indicates that the "prime option" for tailings disposal is disposal below grade, although the Commission also acknowledges that in some instances below grade disposal may not be environmentally sound or practicable.\(^{88}\)

b. **Financial Criteria**

NRC's regulations in Appendix A also require that mill operators maintain financial surety arrangements to ensure that sufficient funds will be available to decontaminate and decommission the mill site and reclaim tailings disposal areas. In addition, the surety must cover anticipated costs for long term surveillance and maintenance, to the extent needed.\(^{89}\) EPA's regulations do not contain comparable requirements.

c. **Ownership Criteria**

The ownership criteria in Appendix A restate the requirement set out in Section 83 of the AEA, that upon license termination the federal government (or the state) must assume ownership and control of the mill tailings and the tailings disposal site -- with ongoing responsibility for monitoring the site and maintaining it, to the extent necessary. With respect to

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\(^{88}\) 10 C.F.R. Part 40, Appendix A, Criteria 1, 3

\(^{89}\) Id. Criteria 9, 10, 12

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the long term ownership of mill tailings and their impoundments, Appendix A provides, in Criterion 11, that:

Title to the byproduct material licensed under this Part and land, including any interests therein ... which is used for the disposal of any such byproduct material, or is essential to ensure the long term stability of such disposal site, must be transferred to the United States or the State in which such land is located, at the option of [the] State.

In addition, Criterion 12 provides that:

As a minimum, annual site inspections must be conducted by the government agency responsible for long-term care of the disposal site to confirm its integrity and to determine the need, if any, for maintenance and/or monitoring.\(^{90}\)

Thus, after the termination of Atlas’ license, the transfer of ownership of the tailings and their disposal site to the government will provide an additional level of assurance that the site will be appropriately monitored and maintained over the long term, to the extent necessary to continue to meet the performance standards set out in the Appendix A technical criteria.\(^{91}\) The license termination process is illustrated in Table 2.

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\(^{90}\) In addition, it will be recalled that under Section 83(b) of the AEA, NRC can require the federal agency or state having custody of the tailings to undertake monitoring, maintenance and any other actions that may be required to protect public health and safety and to comply with the standards promulgated by the Commission under AEA Section 84.

\(^{91}\) Where transfer of title to the tailings is required -- particularly in a case where long-term surveillance will be necessary -- it is virtually certain NRC would never waive the government ownership requirements as the State of Utah did the similar 10 C.F.R. Part 83 requirements for the Envirosure waste facility in Tooele County, Utah.
2. Other Pertinent Regulatory Provisions
   
ea. NRC Radiation Protection Regulations

   General radiation protection regulations promulgated by NRC may also be relevant to the
   reclamation and closure of the Atlas tailings site. These radiation protection regulations, which
   are found at 10 C.F.R. Part 20, apply to licensees under the AEA, including persons licensed to
   possess, transfer or dispose of 114.2(b) byproduct material. Briefly, the regulations in Part 20
   establish the following exposure limits:

   • For occupational exposure to individuals (not including planned special
     exposures): an annual limit of 30 effective dose equivalents (TEDE) or 50 rems for the sum of the deep dose equivalent and the
     committed dose equivalent to any individual organ or tissue, whichever is
     more restrictive. (In addition, soluble uranium intake is limited to 10 mg
     per week, due to chemical toxicity.)

   • For individual members of the public: the TEDE from the licensed
     operation may not exceed 0.1 rem in a year. In addition, the dose in an
     unrestricted area from an external source may not exceed 0.002 rem in any
     one hour, although the licensee may apply to NRC for authorization to
     operate up to an annual dose limit of 0.5 rem for an individual member of
     the public.

   b. NESHAPs Under the Clean Air Act

   As indicated earlier, EPA has promulgated several NESHAPs under section 112 of the
   Clean Air Act that are potentially relevant to the reclamation and closure of uranium mill tailings
   piles. First, EPA has promulgated a NESHAPS to regulate emissions of radionuclides other than
   radon-222 from NRC-licensed facilities, including uranium mill tailings piles prior to their

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10 C.F.R. § 20.1002
In general, this regulation provides that emissions of radionuclides from a covered facility may not exceed an amount that causes any member of the public to receive a TEDE of 10 mrem in a given year.  

EPA has also issued two NESHAPS for radon-222 emissions -- one standard that applies to non-operating (i.e., inactive) uranium mill tailing, disposal sites (Subpart T) and a second standard that applies to sites that are either operating or in standby status (i.e., active sites) (Subpart W).  Recently, EPA rescinded Subpart T as it applies to inactive sites licensed by NRC, finding that the Commission's standards under the AEA governing the management and disposal of uranium mill tailings protect the public health and environment and provide an "ample margin of safety." The Subpart T regulations provided that radon-222 emissions from non-operational mill tailings piles may not exceed 20 pCi/m³/s. The regulations in Subpart W apply the same limit -- 20 pCi/m³/s -- to radon-222 emissions from active mill tailings piles. Thus, the Subpart T and Subpart W limits are the same as EPA's standards under 40 C.F.R. Part 192 and NRC's standards 10 C.F.R. Part 40, discussed previously. Subpart W also contains work practice standards for disposal of tailings in lined tailings impoundments (i.e., these standards would presumably apply to the relocation alternative).

c. NRC's Proposed Rule on Decontamination and Decommissioning

In 1994 NRC issued a proposed rule to set standards for the decontamination and decommissioning of sites licensed under the AEA. Although these standards have not yet been promulgated in final form, the proposed rule provides useful guidance with respect to the standards that could be applied in evaluating proposals for the reclamation of licensed mill tailings facilities.

The proposed rule would establish risk-based limits on residual radioactivity at decommissioned sites, keyed to the TEDE that would be received by an average member of the "critical group" (the group of individuals expected to be maximally exposed). These risk based limits would be augmented by a requirement that residual radioactivity be reduced to levels that are as low as reasonably achievable (ALARA). Under the regulations proposed by the Commission, a site would be eligible for unrestricted use following decommissioning if the TEDE for the average member of the critical group is 15 mrem/yr or less from residual radioactivity distinguishable from background. In addition, the licensee would be required to demonstrate that residual radioactivity had been reduced to ALARA levels before the site would be released.

Significantly, the proposed rule would also permit a decommissioned site to be released for restricted use in instances where it would be unreasonable to reduce residual radioactivity sufficiently to achieve the 15 mrem/yr level required for unrestricted use. Specifically, release for restricted use would be permitted where achieving the 15 mrem/yr standard either would be
"not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm. Under the terms of the proposed rule, release of a decommissioned site for restricted use will be permitted if provisions are made for institutional controls that provide reasonable assurance that the TEDE from residual radioactivity will not exceed 15 mrem/yr, with reasonable assurance that a "fallback" level of 100 mrem/yr would be achieved in the event that institutional controls fail.

The proposed rule states that the decommissioning criteria would "apply to decommissioning of the facility but not to the disposal of uranium mill tailings or soil cleanup." Thus, there is a question whether the final rule would be applicable to a site after tailings removal. If, however, the 15 mrem standard were to be applicable to a site such as the Moab site, once the pile is removed, it is unlikely that any such site could be released for unrestricted use.

D. Expert Guidance On Decommissioning, Decontamination and Reclamation of Sites Contaminated with Radioactive Materials

In addition to the statutory and regulatory framework governing the reclamation of Title II uranium mill tailings sites like the Atlas site, there are recommended philosophies and systems developed by expert national and international scientific advisory organizations that provide further guidance for addressing the reclamation of radioactive materials. This section references pertinent guiding principles of groups such as the National Council on Radiation Protection and Measurements (NCRP), the International Commission on Radiological Protection (ICRP), the

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**HPS, "Scientific and Public Issues Committee Position Statement: Radiation Standards for Site Cleanup and Restoration," June, 1993, p. 7 ("Radiation Cleanup Standards"). HPS was formed in 1956 and "is a scientific organization concerned with the protection of people and the environment from radiation. Today, its membership numbers more than 6,400 and includes professionals representing all scientific and technical areas related to radiation protection drawn from academia, government, medical institutions, research laboratories, and industry from 50 states, the District of Columbia and Puerto Rico. The Society has more than 350 members in nearly 50 foreign countries. The Society is chartered in the United States as a nonprofit scientific organization, and as such is not affiliated with any governmental or industrial organization." Id at 10.
characteristics, e.g., if the subsurface soils are potentially liquefiable in an earthquake; (This issue remains under study by NRC. NRC experts are in the process of determining whether this issue has been addressed to the satisfaction of NRC's requirements.)

(4) There is an inability to achieve adequate groundwater protection at the site. (NRC found that the available data do not indicate that the existing tailings pila has more than a minimal impact on the water quality of the Colorado River beyond a small mixing zone near the bank, leaving the pile in place would, therefore, have little adverse impact." (DEIS p. 4-10). Moreover, "no use of groundwater occurs on the Atlas side of the Colorado River or in areas adjacent to the opposite side of the river. Therefore, the tailings constituents in the groundwater currently represent no hazard to public health." (DEIS, p. 4-15). Atlas has demonstrated that tailings discharge into the Colorado River would not pose any health risk.) The relocation of tailings is very expensive and time consuming when compared with in situ stabilization and often introduces new environmental concerns. If the new facility is away from the mine/mill site, an environmental impact assessment would be required to confirm the safety of the new site and the transportation of large volumes of contaminated material, possibly for long distances over public roads. Relocation should only be considered in cases where a comprehensive health/environmental and socioeconomic analysis indicates significant net benefit in comparison to in situ operations. 40

4. Performance Assessments

As explained above, the regulations for control of uranium mill tailings require "passive" controls for a minimum of 200 years and to the extent practicable for 1000 years. In deciding on this longevity standard, EPA and NRC utilized best engineering and scientific judgments, experience, expert literature, and knowledge of the facts and circumstances associated with uranium mill tailings to develop a generic performance assessment for the criteria that are presently set forth in 10 C.F.R. Part 40, Appendix A. These long term frames require the use of performance assessments to address potential impacts years or hundreds of years into the future.

As noted above, when attempting to evaluate performance of remediation alternatives, the disposal facility and its environment must be considered as a system - i.e., waste type and form, engineered barriers, near-surface geosphere and human environment (soil, surface waters, shallow aquifers, atmosphere, biota). The performance of the disposal system as a whole must satisfy the regulatory/environmental protection requirements. The performance of the various components and their importance may vary and thus may be adjusted (e.g., by design improvements/institutional controls) to compensate for differences in performance of other components. A fundamental prerequisite to effectively evaluating the potential performance of the system is an understanding of the relevant physical and chemical properties of the system based on site-specific data and operational experience. 41 The goal is to develop predictive models that can "bound" the behavior of the system. Long term predictions are necessarily based on extrapolations from known conditions wherein uncertainties are identified and quantified to the extent practicable. Sensitivity analyses of key parameters and iterative reanalyses and


modifications of models, assumptions and data are utilized to assure that the bounding analysis is conservative enough to provide adequate information and to provide reasonable assurance that a system will meet the regulatory objectives.[29]

Uncertainty about the future at a site results from our inherent lack of knowledge about how the site will evolve in time and our inability to "completely perceive reality" of site conditions which cannot be directly observed.[28] These assessments "cannot be used to demonstrate unequivocally that a site will be safe; rather it is a technique for examining factors that may affect site safety and providing a basis to assess whether reasonable assurance exists that a site will meet performance objectives"[18] such as those set out in the Part 40, Appendix A criteria.

As NRC notes:

[T]he very long-term performance of tailings isolation (that is, several thousands of years into the future and beyond) will be governed by climatic and geological factors which cannot be predicted precisely. . . . [T]he staff has examined a full range of possible failure modes, not with the purpose of predicting in absolute or quantitative terms chances for or consequences of failure, but in order to provide a guide in siting and design of tailings disposal schemes. The pertinent question is: "What siting and design factors should be considered or taken into account in order to provide reasonable assurance of long-term isolation of tailings?"[29]

As NRC explains, "the goal of performance assessment should be to provide as much necessary information to the decision maker and the public as possible."[28] The information should allow easy identification of modeling assumptions and associated uncertainties to guide further data collection and validation efforts.[29] It should be understood that the goal of these performance assessments is not scientific certainty because it cannot be achieved. The scientific method requires a scientist to empirically observe the phenomenon of interest to confirm or revise the conclusions about it and, as noted, performance assessments invariably evaluate conditions that cannot be observed. For example, performance assessment data on geological systems are so sparse that unambiguous answers are virtually impossible to achieve.[30] As a result, these assessments are designed to provide regulatory confidence in the regulatory decision based on a "believable conservative bias rather than from any notion of [absolute] accuracy."[30]

Since it is not possible to achieve either scientific certainty or scientific confidence over many hundreds to thousands of years, regulatory confidence must be the goal to be achieved -- that is, reasonable assurance that is not based on an "accurate" answer but rather on a range of possible answers that represent an acceptable level of uncertainty.[30] Accordingly, no method that is based solely on point estimates provides all of the available information on the nature and extent of uncertainty nor a window into the process to identify and criticize the assumptions.

[18] NUREG-1927, p. 15
[29] Id.
[30] Id., Vol. 2, p. 3 (citations omitted)
[28] Id.
[29] Id. at 6
[30] Id.
made. This implies the need for a mix of assessment techniques including probabilistic assessment techniques.

NRC has recently published a final policy statement on the use of probabilistic risk assessment (PRA) methods in nuclear regulatory matters. In that policy statement, NRC notes that it has generally regulated the use of nuclear materials based on "deterministic" - that is, rules which consider a set of safety challenges and determine how best to mitigate such challenges. The policy states that the Commission believes that the use of PRA technology in NRC regulatory activities should be increased to the extent supported by the state-of-the-art in PRA methods and data and in a manner that complements the NRC's deterministic approach.

NRC, therefore, views the use of PRA as an "extension and enhancement of traditional regulation." PRA should be considered for applications that involve projecting system performance for long time periods. Indeed, PRA is called performance assessment for waste management systems because they are "passive systems subjected to interlocking natural and man-made processes and events just as are dominated by complex phenomenology."

Similarly, IAEA notes that probabilistic analysis and deterministic analysis are complementary techniques and, generally, both should be used in scenario and consequence analyses. IAEA explains as follows:

Scenario analysis is necessarily probabilistic because the probabilities of occurrence of various events and processes must be taken into account. However, it also has deterministic components. Since submodels must be used to predict the effects of various events and processes on the disposal system and hence to provide the input data for release and transport calculations, consequence analysis is primarily deterministic because its main objective is the calculation of rates of radionuclide release and transport and subsequent doses to humans, and the models used in these calculations are usually deterministic ones. However, when there are uncertainties in release and transport parameters (which is usually the case) the distribution functions of these parameters will have to be used in the calculations to obtain ranges or distributions of doses. In this situation, it is necessary to use probabilistic (statistical) techniques in consequence analysis in addition to deterministic ones. It can therefore be seen that a comprehensive safety analysis, in which all the relevant phenomena are considered and the uncertainties in parameter values are explicitly included, requires both probabilistic and deterministic techniques. For this reason, the methodologies used in comprehensive analyses are often referred to as fully probabilistic.

Further, ICRP notes, "(1) the requirement that all doses should be taken into account in the optimization of protection cannot always be applied without some consideration of the probabilities that the doses will be received." ICRP cautions:

A distinction should be made between the probability of occurrence of an event at a waste repository, the probability that the event will have a consequence for the integrity of the repository, and the probability that an exposure will be received by an individual as a result of the event. The outcomes of these three

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probabilities are conceptually distinct, and care should be exercised in combining them.\tex\footnote{Id n 6}
Accordingly, Atlas has utilized a mix of assessment methodologies to demonstrate to
NRC that its on-site re-licensing proposal provides the necessary reasonable assurance that
NRC’s Appendix A criteria will be satisfied. Atlas has used state-of-the-art deterministic
analytical techniques to address such things as hydrology issues, slope stability, seismic design
and the reasonableness of cost estimates. Atlas has used state-of-the-art probabilistic Monte
Carlo methods to assess potential radiological risks and the reasonableness of estimated costs of
the on-site and relocation alternatives. Atlas has also used probabilistic analyses to address the
seismicity issues raised by NRC with respect to ground motion events and their associated return
periods.

It is worth noting, again, however, that “no analyses can provide absolute, scientific
assurance that there will be no releases . . . . There are no guarantees. ICRP states that “[e]ven
the most careful engineering design practice for impoundments, can, and often does, incorporate a qualitative consideration of the
effect of geomorphological and climatological processes on the
integrity of the impoundment system. This could cover periods of
up to 10,000 years, but is typically to 200-1,000 years. This is
regarded as the long term. Largely owing to geomorphological
processes within such periods, even the most soundly engineered

\textbf{impoundment system cannot be expected to ensure complete
retention of tailing material.\tex}\footnote{Id n 7}

IAEA states even more emphatically that “no containment system can be assumed to prevent all
release and dispersion of contaminants nor can it be supposed to last indefinitely . . . [T]he
purpose of containment is only to reduce the rate of dispersion of contaminants to acceptable
levels.”\footnote{Id n 8} NEA concurs:

even the most carefully engineered structure cannot be expected to provide absolute containment or intrusion resistance nor can it be
guaranteed to retain complete integrity for the indefinite future. Therefore, the basic goal in managing these wastes must be to
reduce to currently acceptable levels, the overall public health risk
and environmental impacts that are due to radioactivity and other
hazards.\footnote{Id n 9}

ICRP recognizes that passive controls to prevent intrusion and improper use of tailings
will be necessary and that a certain level of monitoring is also necessary. This will likely include
the capability of maintenance and efforts to preserve knowledge of the presence of the repository
and its characteristics through a central and local registry of land use, markers and signs, etc.\footnote{Id n 10}
NAS/NRC has indicated that merely covering tailings with several meters of earth (and even
with rip rap depending on the site) and then essentially leaving them alone will not be sufficient
as “[a]ctive monitoring and repair of the cover will be required to maintain the integrity of the

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Although NRC has taken the position that Criterion 12 in Appendix A does not allow "active" maintenance, it premises its stabilization criteria to meet the 200-1,000 year stability requirement on the basis of the hydraulic principles associated with the design of drainage channels, a practice which "ordinarily assumes that some maintenance will be performed as damage and degradation occur." Additionally, even NRC has acknowledged that "[t]he use of institutional controls is implicitly accepted as part of mill tailings disposal programs." Thus, although Atlas has provided state-of-the-art technical and scientific justification to assure satisfaction of Appendix A criteria in accordance with NRC's reasonable assurance standard, fortunately, as noted previously, the Mill Tailings Act provides an additional level of protection to assure that a governmental licensee (presumably DOE) maintains the Atlas site in a manner that will assure protection of public health and the environment.

5. Catastrophic Events

Finally, with respect to catastrophic events such as worst case floods or seismic events, performance assessment cannot effectively assess improbable events but rather can only address extreme but very likely events. In any event, as NAS/NRC notes, protection against events such as catastrophic floods is not possible, and notes that "the risk posed by piles under such circumstances is small, and inconsequential, compared with other impacts of such a catastrophic event, because tailings would almost certainly be mixed in with and diluted in a much larger volume of sediments." NAS/NRC, accordingly, recommends that "[w]hile protection of piles against local periodic floods is feasible and appropriate, protection against large, truly catastrophic floods is neither feasible nor warranted from the perspective of the risk presented." NAS/NRC concludes that "given the magnitude of other damage to natural and human systems that would accompany such an event, it is clearly unreasonable to worry about protecting the tailings piles under such circumstances." Moreover, as noted above, the Mill Tailings Act provides an extra measure of protection by virtue of the requirement for state or Federal government ownership of such sites as a perpetual NRC licensee with ongoing responsibility to maintain and repair any critical damage to the site. NRC's Criterion 10 requires the licensee to post $250,000 (1978 dollars) prior to termination of its license to fund long-term surveillance of the site.

Thus, it would appear that the reasonable assurance required by the Appendix A performance criteria, cannot guarantee there will be no necessity for or likelihood of future maintenance for the 200-1,000 year longevity period. Given the realities of performance assessment, the inability to hold (and propriety of holding) the licensee responsible for damage due to catastrophic events, and the statutory plan set forth in the Mill Tailings Act, it makes sense to take a realistic and practical view of "net benefit" assessments rather than overdesigning and overspending at the present time beyond that which is reasonable. NEA

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59 Id.
60 Id. at 129. The DES considers the impacts of just such a catastrophic hypothetical flood scenario that results in a major tailings failure and concludes that the long term impacts are minimal. (pp. 4-30-4-31; see discussion III, Section D)
to ensure that the models and parameters

are consistent and that they can be

likewise transformed into different
data analysis and machine learning
tasks. This is achieved by using

transformations that are designed
to capture the underlying data

distribution. In addition, these
transformations help to reduce

high-dimensional data to lower

dimensions, which can improve

the performance of machine

learning models. This is

particularly useful in

applications such as

natural language processing

(NLP), where the data

is often high-dimensional

and complex.

In conclusion, the choice of

transformation functions is

critical for achieving good

performance in machine

learning models. By selecting

the right transformations,

we can improve the

accuracy and efficiency of

these models, thereby

enabling them to

achieve better results in

various applications.
NRC has stated that the radiation exposure to the public from uranium mill tailings piles presents no acute health hazard because "long and sustained exposure to radioactivity in the tailings pile would be required to produce any significant chance of an adverse effect." NRC emphasizes that "even the worst-case intrusion at the tailings site would not result in immediate health effects. The level of radioactivity is low and potential health effects would result only after long and continuous exposure to the tailings."\footnote{IAEA, Report No. 333, p. 3 (see also pp. 1,13,29,97)} IAEA notes that "[t]he consequences of breaching the confinement system and the resultant dispersion of tailings would not necessarily have a significant radiological effect, since sustained exposure to low level radioactivity in tailings would be required to produce significant adverse results."\footnote{IAEA, Report No. 333, p. 21} Outdoor radon concentrations from a tailings pile are limited because the radon that diffuses out of the pile is generally dispersed by air currents and usually will undergo its radioactive disintegration at a higher elevation.\footnote{Horwitz, "The Indoor Radiological Problem in Perspective," (February 1981), pp. 3-6. IAEA states that "[a]lthough the radon which is produced in a tailings pile is released into the atmosphere," IAEA, Report No. 333, p. 21.}

EPA similarly has noted that "[t]he risk from radon emissions (from uranium mill tailings piles) diminishes rapidly with distance from the tailings pile (declining by a factor of three for each doubling of the distance beyond a few hundred meters)."\footnote{EPA, "Environmental Impact Statement for Standards for the Control of Byproduct Materials from Uranium Ore Processing," Vol. 1, 1983, p. 10-12 (EIS).} NAS states:

Persons living at distances greater than a kilometer from most uncontrolled uranium mill tailings piles, and perhaps somewhat closer to some piles, will experience no significant increase in a lifetime radon lung cancer risk from the pile . . . [The health risks] are trivial for the average U.S. citizen and range from small to modest for most persons who live close to uncontrolled piles.\footnote{NRC, "Risk Assessment and Management Tailings," pp. 3 and 7 (emphasis added).}

The main potential public health concern with radon is from the decay of radon and the build-up of radon daughters within a structure - what is commonly referred to as "indoor radon." As EPA notes, "people need to be occupying a structure and not just standing outdoors" for its radon risk estimates to be applicable.\footnote{48 Fed. Reg. 15076, 15083 (April 6, 1983).} EPA and NRC rely on an indoor radon exposure scenario based upon the assumption of some relationship between radionuclide concentrations in soil and radon emissions from the soil. Radon flux rates, however, for a given radium soil concentration are very sensitive to a variety of factors including grain size distribution, moisture content, soil compaction, and barometric pressure. Indoor radon levels also vary depending on the type of building materials and the configuration and ventilation of structures. NRC has stated:

Specifically with regard to radon, radon concentrations in the air vary markedly due to site-specific geological and weather-related factors. In addition, large variations in radon concentrations within structures occur because of building construction, geometry, terrain, and geological compositions of the site. Because of the magnitude of the variations of radon concentrations and the large number of factors affecting the variations, no satisfactory method has been found for prospective generic modeling of radon concentrations within structures.\footnote{NUREG-1496, p. 5-5.}
In any event, all Title II sites will be licensed in perpetuity by NRC and neither residential nor commercial structures will likely ever be allowed on the Atlee tailings impoundment. Thus, the threat to the general public from radon released in the event of a future tailings breach will not be significant nor will there be any significant threat from indoor radon (i.e., radon daughter exposure) from the controlled tailings pile.

3. Gamma Exposures

For gamma exposures to be significant, as with x-rays, there must be proximity to the source. NRC notes that "on open ground, about two-thirds of the gamma radiation dose comes from radionuclides contained in the top 15 cm (6 inches) of soil out to a distance of 6 meters (20 feet) from where a person stands." In addressing uranium milling activities, EPA has found that the potential risk from airborne radon emissions essentially dwarfs the potential risks associated with releases of other radionuclides and other pathways. In a similar vein, EPA states:

In general, the cancer risks from radon inhalation to persons working in [theoretical] offices located on top of waste piles are estimated to be about three orders of magnitude larger than the cancer risk from gamma exposure to persons working on NORM waste piles.

Thus, generally speaking, gamma radiation exposure, which requires close proximity to a source, poses far less of a potential threat to health than exposure to a radon source. Since with respect to the tailings pile closure, no proximity to the source will be permitted and in any event the source will be covered and armored in accordance with NRC requirements, there will be negligible gamma exposure once the pile has been reclaimed.

4. Nonradiological Risks

Among the nonradiological risks associated with tailings piles and the reclamation of those piles is the potential contamination of groundwater with nonradiological constituents. When EPA first began addressing such issues, the Agency acknowledged that "current levels of contamination . . . are low at most sites when developing its groundwater standards." No contamination of deep aquifers has been observed near tailings piles and only "limited contamination" of shallow alluvial aquifers has been found. EPA found it is "difficult to prove that tailings are the cause of elevated concentration[s]" in the shallow aquifers because the substances involved occur naturally in the soil in these mineralized areas. Movement of some nonradiological constituents is limited by geologic and hydrologic conditions to within a few feet of the piles. The primary potential hazard associated with groundwater contamination from uranium mill tailings is limited to nonradiological "toxic materials having relatively high mobility."

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\[\text{\textsuperscript{169}}\] MUREG-1501, p. 13.
\[\text{\textsuperscript{170}}\] 1 FED at 6-11.

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\[\text{\textsuperscript{169}}\] 48 Fed. Reg. at 45926 and 45929 (October 7, 1983).
\[\text{\textsuperscript{170}}\] 1 FED at 3-1.
\[\text{\textsuperscript{171}}\] Id. at 3-13.
\[\text{\textsuperscript{172}}\] Id. at 3-4, D-15, 5-17, 20.
\[\text{\textsuperscript{173}}\] Id. at 5-20.
Even if groundwater is contaminated, it still may not pose a potential threat to the public health or the environment. EPA has stated: "The level of user exposure to contaminated groundwater depends upon the amount drunk, as well as the level of contamination. The total amount consumed depends, in turn, on the palatability and quality of the water, the purpose for which it is used, and the number of users."[122]

Groundwater contamination questions are highly site-specific in nature and must, therefore, be considered carefully on that basis. The levels and type of contamination will vary significantly and so will the potential threat, if any, to public health and the environment. If the impacted groundwater has no likely future use because of pre-existing quality and/or quantity, expensive remediation efforts may not be justified. Moreover, remediation actions for contaminated groundwater need to be carefully evaluated in terms of their effectiveness. A recent NRC/NAS study concludes that "the studies indicated that pump-and-treat systems may be unable to remove enough contamination to restore the groundwater to drinking water standards, or that removal may require a very long time, in some cases centuries."[123] Thus, "the nation may be wasting large amounts of money on ineffective remediation efforts."[123]

Other nonradiological risks that need to be considered in any net benefits analysis of remediation activity include the impacts to workers and the public at large from construction and traffic accidents.[124] NRC notes that with respect to fatal transportation accidents to workers and the general public during the transportation of waste, the impact is determined by looking at "the total volume of waste, number of shipments, the distance to the disposal site, and the rate of fatal vehicular accidents."[125] For fatal construction accidents to workers during decontamination and cleanup activities, the "impacts are based upon the collective effort required to reduce the residual contamination levels and the rate of fatal construction accidents."[126] In this regard, Atlas notes that in 1995 there was an increase in fatalities in surface mining operations, many of which were attributed to truck accidents.[126] In addition, assessments of nonradiological risks tend to focus only on fatalities in transportation and construction accidents, and not serious injuries. However, if heavy equipment and large trucks are being used, there is a high likelihood that there will be many serious injuries. NRC has acknowledged that "there is a point at which the net risk to future populations from residual radioactivity is lower than the risk from the remedial action. In other words, the clean-up may do more harm than good."[127]

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[124] Id.
[125] Id.
[126] Id. at G-8. Atlas notes that there have been more accidental deaths related to DOE's reclamation activities at Title 1 sites. Letter to Dennis Harris from Bruce R. Christoffel, DOE Project Manager, Uranium Mill Tailings Remedial Action Project (July 3, 1994). (See Attachment B).
III. DRAFT ENVIRONMENTAL IMPACT STATEMENT

The DEIS "describes and evaluates (1) the purpose of and need for the proposed action, (2) alternatives considered, (3) potentially affected environmental resources, (4) environmental consequences of the proposed action, and (5) costs and benefits associated with reclamation alternatives." (p. iii). The DTER reviews the technical issues associated with the proposed reclamation plan. This section sets forth specific comments related to the DEIS. Issues related to the DTER are discussed in Section IV below.

A. Purpose of an EIS

There appears to be some misunderstanding within the Moab community about the purpose and role of an EIS in general and the Atlas EIS in particular. The DEIS at issue here, however, makes it clear that the current "decision is whether or not to approve Atlas Corporation's request for a license amendment approving its reclamation plan for on-site disposal of uranium mill tailings on the Atlas site near Moab, Utah." (p. 1-1) As NRC states, "At this environmental stage in the licensing process, NRC will not select a specific alternative site and determine that the tailings must be moved to this site. Rather, NRC is focused on determining whether the Atlas proposal is acceptable and whether the Atlas site is environmentally acceptable for tailings disposal." (p. 1-3) (emphasis added). To assist in the analysis, the DEIS compares the Atlas proposal to an alternative disposal site. However, the basic question is not whether the alternative is in some measure preferable, but whether the Atlas proposal meets NRC's requirements and provides reasonable assurance that public health and safety will be protected.

The DEIS was prepared pursuant to NEPA and the implementing regulations of the Council on Environmental Quality (CEQ) (40 C.F.R. Part 1500) and NRC (10 C.F.R. Part 51).

An EIS is a document that provides "information and analysis on which to base a decision,"\(^{120}\) its findings and conclusions do not dictate what the deciding agency must do. In other words, NEPA is a procedural statute which requires a certain process but not a regulatory outcome. The CEQ explains:

The "agency's preferred alternative" is the alternative which the agency believes would fulfill its statutory mission and responsibilities giving consideration to economic, environmental, technical and other factors. The concept of the "agency preferred alternative," is different from the "environmentally preferred alternative," although in some cases one alternative may be by\(\text{v}\).\(^{120}\)

Indeed, the Supreme Court has made clear that:

The sweeping policy goals announced in §101 of NEPA are thus realized through a set of "action-forcing" procedures that require that agencies take a "hard look at environmental consequences," and that provide for broad dissemination of relevant environmental information. Although these procedures are almost certain to affect the agency's substantive decision, it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process. If the adverse environmental effects of the proposed action are adequately identified and evaluated, the agency is not constrained by NEPA from deciding other values outweigh environmental costs.\(^{120}\)

The Court further noted that an EIS does not require the adoption of an alternative plan:


\(^{121}\) Id. (Question 4a).

The DECS, or Dynamic Excitation Control System, is designed to monitor and control the excitation of generators in power plants. It is essential for maintaining stable and efficient power generation, especially during transient conditions such as load changes or disturbances. The DECS uses a combination of analog and digital control methods to ensure smooth operation and prevent overexcitation, which could lead to system instability.

In operation, the DECS continuously monitors the performance of the generators and adjusts the excitation voltage accordingly. This is achieved through feedback loops that compare the actual excitation level with the desired setpoint, and then apply corrective actions as necessary. The system is designed to respond quickly to changes in load or other disturbances, thereby maintaining optimal system performance.

The DECS also incorporates advanced features such as protection against overexcitation and underexcitation, as well as the capability to handle sudden changes in load. It is an integral part of modern power systems, ensuring reliable and efficient operation of the generators.

In summary, the DECS plays a critical role in maintaining the stability and efficiency of power systems. Its advanced features and continuous monitoring capabilities make it an indispensable tool in the operation of modern power plants.
floodplain. As such, all the issues and concerns currently identified with the hydrological aspects related to potential impacts of the Colorado River on the tailings area would hold true for any future redevelopment on the site. Similarly, any issues and concerns raised with respect to seismicity and salt dissolution would also apply to potential considerations for site redevelopment. The U.S. Army Corps of Engineers, state or other federal floodplain programs could prohibit or severely limit the site's use.

If such design considerations or requirements are imposed on potential structures or facilities that might in the future be placed on this property, redevelopment may become uneconomical. If lower design standards were to be accepted, it would suggest acceptance of a much higher potential risk of loss of life or property damage than is currently considered reasonable. It is also questionable whether the current economic realities of Moab prompting the desire to have this property available will still prevail when and if the property is released.

Thirty years ago, Moab's economy was centered around the uranium mining and milling industry. It is possible that the current tourist-based economy may want by the time the entire property is available for redevelopment.

While it is acknowledged that portions of the property furthest from the river and not impacted by the former operations could be usefully redeveloped, it is likely that this property would not be open for uncontrolled redevelopment. As previously noted, the site is situated near the entrance to Arches National Park and it is difficult to envision a rational argument for the removal of a natural weathered sand pile, that does not contrast significantly with the surrounding scenery, at extreme cost and no health benefit, only to replace it with unsightly roof tops from a commercial or industrial complex.

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During reclamation cycles, it is highly likely that current land use in the area will be more significantly impacted if the pile is moved than if the pile is reclaimed in place. Reclamation construction has been confined on-site to this point. While it is true that industrial traffic will increase when clay and rip-rap are brought to the site, the impact of this will be minimal compared to the wholesale disruption of the entire Moab Wash Valley that moving the pile will entail. As seen below, no matter how the pile is moved, tailings will be transported past the entrance to Arches National Park, alongside or over established biking and hiking trails, and either over or within close proximity to the main thoroughfare that brings those persons who most often use the lands surrounding the site.

6. Ecology

a. Reclamation Impacts

The DEIS notes that aquatic biota and aquatic organisms, could be adversely affected by potential water quality impacts due to surface run-off (sediment, etc.) during on-site reclamation of the Atlas tailings pile. However, the DEIS also notes that aquatic organisms in the Colorado River experience large swings in concentrations of suspended solids and turbidity and are generally quite "tolerant of these conditions." (p. 4-32) The DEIS further concludes that because surface waters with aquatic communities will not exist at the Plateau site "impacts on aquatic biota from reclamation activities at this site are not an issue." (id.) While this conclusion may
appear at first blush to be justified, the DEIS also notes that potentially significant surface run-off impacts at the Mosh site are associated with the Plateau alternative. (p. 4-21) Thus, since the relocation activities at the Mosh site are going to bare the inside of the tailings pile to the elements as it is dismantled (and for a time period 2-4 times longer than it would take to complete reclamation in place), the potential for short term adverse impacts from surface run-off is substantially greater under the relocation alternative, although not at the Plateau site itself.

b. Post Reclamation Impacts

The DEIS notes that after reclamation the impact on biota and aquatic organisms of leachates from the pile entering the river will decrease as "an effective cover . . . would substantially reduce movement of contaminants into the Colorado River." (p. 4-33) The DEIS also discusses a variety of potential contaminants, both radiological and nonradiological. While in many respects, the discussion is one-sided, it is at this point (and again in the Biological Assessment contained in Appendix F) that the discussion begins to degenerate into unsupported speculation.

On the one hand the DEIS notes that "available data do not indicate that the existing tailings pile has more than a minimal impact on the water quality in the Colorado River beyond a small mixing zone near the bank. Leaving the pile in place would, therefore, have little adverse impact" (p. 4-30, emphasis added). The DEIS further states that contaminant concentrations (leachate contribution plus ambient concentration) are well below both water quality standards and toxicity benchmarks with the exception of ammonia and gross alpha. (p. 4-33). With respect to radionuclides, the DEIS indicates that "although probably unlikely, it is possible that any individual fish residing or feeding for long periods of time in this relatively small area [the groundwater/surface water interface before much dilution has occurred] may receive potentially harmful doses." (p. 4-37) With respect to non-radiological contaminants the DEIS maintains that available data from fish sampling are not sufficient to support a conclusion that the existing tailings pile does not have an effect "on individual invertebrates and endangered Colorado squawfish and razorback suckers that could be present in the mixing zone or downstream deposition areas." (p. 4-39) And similarly, Appendix G states that both the proposed action and the alternative action would be unlikely to adversely affect any of the endangered fish at the "population level," however, some individual Colorado squawfish or razorback suckers reside or feed extensively in the mixing zone or in one or more deposition areas downstream, it is "reasonably possible such individuals could be adversely affected under current conditions or under the proposed action." (App. F, p. 37, emphasis added.)

First, the "mixing zone" at the river's edge adjacent to the tailings pile cannot properly be described as "habitat" for endangered species and, second, it would seem that no amount of data could demonstrate that the tailings pile does not have an effect on a hypothetical maximally exposed fish. Furthermore, while there is obviously insufficient data to conclusively establish that no individual fish is being subjected to potentially high concentrations of radiological or nonradiological contaminants, there is also no evidence that would allow one to say it is "reasonably possible" that an individual fish could be exposed to concentrations that could adversely affect the health of the individual fish. This is at best a hypothetical assumption not identified as such and at worst pure speculation.

The idea of focusing serious regulatory consideration on a potential individual fish residing or feeding in a mixing zone (which is not
will not scar the landscape the way that: many industrial, commercial, and residential sites across
the country mar the aesthetics of other natural monuments. Visual aesthetics and an individual's
interpretation of such are highly subjective. Many national monuments of historic and aesthetic
significance (whether natural or man-made) in this country have been encroached upon in the
name of progress. In this instance, Archers National Monument predate any industrial activity at
the Atlas site. Surely, AEC was well aware of the original ore buying station's close proximity to
the National Monument when it directed that the station and later the processing mill be placed
there. Atlas should not and cannot be held responsible for site placement over which it had no
control or for socioeconomic trends, in this instance the popularity of what is now Arches
National Park, over which it had no control.

In addition, the reclamation activities at the Moab site will be visible significantly longer
under the relocation alternative than under the on-site reclamation plan. Estimates are that
off-site reclamation will be at least twice as long and possibly up to six times as long as on-site
reclamation. (On-site reclamation is currently expected to take 5-7 years.) The negative affects
of off-site reclamation will also be increased by the need to construct new and highly
visible structures possibly including a loading facility, storage site and a conveyor gallery.
These elements would recreate an industrial operation that starkly contrasts with the existing
environment and would be a source of visual, air and noise quality impacts. Markings and
warnings at public crossings and along the rail right of way will heighten tourist awareness of
transport activities related to radioactive materials, to say nothing of holding up the normal
progression of traffic through the area, and the heightened risk that industrial accidents will occur
in public areas and on public ways.

In either case, reclamation activities will likely only occur from spring to fall -- the
"tourist" months. Thus, the longer time frames required for off-site reclamation will likely have
greater impacts on tourism than will on-site reclamation. If, as many desire, the tailings pile is
moved to an alternate site, with the ensuing 10-15 years of construction, it is possible that many
tourists will avoid the Moab area until construction is completed.

Activities at the Atlas site have benefited the regional economy of Moab from initiation
of operations in 1956 through mill shutdown in 1984. As such, Atlas has been a prime
contributor to the economic and infrastructure development of the Town of Moab, Grand County
and the surrounding region. In the past and during its operation, Atlas had enjoyed good
relations with local residents, the Grand County Council and the Town of Moab.

It is our understanding that the local community is somewhat split in its feelings towards
the reclamation options. Some residents appear to accept on-site reclamation while others
suggest that it should not be tolerated. It is difficult to make a case that tourism will be adversely
affected by on-site reclamation, since tourism has prospered even with the mill unused and
rusting on-site and the remainder of the site unclaimed. It has also been noted in various
documents that the reclamation work would have a mixed economic impact on the area. On the
one hand, limited spin-off job creation could result in higher paying construction jobs for specific
periods of time, but these jobs may in turn place strains on existing town services. Ultimately,
no major or lasting benefit would be expected for local industry and only minor short-term job opportunities could be expected for the local workforce.

An area of possible unavoidable friction may exist in the sourcing of rip rap materials. It has been suggested by some that available sources of rip rap are limited and that borrow and transport of rock materials could be a contentious issue for either reclamation option. Atlas has determined that adequate sources of rip rap are available in the Moab area. Round Mountain in Castle Valley, the most contentious potential source, has been eliminated from consideration as a source by Atlas, because of concerns expressed by the public. Although the DEIS addresses the adverse impacts associated with transferring rip rap to the disposal site, the DEIS fails to adequately balance the potential impacts of the longer haul for rip rap to the alternate site versus the shorter haul of more rip rap to the Moab site.

Some local (Grand County) groups and individuals have been vocal in their preference for off-site reclamation. The Southern Utah Wilderness Alliance (SUWA) was one of the groups that requested that a full EIS be undertaken to ensure that the NRC decision on the reclamation proposed by Atlas was adequately supported by meaningful and appropriate environmental information and not merely economic expediency.

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Thus, these multiple (deterministic and state-of-the-art probabilistic) analyses support the DEIS conclusion that Atlas' estimates for on-site reclamation are reasonable and compare favorably to costs projected for similar sites.

b. Off-Site Reclamation Cost Assessment

An alternate disposal site (the Plateau site) has been identified by NRC as the reference alternative at a location some 18 miles northwest of the existing site. The alternate site is located approximately 2.5 miles from the Moab Canyonslands airport in an area known as the Klondike Flat. Ground surfaces slope up steeply to the north, and are relatively flat to the south, east and west of the site. The site is underlain by Mancos Shale consisting principally of marine shale and some marine and non-marine sandstone units.

The primary components and activities associated with the off-site relocation option as developed by Smith Environmental include the following:

- construction of new load out facilities at the existing Moab site including transfer conveyors, feeders, hoppers, storage silos, highway crossing and control structures;
- excavation and loading of 7.8 million cubic yards of tailings (estimated at 8.7 years for 5 day/week yearly operation or 6.2 years for 7 day/week yearly operation);
- loading of railcars with excavated tailings;
- transport of tailings by rail to the new site;
- off load and dispose of tailings at new site;
- excavation and transport of tailings embankment soils;

- mill site soils excavation and transport;
- removal and transport of mill site demolition materials;
- offload tailings embankment materials;
- offload mill site soils;
- demolition, decontamination and disposal of loading and rail facilities;
- reclamation of existing site (340 acres);
- reclamation of new site;
- measuring to determine radon emission compliance with the 20 pCi/m3/hr standard;
- fencing, monitoring and inspection of both sites.

As noted above, implementation of this alternative as developed for the 1993 NRC response would require construction of a new on-site rail load-out facility including construction of such on-site items as a new rail siding, conveyor systems to the siding, a site storage facility and a feeder-hopper loading structure for railcar loadout. As noted previously, the DEIS does not adequately assess the impacts of these activities or appropriate alternatives thereto.

Additional activities solely associated with the off-site option include; development of a new repository for the tailings materials at the alternate site, which must be at least as large as the current site if not substantially larger, and construction of the necessary route transport and off-loading related facilities. This would include the construction of some 3.5 miles of rail siding, improvements on the existing 14 mile main line, and the construction of new access roads to the

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Presumably, none of these activities can be undertaken without all necessary NRC approvals including those associated with the alternative site.
considered in terms of potential road damage, fuel consumption (non-renewable resources), increased traffic accident potential, air and noise pollution, and potential impacts on tourists.

The State of Utah has suggested in meetings with Atlas representatives that if Atlas considered the costs of groundwater cleanup, the costs for on-site reclamation would be greater than Atlas estimates.\(^{26}\) Focusing on a single component of the disposal system can be misleading. For example, if the pile is moved, it will not eliminate groundwater cleanup at the Atlas site, and may require even more extensive groundwater cleanup since unrestricted use would eliminate the ACL option. As noted in II Section D.2, it is important to consider the system as a whole when considering waste disposal options.

Another issue raised by some proponents of off-site reclamation is that slurry transport might be a significantly less expensive means of transporting the tailings to the alternate site than the rail transport option. In general, slurry conveyance can be effective over short distances, where siting logistics allow appropriate controls (i.e., low pressures and contained areas) such that potential spill impact is minimal and where dewatering is not a major concern. Slurry transport for the relocation alternative, however, is not a viable option. It would pose significant potential incremental environmental and public health risks due to the length, complexity and siting of the slurry pipeline. The increased risk to the environment and public health derives from the significant water handling system necessary adjacent to the Colorado River and at the new site, as well as from the 18 miles of pipeline that could fail and discharge contaminated water (i.e., tailings and slimes) into the environment. Final stabilization of the tailings at the alternate site would be much more complex and expensive if slurry transport is used due to the need to remove and treat excess water. Additionally, as noted above, the "defacto" realignment of entire tailings mass would introduce substantial concerns regarding the time necessary for, and effectiveness of, consolidation. The nature of the issues to be considered for a slurry relocation system can be summarized as follows:

**Genera requirements**
- licensing and EIS for route selection including risk assessments;
- environmental, maintenance and monitoring programs;
- right of way costs and considerations.

**Infrastructure Requirements - On-site Construction**
- general site preparation and infrastructure development;
- a repulp facility to create a slurry for pumping;
- pumping stations;
- holding and surge basins or tanks;
- a recycle facility;
- yard control and spill containment;
- control and monitoring buildings.

**Tailings Transfer/Conveyance Construction Requirements**
- route preparation including general clearing and grading;
- pipeline bed construction including access route for inspection, maintenance and repair;
- highway and road crossings by underpass or overhead crossings at all intersections;
- spill control and containment embankments along the pipeline;
- emergency drainage facilities (dump ponds) as practical (based on topography).

**Pipeline Requirements**
- secure (potentially double walled) slurry pipeline;
- secure (potentially double walled) reclaim pipeline;
- booster pumping station(s);
- sophisticated pipeline monitoring and instrumentation for spill detection and emergency response (flow meters, pressure monitors, etc.);
- appropriate controls and designs (such as vacuum breakers, etc.) to avoid water

\(^{26}\) It should be noted that the SEES' cost analyses include assessment of groundwater corrective action.
hammer effects;
emergency drain valves and emergency containment areas for emergency line evacuation if necessary.

**New Site Infrastructure and Containment Requirements**

- enhanced basin construction with synthetic liner to contain liquid tailings;
- tailings basins and cells to facilitate slurry discharge and solid/water separation;
- specialized tailings discharge system to promote rapid settlement;
- reclaim water collection system including basins and pumping stations;
- control and monitoring facilities;
- yard and site facilities to ensure tailings spill containment and mitigation;
- power supply and transformer station(s)

The critical environmental issue that would need to be addressed in depth in reviewing any such alternative, in addition to the cost of the infrastructure, pump, and treatment facilities, would be the overall issue of water management and spill prevention during the life of the operation. See Attachment 1.

It is apparent from the discussion of the necessary components for slurry transport that significant increases in costs and risks are likely. It would cost approximately $30 million to reconstruct the pipeline, install pumping systems, and extra construction costs (i.e., extra excavation costs and costs for water treatment facilities) would be incurred for the new tailings area. Slurry-related capital costs could range from $40 - $55 million and operating costs for slurry excavation, pumping, and reclamation would be $5.00 - $6.00 per ton. The subtotal slurry direct costs would be $8.80 - $11.24 per ton. Subtotal rail transfer for similar activities have been previously estimated at $7.20 per ton. Thus, the potential increase to the cost estimates for off-site reclamation is $1.60 - $4.04 per ton.

Similarly, the Association for the Tree of Life recently suggested that the costs of moving the tailings pile could be greatly reduced by building a haul road and using 100 to 300 ton mining haul trucks. This proposal and the associated cost estimates provided by the Association for the Tree of Life are without merit. It asserts that relocation could be accomplished for approximately $20 million and could be completed in 1-2 1/2 years. Details are not provided except to assert that relocation could be accomplished through the use of large scale mining haul equipment ranging in capacity from 100-300 tons capacity, operating 24 hours a day. Three potential haul and route alternatives are suggested that are internally inconsistent and utterly impractical.

It is also noteworthy that the numbers provided are limited to the direct excavation, haul and placement/capping, with no mention of other related and necessary activities. For example, the total cost for excavation at the existing site and capping at the Plateau site of 10 million tons plus debris, plus excavation to a depth of 8 feet is estimated at $5 million dollars. To put this into a perspective, this means that approximately 10 million cubic yards of material can be excavated from its existing location and placed and capped at the new site (not counting haulage) for about 50¢ per cubic yard, or less if cover materials are included in the estimate. Furthermore, no significant capital infrastructure costs such as the cost of the trucks are provided other than the $2 million for construction of a 14 km haul route. No costs are provided for maintenance and

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*Memorandum from Richard Lance Christie, Chairman of the Association for the Tree of Life, to Atlas Mill Reclamation Task Force & Interested Parties, Re: "New Perspectives on Costs of Moving the Atlas Tailings to the Plateau Site," April 3, 1996. It is interesting that Mr. Christie has no difficulty in relying on the assistance of "experts" (i.e., "professionals who actually do this kind of work").*
no serious discussion of technical limitations (i.e., slimes) or environmental and aesthetic impacts are presented.

D. Relative Risks and Benefits

As noted in Section III.C above, while the DEIS finds that the relocation alternative would involve significantly greater costs than on-site reclamation and in a disjointed fashion acknowledges that some of the risks associated with relocation may be larger, the DEIS should bring consideration of these issues to closure by completing a "net benefit" analysis. The analyses of both radiological and nonradiological risks associated with the reclamation alternatives should be summarized and compared to demonstrate with clarity the net risk benefits or detriments associated with the decision to choose one or the other alternative. Similarly, a comparison of the costs associated with the reclamation alternatives should demonstrate with clarity the net cost benefit or detriment associated with the choice of alternatives. Then the two components should be considered together to demonstrate whether the overall "net benefit to society is maximized" — to assure that the reclamation decision will "do more good than harm." The DEIS fails to do this with the precision and focus these issues and the parties interested in them deserve.

In an effort to address the "net benefit/risk/simulation—optimization" issues and in response to a specific request from UDEQ, Atlas requested SENES Consultants to conduct a screening level risk assessment of reclamation options for the Moab tailings pile (Appendix 11). The purpose of this analysis was to compare radiological and conventional nonradiological risks associated with Atlas’ proposed reclamation plan to those associated with the relocation alternative. The multi-variate analysis deriving the assessment includes both site specific radiological and nonradiological risk factors. The potential radiological health risk associated with the reclamation and post reclamation periods is based on widely used and accepted expert assumptions and scientific and technical standards of practice. Potential nonradiological fatality risks for reclamation operations are based on actuarial statistics for similar activities.

Specifically, the potential risks considered in the multi-variate analysis included the potential risks related to radiological emissions from radon, those resulting from resuspension of dust by wind and earth moving equipment, potential direct radiation exposure to workers, potential construction fatalities, potential off-site rail and road transport fatalities to workers, and long-term post-reclamation impacts potential for the two options. Based on the available information, EPA accepted models, and current accident statistics, the following conclusions were reached:

- The potential radiological risks associated with either reclamation option are low compared to the risks from natural background.
- In either case following reclamation, the predicted radon levels from the tailings would be smaller than background radon levels.
- Risks from on-site reclamation are less than corresponding risks from the relocation alternative, including consideration of all foreseeable potential delays, when the following impacts are considered:

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Again, Atlas notes that actuarial statistics are based on experience indicating such effects are indeed likely to occur and probably should be given a higher weighting factor than potential hypothetical stochastic radiation health effects. It is also worth noting that neither the DEIS nor the SENES assessment address potential significant but non-fatal injuries that are actuarially likely as a result of the large amounts of material to be handled and the heavy equipment necessary to handle it.
- dose and risk to maximum individuals;
- dose and risk to populations within 80 km;
- radiation dose and risk to workers;
- construction risks (of death) to workers; and
- transportation risks (of death) to workers.

- Both the potential radiological and nonradiological risks associated with the relocation alternative are significantly higher than such risks associated with on-site reclamation. Although the risks from both options are small, the relative difference between the options is large - impacts from the relocation alternative are 4 to 15 times greater than from on-site reclamation.

- Properly engineered on-site reclamation of the tailings pile presents negligible adverse impacts to the Colorado River.

- Transport of radionuclides in groundwater from the tailings pile to the Colorado River has no measurable impact on water quality downstream. The radionuclide movement is decreasing with time and is expected to continue to do so.

- The use of NRC approved engineering designs for the stabilization of the tailings pile in a safe and environmentally sound manner will provide the required reasonable assurance of long-term protection of public health and the environment for the design life of the structures.

- The occurrence of a rare natural event exceeding design specifications while extremely unlikely is possible. An extreme seismic event could result in disruption of the tailings pile cover and possibly in the exposure of the tailings. An extreme precipitation event could have a similar potential impact on the cover. A major flood event exceeding known design standards could have the potential to damage the embankment armor and in the ultimate extreme result in material loss. However, in such an occurrence, it is highly unlikely that the impact of the tailings release would pose a significant incremental threat to either natural or human systems.

- The costs of the relocation alternative exceed the Atlas' reclamation costs by between $80 million and $100 million.006

Thus, by either measurement - risk or cost - there is no benefit to relocating the tailings. Accordingly, when these two fundamental factors are considered together there can be no basis for asserting that the relocation alternative provides a "net benefit" by doing more good than harm. (See Table 3) Indeed, there is a net "dis-benefit" or "net detriment" to not reclaiming the tailings pile on-site as quickly as possible. The balancing of risks and costs required by the Mill Tailings Act would be turned on its head by delaying site closure and relocating the tailings.

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006 See Section C for updated cost information. Atlas's relocation cost estimate has been revised (Smith 1996) to increase the estimated cost to $143 million reflecting, among other things, the costs and practical difficulties associated with slime handling and consolidation and additional facilities at both sites.
Finally, the DEIS assesses the impact of a hypothetical flood (HF) scenario in which 2.1 million tons of tailings are released into the Colorado River. The HF scenario combines two extreme assumptions: Pile failure is assumed to occur by "some arbitrary mechanism" other than the HF and the HF is assumed to occur concurrently. The HF combines the worst case conditions of all floods that could occur on the Colorado River. Maximum velocities are assumed coincident with maximum water levels to provide an upper-bound estimate of the ability of the river to erode and transport tailings. (p. 2-13)\textsuperscript{30} Nonetheless, the DEIS concludes:

At the Moab site, the hypothetical failure of the tailings pile design during an HF would have some temporary impact on water quality in the river near the pile. However, the river's water quality, which is already degraded regardless of the tailings pile, would be further degraded by only a slight amount. Contaminants from the tailings would be quickly diluted to currently existing levels, which are generally below water quality standards and criteria for the protection of aquatic biota. Thus, the long-term impact to water quality should be negligible. (p. 4-30 - 31).

Given that even under these extreme (i.e. impossible) assumptions a failure after on-site reclamation would not produce significant adverse impacts and given that there is a "net detriment" to relocation of the tailings pile, it would be arbitrary, capricious and in direct conflict with the Mill Tailings Act, and national and international expert waste management criteria to relocate the pile.\textsuperscript{30}

\textsuperscript{30} These maximum values (velocity and water level) cannot occur coincidentally in nature at the Atlas site since as water levels rise in the Moab flood plain (i.e., between the porous) velocities at the pile will decrease.

\textsuperscript{30} NRE's HF scenario analysis is highly relevant as some public opinions have been expressed (particularly by NPS representatives) about the impacts of a tailings pile failure on the downstream river system and specifically Lake Powell. Mill tailings associated with the White Canyon uranium mill near Hite, Utah, currently reside beneath the waters of Lake Powell with no discernible adverse impact. Attachment M.
E. Summary

In summary, while the DEIS is basically a sound document, the FEIS should affirmatively conclude that the overall risks, both radiological and nonradiological (conventional) associated with the relocation alternative are greater than those for Atlas' on-site reclamation proposal, and that the costs of the relocation alternative are substantially greater such that when both risks and costs are considered, the relocation alternative results in a "net detriment" (i.e., does more harm than good) as a waste management intervention alternative.

IV. DRAFT TECHNICAL EVALUATION REPORT

A. Introduction

The background of Atlas' operations at Moab, and the regulatory framework and environmental concerns affecting final site reclamation have been discussed in some detail in the DEIS section of this response. Nonetheless, it is perhaps worthwhile to review and comment on the specific issues that triggered the current EIS, and the development of the attendant DTER. In this regard, it is also important to note that the DTER itself is focused solely and specifically on the Atlas application for on-site reclamation and not on the off-site alternative. While no comparison of alternatives is included or appropriate, it should be recognized that the information base the DTER utilizes regarding the on-site proposal is extensive and far greater than that which exists for the alternative. The data base for on-site reclamation is substantially complete.

SPECIFIC COMMENTS
OF SENES CONSULTANTS LIMITED
ON RADIOLOGICAL IMPACTS FROM
RECLAMATION OF THE ATLAS MOAB TAILINGS PILE

Estimated Doses from Radon Exposure

Potential impacts under current conditions and during reclamation are dominated by radon daughter doses. However, irrespective of whether or not the radon emissions rates estimated in the DEIS are conservative, the DEIS has significantly overestimated the dose from radon daughter exposure.

15-66

The DEIS (p. 4-75) makes use of radon daughter dose estimates developed by the NCRP in Report No. 91 (1987) for converting CAP88 (EPA 1992) air concentration predictions (given in units of WLM, working levels) to dose. NCRP Report No. 91 has been superseded by Report No. 116 (NCRP 1993), although both reports use the 10 mSv/1 rem) per WLM (working level month) dose conversion factors of ICRP Publication 32 (ICRP 1981). ICRP Publication 32 has however been updated to make use of more recent information on the risks of exposure to radon daughters. The new dose conversion factors in ICRP Publication 65 (ICRP 1993) is a 4 mSv (0.4 rem) per WLM for members of the public, and 3 mSv (0.3 rem) per WLM for workers. Using the new dose conversion factor would therefore reduce the radon doses to members of the public estimated in the DEIS (e.g. p. 4-56, Table 4-8-6) by a factor of 2.5.

As noted in both SENES (1995) and the DEIS (e.g. p. 4-79), CAP88 generates conservative estimates of dose. The predictions are particularly conservative for exposure to radon daughters outdoors because of incorrectly elevated radon daughter equilibrium fractions (denoted F in this memo). As done in EPA (1993, p. 4-9), CAP88 (EPA 1992, p. 8-11) calculates F as a function of travel time assuming a wind speed of 3.5 m/s, which results in an F of 0.267 at 150 m, and which the DEIS subsequently relies on (e.g. p. 4-81) to estimate dose. (This is actually an effective F, based on 75% of time indoors and 25% outdoors, EPA (1993)). However, for a travel distance of 150 m, the outdoor radon daughter F would be less than 0.02 (EPA 1993). There is not enough time for radon daughter ingrowth (DEIS, p. 4-41). Therefore, CAP88 and the DEIS estimates of radon daughter concentrations immediately over the tailings pile, and the subsequent calculations of worker dose are greatly overestimated (by more than a factor of 10) (i.e. 0.267/0.02) because of this factor alone.

Contribution of Leachate Contaminants to Colorado River

Using the same conservative methodology as in SENES (1995), the DEIS (pp. 4-25 to 4-27) estimates the contribution of selected tailings contaminants to Colorado River concentrations at mean and minimum river flows using a leachate flow of 283 gpm (17.8 L/h). However, under existing conditions, the leachate flow according to the DEIS (p. 4-33) is about
25 g/m³ (6 L/s). (Note that Casonite (1994), as referenced in SENES (1995, p. 4-3), estimates the average rate of seepage from the uncovered tailings after the cessation of mill operations at 33 g/m³.) Using this value would reduce the estimated impact by more than a factor of 10, so that even under minimum river flows, the contributions of all contaminants (including uranium, gross alpha, etc.) to the Colorado River concentrations would be insignificant, contrary to the DEIS statements (p. 4-27).

These comments also relate to the calculation of post-reclamation impacts especially since the DEIS very conservatively assumes that sorption and other processes that attenuate contaminant levels are insignificant, and that there is no effluent cover in place (p. 4-33).

**Dose to Fish and Other Biota**

The radiation dose to generic fish, invertebrates and aquatic plants were estimated in the DEIS (Table 4.6-2, pp. 4-36 and 4-37) using internal dose conversion factors for specific radionuclide/organism combinations generated by the BIORAD computer code (Killough and McKay 1976). For example, the dose to invertebrates in water containing polonium-210 at 3.7 pCi/L was calculated to be 78 rad/day and the total dose from all uranium series radionuclides was estimated at 79 rad/day, 21% of the DOE limit (Table 4.6-2). As explained below, the absorbed dose to invertebrates (and other organisms) from polonium-210 (and other alpha emitters in the uranium series) was overestimated in the DEIS by a factor of 10.

The overestimate is a direct consequence of the use of dose factors from Killough and McKay (1976) which were originally derived for estimating dose equivalent (rem) to human tissues (90% of the quality factor for alpha radiation = 10, p. 405, Killough and McKay 1976). R/a is a unit of absorbed dose and is indexed as a quality factor is not required in its estimation i.e. has been confirmed by Blythlock (1993). Moreover, IAEA (1992), the basis for the 1 rad/day interim dose limit, does not use a quality factor.

The absorbed dose to invertebrates from polonium-210 can be calculated by using the bioaccumulation factor reported in Killough and McKay (1976) (Table 4-12a) and the method of Blythlock, et al. (1993, p. B-4). The absorbed dose from polonium-210 is:

\[ 3.7 \text{ pCi/L} \times 10^6 \text{ pCi/} \text{Ci} \times 10^5 = L/\text{ml} \times 2 \times 10^8 \times 5.4 \text{ MeV} \times 1.87 \times 10^7 \]

\[ = 7.5 \times 10^9 \text{ rad/day} \]

\[ = 7.5 \text{ rad/day} \]

- 3.7 = polonium-210 concentration in water used in the DEIS, pCi/L
- 2 x 10^8 = polonium/invertebrate bioaccumulation factor for freshwater biota (Table 4-12, Killough and McKay 1976)
- 5.4 = average alpha and alpha reco energy, MeV (Table A.2, Blythlock, et al. 1993)

1.87 x 10^7 = unit conversion factor, g rad/day (\mu Ci/\text{y MeV}) (p. 4-28, Killough and McKay 1976).

This is about one-tenth of the value of 78 rad/day estimated in the DEIS (Table 4.6-2).

The absorbed dose to aquatic biota from radium-226 was overestimated by approximately a factor of 2 (rather than 10) in Table 4.6-2 because doses from short-lived radon decay products were not included in Killough and McKay (1976) (see p. B-5, Blythlock, et al. 1993).

**Meteorology**

The DEIS reports that "preliminary winds in the Moab region are westerly to southwesterly" (p. 3-1). The source of this information is not clear. SENES used 1993 data from the Moab automatic station provided by ORNL as data that were best available and being used by ORNL (p. E-1 SENES 1995) which showed predominant winds from the southeast and south southeast (Figure E.1, SENES 1995). It appears that NRC has used data other than from the northeast of the tailings pile as those potentially exposed to the highest dose; whereas the corresponding group identified by SENES (1995) live at the entrance to Arches National Park. This difference is of little consequence as SENES noted that the predicted dose to Arches National Park residents were only a few percent higher than predicted doses to Ten’s Tour Centre residents.

**Location of Nearest Residents**

The closest residents to the tailings pile as used in the DEIS (p. 4-71) and SENES (1995) (both the DEIS and SENES used the center of the pile as origin of the co-ordinate system) are as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>From Pile Center</td>
<td>(my notes February 1995)</td>
</tr>
<tr>
<td>Direction</td>
<td>Distance</td>
</tr>
<tr>
<td>NW</td>
<td>1.9</td>
</tr>
<tr>
<td>ESE</td>
<td>2.6</td>
</tr>
<tr>
<td>ENE</td>
<td>1.4</td>
</tr>
</tbody>
</table>

The locations of nearest residents were very similar in both the DEIS and SENES (1995) assessments.

J-237
Estimated Releases to the Air

For purposes of estimating doses during on-site reclamation work, the DEIS (p. 4-73) estimated tailings emissions at 18.1 ton/day, after dust control measures are taken. The DEIS also estimated that the tailings contained Ra-226 and U-238 at 700 and 27 pCi/g, respectively.

Estimated Annual Emission During Reclamation Activities

<table>
<thead>
<tr>
<th></th>
<th>On-Site</th>
<th>Average Emission</th>
<th>NRC (1)</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SENES/NRC</td>
<td>SENES</td>
<td>NRC</td>
<td>SENES/NRC</td>
</tr>
<tr>
<td>Ra-226</td>
<td>10,000</td>
<td>1.711</td>
<td>0.17</td>
<td>0.000</td>
</tr>
<tr>
<td>U-238 (1)</td>
<td>1.1 x 10^7</td>
<td>2.8 x 10^-1</td>
<td>2.6</td>
<td>0.01</td>
</tr>
<tr>
<td>Ra-226 (2)</td>
<td>2.3 x 10^7</td>
<td>3.1 x 10^-1</td>
<td>2.3</td>
<td>0.01</td>
</tr>
<tr>
<td>Source</td>
<td>NRC 1996</td>
<td>SENES 1995</td>
<td>Section 3.6</td>
<td>NRC 1996</td>
</tr>
</tbody>
</table>

Notes

* At each of the Atlas and Plateau sites.
  1. The release rate of each of the decay products U-238 to U-234 were assumed equal to that of U-238.
  2. The release rate of Th-230 and each of the decay products of Ra-226 to Po-210 were assumed equal to that of Ra-226.
  3. The DEIS states these values include upper bound estimate of wind blown sources.

The particulate radioactivity source terms used by SENES (1995, Section 3.6 1995) were based on a more detailed evaluation of wind and machine resuspension than made by NRC and exceeded the corresponding values in the DEIS by factors of 2.3 to 7.6.

SENES was more conservative in estimating 50 acres would be recontoured at a time compared to the DEIS assumption of 25 acres.

SENES estimated radon emissions from the tailings pile at 0.17 at 0.42 of the emission rate used by NRC. We interpret the difference to be attributable to NRC's assumption that the tailings pile had no covers, whereas SENES took credit for poor ore covers and water ponds on the surface (when they were present).

Doses to Maximaly Exposed Individuals

The DEIS (p. 4-76) estimates that the effective dose from particulates to maximally exposed individuals at the Tes Tour center would be 11.4 mrem/day during on-site reclamation. The corresponding estimate by SENES (Table 3.2, p. 3-26, 1995) is in good agreement. At 9.4 mrem/day from dust (SENES used meteorological data from Moab and predicted only slightly lower doses at the Tes Tour Center compared to Archs national park Headquarters.)

It is not clear what radon emission rate was used in the DEIS to estimate radon daughter concentrations (p. 4-78, 4-79). It appears that the DEIS estimates the concentration of radon daughters at 0.0074 WL at the Tes Tour Center based on measurement. This is higher than the predicted value of 0.0015 WL by SENES based on CAP 88 modeling and 1,700 Cvy emission rate. The DEIS appears to have been conservative in its emission rate by not taking existing covers into account.

Impacts to Maxima1y Exposed Individuals

The DEIS (p. 4-87) is in agreement with the results of the SENES assessment (Table 3.3, 1995) that annual doses to maximally exposed individual near the existing Moab tailings pile during disposal to the Plateau site could be the same (or lower was included in DEIS statement) as during on-site disposal. However, the DEIS and SENES are also in agreement that the total inhalation dose over the duration of tailings removal would be higher for the reclamation period for the Plateau site alternative.
REFERENCES

Blaylock, B. G. Personal communication with M. Davis 1995


Canons Environmental Services Corp. NRC Request for Information - Atlas Corporation Reclamation Plan Uranium Mill Tailings Disposal Area 1994

International Commission on Radiological Protection (ICRP). Protection Against Radon-222 at Home and at Work. ICRP Publication 65, Annals of the ICRP 23(2) 1993

International Commission on Radiological Protection (ICRP). Limits of Inhilation of Radon Daughters by Workers ICRP Publication 32, Annals of the ICRP 6(1) 1982


U.S. NRC. Draft environmental impact statement related to reclamation of the uranium mill tailings at the Atlas site, Moab, Utah. NUREG-1531, January 1996


Dear Joseph J. Holonich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

I am a life time resident and past County Commissioner of the Moab community.

Having followed the situation for some time now, I can come to only see one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and the Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all to me. And slight environmental benefits can not make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contour it, cap it... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.
I feel that Atlas has done everything possible to handle this problem correctly, safely... and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

For the purpose of keeping the river from under mining the tailings pile, a rock apron between the river and pile would be a good safety guard.

Sincerely,

Ray Tibbette
Realtor

RT:gb

April 25, 1996

ATTN: Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
High-Level Waste and Uranium Project Branch
Mall Stop: TWFN7-J8
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Joseph J. Holonich:

Between the time the Atlas mill ceased operations in 1984, and the present when the ugly, rusty mill buildings were taken apart and buried, Moab, Utah saw a significant increase in tourism. The fact that an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, and hikers from visiting Moab and the nearby National Parks. The artist conception of what the mill site will look like once the site is capped is a vast improvement over what has been at this site for the last forty years. The only challenge will be to keep the "city slickrocker" of the cap.

I vote for leaving it in its place, and by beautify the area by making it a golf course.

Sincerely,

William Hansen
Realtor

WH:gb
Dear Joseph J. Holonich:

I am writing in regards to the decision currently before the Nuclear Regulatory Commission regarding the Atlas Mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its “spouting.”

For over forty years, the uranium tailings have been situated at the location in Moab and Atlas’ and NRC’s experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile’s future.

I personally have been involved in mining since 1954. My father worked in mines for 45 of his 55 years. In this time we mined a grade of ore higher than Atlas could ever mill.

Therefore, we had to mix non grade muck just to ship this ore to the mills. One of these mines, with high grade ore, was on the Green River bottom. When one mine was discontinued in one drift due to water, this drift being one of the hottest ore bodies we found, it appears to me that natural uranium has not killed anyone down stream or those of us who mined it for years.

Let's let the mills tailings be capped where they are and in case of a giant earthquake as the environmentalist predict, I am sure that with the falling of the rocks around us and the closing of the river portal the tailings in the river will be the farthest thing from our minds.

The environmentalist predict dooms day with everything. Let's let the experts do their jobs and get this over with, with minimal costs to the tax payers and citizens of Grand County who are the real tax payers of our county and not the environmentalist who pay very little.

Thank you for your time and consideration.

Sincerely,

[Signature]

Randy Day
Broker

RDrgb
April 28, 1996

Dear Mr. Holoscich:

This letter is an effort to reflect some of the basic opinions of many of the property owners and county residents who have spent time looking over the DEIS and DITER for the Atlas tailings pile in Moab. This is not a set of opinions from individuals or specific experts, but a compilation of opinions expressed to me from a highly diverse population and a highly eclectic community. These opinions boil down to a consensus, a common set of opinions when it comes to tailings pile issues. What follows is what I have heard voiced to me in hundreds of conversations, correspondences and meeting contexts, with rarely so much as a flutter of doubt, over the past months.

Of the reclamation options considered in the DEIS, the option people favor exclusively is to move the tailings pile to the Klondike Flats (Platteau site). People want to see the pile moved away from the Colorado river, out of the Moab wash, off of the faults, further from Klondike’s explosive population center, far from the range of the endangered fish and the migratory bird habitat, and away from our precious ground water. They want to see the pile placed in a lined, permanent position where it is, if possible, entirely below grade, sealed off from the water and unlikelihood of accidental or environmental forces affecting it as it now sits. (For many people, the most obvious assertion of this whole process is that the Colorado river can be stopped from following its natural trends and cutting through the pile.) Klondike Flats matches all of the NRC’s Appendix C criteria better than the in-place option.

People want the pile to be moved by rail. Many housewives were horrified at the public hearing by the comments from former Atlas workers saying the public should resist “disturbing” the pile more than anything else, because they were aware of the hazardous nature of the materials that were dumped into the pile from the first hand experience, and the public should really fear the horrible specter of turning up the coke into the air and stirring it along the roadways. For many, this argument boomerangs to become a testimony for getting the pile the heck away from us and its potential impact on our health and the environment. Too many people are using the most remote, enclosed transport option possible. People with hand calculators and common sense have done the math, thinking and minimal research (try calling the local potash plant to find out how many trucks loads will fit in a covered tank) to determine that this pile could be moved many times faster, and with far greater containment during transport, by rail than it can using the costly carrier of heavy, messy, dangerous trucks on our public highways. Atlas should be made to do at least much research in the direction of moving this pile as concerned citizens have done in ten months.

The NRC needs to demand that Atlas use real costs and figures, and sufficient accurate data in all of their calculations. Real costs are available (several county residents have some real figures from actual DOE reclamation projects were piles were moved), and are, by definition, more realistic, accurate, reliable, etc. than outdated multipliers which show up in this DEIS. Real costs or public inconvenience factors for repairs to transport roads/surfaces were not included. Numbers of truck loads and amounts of cap materials listed in different parts of the DEIS fail to match up, and while Atlas publicly admitted to various inaccuracies when they were brought up at the NRC hearing and the Atlas public meeting, the time and cost estimates based on these faulty numbers are quoted as accurate. The NRC is responsible to reject these figures as inaccurate and/or inconsistent. This is what people want you to do.
April 24, 1996
Joseph J. Holotich, Chief
U.S. Nuclear Regulatory Commission
Division of Waste Management
Office of Nuclear Facilities
Safety and Safeguards
Washington, D.C. 20555-001

Dear Mr. Holotich

Thank you and your commission for the privilege of making the following comments as to the reclamation of Uranium Tailings at the 20-1 Atlas Site, NW Moab, Utah Valley. Without restrictions, I support the concept of burial in place, or capping.

As to my background and the long-time related experiences I wish to state the following:

**MY BACKGROUND AND HISTORY**

1) As a shipper's representative for custom producers shipper's five of the seven mills in the Four Corners Region. I spent 31 years on a part-time basis, including the most time spanning 25 years (October, 1959 thru July, 1984) at the Moab Plant. Also over 3 years at the Mexican Hat mill. 2 years at the Tuba City mill one year at the Shipton mill and seven years for the principal Royalty Holders, including two also for the Custom Producers at RIO Carbon plant. I can rightfully say that I become an expert on the shipping crushing and sampling of raw ores.

2) I am a certified professional geologist by the American Institute of Professional Geological Scientists, # 2193. 1970. I became a Geologic Consultant at age 27 and still do some reviews and recommendations on older properties, now idle by the extreme low in U.S. Uranium Industry.

No. 1 of my exploration supervision was in the search of new or expanding ore properties found in the Chine formation, the bulk of which shipped to the Moab mill. Mexican Hat and Rio Algom Lisbon plants.

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**GEOLOGICAL SERVICE at MOAB, UTAH**

Page 2.

My primary area of expertise included all uranium and vanadium deposits in the general Four Corners Region. Including considerable amounts of work with the proven reserves in the Grants Mineral Belt, New Mexico. I also traveled the five western states on 18 reconnaissance of possible new projects for major and small corporations and individuals. Most of this consulting work is the Evaluation of and recommendations as to the possible project-expenditures toward the search and development of new favorability of belts, trends and the finding, drillhole expansion of new deposits and of known deposits in the areas of studies.

I guess and quoted as being, become an expert in the Chine formation deposits, trends, belts of favorable exploration.

3) Included in the Cancer Risks and history, my older brother, D.C., worked in smaller Uranium-Vanadium mines from 1941 thru the late 1970's. He did develop Colon Cancer, which was removed, and the Cancer arrested. D.C. died in 1993 at age 71 from diagnosed Black Lung and Emphysema. He had worked the last ten years in a coal mine near Price, Utah. He also was a long-time smoker, he did not have any known cancer at the time of death.

I am 69 years old, Trim and Fit, having exceptionally good organs, including the lungs, heart, liver and others. I have very low blood pressure rates, a good heart beat rate and really enjoy a quality life in the Moab area. I am the example on a healthy life, after many years of exposure to low levels of radiation from raw ores at mines, mills and drilling projects. I do not doubt the dangers of heavy smoking, radon gas and dust combination.

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**ATLAS CORPORATION AND THE COMMUNITY**

4) I would like to praise and show my appreciation to the Atlas Corporation and its former corporations merged into the parent corporation. Atlas operated a most fair, reputable operation in the industry and community. Agreements and recommendations naturally and rightfully relate to some forty years. 1956 commencing milling, up to present-1996. From day one, the Uranium Reduction Corporation 1954 the participated in community projects including the building of a new nine hole golf course-One green was the duty of Hitch Melich, Vice President, and other duties in the overall new course by the corporation. This was the beginning of a most successful and well played eighteen hole Moab Municipal Golf Course operated by the Moab Country Club, on the Moab City Culinary primary water source-supply. In the 1960's Uranium Reduction gave 50% of the Shackleford spring to the Moab City in exchange for the water and Sewer connections to the new company housing subdivision-Palisades, NW Moab.

At the Moab mill, as the new safety-health rules came down Atlas abided by all, and insisted that we as visitors do the same. My firm became a watchdog for fairness for both our clients and Atlas. The Atlas personnel did the same with us. No finer working relations were known anywhere in the industry.
CONCLUSIONS

Up thru 1970 we all work toward the finding, development of and production of Yellowcake for the U.S. Atomic Energy Act. We thought of this as our jobs and also our patriotic duty. During the OPEC embargo of the 1973 thru 1973 era, our demand for electrical power produced from Nuclear Power plants rose from 4% U.S. requirements to the high 40% Nuclear. By 1978 we had on order some 331 plants in the United States. The picture changed to over 50% reduction in the completion of U.S. plants. It is my understanding that approximately 56% of the Moab Tails belong to the A.E.C. for the arsenal production. It is also my understanding that Atlas was required to meet Requirements for future reclamation of the tails with each expansion and raising of the tails pond coming in the 1980's til final.

Since 1970, I have taught, mainly, over division Geology Courses for Extension Divisions of Utah State University of Logan, Utah, and the past two years the College of Eastern Utah. Price, Utah. One of the favorite courses is termed Moab Geology. §90 U.S.U., normally taught during Spring Quarter. This is a special Topics science course consisting of six lectures by myself plus four from guest lecturers from the Park Service, BLM, mining and oil. This course was structured first in 1970, upon the advice and help for all three representation. We pretend to know well the structural and physical history and present day geology of the Moab Salt Core anticline. When in comes to possible quakes caused rupture and breaks in the brittle formations of this structure we believe that there is a great advantage by being over Salt beds and intrusions anywhere in the center or floor of the valley proper.

As a longtime resident of Moab Valley, having love and devotion to the concerns of health-safety and the Environment, both past and future, and not only for me and my family but my friends and voters, I do not dread or doubt the wisdom of capping the tails in place. After much serious thought, research and examination of reclaimed Rio Algom-Lisbon, Tuba City and Mexican Hat tails, it only makes good sense to me to cap the Moab Tails in place. The High ratio of clay minerals in the San Juan River, the high ratio of clay minerals in the tails and the high ratio of the ponds really form fine impermeable layers. In 1991, I sampled the Underflow liner materials in the Keystone Tails ponds for Grand County Commission. This liner came from the Dakota sandstone mainly. I doubt very much that it contains anything near the clay minerals as do the Chinle production at Moab. Our tests from commercial lab in Salt Lake came back with assurance by the state enforcement agencies as one of the best natural barriers known anywhere in the state of Utah. Carelessness by overloading to levels above the slumping liners lead to brine contamination in the monitoring wells in the mid 1980's. I officially notified the commission too late to eliminate the problem.

I am now serving my 33rd year on the Moab City-Council and Mayor board. I served as mayor from 1974 thru 1977. My main expertise here lies with ground water of our Spring and Well area, partially covered watershed by the municipal golf course, a segment of the fault rich water laden flank of the Moab anticline being recharged by the Hill Creek Drainage. I also have spent considerable time as a councilman with the Utility Department, embracing water, sewer, storm drainage, streets, Bike routing lanes, curbs and sidewalks. My City service as an elected official first came in 1954. All of us thru maturity becomes more aware of the environment we reside and work in. This is also my case; however, after much consideration as to the potential dangers to Moab Valley population, and having reviewed the reports by the HBC, Atlas and their consultants, I DO NOT have any problem in full endorsement of the plan for capping these very low level mill tails in place.

I have not chosen to become "Vocal" in the hearings. It is obvious that I come from the "Bias" or favorable side and I would immediately be branded the same.

Thanking you, for this opportunity to express myself, and please excuse the quality of this typing, my wife and word processor is out.

W. Dean Mc Dougall
Certified Professional Geologist (retired)
WDMC/WMDC

Elected U.S., State, County and City officials to include: U.S. Senator Orrin Hatch, Senator Robert Bennett, U.S. Congressman Bill Orton, U.S. Representative James Hansen, State Senator Mike Dinetrich, State Representative Neal Johnson, State Of Utah Honorable Governor Michael O. Leavitt, members of the Grand County Council, Moab City Mayor, members of City Council and the Moab Chamber Commerce.
April 29, 1996

Joseph J. Holonich, Chief
US NUCLEAR REGULATORY COMMISSION
High-Level Waste and Uranium Urnach (Mail Stop TWF47-39)
division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington DC 20555-0001

Transmitted by Facsimile to (301) 415-5397. Original mailed this date to above address

Re: Proposed Disposal of Mound Uranium Tailings Pile

Dear Mr. Holonich,

I respectfully request that my comments be added to the record as public comment. In my opinion that the above named tailings, should be contained IN PLACE and should NOT be moved to another location for containment.

There are numerous reasons I feel strongly about this.

Cost is minimal. Without statistics in hand the cost for labor, equipment, building of roads, and repair of current roads after the hauling of 10.5 million tons of tailings when completed will be astounding. Over the expected extra seven years it will take to move the tailings pile the cost to taxpayers will be phenomenal. And who is to benefit from this?

Safety factor. The increase in traffic on the roads alone speaks for itself. With the high traffic that the highway and roads surrounding Mound already have from tourism are hazard enough just for residents. With the heavy increase in traffic caused from moving the tailings pile the statistics of death and accident rates will be blown any high. Mound is a factor that is even more crucial than monetary factors.

Legal: If a legal decision is to be made, the piles will stay where they are. It's quite simple. There is currently no threat to fish, wild life, or water by leaving the piles in place. There is no threat to human life but there would be from traffic deaths were the piles to be moved. There is no affect on tourism now but there would be from increased traffic.

I was born in Mound in 1946 the daughter of Ralph Dunn. He transported uranium by truck from 1943 until around 1992. I grew up around mines, tailings, and the like and I'm positive the exposure I've received is much less than any individual would receive from driving by the tailings pile in their car. The man I grew up around are gradually dying but 27 L. uranium had anything to do with their deaths, it has taken 70, 80, and 90 years for it to do the job.

Thank you for taking the time to hear concerned citizens such as myself.

Sincerely,

Vicky Thurlow
Nuclear Regulatory Commission  
Joseph J. Holonich, Chief  
High-Level Waste and Uranium Projects Branch  
Mail Stop: TMFN7-39  
Division of Waste Management  
Office of Nuclear Material Safety and Safeguards  
Washington, D.C. 20555-0001

Re: Draft Environmental Impact Statement and Technical Evaluation Report  
Atlas Corporation's Uranium Tailing Pile  
Moab, Utah

Dear Mr. Holonich:

This letter comments upon the recently issued Draft Environmental Impact Statement (DEIS) and Draft Technical Evaluation Report (DTER) on Atlas Corporation's uranium tailings pile located near Moab, Utah.

The Minerals Exploration Coalition (MMEC) is concerned that inadequate justification has been presented in the DEIS for removing the tailings pile to another location at a cost ($122-157 million revised estimate) many times that estimated for capping the pile in place ($11-17 million). Before any such removal can be seriously considered, a convincing cost benefit analysis must demonstrate the strong need for such removal.

It is our understanding that capping the tailing pile in its present location is satisfactory both from a technical and health risk standpoint. Moving the pile would induce unnecessary health risk, both during transport and prior to capping at the new location, without offsetting benefit. Justification for the need to move the pile has not been made in our judgement.

MMEC believes your documentation clearly demonstrates the tailings material can be permanently safeguarded by capping in place. We urge you to select this mode for final resolution of this matter.

We note this matter has been under consideration since 1988. We strongly urge you to make a prompt decision on this matter, so that capping and restoration can begin and be completed in a timely fashion.

Decisions such as the one your agency must make on this tailings pile restoration should be made on sound technical advice and solid economic criteria, not based upon unfounded emotional concerns of a few residents who may not understand the factors involved. We urge you to make your decision based upon such fact based criteria.

The Minerals Exploration Coalition is an advocate on public policy issues involving access to, and use of, public lands of the United States for mineral exploration. Our membership, including over 30 corporations, represents a diverse group of individuals and companies engaged in mineral exploration on the public lands. Please note that Atlas Corporation is not a member of MMEC.

Yours very truly,

MINERALS EXPLORATION COALITION

Paul C. Jones  
Executive Director
April 29, 1996

Dear Mr. Mullins:

The National Parks & Conservation Association, an organization established in 1919 with over 450,000 members nationwide, wishes to voice serious concerns about the DEIS (MUREMENT-1992) and OFER (MUREMENT-1992) for the Atlas Corporation’s proposed reclamation of the uranium mill tailings at the Atlas site near Moab, Utah. This DEIS strives to identify and assess the effects of covering the 11 million tons of tailings from the mill and leaving them in place along the Colorado River.

We are particularly concerned about the fate of this external tailings pile for its effects today and future impacts tomorrow upon the national parks in this region. The tailings are within a quarter mile of Arches National Park, and is upstream of Canyonlands and Grand Canyon National Parks, and Glen Canyon and Lake Mead National Recreation Areas. We are very troubled by the fact that the tailings pile is unlined and is leaking heavy metals, radioactive particles and other toxic substances into the river, with unknown effects.

23-2 Aesthetic impacts of the pile are also troubling as it is visible from several places within Arches National Park.

Comments specific to the DEIS are as follows:

1. We believe the NRC is required to prepare a Biological Assessment assessing the project’s effects on endangered species and critical habitat before the agency makes conclusions about the project’s effects on listed species.

2. There needs to be a more sound scientific basis on the tailings leachate seepage impacts on the Colorado River under the Atlas proposal.

3. There needs to be a complete analysis on how each alternative will impact the tourism industry.

4. Aesthetics and Recreation: Since units of the National Park System are located downstream and would likely be adversely affected should the tailings pile at the Atlas site fail, we would like to see a more elaborate and specific analysis of these potential impacts both to the natural resources and to local economies.

It is inconceivable that such a tailings site would be approved today if this were to be a new project. Why then should it be allowed to continue in its present location, in harm's way of our national parks, a thriving, productive ecosystem and a tourism-dependent economy? We continue to believe that the Atlas site is wholly inappropriate for tailings disposal and support an alternative site.

Sincerely,

[Signature]

Mark R. Peterson
Rocky Mountain Regional Director
National Parks & Conservation Association
1407 Omney Court
Fort Collins, Colorado 80525
it is not a valid assumption that if the pile is moved, the site will be sufficiently clean to invite (or even permit) unrestricted development. We have essentially created two contaminated sites, where before there was only one. This conclusion should be revisited since there is no clear precedent for such a leap of logic.

The DEIS acknowledges that removing the pile will take a considerably longer period of time (up to seven years longer) than capping in place, but it does not clearly state that this means the potential dose from radon would be greater for moving the pile than for capping it. The DEIS should clearly show the increased risks associated with moving the pile.

With respect to the open items listed in the DTER, we are informed by Atlas that they have submitted responses to all but those that are more procedural in nature. While we do not have the benefit of NRC's analysis of the responses, it is our understanding that the Moho Fault issue has been resolved satisfactorily and that the Moho Fault is not considered a fault. The other issues also appear to be satisfactorily addressed.

The critical environmental issue appears to be the worst-case consequence of embankment failure. The authors have addressed this concern and concluded that "[t]he potential for impact on water quality and soil erosion is not expected to be significant due to site mobilization and operating procedures." This conclusion, we can only agree with our member company that capping the pile in its present condition is the appropriate course of action.

In conclusion, we generally support the reclamation plan proposed by Atlas Corporation and strongly urge the NRC to make a finding that is favorable to the licensee. Due to the uncertainty that Atlas has endured since 1988 when it initially submitted its modified reclamation plan, we also urge the NRC to make its decision in the most expeditious manner possible. This uncertainty has been a tremendous burden for the company in the conduct of its business.

Thank you for your consideration of these comments.

Sincerely,

[Signature]

Larry D. Buskall
President
The left and right associations in the neck, brain and spine may be affected by
various factors. It is important to consult a health professional for an accurate
assessment and appropriate treatment.

Dear [Name],

1000-200-00

Office of the President, Exempted

Director of the Program, Exempted

Assistant, Program, Exempted

Director, Program, Exempted

April 22, 1999

[Signature]

[Title]

[Name]
In accordance with the Interior agency's sampling design, 3 replicates of sediment samples, each consisting of 3 discrete samples were collected from each sampling station. These were combined into a composite sample for analysis. Approximately 3 to 5 kilograms of fathead minnows were collected from each sampling station. All replicate sediment samples and excess fish samples were preserved and archived at Barringer Laboratories in Golden, Colorado for additional analysis if any agency wishes to perform the tests.

This should read "...near the east bank."

Please feel free to contact me if you have any questions.

Sincerely,

Michael W. Klish
Environmental Scientist

April 29, 1996

Division of Waste Management
Ofc. of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Re: DEIS Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah.

To Whom It May Concern:

We have reviewed the DEIS and found it to be technically inadequate. The preferred alternative is not acceptable. Major problem areas are outlined below.

- No extensive soil investigation has been performed to document the nature and extent of soil contamination adjacent to the site. ERR (1986) at the Urranum Uranium Mill in Colorado found statistically significant elevated levels of heavy metals at distances up to 28,000 feet from the mill and ancillary facilities. At Moab, metals and radionuclides from the Atlas Mill could have been wind-transported both up- and down canyon in Moab Wash and along the Colorado River. The sediments in Moab Marsh could be heavily contaminated with heavy metals and radionuclides as wells as salts such as sulfate, nitrate, etc. from wind-blowen deposition from the Atlas Mill and Tailings.

- No complete description of groundwater aquifers with flow directions, confining layers, depth or thickness of each has been presented. Groundwater is assumed to flow into the Colorado River adjacent to the site. No analysis was presented to determine whether or not contaminated groundwater from the Atlas site moves across the Colorado and into Moab or the Moab Marsh. It is entirely possible, depending upon the depth and nature of formations beneath the Atlas site, that contaminated groundwater moves down and across the Colorado River. It is certainly possible that the contamination moves down river along the Colorado in the riparian zone and enters the river along several miles until encountering a barrier such as might occur at the Portal, at which location a pulse of contamination might be noted. (This might explain some of the elevated concentrations observed in the fish downstream).

J-254
Dear Mr. Holdich:

Between the time the Atlas mill ceased operations in 1984, and the present when the ugly, rusty mill buildings were taken apart and buried, Moab, Utah saw a significant increase in tourism. The fact that an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, and hikers from visiting Moab and the nearby National Parks. The artists' conception of what the millsite will look like once the site is capped is a vast improvement over what has been at the site for the last forty years. The only challenge will be to keep the "city slickrockers" off the cap.

I vote for leaving it in place.

Sincerely,

Kenneth Allred

32-1

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Dear Senator Robert F. Bennett:

I am a part-time resident of Moab, Utah. While I am not entirely happy about having a tailings pile in my backyard, I am aghast that the NRC would even consider requiring Atlas to dig up and move by truck or other means 10.5 million tons of fine, sand-like material that will pose greater risk to the public during the moving process than leaving the pile in place will pose. In addition to industrial strength traffic, the residents and visitors alike will have to breathe the tailings dust as they are moved.

Further, should the pile be moved, I question whether anyone would seriously want to live on the site of a former uranium tailings pile. If Grand County wants property to develop, let them develop the Airport site, and use the existing rail line as the cornerstone of Moab's public transportation system.

Sincerely,

Kenneth Allred

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[Signatures]
April 19, 1996

U.S. NRC

Dear MR. Holonich:

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its capping. For over forty years, the uranium tailings have been situated at that location in Moab and Atlas' and NRC's experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile's future.

Sincerely,

[Signature]

Curtis C. Freeman

I hope these signatures help to keep the tailings pile in place.

[Curtis C. Freeman]

April 19, 1996

U.S. NRC

Dear MR. Holonich:

I cannot comprehend that in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved this incurring an expenditure of ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover $4.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with this bill? It doesn't take a rocket scientist (let alone a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Atlas does default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safely guarded uranium tailings pile in our town. O do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Atlas close the tailings pile in place.

Sincerely,

[Signature]

LaVerne B. Allen

[Additional Signatures]

Curtis C. Freeman
April 23, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWPEN-2)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

This letter concerns the Atlas Corporation tailings pile near Moab, Utah. We are residents of Moab and have lived with the pile where it is for many years.

We can see no reason for the tailing piles to be moved. The information in your Draft Environmental Impact Statement proves that the pile will be safe for a long time if it is simply stabilized and capped right where it is. Science is on the side of Atlas and the Nuclear Regulatory Commission. Atlas, we know, has spent a great deal of money responding to your questions and concerns. Those questions and concerns have been addressed quite adequately. We have no doubts that the outstanding questions in your Technical Evaluation Report will be addressed just as well, if they already haven't been.

If it boils down to a case of "who do you trust?", we'll put our faith in Atlas' scientific consultants and the NRC's judgment, rather than the Grand County Council and their task force. All we've heard from them is unfounded claims, based on shaky science and fiscal irresponsibility.

Cast our vote for responsibility. Please stick by your guns and cap the tailings pile in place.

Thank you for your consideration.

Sincerely,

Floyd and Edna Avery
459 W. Jefferson
Moab, UT 84532

Fritz Bachman

The Nuclear Regulatory Commission
Washington, D.C.

Dear Sirs: I would like to comment on the Draft EIS related to Reclamation of Uranium Mill Tailings at the Atlas Site, Moab UT.

In Appendix C you summarize your criteria. These comments pertain to these criteria.
1) Does the Atlas site maximize remoteness? Hardly.
2) Is it in an unstable condition? It is in a flood plain and located on a fault.
3) Potential for dispersion by natural forces is maximal. 
4) The existing pile is not below grade.
5) Upstream rainfall catchment area is maximal. It is the main water course.
6) Topography provides no wind protection.
7) Your plan calls for slopes steeper than 20%.
8) The tailings are on a major fault line identified as potential for a major earthquake.
9) The design does not have a liner, is not designed to prevent failure, and the corrective action program has already proven faulty.
10) There is no proof that the reclamation plan will control the pile for 200 years, much less 1000.

It is very obvious that this plan does not merit your own criteria. Why is it even being considered?

Cost data for the reclamation plan make no sense at all. When Atlas considered getting rocks in Castle Valley, the Utah Department of Transportation estimated $50 million to upgrade and maintain the road (Highway 128). This is not reflected in Atlas estimates. How the say, vaguely, that they will get cover material elsewhere. Where, is the cost estimate for the road damage that will be caused. Will Utah and Grand County taxpayers be expected to foot that bill?

The data Atlas used to compile their cost projections does not reflect current technology and costs. What are the other options to be considered? Atlas only has told us what they want us to hear.

Do you (the taxpayers) have any reason to believe that the estimates will be accurate when all is said and done? History shows that costs are seldom accurately estimated.

The Pile is on TWO major faults. These faults have been
identified as highly potential for an earthquake. Why are we even considering this location as a potential site? Atlas economics?

37-4

What evidence is there that ground water contamination will stop? It is happening now. Atlas attempts to stop it have failed, as Mr. Pattison admitted at the public hearing. There is no plan of how this will be addressed, except by an altering of the standards. This is a major issue that is not addressed. Spell it out. What will happen to our groundwater, especially that which is entering our river?

37-5

Atlas says that the alternative site is environmentally safer. The NRC says that the alternative site is safer. Are you protecting the American public? What criteria could possibly be more important than public health and safety? Atlas pocketbook?

37-6

Open issues abound. We keep being told that we must trust your expert judgement that these will be addressed satisfactorily. Why?

37-7

The studies done on fish and sediments in '95 very badly mangled. Why has no follow up been done to gather this evidence? Is there something that Atlas doesn’t want us to know? What about the dead Tamarisk trees? Does anyone have a reliable answer to the cause of their death? Does it matter to us? You bet your life (or ours).

37-8

Atlas says that Round Mountain will not be the site of ‘stapling materials. How then can costs and impacts of

Ran out of ribbon. Sorry.

Sincerely,

[Signature]

April 23, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFN7-J9)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

This letter concerns the Atlas Corporation tailings pile near Moab, Utah. I am a resident of Moab and have lived with the pile where it is for many years.

I can see no reason for the tailings pile to be moved. The information in your Draft Environmental Impact Statement proves that the pile will be safe for a long time if it is simply stabilized and capped right where it is. Science is on the side of Atlas and the Nuclear Regulatory Commission. Atlas, I know, has spent a great deal of money responding to your questions and concerns. Those questions and concerns have been addressed quite adequately. I have no doubts that the outstanding questions in your Technical Evaluation Report will be addressed just as well, if they already haven’t been.

If it boils down to a case of “who do you trust?”, I’ll put my faith in Atlas’ scientific consultants and the NRC’s judgment, rather than the Grand County Council and their task force. All I’ve heard from them is noise and a long series of unfounded claims.

Cast my vote for reason. Please stick by your guns and cap the tailings pile in place.

Thank you for your consideration.

Sincerely,

[Signature]

Bob Baldwin
52 E. 200 North
Moab, UT 84532
April 22, 1996

Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWPN-18)
Division Of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D. C. 20555-0001

Regarding Atlas Tailings Pile:

Dear Sir:

As a former Plant Superintendent for Atlas at the Moab Hill I am well acquainted with the tailings pond at the Atlas Hill site. I worked there 1977-1979 at the mill before transferring into the mine division. Throughout my career I have worked in CA, NV, CO, AZ, and UT in the mining industry dealing with mines, mills, and tailing ponds. I have found that they are better left and secured in place.

I get the feeling that the "tree hugger" are making a great big mountain out of a tiny molehill. They are so determined to spend somebody else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a long time doing no harm to the environment or the people of the Moab Valley.

They want the pile moved somewhere else, and they want somebody else to pay for moving it. I don't think Atlas has enough money to start moving the pile, and I don't think the government should waste money on it.

Why do we keep beating a dead horse about the "dangers" certain Councilmen keep fanning about? I don't think there are any real dangers. Enviros like them are quick to point out problems but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done. Some of the mentality of the people here is move the pile regardless of the cost because it was done elsewhere.

Let Atlas proceed with their plan of capping the pond in place and lets get it done.

We don't need any more help from government agencies and "tree hugger".

Sincerely,

[Signature]

Donald J. Beauregard

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U.S. NRC
WASHINGTON, D.C.

April 22, 1996

Dear Mr. Holonich:

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be safer, take less time and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to ingesting these particles. While it is a loose comparison, considering what is happening in England with the "sand cave" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

Logistically, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety's sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your time and consideration.

Sincerely,
April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I cannot comprehend that in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved this incuring an expenditure of ten times the projected cost of closing the pile in place. Aedas has posted a bond to cover $6.5 million of the cost. Aedas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn’t take a rocket scientist (or even a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Aedas does default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safety guarded uranium tailings pile in our town. I do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Aedas close the tailings pile in place.

Sincerely,

Gary L. Blake

Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects
Branch (Mail Drop: WMF7-21)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20545-0001

April 10, 1996

Dear Mr. Holonich:

I have been following the course of ongoing arguments concerning what to do with the Atlas mill tailings located at the northerly sector of Nevada along the Colorado River.

As a retired engineer I take pride in that inherent trait to weigh facts, and as a resident of Spanish Valley am vitally concerned with health risks affecting our locales.

Reviewing the summary results of ongoing tests during the period of the next several years certainly presents some highly valid and beneficial reasons for ceasing the mill tailings in place as the optimum solution, both to controlling health hazards, as well as affording a sound economic approach. I have not discovered any factual data disputing or reporting errors in the findings recommending ceasing the mill tailings, nor have I noted any evidence that moving the tailings to another site will not result in increased radon releases that will indeed result in a definite high risk health hazard for our area as stipulated on the basis that the tailings were to be moved to another site.

If the proposed plan for ceasing the Atlas mill tailings provides erroneous or misleading evidence pertinent to health hazards, then it is well past the time that those who oppose ceasing the tailings come forward with factual data that will refute the proposed plan and provide delineated information supporting moving the tailings. It is time to formalize and present that plan thorough public communications for assessment by our constituents in Grand County instead of all this word of mouth crap that offers no supporting evidence advantageous to tailings relocation.

As a long-time resident of Spanish Valley, I share the growing concerns of many whom are commencing to recognize the poor quality and lack of cost effectiveness of the leadership and management in the community. Based on the evidence and test results presented, I must confess in the logic to strongly support ceasing the Atlas mill tailings in place.

Sincerely,

[Signature]

Rex G. Bloom
April 22, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFH7-33)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

April 22, 1996

Dear Mr. Holonich:

This letter concerns the Atlas Corporation tailings pile near Moab, Utah. We are residents of Moab and have lived with the pile where it is for many years.

We can see no reason for the tailings pile to be moved. The information in your Draft Environmental Impact Statement proves that the pile will be safe for a long time if it is simply stabilized and capped right where it is. Science is on the side of Atlas and the Nuclear Regulatory Commission. Atlas, we know, has spent a great deal of money responding to your questions and concerns. Those questions and concerns have been addressed quite adequately. We have no doubt that the outstanding questions in your Technical Evaluation Report will be addressed just as well, if they aren't already been.

If it boils down to a case of "who do you trust?", we'll put our faith in Atlas' scientific consultants and the NRC's judgment, rather than the Grand County Council and their task force. All we've heard from them are unfounded claims, based on shaky science and fiscal irresponsibility.

Cast our vote for responsibility. Please stick by your guns and cap the tailings pile in place.

Thank you for your consideration.

Sincerely,

Bo and Ronny Johannson
391 Walker
Moab, UT 84532
April 1, 1996

Dear Mr. Holonich:

Between the time the Atlas mill ceased operations in 1984, and the present when the ugly, rusty mill buildings were taken apart and buried, Moab, Utah saw a significant increase in tourists. The fact that an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, hikers, and river runners from visiting Moab and the nearby National Parks. The artists conception of what the millsite will look like once the site is capped is a vast improvement over what has been at the site for the last forty years. The only challenge will be to keep the "city slickers" off the cap.

I vote for leaving it in place.

Sincerely, O C (Bill) Bauleen

P.S. I've lived in Grand County for 64 years. During the uranium boom I did "dirty work" for the industry. For 45 years I owned a ranch on the bank of the Colorado River on Utah Hwy 128. I lived there for 29 years. Twenty-six years ago I completed two quarters of local geology classes under the Southeastern Utah So Continuing Education. I feel that I am qualified to know that leaving the tailings pile in its present place is the very best place for it. Sincerely,

O C Bauleen
1784 Plateau Circle
Moab, UT 84532-9241

April 24, 1996

Bernice Bowman
226 East 100 North
Moab, Utah 84532

Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High-Level Waste and Uranium

April 24, 1996

Dear Mr. Holonich:

In regard to the Atlas Corporation tailings pile near Moab, Utah I strongly urge you to make the decision to cap the tailings pile in place.

The decision to cap would be economically a wise choice and the danger of airborne radioactive particles would not be as great.

From a safety and financial standpoint it makes clear sense to cap the pile; the sooner the better.

Sincerely,

Bernice Bowman
April 28, 1996

Dear Joseph Holonich,

Please cooperate to help move the Atlas tailings pile from Round Mountain to the proposed plateau site. I've now heard from all the folks around here who have studied the issue & the arguments against it. This move clearly can & should take place. I'm in Castle Valley now. Time is of the essence & would certainly appreciate your help.

Thank you,
Dean Bradford

April 28, 1996

Dear Mr. Holonich:

Between the time the Atlas mill ceased operations in 1984, and the present when the ugly, rusty mill buildings were taken apart and buried, Moab, Utah saw a significant increase in tourism. The site of an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, and hikers from visiting Moab and the nearby National Parks. The current condition of what the millsite will look like once the site is capped is a vast improvement over what has been the site for the last thirty years. The only challenge will be to keep the "city slickers" off the site.

I hope I am leaving it in place.

Sincerely,
[Signature]

455 Carlos Court
Moab, Utah.
April 21, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I have been a resident of Moab, Utah for over 24 years. I (or someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river road, State Highway 191 and the alternative Plataea site into a major industrial operation for the next 15 years. The capping this will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

[Signature]

[Signatures of other residents]
April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear MR. HODGMAN:

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

[Signature]

CHIP BROS
313 N. MAIN STREET
MOAB, UTAH

April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear MR. HODGMAN:

For many years now, I’ve been following the situation between the NRC and Atlas company.

From what I’ve been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, “What would be accomplished?” I mean, we would have two radioactive piles instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal site, and cleaning up the old place.

From what I’ve read and heard, moving the tailings would mean a whole lot of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings site where they are. I believe them when they say they can make the place safe.

Hence, I’ve lived here and raised a family, and we’ve all been healthy.

Thank you.

[Signature]

CHIP BROS
313 N. MAIN STREET
MOAB, UTAH

J-268
April 28, 1996

Dear Sirs,

Even to a layperson, it is obvious that the DEIS for the Atlas tailings pile at Moab, UT, is seriously flawed.

The DEIS as much as admits that the background monitoring well is contaminated. The fish and water samples taken were bare minimal and were obtained at high water, which would skew the results.

When asked at their March 19th meeting in Moab, why the discrepancy between the numbers for amount of borrow material for capping in place vs. removal (on pages 2-12 and 2-22 in the DEIS), Atlas replied that the numbers were "typos". Yet they based their cost estimates on these "typos". Makes you wonder if the whole document isn't a typo.

Capping in place does not meet most of the NRC technical criteria as listed in appendix C. Most of the conclusions drawn by your own staff are that removal of the pile to the alternate site is the best option. Yet your final conclusion is to cap in place based only on financial considerations which are based on these "typos". I don't believe you are following your primary mandate, which is protecting public health and safety. To protect public health and safety, you must move the pile.

Thank you for your consideration.

Sincerely,

Jake Burnett

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U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holmich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the pueblo of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be financially irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current site from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contain it, cap it...and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely...and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added the dollars involved.

Thank you for your consideration.

Sincerely,

[Signature]

Jake Burnett

3350 E. JUNIPER DRIVE
MOAB, UTAH.
Joseph Holonich, Chief High-Level Waste & Uranium Recovery Projects Branch
Office of Nuclear Material Safety & Safeguards
Mail Stop TWPH 7J-9
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Holonich,

I have reviewed the Draft Environmental Impact Statement for the Atlas Tailings Pile and offer the following comments:

1. The format for the DEIS is difficult to follow and does not conform to the normal format for an Environmental Assessment or an Environmental Impact Statement. The analysis of the Atlas proposal and the Plateau site alternative should be presented separately and discussions on land use, groundwater, geology, radiation exposure, transportation etc. should be developed and presented individually for each alternative. If changing the format is too time consuming, maybe you would consider indenting the beginning of each paragraph when you are changing the alternative you are discussing and labeling the paragraph (i.e. Atlas Proposal, Plateau Site etc.).

2. Section 2. ALTERNATIVES INCLUDING THE PROPOSED ACTION describes in detail each alternative. However, this section should NOT include impact discussions. Discussions of IMPACTS and ENVIRONMENTAL CONSEQUENCES belong in Section 4. More specifically, the following paragraphs DO NOT BELONG in this section:

- Section 2.2.1.2: Alternative Modes of Tailings Transport
  - Conventional Truck: last paragraph
  - Slurry Pipeline: last paragraph

- Section 2.2.2: Other Alternate Sites
  - The entire section except for the first descriptive paragraph.

- Section 2.3: THE NO-ACTION ALTERNATIVE
  - Last two sentences

Section 2.4: COMPARISON OF THE IMPACTS OF ALTERNATIVES

The entire section belongs in ENVIRONMENTAL CONSEQUENCES.

3. Page 1-8 Section 1.5.7 Scope of this Environmental Impact Statement:

The second paragraph states that "the selection of an alternative site for actual disposal of the Atlas tailings is not within the scope of this DEIS. Should NRC not approve the Atlas proposed on-site reclamation plan, additional environmental evaluation would be required for any alternate plan." THIS IS NOT ACCEPTABLE! The NEPA process REQUIRES that you evaluate reasonable options and that you provide an analysis that IS AS COMPREHENSIVE FOR THE ALTERNATIVES AS IT IS FOR THE PROPOSED ACTION.

4. Section 2.2.1.3 Tailings Disposal

I am shocked at the analysis that was performed on the PLATEAU SITE alternative. The design that is presented and analyzed in the DEIS does NOT meet the NRC criteria for below-grade disposal. The NRC presents an analysis throughout the entire DEIS based on the fact that the tailings would be partially buried and piled 14 ft ABOVE GRADE. The last paragraph of this section states "If NRC does not grant a waiver for partial below grade burial, the licensees would be required to bury the tailings entirely below grade at Klonodee Flat."

How can you present an alternative that DOES NOT MEET YOUR OWN CRITERIA when you are already supporting the Atlas proposal which also does not meet your criteria? The analysis of the PLATEAU SITE should be RE-DONE and RE-DESIGNED AND ANALYZED ACCORDING TO COMPLETE BELOW-GRAGE BOUNDARY:

5. I am concerned about the cover designs that have been described in numerous places throughout the document. Page 2-5 states that "the cover system would provide a minimum of 94 cm (37 inches) of cover above the tailings on the tops and sides of the cell." The various profiles and schematics presented don't add up.

At the Durango, CO disposal cell a four-foot layer of clay was installed to control the escaping radon gas. In addition to the four-foot clay layer, three more feet containing layers of soil and rocks were added to make a total of seven feet of cover material. Six feet of cover materials were used on the slopes.
And there is still leaching of contaminants into the groundwater.

56-11 I'd just like to raise a big shocking pink flag. No matter what you put on top of the pile, it will continue to leach into the groundwater and ultimately the Colorado River! The tailings pile must be moved!

6. The discussion on page 4-4 Section 4.1.2 Borrow Operations is deficient. While Atlas has publicly stated that Mount Sanitas is not being considered as a source for cover material, it still must be emphasized that no matter where the source of borrowed materials is located, a detailed analysis must be made. The issue of importance that must be addressed should include but not be limited to a description of current road conditions and use, impacts to traffic, air, tourism, local businesses, end-of-project road repair requirements, costs of road and traffic repair and improvements and identification of who will pay.

7. Section 4.3.6.2 Tailings Pile Failure (pages 4-9, 4-10)

I keep re-reading this section, hoping that what I read really wasn't there. "Most water quality standards in the river (uranium being the exception) would not be violated during a pile failure, because of the great dilution provided by the HP." "After flood waters in the Missouri recede, the use of previously flooded lands could be restricted until surveys of contamination and any necessary cleanup activities were completed and the results evaluated." There's also reference to the flooded lands being contaminated by dissolved substances in the water and by deposition of tailings solids. But because of dilution, the contaminant levels should not be high enough to limit the growing of crops or grazing of livestock after the flood waters recede.

This description conjures up for me a mini-disaster. The DEIS states "Some temporary restrictions of land use could apply until surveys and any necessary cleanup were completed. No requirement for monitoring or mitigation appears necessary with regard to land-use impacts."

7. WHO would be called in to handle this after Atlas is long gone? Who is responsible for the clean-up and/or the surveys? FEMA? DOE? Grand County? The MRC?

8. The approach to the previous section typifies the entire tone of the DEIS. There is a glibness that is discomforting. Every discussion related to environmental consequences of the Atlas proposal seems to minimize the impacts in no uncertain terms.

3 Based on what I have read, there are really no impacts associated with leaving the pile where it is and capping it in place. I am not to worry about the groundwater in the Quaternary Formation...it's not used for drinking water, only for irrigation. Have you forgotten that plants use that water, livestock graze on those plants and people eat livestock. Page 4-13, last paragraph states: "The groundwater at the tailings pile would continue to be impacted until the entire leachiage content of the pile had leached out. However, it is expected that the tailings will continue to leach well beyond the design life of the pile."

And I know we shouldn't worry about Lake Powell becoming contaminated. On page 4-28 the DEIS states that "None of the contaminants except uranium would exceed any of these criteria...As this slug of contaminated water flows to Lake Powell (a matter of a few days) dilution would lower the contaminant concentrations...During the passage of the contaminated water mass down the river, it would be advisable to prohibit any diversion of the water for human consumption or agriculture." I was wondering if there was a way I could swim and recreate at Lake Powell without getting any water in my mouth.

Page 4-56 Section 4.7.2.5. Conclusion states "Although the Atlas proposal and Plateau site alternative would cause some economic costs and benefits in the Moab area, the net impact to the overall local economy would not be expected to be significantly adverse. The hypothetical tailings pile failure should also not significantly affect the local economy over the long term. The Lake Powell tourism industry is a $340 million industry for our region. If a quarter of the people don't use the lake because of bad press and water contamination our region could lose $80 million.

Section 4.6.5 Conclusion: Aquatic, Ecology, Including Threatened and Endangered Fish Species (page 4-45) states: "The potential conditions related to the tailings pile do not appear to adversely affect aquatic biota of the Colorado River beyond a small mixing zone adjacent to and downriver of the pile. Very limited, but recently obtained data on fish contaminant levels, however, suggest that possibly hazardous levels of selenium and mercury occur in fish fromMinors collected near the pile. Should individual endangered Colorado squawfish or razorback suckers reside in, or frequent the mixing zone or downstream deposition areas, these individuals could possibly incur some degree of harm ranging from slightly reduced reproduction to death."

I am uneasy and I think the previous paragraphs say it all. The DEIS has not convinced me in any way that the Atlas proposal is the best alternative. In fact, it actually states that the Plateau Site is the most environmentally sound alternative.
9. It has been my understanding that the National Environmental Policy Act (NEPA) was developed to ensure that a mechanism exists for the analysis of environmental consequences of proposed actions and alternatives. If I'm not mistaken, COST ANALYSIS is never included in an Environmental Assessment. Draft Environmental Impact Statement or Final Environmental Impact Statement. The purpose of NEPA is to allow the public and reviewing agencies to view the project in its entirety without cost figures to taint the analysis.

If I BASE MY POSITION and review on what YOU have presented in the DEIS, without cost considerations, it is blatantly clear that YOUR choice is the PLATEAU SITE alternative. Your technical analysis supports that alternative.

Page 2.26, last paragraph: "In conclusion, the differences in potential long-term impacts listed above suggest that the Plateau site alternative is environmentally preferable to the Atlas proposal....Thus, the high financial cost of moving the tailings may be the only significant disadvantage of the Plateau site alternative."

Why not find a way to ensure that moving the tailings to the PLATEAU SITE becomes a reality. All who are supporting the PLATEAU SITE ALTERNATIVE (the Grand County Community, the findings in the DEIS, and the numerous Federal and State agencies which have been intimately involved in this process) I'm sure would be willing to work toward this end! Please: WMC and ATLAS, put down your swords and follow your own recommendations. Let us work together to get the pile moved.

Sincerely,

[Signature]

Omni Butterfly

To Whom It May Concern

April 13, 1996

Joseph J. Holonich, Chief
U.S. NUCLEAR REGULATORY COMMISSION
High-Level Waste and Uranium Projects branch (Mail Stop: WPHM-7-39)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Greetings:

My name is Dennis E. Byrd. I live at 778 Palisade Drive in Moab, Utah. My mailing address is 854 Rainbow Drive. My telephone number is 801-259-7796. Except for the school years of 1950-59-60, when I lived in Salt Lake City, I have lived in Moab since early 1953. I am seventy five years of age. The only public meeting I have attended for many years was the recent informational meeting given by Atlas Corporation at the Moab Civic Center. That was a very informative meeting. For a change it was nice to hear from experts who knew what they were talking about. I do not understand why the Grand County Councilmen and all those people yelling about moving the uranium mill tailings were not present.

I take medication for high blood pressure. Listening to the ignorant statements made by Grand County's elected officials and other newcomers, who have no practical knowledge or experience with the uranium industry or radiation, almost gave me a heart attack the one time that I attended a public hearing on the Moab mill tailing at Star Hall.

As I worked on this letter/statement it grew into something very different than I started out to write. There are a lot of things I have been wanting to say but have not taken the time to write. In the attached statement I explain the facts upon which I base my opinions expressed in this letter.

To me, moving the Moab Uranium Tailing Pile is the stupidest idea I have ever heard. It would be better and cheaper to just purchase the homes and property of those who want the tailings moved, cap the tailings pile where they are and leave the rest of Grand County's residents alone? That would be the preference of many Moab citizens.

It distresses me to see so much money and effort being wasted on studies and litigation about the Moab uranium mill tailings. Since the 1960s the environmental organization, companies & attorneys who make huge profits from tailings, universities that profit from radiation studies, and U.S. Government departments including the Nuclear Regulatory Commission and especially the E.P.A. have confused the general public about uranium radiation to the point where even educated persons equate mill tailings with spent nuclear fuel rods.

I am not a geologist or a mining engineer. However, I have prospected for uranium by "rim flying." I have compared the radiation readings in an airplane over the Moab mill tailings to nearby natural uranium outcrops. I have examined uranium discoveries in several states with professional geologist, have managed a small uranium mine and I supervised development work on uranium discoveries in different places and formations that were made by many prospectors. I have worked with prospectors, geologist, uranium miners, promoters and attorneys. I have staked and sold uranium mining claims for enough money that I thought I was going to be very rich. I have actually collected approximately $100,000 in royalty payments from uranium ore mined on mining claims that I staked in 1953. As a professional pilot during the "uranium boom" I flew into about every airstrip on the Colorado Plateau for ambulance emergencies, hauling workers and delivering food or supplies. Once I delivered a special addition of Grand Junction's Daily Sentinel newspaper to every mining camp we could locate on the Colorado Plateau. My experiences make me more of an expert on uranium, radiation and mill tailings than any person I have heard speak or have read about speaking that want the Moab tailings pile moved.

Respectfully submitted

Dennis E. Byrd

J-273
STATEMENT

TO WHOM IT MAY

DENNIS E. BYRD

I have come to believe that the major reason there is a problem regarding the Moab uranium mill tailings is the fact that the U.S. government, the U.S. Nuclear Regulatory Commission and the E.P.A. has failed to give our Grand County Councilmen and the general public the information they need to properly evaluate all the hazards. If there really are any hazards, associated with the our uranium mill tailings. As a result their negligence any attempt by Atlas Corporation to clarify the problem is suspected to be misleading.

Why doesn't N.R.C. tell the people of Grand County facts like these. It would take many Moab tailings piles to equal the health hazard of the cigarettes are that hauled into this county every month. That the tailings piles is just made up of crushed native rocks hauled in from the surrounding area and processed to remove all the uranium from those rocks that was possible. Atlas did not make those rocks. That large uncovered truck loads of ore grade uranium bearing native rocks (02 1308 or higher) were hauled down Moab's Main Street several times every hour for thirty years. One twenty ton load averaged 2294 U308 and many loads averaged 39%. Today the dust from all that ore is spread the length of Main Street and along the highway on both ends of town. If uranium radiation was as dangerous as many of Grand County's new-comers believe, all the Moab citizens who lived here for the past forty years would be dead. That, because of Moab's altitude, the natural back ground radiation count caused by the sun at Center and Main Street is higher than the highest lead radiation level measured outside the power plant compound during the accident at Three Mile Island. Tell the people how the radium reading on top of the Moab tailings piles compare to radium readings in the basement of the Utah State Capitol building or in New York's Grand Central Station? Tell them how many uranium miners who did not smoke cigarettes actually died of lung cancer. Explain the difference between the radiation level of an equal volume of Moab mill tailings to that of an equal volume of cigarette ash or the manure of a Coleman gas lamp? - AND - Tell them how any uranium and heavy metals leakage into the Colorado River from the Moab tailings would compare to the natural uranium & heavy metals that have gone down the Colorado River for a million years in the past and will continue to wash down stream every time there is run-off water from the cliffs in this area?

From 1954 until the mid 1960's, our Moab City Limit signs proudly proclaimed that Moab, Utah was the URANIUM CAPITOL OF THE WORLD. That was before there was either a URANIUM REDUCTION COMPANY URANIUM MILL or a tailings pile. The claim was based upon Moab having more known uranium ore deposits within forty miles of the town than any other town. We lost the honor of being the URANIUM CAPITOL OF THE WORLD when larger uranium deposits were discovered near Grants, New Mexico and in the Gas Hills of Wyoming.

Very few people realize just how common uranium mineralization and other radioactive elements are all over this nation. I have examined uranium discoveries in those black desert mountains near Blythe, California, in cliffs and flats near Cameron, Arizona, in sand deposits near Baggs, Wyoming, in lignite coal seams near Rangely, Colorado, in little yellow highly radioactive puffs balls in the Red Desert of Wyoming, old lake beds and rocky hills all over northern New Mexico, radio active areas high mountains near Gunnison, Colorado, in many formations from St. George to Cisco in southern Utah, in radio active beach sands in Florida and in clitch pits and dirt roads in Texas.

Attached hereto is a reduced copy of a map produced by the DEPARTMENT OF
It is my opinion that almost every uranium ore location represented by a dot on the AEC map still constitutes an equal or greater source of radon gas, uranium and heavy metals, that might contaminate the air and water in the Colorado River drainage, than the Moab tailing pile. Most uranium prospects and mines produced a lot of low grade uranium ore that was less than the saleable 0.1% U3O8. This Map shows that a large number of those discoveries were high on the cliffs which drain into the Colorado River. Their low grade ore, put there by nature millions of years ago, was dumped down the side of those cliffs where it remains today. Every time there is any water run-off, some of that material is washed into the Colorado River.

My count of the dots on the AEC map shows that within forty miles north east of Moab there are 102 old uranium mines. There are 109 abandoned uranium mines within forty miles south east of Moab. South west of town I count seventy seven old uranium mines within forty miles. One of those uranium digsgings is the Rattlesnake Mine. (see the enclosed photo) It was a large open pit mine about thirty miles away. I think that pit would hold all the Moab mill tailing pile. To the north west, mostly between Moab and Thompson, there appears to be at least 43 old uranium mines. These mines are right next to Arches National Park. Run-off Water from them and their waste dumps runs directly into the Arches National Park. It will continue to drain that way forever. When National Park employees stand up in public meeting and claim that uranium in the mill tailings hurts the tourist industry it is either plain B.S. or an expression of ignorance.

In 1955 I heard Mr. Floyd Odim (founder and President of Atlas Corporation) tell the annual meeting of Atlas stockholders in New York City that Atlas planned to build their own uranium mill near their Big Indian District mines. Mr. Odim made an overhead photograph, which I made for him to show the stock holders the exact location of their proposed mill. The proposed Atlas uranium mill location was near the old copper pits in Lisbon Valley.

To me, it is not correct to call this "THE ATLAS TAILING PILE". It is a Moab, Grand County and San Juan County tailings pile. Local rocks, mostly from San Juan County, were hauled to the Moab mill from all directions and ground up to make the tailings in that pile. Those rocks and that mill are what built the City of Moab and made the Grand County that we enjoy today. Sand in that pile came from came from the Hecla Mine, Homestake's North Alice and La Sal Mines, E.L. Cord's Jen Mine, Lisbon's Ike Shaft, Bill McCormick's Standard Metals Mines, Steen's Mi Viado, the Atlas Hidden Splender Far West Mine and dozens of other mines.

The ATLAS MINERALS sign did not go up on the Moab uranium mill until Charley Steen got disgusted with the greedy Utah State Tax Comission in about 1964. Almost overnight, Charley sold his Utah mining and milling operations to Mr. Floyd Odim for Atlas and moved to Nevada where there was no personal state income tax.

Enclosed are pictures showing the tailings site when our U.S. Government Atomic Energy Commission had a Uranium Ore Buying Station and uranium stockpile at that location. All the uranium ore in those huge piles belonged to the United States Government. It had been purchased and stockpiled there by the U.S. Government long before Charley Steen's Uranium Reduction Company mill was completed. This shows that the site for the uranium mill and tailings had been selected and approved by the U.S. Government Atomic Energy Commission. If Charley's U.R.C. or Atlas Corporation had not built a mill there, then AEC would have built it or had some other company build and operate it. A reading of the Atomic Energy Act shows that when it came to uranium ore, the AEC could do anything they wanted to do.

From 1962 until 1974 I leased approximately one thousand acres of the land across the Colorado River from the uranium mill. Pioneer cattlemen discovered that cattle who grazed in the lower Moab Valley, on the south side of the river, would die if they had to eat that forage very long. The old-timers said the cattle got "Alcooled". I had several spectrographic analysis made of samples of grass collected from different sites in that area. A copy of one of the Feed Services Corporation Laboratory reports is enclosed. Note that grass contained levels of nickel, molybdenum, aluminum, magnesium, chlorine, silicon, potassium and sodium that are high enough to poison cattle. These grass samples grew right out of soil which had been deposited there by Colorado River water long before the uranium mill was built. Another problem with grazing cattle in what is now Nature Conservatory land, (we called it the "Slew") are the many different internal parasites. For example livers of all the cattle pastured in that area are destroyed by liver flukes after livestock (or a people) swallow the parasite eggs which are attached to grass stems. The slew also contains disease germs and virus's deposited there when ranchers and Moab residents dumped their dead animals in the reeds around slow area for nearly one hundred years.

The land I leased across from the U.R.C. Uranium Mill was owned by a real estate
speculator in Houston, Texas. He asks me to try and find a gravel deposit on his property. One day we dug up what appeared to be a load of excellent gravel. It was found beside the Colorado River less than ten feet below the surface of the ground. Pipeline employees discovered the fist size rocks when they were replacing some rusted pipe near the valves that control the flow of gas in the 30" lines under the river. The following day we discovered that our gravel rocks were actually rock salt. Not just plain salt but highly mineralized rock salt. I wish there was an analysis of what minerals were contained in those rocks. I have never touched my to anything else that tasted like that. The second day there was three feet of brine solution in our trench. The ground in that vicinity was so salty that an electric welding arc could be struck using the electricity flowing through the surface of the soil. That salt discovery and the minerals in the grass indicate to me that those people who express concern about contamination of the ground or river water from the mill tailings are either stupid or they are trying to confuse the general population. Contamination of the river or the ground under the tailings pile can't compare to the contamination already present. This is caused by natural metals and salt that were put there by nature.

Years ago an old oil geologist with extensive experience in Grand County, named Glen Ruby, told me that the cause of the "slub" was salt dissolving and letting the ground settle thereby making a kind of lake. I ask Glen deep is this to the salt. His reply, "not very many feet."

I was amazed when a retired Texas Gulf employee suggested at a Star Hall public tailings pile meeting that high radiation readings he observed at the Potash plant must have come from the Moab uranium mill tailings ten miles away. The Potash plant is located within a mile or two of several old uranium mires on both sides of the river. Most of uranium ore deposits were found along the cliffs in ancient stream channels. These stream channels are often visible as indentations in the gray strata located below the smooth sandstone part of our cliffs. Above the Potash plant I see seven dots on the AEC map along the north side of the Colorado River and at least five on the south side of the river. Several more good mires were developed near the mouth of Cane Creek after the AEC constructed the road down the river opened up a pass into Cane Creek. (Today the bikers and four wheelers probably think Grand County built that road for them.) It is completely normal to find higher radiation counts near places where uranium ore is exposed along the cliffs. We prospected for uranium by flying a Super Cub very close along that gray strata and watching our Scintillator for an increase in radiation readings. Often we found uranium ore by picking up a high radiation count where we could not see any stream channel.

It doesn't take a college education in geology to see that those stream channels, containing uranium ore on the face of the cliffs under Dead Horse Point and Island In The Sky; once went all the way across the Colorado River gorge. Millions of years ago all that material, including the uranium ore washed down the Colorado River. It is my opinion that if all the Moab tailings pile washed down the river, that amount of sand, uranium and heavy metals would be so small compared the amount of those things naturally there that the tailing would not have any effect. Uranium sand and other minerals in the Colorado River were as natural and old as it is in the hills and cliffs that drain into the river. I believe that if the whole.

My old friend, the late John Sogg Shafer, told me how he went broke during the depression. To get away from people he owed money he constructed a trail and took a little bunch of cattle off the cliff down to the river bottom. He said he stayed there with his cows until they produced enough calves that he could come out, sell them and pay off his bills. After WW-II when the U.S. Government A.E.C. began buying uranium ore, Howard Shields, and his friends ball-dozed a wild crazy road down John Sogg's cow trail so they could haul uranium from their claims (the black dots on the AEC map below Dead Horse Point and Island In The Sky) to the AEC buying station in Thompson. Later the A.E.C. Engineering Department improved the Shafer Trail road built by Shields, Murphy and the Knights until a pussy person could drive a passenger automobile over it.

Shafer Trail, Cane Creek Road, The Mineral Canyon Road, The White Rim Trail, Potson Spider Road, the road up the Colorado River, the to Castle Valley road, the road to through Castle Valley to Polar Mesa and almost every other road or trail in the southern half of Grand County was built or improved by the AEC. In the north half they were built by oil companies. Our Federal Government built those roads to open up the vast Colorado Plateau wilderness for uranium prospectors and so those prospectors could haul their uranium ore to U.S. Government buying stations. A lot of AEC government employees also traveled those roads.

There has been a lot of gum-chewing about the danger of the mill tailings contaminating the land under Arches National Park with uranium. Along the cliffs west of the highway, about ten miles of Moab, you can see a number of uranium mine tunnels. They were dug into that gray strata below the vertical red sandstone cliff. In 1934 that was one of the largest uranium mines in Grand County. Here it is plain to see that this cliff is the west side of a fault. Arches National Park is the land on the east side of that fault. Those same ore channels that were mined on the western cliff continued eastward at the time that fault occurred. They now lie at some depth underneath Arches National Park. This is exactly the same situation that existed in Lisbon Valley. A promoter, named Jim Hudson, reasoned that the ore channels being mined in the Big Indian District west of the fault continued on to the eastern side of the Lisbon Fault. He drilled several deep holes there and found a huge deposit of uranium ore. Jim leased his mining, claims to Rio Alguard Mining Company and lived the rest of his life as a very rich man. The land under Arches already contains thousands of times more uranium than all the uranium in the mill tailings pile.
effort was being spent to study and correct other Moab Valley health problems. There has to be reason for the excessive number of people who die of different types of cancer in this Valley. I am confident these cancers are not being caused by uranium. Almost all of Moab’s subdivisions are built land that was once covered with orchards. Before WW-II arsenic, zinc, copper sulfide and nicotine were used to fight orchard pest. After WW-II DDT, Lindane, Tetrachloride, Chlorodene and many more dangerous insecticides were sprayed on the ground.

I, a friend, the late Jack Riley, was the druggist who sold most of those insecticides. Jack told me that many farmers around Moab used several times the recommended rates. Jack mentioned tracts of land that he would be afraid to live on because of insecticide contamination. Today there are houses on all those tracts of land. The late L.B. Perry was sent here by the U.S. Government to try to control insect pest in the orchards. L.B. told me that he found a number of cases of “encephalitis” when he arrived here before WW-II. L.B. was the first person to make any effort to control mosquitoes in the Moab Valley. He went around dropping old used oil filters in puddles of standing water. Of course those oil filters contained lead from the gasoline being used at that time. An old Moab newspaper article states that Dr Williams was credited with controlling malaria in the Moab Valley. For many years the Mosquito Abatement District had the slow area and creeks running through town sprayed with DDT and diesel oil several times each summer. I do not believe residents, including the Mosquito Board Members, realize the real health hazards associated with insect pest in this Valley.

I am not a bit concerned about any health hazard existing after the mill tailings are capped in place. Mr. Howard Balsley was called the father of the uranium industry on the Colorado Plateau. Howard Balsley never smoked cigarettes. He was the ore buyer for TVR Chemicals before WW-II and handled more high grade uranium ore than anyone I know. I saw boxes of special high grade uranium ore specimens in his yard, house and in his bedroom. Later I was told he kept his most valuable uranium specimens in a wooden box hidden under the bed he slept in. Mr. Balsley was injured when he wrecked his car driving to either a Lions Club or a Chamber of Commerce meeting when he was forty years of age. I can’t remember how old he was when he died.

Before the uranium mill and tailing pile were there, that whole area was covered with deep blow sand. That sand caused the pioneer’s wagons to bog down and get stuck. That was their last major obstacle before they forded the river. In 1933, when I first arrived in Moab, the air in town would be filled with fine silicon dust from that area every time the wind blew from the north west. The portal caused a venture effect and that made the turbulent wind pick up speed and gather even more sand. I think the tailings pile makes a very valuable and effective wind and sand break.

There was a time when I missed seeing Moab’s lights when I drove into the Valley at night. However the upper Valley is built up now so there are more lights than we use to see before the tailings pile got high. A view of the lights is no longer a good argument for wanting the pile moved. Once the tailings pile is covered with red rocks it will be appear to be just a tiny hill between the high rock cliffs.

From May 15, 1953 until January 1, 1954 I flew Charley Steen’s airplane. We traveled together a lot and as we flew we discussed the effect his Mt. Vida Uranium Mine discovery was having on Moab and Grand County. One of the things we discussed was Moab and Grand County governments having neither the money nor a tax base with which to build necessary schools, hospital, water system, sewer system and everything else that was needed. Except in these western states, private land and it’s improvements are taxed for those purposes. Ninety five percent of the land in Grand County paid no taxes because it belonged to the state and federal government.

THE REASON CHARLEY STEEN DECIDED TO BUILD HIS URANIUM MILL IN GRAND COUNTY WAS SO THIS COUNTY WOULD HAVE A VALUABLE PRIVATE PROPERTY TO TAX AND BE ABLE TO BUILD THE NECESSARY FACILITIES REQUIRED FOR A RAPIDLY GROWING MOAB AND GRAND COUNTY.

I was also associated with Bob Barrett. Bob was a UTEX stockholder who wanted to build the company mill near their Big Indian District uranium claims. Ultimately Bob purchased the land for the mill here and then sold it to Uranium Reduction Company.

Former county councilman Charley Peterson makes this statement in the April-May issue of THE ZEPHYR: “THE SITING OF THIS MILL AND TAILINGS DUMP WOULDN’T HAVE BEEN TOLERATED WITH GOOD PLANNING...” I doubt if it possible to communicate with people like Charley Peterson who are so badly misinformed about the 1953 conditions in South Eastern Utah, Grand County and Moab when the mill site was selected. Actually I believe the word ignorant would be the correct word to use.

It had taken seventy years from the time the first permanent settlers came to the Moab Valley for it’s population to reach the 1930 census figure of 1271 people. With an average size family of five, that means there were only approximately 253 men living in the Moab Valley. I doubt if a single man here gave a damn about city planning or uranium mill tailings. True wilderness, largely unsurveyed, adjoined Moab City limits in every direction except to the south east. As soon as school let out in the spring many families left town and lived on ranches or at their uranium mines. Often they hauled the uranium ore they mined home in pickup trucks and dumped it in their yard until they accumulated a small truck load to haul to Thompson. This was an extremely poor village. People lived mostly off of what they raised and the venison which they killed year around. It was the custom for men to go to other towns to
earn cash so they could live in Moab. There were more women than men in Moab and other southwestern Utah towns because many of the young men who got drafted or went away to work never came back. There were horses, cows, chickens and out-houses on almost every block in town. The most valuable possession of most citizens was their Moab Irrigation Company stock they owned. People had to have water in order to raise food. Moab Irrigation Company irrigation water flowed in open ditches to yards, gardens, orchards and livestock in every Moab Village block. An inadequate supply of untreated & un-metered water was piped from several springs in the hills above Center Street to most homes and livestock corrals. Sometimes very little water came out of the tap. Everyone turned off all running water when the fire siren on the Midland Telephone building sounded. The village's sewerage passed through a small overloaded digester before flowing into the Colorado River. Howard Shields, Moab's first plumber, installed 246 toilets in 1946. Many of them were in motels, commercial buildings and perhaps the school. Heating was done with either wood or coal. During the winter, except when the wind blew, the Valley was filled with dense stinking coal and wood smoke. There was no natural gas. A few families used propane to cook. When the wind blew, the air was filled with swirling clouds of red dust that was so fine it seemed to go right through glass and build up in piles on window sills. The only paved street in Moab was the two lane highway which came down Center Street and turned north on Main Street. The highways were so poor in the Four Corners Area that there was no through truck traffic. Very few cars passed through Moab in a day. Main Street ended at the bank of Mill Creek. One filling station was open part of the time. No electric power lines came to the Moab Valley. A diesel generator beside the power dam furnished electricity. The last electric light going north was the Old Ranch House and a private power line took power south to Arnold Holvoet's house. The Middle School building was the only school. Of course there was a Mormon Church. The protestant church in Moab was the Community Baptist Church. The building was used on Sundays by the Seventh Day Adventists and on Sunday night by the Roman Catholics. Moab did not have a police force or City Hall or pl. mining commission. As I recall the only City or County ordinances on file referred to beer licenses and dance halls. There were less than six street lights. Even during the daytime, mosquitoes were so thick that when you brushed them off your arms, your arms would be smeared with your own blood. Outhouse & barn yard flies swarmed on everything left uncovered. A candidate for county office had to carry Sago, Thompson or Cisco in order to get elected. There were no practicing doctors. Dr. Allen was retired and Dr. Temple was sick and died soon after I arrived. The road up the river had only one unpaved lane and a few places to pull off when two vehicles met. In dry weather it was passable for a passenger car if the driver carefully avoided protruding rocks in the road. In many ways Moab was not a very good or healthy place to live. I found the people to be different from any I had met while living in eight different states. Once we got to know them they were wonderful. Today I could live where ever I want but I prefer Moab.

Unlike most men who made a huge amount money by discovering uranium mines, Charley did not immediately sell out and move away from Moab. Montecello was closer to his Mi Vida Mine than Moab. However Charley liked Moab better and chose to live in Moab and make it headquarters for his Utex Exploration Company and Moab Drilling Company.

He purchased the Beardon Farm, subdivided the land into Utex Subdivision and built a large number of houses which he furnished to his key employees. All the houses in Utex Subdivision still belonged to the Utex until after Floyd Odum purchased Charley's operations for Atlas in 1964. Uranium Reduction Company purchased the Westwood Ranch (I now own) and subdivided part of it into Palisade Subdivision. The Westwood Ranch owned half interest in the big Skable Spring. That 250 gallons per minute was probably more water than the town of Moab owned at that time. Moab did not have any money to hook the spring into the city system. Charley loaned the city $40,000 to build a pipeline and connect it up.

An absolute requirement for a mining town is a good hospital. One of the first major projects undertaken in Grand County after major mining operations began was to build a new modern hospital. I am sure that most of the money that went to build Allen Memorial Hospital came in the form of donations from mining companies in the Big Indian Mining District. I believe this story to be true. The County lacked $35,000 having enough cash to begin construction. Bill Mc Cormick, then President of Standard Metals, called up the Hospital Board Chairman and told him that if they would name the hospital after Dr. Allen he would write them a check for the needed money. Doc Allen was Bill's poker playing and whiskey drinking pal. Later Bill donated his Standard Metals Company office building to the school district. That was how Grand County acquired our District School Officer. Dr. Paul Mayberry arrived in Moab about the time the hospital was completed. Mr. Don O'Laurie, the original president of Utex Exploration Company loaned Paul money to buy a home and set up his practice in Moab.

Reporters from all over the nation came here to interview Charley Steen and date their stories Moab, Utah. In the spring of 1953, TRUE Magazine published a story telling how Charley Steen found his Mi Vida Mine. The story was titled, "HOW TO FIND $130,000,000." That story, more than another single story, started the "URANIUM BOOM." Later a Chicago Tribune reporter was supposed to have arrived in Moab on the bus at 0230 one morning and he left on the very next bus that passed through town. His story, dated Moab, Utah, reported that before Charley Steen's Mi Vida Mine discovery, Moab was the most inbred town in America. In November 1954 a syndicated series by New York Harold Tribune reporter Robert S. Bird gave the uranium boom another big push. Life Magazine had a photographer stationed in Moab for over a year. I flew the Editor of Fortune Magazine and a photographer for Look Magazine around the Colorado Plateau. Time, Mc Call's and other magazine and newspapers carried many big stories about Moab and Steen. The A.E.C. headquarters was in Grand Junction, Colorado but it was Moab, Utah where people from all over the country came to seek their fortune. A few of us are still here and still alive.
Families with trailer houses come from every direction and by 1955 Moab's population was estimated to be over 7000. Moab's corrals and gardens, any place where water was piped, became trailer parks over night.

A uranium mill couldn't be built just any place. There had to be an adequate supply of water. The Colorado River was the only water source volume in southern Grand County. The site that was selected for the mill and tailings was the only site on the Colorado River suitable for a uranium mill.

Building the U.R.C. mill thirty five miles from the major mines in the Big Indian District also created a trucking industry with hundreds of good money making jobs. Unlike Hidden Splendor Mining Company, who contracted their ore hauled to one large trucking company, Utx and Standard Metals hired locally owned truckers to haul their ore. Charley wanted his trucker friends to share in his good fortune. Many Moab natives owned and operated several trucks on the Utx and Standard haul. When Steen's Mi Vida mine reached production of 1000 tons per day it required fifty 20 ton truck loads per day to haul the ore to the U.R.C. Mill. Standard Metals had about seven trucks making which made five round trips a day for several years. I would estimate that for thirty years at least one large twenty ton load of uranium ore passed down Moab's Main Street every thirty minutes or less. One twenty ton uncovered load from Lisbon Uranium's Ike Shafl averaged and amazing 22614308. Uranium mining and milling gave Moab thirty years of prosperity.

In 1958 Charley Steen and I had law suite over a business partnership that was as bitter as a divorce. That ended our friendship. Charley and I disagreed have always disagreed on many subjects and I have been one his most outspoken critics.

Nevertheless, Charley certainly deserves credit for what he did for Moab, Grand County and the people who lived here then and those who live here now. I have often wondered just what Moab would look like today if Charley Steen had sold out to the New York bankers in the spring 1953 and moved away like some of the Utx Corporation stock holders preferred. This city was not built by or for tourist, U.S. Government offices or retired. Moab would not be this nice little city today if Charley Steen had not built his uranium mill here and headquartered his business offices in Moab.

Not only did the uranium mill's taxes build our schools, hospital, water system, sewer system, paved the streets and bring electric power line to the Valley. For the first time in history there were a lot of good paying jobs local citizens. Because those citizens had money to spend many new business's moved here or were started. Charley's uranium mill, unlike the Homestake Sapin Mill at Grants, New Mexico which operated with very few employees, was designed to create employment for a large number of Grand County citizens.

Frankly, except for ignorance by a few people. I do not understand why some of our county councilmen and others are making so much effort to try and have the mill tailings moved. To me, there doesn't appear to be a chance in hel that they can make Atlas do more than Atlas agreed to do long ago. The information I have about Atlas Corporation's financial condition indicates the company couldn't move the tailings if they were ordered to do so by the N.R.C. or a court. Furthermore last weeks Grand Junction newspaper carried stories about huge personal layoff by the U.S. Energy Department because of the financial condition of the United States Government.

Councilman Ken Ballantine's letter in last weeks Times Independent questions why the Moab tailings are not being moved when other tailings piles have been moved. That question deserves and answer - I know several possible explanations. Most of the uranium mills in this part of the country were mineral extraction facilities built to process other types of ore like vanadium. They were all old facilities which were modified to process uranium. The Moab U.R.C. mill was new and it was designed and built to process uranium ore. For that reason there should be less uranium and other products left in it's tailings. The Monticello mill, the Grand Junction mill, the Salt Lake City Yuro mill, the Riffle mill, and I think the Nucka Mill and Durango mills were either in or adjoining populated areas. It appears to me that at site of the Moab tailings completely different. I doubt if the Maybell, Colorado, the Homestake Sapin mill at Grants, N.M. or the Gas Hills mill in Wyoming have had their tailings moved. Another factor is that in Grand Junction, Monticello and perhaps other places the tailings were used as fill material all over town. The Moab tailings have been kept right on the mill property. Perhaps most important was the attitude of the Federal Government to waste money before it's financial situation became so critical.

During the Utah Wilderness Senate Hearing, I heard a speech by a senator that made me wonder. I think the senator was from Oklahoma. He said that in order to pay the enormous salaries of the executives of environmental organizations, their treme-dous organization operating cost and their expensive attorneys, those organization require a hot button issue to keep the uninformed public excited so we will continue to donate money to the causes they are promoting. Because of the mystery about radiation, which can not be seen, felt or smelled, nothing makes a better hot button than uranium. Recent news accounts report large donations to the Grand County tailings removal legal fund. I wonder what those attorneys are accounting for that donated money. I also wonder just what the Chicago attorneys know about the history of uranium in Grand County.

Dennis E. Byrd

J-279
Steen’s MiVida Pours Out 1,000 Tons
A Day In Anticipation of New Mill

In the three years since discovery of the MiVida claims of the Urea Exploration Co. by Charles A. Steen, a development has taken place in the Big Indian Wash Mining District that has changed the face of the land. Civil war, roads, and mining camps have sprung up along the length of the same bench ridge. Desert loneliness has vanished; the region is a hive of activity. Supplies come by truck; ore leaves heaped for mill and stockpile.

To date, the Urea mine has shipped largely development ore, and yet the development job is only half done. Even a thousand tons a day leaves its tracks in the barren section in bloom, to await completion of the Uranium Technologies Co. mill.

Mining at Urea has been trackless on the surface. Deep-sea mining in the future is assured by present plans to explore the trackless badlands, well-adapted to initial operations, by a rail system integrated with the Glamis mining machine through the new MiCarrick tunnel. Six months hence the dumpers may well have disappeared from the present incline. Ore will be taken from the mine in cars, loaded from a thousand ton bin to the washing troughs, instead of being dumped and then washed up again in the narrow sandstone canyon as at present.

Ventilation has always had top priority at Urea, and the future will see expansion of the system, to assure the very best of working conditions underground. The rail backing system at present in use will be continued until the very last phase of the operation. Its use has been entirely successful, and it is difficult to conceive a cheaper and more flex-

HOW TO FIND
$150,000,000

BY MURRAY TEICH BLOOM

BEST COPY AVAILABLE
Atlas Casts Its Spell Over Uranium World

Floyd Odlum and His Famous Company See Fabulous Future for Peace-time Atomic Energy

Whereas fabulous Floyd B. Odlum and his 90-million-dollar investment company, the Atlas Corporation, run into what they call a "special situation", they generally end up in a new business. The knack of finding such situations has to date paid more than $49 million in profits to Atlas.

The foundry seems to do "special situations" in uranium and are proud of their usual prosperity. In less than a year and a half after a series of events just culminated in a $10 million dollar deal, the largest in the iron industry, the iron division of the United States Steel Corporation has become the "Uranium Tycoon" of the Colorado Plateau and the nation, and Atlas the biggest operator of uranium properties in the United States.

There is little mention that the 38,000-old stockholders of Atlas will benefit from uranium. They have benefited from everything Odlum and Atlas have touched in the desert; they have found "special situations" in oil, in copper, a uranium recovery plant, a new hotel supply house, a bus system, a New York specialty store, and a dairy, to name but a few.

Basically, Atlas, through an exceptionally brief history, has operated with three basic… and rehabilitation of companies in distress; the realization of hidden or under-developed assets, and to provide the strength to develop dormant properties.

Generally, the most effective way of using capital in the past has required them to sell out as a profit; their company is taken over and moves on to the next opportunity when the job has been done and a special situation brought to maturity.

Once Was Indifferent

Whether or not this will be true of uranium remains to be seen. After a great deal of indifference toward uranium as a potential investment only slightly more than a year ago, Odlum has now become one of the most enthusiastic spokesmen for the metal and the crisis need for its unlimited development for peace-time use.

He has, in the past year, created and recouped the nation, keeping himself out of the political and financial scene, and pushing along new developments in the field of atomic energy, urging more and more uranium development in the country, and with American investment capital throughout the world.
was selling at substantial discounts from the cost of their oil reserves. In buying the shares of oil companies, Atlas, in effect, was buying the oil at the ground or a large discount from the year in which it had been bought.

This was the basis of the Brewster-Ball purchases. In these cases, there were two parts to the purchase price: a favorable option on a large block of Summer stock.

Atlas Aircraft Corporation

It was in 1947 that Atlas entered the Consolidated Vultee Aircraft business. The giant aircraft manufacturer was in serious financial difficulties. Its program for building the two-engine Convair transport plane was bogged down in testing costs and heavy losses.

Atlas assumed the financial responsibilities for Consolidated Vultee, bought new blood into the management, and made credit agreements with the banks, inflating new capital and began the task of building the big company back to health.

Ollum assumed the chairmanship and pushed plans for the famed B-36 intercontinental bomber. The B-36, however, became a target of many of the world's airlines, and the B-36, with its four 2800 HP engines and its ability to carry the same bomb load, was the mainstay of the United States during the principal deterrent to the airpower of many nations.

By mid-1952, Consolidated Vultee was earning substantial profits and was in a much improved position. Its job was completed.

In May 1953, Atlas sold the bulk of its holdings in Consolidated Vultee to the General Dynamics Corporation. As almost the same time, Atlas sold its holdings of Summer Oil Corporation. The profits of some $100,000,000 in 1952 and $200,000,000 in the bank at the close of that year.

Atlas, in 1954, received a visitor at his home in a suit and tie. The visitor, he was informed, was a representative of the Federal Trade Commission.

The visitor had come from Utah to interest Ollum in some uranium claim. Ollum showed little interest.
March told the court that a company like Atlas with the reputation for securing the hands of its 24,000 stockholders at a fair price, was about to enter into business with a stable mining claim.

But one fact exceeded his informants.

Looking at a map, he recognized that the claim was at the same point where, as early as 1850, his company had secured a similar one.

He recalled that the mine was not then considered as a part of his company's holdings, but was a valuable asset.

He realized that the mine was not yet a part of the company's holdings, but was an asset.

With this map, he proved that the claim was at the same point where the mining company had secured a similar one.

Atlas stockholders would not have been willing to pay a fair price for the mine.

This association with the mining company was a valuable asset to the company.

He concluded that the mine was not an asset but held a future, a new future.

He recommended that nuclear-powered electric power plants could become an important factor in the future.

He explained that nuclear power plants would not be developed by the company.

He was a rapid expansion in medical, industrial and agricultural work.

He also saw that these developments would not just happen in their own accord.

It would take, as it had to in many other industries, the knowledge, the know-how, and the capital of science and industry.

Atlas was a new industrial revolution in the making, but someone had to carry the ball of industrial leaders, get it back and turned, it might be the company's future.

Cheap Power Facilities

Olliver explained that large amounts of uranium had been used for nuclear weapons, and that this would not be the future.

He stated that the mining of uranium was the key to the development of nuclear power energy.

He understood that mining was the key to the development of nuclear power energy.

The electric power was developed as fast as it was expected, and the uranium used was mined, and much larger amounts of uranium than what was mined was stored.

Moreover, the nuclear power was not used to develop nuclear industries.

The mining of uranium was an important factor in the future.
tion, but this mine, with enough ore already proven to cover the purchase price and with good potential, seems an ideal opportunity as a "special situation."

Its acquisition placed Atlas in one of the leading positions in a new and growing industry with what seems to be unlimited horizon.

As the mine site in the desert reaches of central Utah, Atlas pushed the building and equipping of a modern mining camp. At the same time, it ensured the country for a staff of top-flight mining men. To operate the Delta Mine, Atlas created a new wholly-owned subsidiary, the Hidden Splendor Mining Company. Exploration has enlarged the Hidden Splendor deposits from an estimated 500,000 tons at the time the mine was purchased to a presently estimated 800,000 tons.

Production Increases

In July, mining commenced at a rate of 3,000 tons a month and it is expected that this rate will be stepped up rapidly later this year.

At the same time that it is an operating Hidden Splendor ore, through another subsidiary, Utah Uranium Corporation, was purchased, substantial interest in the Lisbon Uranium Corporation, in the Bluff area.

Through a series of steps, Atlas owns 1,400 shares of Lisbon, while it has several companies in which Odell is interested, Airflite Incorporated and San Diego Corporation, owns another 1,400 shares, giving Odell interests well over 50 per cent of the outstanding Lisbon stock.

Atlas has not yet started mining operations, but continues its exploratory drilling program. Lisbon has a merger pending with Gateway Uranium, whose properties are located some 60 miles northeast of Lisbon Valley. It also has an option to buy the Harrison properties in the Lisbon area.

Recently, Hidden Splendor acquired an option to buy all the outstanding stock of Almar Uranium Incorporated, which owns the Daniel-Ruddock ore body in the Bluff area. Atlas also owns a large block of Inland Uranium Corporation.

Guest Outside U. S.

Nor has Atlas neglected uranium properties outside the borders of the United States. With erratic uranium, it owns 50 per cent of the stock of North Australian Uranium Corporation, which has extensive properties in the Alligator River district of northern Australia. In Canada, Atlas is a large stockholder in Providence Uranium Mines and in Penin Consolidated Uranium Mines. Another article in this issue covers the fabulous potential of Providence in the Blind River area.

These uranium holdings add up to a considerable sum of money. In its mid-year report to stockholders, Atlas shows Hidden Splendor at $15,565,000. The Lisbon shares held by Walsha have a market value of close to $10,000,000. The investment in North Australian Uranium is roughly $2,000,000, and the Atlas report indicates that the option on North Uranium Incorporated, if exercised, may require as much as $10,000,000 in cash.

These holdings total more than $37,000,000 without taking into account smaller holdings in various uranium enterprises.

The size of this commitment doesn't worry financier Odell. It is a long-standing philosophy for mining his stockholders' funds invested in things like uranium ore which have an in-eliminate — not, rather than to entrust these savings to the whims of the stock market.

Steelholders Tell Story

At mid-year, the owners of Atlas stockholders as follows:

"Your company's investments in uranium are being made in reliance on the military requirements. Rather, they are not so much on the conviction that the uranium industry may become a major industry in the future as a result of new and expanding military requirements, but that it is more far-reaching and of greater significance than the impact of nuclear weapons.

"Our Management has fully explored and studied all phases of the economic future of nuclear fuels in general and uranium in particular. These studies have resulted in the following main conclusions:

(1) The domestic requirements for fissionable materials to meet developing industrial, agricultural, and medical requirements will soon begin to outstrip the domestic capacity of mines and mill such materials, based on known uranium deposits.

(2) The development of safe, economically, usable fissionable materials is not in immediate prospect. If and when such materials become economically available is believed they will have to supplement our supplies of uranium.

Perfected Process

(3) 11 and when other fissionable materials become economically available on an economically feasible basis, your Company, since it is already in the field on an important basis, will be able to enjoy a preferred position to participate in and profit from such developments.

Since more than a year since your Company decided to acquire its first uranium mining property. In that time there has been substantial progress in all phases of this new industry.

There have been forward technical developments in mining, milling, refining, fabrication and use of uranium. There has been marked progress in the development of reactors and in their availability for industrial, agricultural, and medical applications. In this country and throughout the world industrial plants are moving increasingly toward adoption of large scale nuclear fueled plants for the generation of electric power.

"Only recently Chairman Lewis L. Strauss of the Atomic Energy Commission stated that the uranium will no longer be our concern of the fissionable materials. This statement was made to say that the American companies are ready to build up the essential civilian (Continued on page 32)
FEED SERVICE CORPORATION LABORATORY SERVICES

BEFORE YOU CAN FEED YOUR FARM ANIMALS TO THEIR SATISFACTION, YOU MUST FEED THEM PROPERLY.

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J-285
REPORT OF ELEMENTARY FEEDSTUFF ANALYSES

Customer's Name: [Redacted]  Address: [Redacted]
Submitted By: [Redacted]  Date: 10-8-69 Rec. 10-12-69

Sample Description: River Bottom area - winter pasture area

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<th>% of Dry Matter</th>
<th>% Dry Matter</th>
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<tr>
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For the optimum ration, this amount is:

\[
\text{eeH} = \left( \text{hydrogen \%} - \frac{\text{oxygen \%} + \text{nitrogen \%}}{14} \right) \times (46.60) \]

For this sample, the eeH is:

\[
\left( \frac{7.83 - (40.93 \times 46.60)}{46.60} \right) \times (46.60) = 4.24
\]

The organic ash of the sample is:

- **Optimum**
- **High** (Dust with low ash grain, if possible)
- **Low** (Add high ash roughage, if possible)

Any feedstuff with a high or low organic ash content may be more or less unpalatable unless adjusted.

**Stress Affects Production**: The productive performance of animals must always be expressed in light of the cumulative effects of all kinds of stress. The amount of stress can only be assumed and not measured. This is the net effect of genetic misfortune, history of impairment by bacterial, viral and parasitical infection, virul, high or low temperature, high or low humidity, current infection, parasitical load, muddy beds, crowding, improper feed preparation, erratic feeding schedules, anemia, or other. Table VIII is such a guide wherein a eeH value of 1.00 or more is considered necessary to overcome normal stress including the stress of maintenance.

**TABLE VIII**

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<th>eeH - value</th>
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Total ash as determined in laboratory.

J-286
A bundle of the "Uranium Special" edition of the Grand Junction Daily Sentinel is dropped from a light plane to a remote uranium mining camp in the heart of the new Colorado Plateau. The special issue carried a detailed story describing a new federal program for uranium mining. The papers were dropped over a 200-foot area in the middle of the mine and numbered over 1,000. The letters on the upper left is the pilot, "This is a flying special," and the letters on the lower right is the pilot, "This is a flying special." The letters on the lower right are "This is a flying special."

**Uranium miners and prospectors in remote camps in Colorado and eastern Utah had an air attack" from a plane sent to survey uranium prospects. The Grand Junction Daily Sentinel was delivered by air to the remote camps.**

It was something more than just a stunt. The issue carried a detailed story describing a new federal program for uranium mining. The story said that the program would be a "big boost" for the mining industry. The story went on to say that the mining industry would be a "big boost" for the mining industry. The story ended with the words, "The mining industry will be a "big boost" for the mining industry."

**Grand Junction Sen..n..el Bombs The Miners With Special Uranium Story**

**Uranium mining is on the rise in Colorado and eastern Utah. The federal government is encouraging mining companies to expand their operations.**

**Lisbon Delivers Richest U-Ore Load**

Lisbon Uranium Co. of Salt Lake City has delivered the richest uranium ore load ever mined in the United States. The ore was shipped to the AEC's Oak Ridge Plant in Tennessee. The ore was shipped to the AEC's Oak Ridge Plant in Tennessee. The ore was shipped to the AEC's Oak Ridge Plant in Tennessee.

**Holds for Caveted AEC Beams**

Lisbon Uranium Co. of Salt Lake City has delivered the richest uranium ore load ever mined in the United States. The ore was shipped to the AEC's Oak Ridge Plant in Tennessee. The ore was shipped to the AEC's Oak Ridge Plant in Tennessee.
Bids for Coveted AEC Bonus

Lisbon Uranium Corp. of Salt Lake City has submitted the largest single uranium mine in the U.S., the Rich uranium deposit in the Beartooth formation near the Wyoming border. (Photo: George F. McGovern)

The mine has been worked by Lisbon operations since 1965, and the bonus is expected to be about $500,000.

Two Uranium Firms Plan to Merge Operations Soon

Salt Lake City—The Board of Directors of Federal Uranium Corporation and Redrock Resources, Inc. on Tuesday approved plans to merge the two companies, subject to the approval of shareholders. The two firms will merge as a share exchange, although the net effect will be to reduce the total outstanding shares in the surviving corporation because of the inter-company ownership of shares. At present, the two companies have a total of 12,810,812 shares outstanding. The surviving corporation will have 8,570,712 shares outstanding.

It is contemplated that the merger corporation will pay a two-share dividend payable in cash. This is the same dividend policy as Redrock has followed.

Fred W. Stahel, president of Redrock, and R. W. Hayman, president of Federal, said the merger would be advantageous to both companies from several standpoints. It will reduce administrative and operating expenditures and result in more efficient tax planning. The two companies already have several common interests, including joint ownership of several properties and companies. Also, Federal owns 47% of outstanding shares of Redrock, and Redrock owns approximately 10% of outstanding shares of Federal.

The surviving corporation will have assets of about $3 million, primarily in the form of convertible stock, a regular dividend policy, and an experienced staff. Mr. Hayman and Mr. Stahel said in their statement that the surviving company will pay the regular dividend.

The group was then split into two groups, the smaller group leading the larger group in the race to the finish line.
Radrock Discloses Merger Blueprint

By Robert W. Beall,

Tribune Business Editor

Board of directors of Radrock Resources, Inc., Salt Lake City, an affiliate of Federal Uranium Corp., has voted to sell its stake in the mining company to Arches Uranium, Inc., an investor group led by Charles S. Stenhouse, Jr., former president of the latter company. The sale, which will be closed, is expected to generate $10 million for Radrock Resources, Inc., and $15 million for Arches Uranium, Inc.

Under terms of the agreement, Radrock will receive a 25% stake in Arches Uranium, Inc., in exchange for its 15% stake in the mining company. The terms of the agreement were not disclosed.

Bank Cashier Named Director for Sure-Seal

P. S. A. Baker, cashier of the Bank of Utah in Ogden, has been named a director of Sure-Seal Corporation at its annual meeting Thursday, April 13, at 2:30 p.m., at Union Hall, Ogden. The bank, a member of the Commercial Credit Corporation, is one of the largest credit unions in Utah.

Mr. Baker has been a director of the bank for several years and has been actively involved in its operations. He has been a regular customer of the bank for many years and has been a valuable asset to the bank.

Sure-Seal Corporation is a credit union that provides loans to members at competitive rates. The bank has a strong reputation for providing quality service to its members and has been a leader in the credit union industry for many years.

The bank is committed to providing its members with a wide range of banking services, including checking and savings accounts, credit cards, and mortgage loans. The bank also offers a variety of investment services, including stocks, bonds, and mutual funds.

Uranium Discoveries By Air

BY TOM ASHLEY

Uranium discoveries are now being made by prospectors in highflying and the writer recently made a visit to the Colorado Plateau. The area covers 100,000 square miles of brown-like terrain encompassing parts of New Mexico, Arizona, Utah and Colorado and the search is spreading area of stores Wyoming and South Dakota.

This uranium exploration is being

a part of commercial uranium and creating a new state of interest in uranium mining. We visited the planes last month to examine the operations, taking with us the great areas and many man-made uranium deposits. The experts are pushing for the potential super ore. Lightplanes have become in much

a part of the uranium industry or the process, "jumping at trunks," we were told by the Atomic Energy Commissioner. Its exploration was done by contractors for Grand Junction, Colorado. They believe uranium production will be increased.

Lightplanes' Contribution to AEC

Gordon and U.S. explorers for uranium in the area have been advancing the use of lightplanes in the last two years — a result of their work that has improved the work of mining companies and is making possible the mining of uranium on a large scale. The AEC has been valuable in uranium production and is making a large fortune in uranium mining. This is in contradistinction to previous uranium sources such as the Belgian Congo.

Flown Magazine
AM COMES TRUE

'Nah Prospector Makes Uranium Million

What he means by 'buck' today is a fortune in gold, silver, or uranium.

The prospector, who had been working in the area for some time, had just struck it rich with a uranium deposit. He was overjoyed at the prospect of becoming a millionaire.

The news迅速 spread across the country, and soon the prospector was the talk of the town. Everyone wanted a piece of his luck, and the price of uranium soared.

The prospector decided to go into business with his newfound wealth. He invested in mining companies and developed a network of contacts in the industry.

In no time, he became a successful businessman, and his fortune grew even larger. He continued to prospect and invest, becoming one of the most successful men in the uranium business.

The prospector's story was a source of inspiration for many others in the industry. They too started looking for uranium deposits, and soon the market was flooded with new players.

The prospector's success also attracted the attention of the government. They began to regulate the industry, and the price of uranium stabilized.

In the end, the prospector's story was a reminder of the power of perseverance and the importance of taking risks.
You Can Be Miserable with $20,000,000

by ERNEST LAFRANCE and CAL BERGSTROM

Estate of Paul H. Doane, an oil man who died recently in Los Angeles, has been settled for more than $20,000,000, an amount that leaves the Doane heirs in a state of misery. The Doanes are a family of six children, all of whom were left destitute. The children were left with nothing but the clothes they had on, a few dollars in the bank, and a small apartment in a slum area of Los Angeles. The family was forced to live in a shabby hotel and later in a series of cheap furnished rooms. The children were left to fend for themselves, with no money for food, clothing, or education. The Doanes were a family of hardworking people who had always worked hard to make a living. However, the children were left with nothing but the clothes they had on, and they were forced to live in a state of misery.

Find in Utah Booms Hot A-Ore Rush

Multi-Million Dollar Strike Lures Miners to San Juan

A 100-ton ore rush has developed in the Big Section of Utah, and miners are flocking to work the deposit. The ore is a high-grade gold ore and is estimated to contain up to 150,000 ounces of gold. The ore has a high grade of gold and is expected to last for several years. The deposit is located in the San Juan Mountains, some 20 miles east of the town of Ouray, Colorado. The ore is being processed by the Anaconda Company, which has a mining camp set up near the deposit. The camp is being supplied with all necessary equipment and supplies for the operation. The ore is expected to be ready for shipment to the smelter in a few weeks.

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Plateau

Uranium

Air Prospecting Basic Operation on Colorado

Charlie Steen a Legend in Modb
Uranium—The Old West's New Boom

Prospecting's Not as Simple as It Appears

Prospecting for uranium is not as simple as it might first appear. Much of the work is done by specialists who understand the geological setting in which the ore occurs. The process involves careful analysis of soil samples and core samples from drill holes.

The process of uranium exploration is complex and requires specialized knowledge. The procedure involves several steps:

1. Surface exploration: This involves the use of geophysical techniques such as magnetic surveys to identify potential uranium deposits.
2. Drilling: Core samples are taken from the subsurface to determine the quality and quantity of the uranium ore.
3. Analyzing samples: The core samples are analyzed to determine the grade and type of uranium.

The process of uranium exploration is expensive and requires a significant amount of time and effort. The exploration process is regulated by state and federal agencies to ensure the safety of the workers and the environment.

Claim-Staking Spurred by 'Free Pickin's'

U.S. Bureau of Mines

Robert E. Bond

The new boom in uranium mining has been driven by the desire for low-cost exploration and the promise of easy pickings. The Department of the Interior, in cooperation with the Atomic Energy Commission, has undertaken a comprehensive program to encourage the exploration of uranium resources.

The program, known as the Uranium Geologic Program, was established in 1944 to provide financial assistance to private companies for the exploration of uranium resources. The program has been highly successful, and many new uranium deposits have been discovered.

The program has been highly successful, and many new uranium deposits have been discovered. The program has also been credited with helping to establish the uranium industry in the United States.

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A COMPACT, WELL-DESIGNED SURFACE PLANT characterizes the Cinder Uranium Mine of Jen, Incor-
porated. This prolific producer is another of the
notable mining names in the Big Indian District of
southeastern Utah. The Bighorn State is one of
America's top producers of not only metallic minerals,
but also non-metallic minerals and mineral fuels.

A WOODEN HEADFRAME covers the shaft at the
La Sal Mining and Development Company, the stock
of which has been purchased on an installment basis
by Homestake. The shaft reaches 572 feet in depth
and 39,000 tons of uranium ore were mined from this
property in 1958. The buildings house the mine
offices, warehouse, boiler room, shop and compressor
plant. This snow was melting rapidly on this par-
ticular February, 1960, morning.

THIS HOUSE TRAILER COMMUNITY is but a
stone's throw from our La Sal Uranium Mine. The
trailer park is common, maintained. In this area
other plants native to the southwest abound.

OTHER PLANTS native to the area, too. Such plants and bushes, as Harriman Yucca
and Mesquite, would have been dominant had there
not been HMR.

The Rainbow Reduction Company's Process-
ing Mill to the north of Moab, Utah across
the Colorado River processes the ore from the Big
are hauled by truck a distance of 40 to 60 miles to the
plant. It was constructed in 1956 and has a rated daily
milling capacity of 1,500 tons.
HERE'S THE FIRST PRODUCING LEAD THE MINERALS DEPARTMENT IN THE RINGLING MINE has to work hard to put a stop to the mining operations. Originally, the Ringling Mine was a rich source of silver and lead, but now it is mainly a place to test the latest mining techniques. The mine has been operational since 1879.

A MOST ATTRACTIVE NEW HOSPITAL, advertised by the Chamber of Commerce as a million-dollar structure, services the people of the Moab area. It is named after Dr. J. W. Allen who had come from the U.S. Army in 1920, and set up practice. He has resided in Moab since that date.

JUST ONE OF FIVE HOUSING PROJECTS in Moab, Utah, is this one—known as the Mountain View Subdivision. As is plainly noticeable, many are popular ranch-style homes with attractively landscaped yards.
ANOTHER URANIUM MINING NEIGHBOR of ours in the Big Indian District of San Juan County, Utah, is this efficient, compact mine and surface plant of Harris Mining Company. Note the air-exhaust ventilation pipe which is brought to the surface through the shaft. From each exhaust of these mining companies ore is also emitted through the area, but the smoke removed from the shaft and carried away.

THIS COLORFUL OPEN PIT of the Centennial Uranium Company is located a few miles west of the village of La Sal in San Juan County, Utah, and resembles somewhat the surface of the Big Indian District. It was raised from the announced area about 1950, and the first claim was made in 1955. The first known uranium occurrence was found in the county in 1955, and the first claim was made in 1955. The first known uranium occurrence was found in 1955, and the first claim was made in 1955.

THE SKELETON is another producing uranium mine in the Indian District of San Juan County, Utah. It is a more standard mining company. The area is also regraded and some development is planned. Some 20 mines now known to exist in the area are expected to reach the next decade.
The AEC Grand Junction Operations Office
NERVE CENTER OF URANIUM

What It Is—

What It Does—

Lever's Note—During the first six months of the year, more than 20,800 persons worked on the Grand Junction Operations Office of the Atomic Energy Commission, serving as operators in the uranium-enrichment plants at the manufacturing Division, the Heavy Water Division, and the Fuel Material Division. These workers were employed in various capacities, such as maintenance men, machinists, and operators. The following article has been prepared by a technical writer at the NERVIS, a new laboratory set up in various locations throughout the United States. The article summarizes the services available through the Office, and describes its functions.

The Grand Junction Operations Office is essentially the administrative headquarters of the Atomic Energy Commission's uranium enrichment plants located throughout the western United States. The office is responsible for the administration, planning, and execution of all operations pertaining to the production of enriched uranium.

The Office operates under the direction of the Atomic Energy Commission, and its primary function is to ensure the safe and efficient operation of the plants. The Office also provides technical support to the plants, including the development of new processes and equipment, and the training of new employees.

An examination of the Office's activities reveals that its primary focus is on the production of enriched uranium. The office is responsible for the planning, scheduling, and execution of all operations necessary to achieve this goal. The Office is also responsible for maintaining the safety and security of the plants, as well as ensuring compliance with all regulations and standards.

The Office maintains a close working relationship with the plants, providing technical support and assistance as needed. This includes the provision of new processes and equipment, as well as the training of new employees.

The Office is also responsible for the maintenance of the plants, including the repair and replacement of equipment as needed. This is accomplished through a combination of internal and external resources, including a maintenance force and external contractors.

The Office is committed to ensuring the safe and efficient operation of the plants, while also maintaining a focus on cost-effectiveness and productivity.

The Grand Junction Operations Office

TOTAL EMPLOYMENT—5,200

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The Grand Junction Operations Office

TOTAL EMPLOYMENT—5,200

(Continued on page 32)
April 20, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I have been a resident of Moab, Utah for over 12 years. I (or someone in my family) worked in the uranium industry during the depression. I am opposed to moving the tailings pile because it will worsen the river road, State Highway 191 and the alternative Placem site into a major industrial operation for the next 15 years. The eyesore this will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

[Signature]

April 23, 1996

US Nuclear Regulatory Commission
Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFNT-39)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

Please accept and enter into the public record this letter as my comment regarding the Atlas Moab Tailings Pile Draft Environmental Impact Statement.

I firmly believe that the DEIS has proven that the tailings pile at the old Moab Mill should be stabilized and capped in place. Doing so would be in complete compliance with NRC regulations. Furthermore, there is no environmental or economic reason to relocate the tailings. I've worked in the mining industry, I know.

Please let good science and good economics prevail.

Thank you.

Sincerely,

[Signature]

Bill Chacon
264 W. Walnut Lane
Moab, UT 84532

J-304
Greetings

28th April 1996

What really is in the Atlas Tailings Pile?

According to the LTER, "the characterization program for the tailings pile [ARP] consisted of 1,200 borings and the sample was extremely up to eight feet." Are they kidding?

Why haven't sampled borings been drilled all the way through the pile (below 10 feet) and analyzed thoroughly? How can any sensitive decision be made without real information?

Three samples need to be drilled. A complete ground water & river water contamination study needs to be done—responsible decision-making based on incomplete data.

Realistic cost estimates must be considered. That, outdated, incomplete & unrealistic data are unacceptable. Without knowing where the system will come from, how can analysis of this situation be accomplished? The cost estimate alone—must include the cost of maintaining and decommissioning all lands concerned. This estimate must also include the cost of maintaining the pile—projected at least 100 years into the future. How will the present Atlas pile respond to real life? With 3,000 ft. on top of 2 fault zones & oil sludge exposure in the floodplain of the Colorado River? To control possible thermal actions within the pile itself?

How will the pile respond to bioturbation—a problem of other reprocessed sites that manifests as soon as a year & spreads contamination out into the food chain? And on & on....

J-305
April 23, 1996

US Nuclear Regulatory Commission
Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFN7-39)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

Please accept and enter into the public record this letter as my comment regarding the Atlas Moab Tailings Pile Draft Environmental Impact Statement.

I firmly believe that the DEIS has proven that the tailings pile at the old Moab Mill should be stabilized and capped in place. Doing so would be in complete compliance with NRC regulations. Furthermore, there is no environmental or economic reason to relocate the tailings. Having worked in the mining industry, I know what I'm saying.

Please let good science and good economics prevail.

Thank you.

Sincerely,

Nick Chavez

Nick Chavez
564 N. Cliffview
Moab, UT 84532

May 1, 1996

U.S. Nuclear Regulatory Commission
Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFN7-39)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

As a former uranium miner, and because I was asked my opinion, please accept my point of view regarding the Atlas Moab Tailings Pile Draft Environmental Impact Statement.

Although I do not fully understand everything that is involved with the tailings pile at the old Moab Mill, I would like to mention, that as a naturalized citizen of this country, I firmly believe that as long as it complies with NRC regulations, these tailings should be stabilized and capped in place. I see no need to use extra dollars to relocate the tailings, just to satisfy unnecessary objections.

I also understand that as citizens of Moab, we have the right to know why things are done in one way or another.

Please let good science and good economics prevail.

Thank you.

Sincerely,

Nick Chavez
564 N. Cliffview
Moab, UT 84532

J-306
Joseph Holonich  
Chief, High-Level Waste & Uranium Recovery Projects Branch  
Division of Waste Management  
Office of Nuclear Material Safety & Safeguards  
Mail Stop TWFL 7J-9  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

April 29, 1994

Dear Mr. Holonich,

I am a resident of Grand County, Utah and am writing today to comment on the Atlas DEIS. To begin, it is my understanding that Atlas's cost estimates regarding capping-in-place vs. moving the pile are not accurate. They used outdated cost data to justify lower cap-in-place costs, and did not adequately research realistic costs or options for moving the pile.

Atlas has publicly dropped Round Mountain from the possible list of capping material. Although other sites in the general area are being considered, the specific site for obtaining the rip rap has not been identified, therefore no accurate cost analysis is possible. Yet, what about the costs of maintaining and resurfacing the roads used to transport the capping material? Aside from these basic costs, it must be realized that road 130 is a dangerous, winding, road that carries a lot of tourist and commuter traffic, including a school bus twice per day. Safety has not been realistically addressed. Conversely, there is a rail line next to the pile that runs near the plateau site that could be used if the pile is moved. This option should be seriously considered especially since Atlas admits the plateau site is environmentally and economically preferable to the cap-in-place alternative.

The main problem that has not been adequately addressed is the contamination of ground water, both that which has occurred and that which will continue (and be compounded) if the pile is left in place. Atlas has not been able to meet the safety requirements placed on them for reducing the levels of continued contamination. In addition, they provide no plan of how they will address this problem or what actions they will take to reduce or eliminate this problem in the future as the leaching continues. Further, the impact to the River and it's ecosystems has not been realistically studied. The random sampling of sediments and fish were taken last year during the flood stage. This resulted in inaccurate data, from which non-representational conclusions were derived.

A final point to consider is the economic impact to the area if the choice is made to cap this pile in place. When water and biointrusion cause the pile to fail and only 2% of the annual visitors to Lake Powell choose to vacation elsewhere, the loss of revenue would more than cover the cost of moving the pile. This loss of revenue will trickle down the economic chain and affect many, many, people.

I urge you to consider these and other points raised about the DEIS and make appropriate recommendations to address these problems and discrepancies. Thank you.

Sincerely,

Karen Clark
Dear Chief,

We are writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now and having perused many of the documents available, we can come to only one reasonable conclusion: the tailings piles should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternative site would be fiscally irresponsible.

As you noted in your DEIS, the alternative site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. Actually moving the pile would be much more dangerous than leaving it where it is. Slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, cover it, cap it ... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and have it end up as an EPA Superfund site.

We feel that Atlas has done everything possible to handle this problem correctly, safely and within the rules and regulations as it was handed.

In view of that, we think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Kathy Creswell
Woody Creswell

Cathy and Woody Creswell
4861 S. Highway 191
Moab, UT 84532

April 28, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Moab.

I am beginning to get the feeling that the "true huggers" are making a great big mountain out of a tiny mole hill. They are so determined to spend somebody else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" certain Councilmen keep yapping about? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "true huggers".

Sincerely,

[Signatures]

J-309
April 26, 1996

Dear Mr. Holonich:

I wish to comment on the Atlas tailings issue.

I have listened to all sides of the story and am very concerned about what some of our county commissioners are trying to do. These people have avoided the real issues of the protection of public health and the environment and, I believe, are concentrating on how they can improve their own political well-being by hiding the true reasons why they are fighting Atlas on the tailings issue. I speak as a long time resident of Moab, as I was born and raised in this part of the U. S. of A. I am very concerned about the environment and the health and safety of the public.

Several Grand County commissioners, notably Mr. Heddin and Mr. Haney, believe they can make big bucks for the county by forcing the Atlas tailings into Superfund status. They think that this will ensure that there are many high paying jobs in the Moab area for the foreseeable future and that it will provide lots of extra land for high-dollar development. I do not agree with this because most of the skilled people who could do this type of work have already left the area, many years ago. Also, if this is true, the potential developers should be the ones who foot the bill for the extra cost of moving the tailings, not the taxpayer.

For these reasons I strongly support Atlas's position for in place reclamation of their tailings, and the work should be done as soon as possible.

Yours truly,

Sincerely,

Darrell Dalton

Darrell Dalton
County Commissioner

Dear Mr. Holonich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can see only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DES, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contour it, cap it...and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and have it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely...and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the jobs can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Darrell Dalton
April 23, 1996

U.S. Nuclear Regulatory Commission
Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWPN7-J9)
Division of Waste Management
Office of Nuclear Materials Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

I am writing this letter to register my disappointment over the proposal to move the Atlas tailings pile from its current permitted location to a new location by the airport.

If we really are concerned about radiological contamination, why should we risk contaminating another location with the tailings? The tailings pile has been at the river location in Moab under the direction of the NRC for close to 40 years, with little impact on the surrounding population.

Let's not try to solve one problem by creating another one. Cap the Atlas pile in place.

Thank you.

Sincerely,

Ralph Dalton
582 E. Rosecreek Lane
Moab, UT 84532

Rodney L. Delton
750 East Bittle Lane
Moab, Utah 84532

April 14, 1996

Joseph J. Holonich, Chief
U.S. NUCLEAR REGULATORY COMMISSION
High-Level Waste and Uranium Projects Branch
Division of Waste Management
Office of Nuclear Materials Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

I would like to express my feelings regarding the situation with the Atlas tailings site northwest of Moab. I feel it would not only be cheaper, but safer to cap the tailings pile rather than attempt to move it. I believe that by removing the tailings pile you could create a dangerous situation with airborne radioactive particles. There is always the possibility of accidents in moving and transporting the tailings. If we lived in a perfect world there would be no question about moving the pile. Since we don't I feel it would be better to stabilize the pile, contour it and cap it. Then offer the best solution to keep the tailings from seeping into the river. This seems to be the major concern.

I have been a resident of Moab for 62 years. We have what may be more than the national average in cancer cases. To disturb the pile could cause more contamination in our valley. I feel the greater danger would result from attempting to move the tailings.

Sincerely:

Rodney L. Delton
April 22, 1996
U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch: Mail Stop
TWMN 7J-9
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Chief,

We are writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now and having

7B-1

perused many of the documents available, we can come to only one reasonable conclusion: the tailings pile should be capped in

7B-2

place. I think there is ample evidence to support capping as a

safe solution for the people of Moab and Colorado River users.

With the cost differences being what they are, moving the pile to

the alternative site would be fiscally irresponsible.

As you noted in your DEIS, the alternative site is somewhat

7B-3

better than the current one from an environmental standpoint, but

moving the pile would then create two contamination

7B-4

instead of just one, which makes no sense since usually moving

the pile would be much more dangerous than where it

is. Slight environmental benefits cannot

be outweighed by the huge

cost differences in moving the pile.

If we lived in a perfect world, there would be no question

7B-5

about moving the pile. But we don’t live in such a world, so

let’s just stabilize the pile, contour it, cap it . . . and let

everyone get on with their lives. It would be tragic for the

people of Moab and for Atlas to allow this situation to get out

of hand and having it end up as an EPA Superfund site.

We feel that Atlas has done everything possible to handle

7B-6

this problem correctly, safely, and within the rules and

regulations it was handed.

In view of that, we think that the decision to cap in place

should be made quickly, so the job can get done quickly and

without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Tug and Billa Daniels
1520 E. Murchey Lane

April 23, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

For many years now, I have been following the situation between the NRC and Atlas company.

7B-7

1 from what I have been able to determine, it seems to me that it would really be a waste

7B-8

of money to move the tailings pile to another place.

First of all, I ask myself, “what would be accomplished?” I mean, we would have two

radioactive piles instead of the one we have now. It seems to me that you would be

spending at least twice as much trying to make a new disposal place, and cleaning up

the old place.

From what I’ve read and heard, moving the tailings would mean a whole lot of big

equipment, like some kind of a system to get the liquids out of the tailings so they

could be moved. Then you would need a lot of trucks to haul the loads carrying either

the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right

where they are. I believe them when they say they can make the place safe.

 Heck, I’ve lived here and raised a family, and we’re all healthy.

Thank you.

Bonnie L. Day

240 N. 300 EAST
MOAB, UTAH.
April 21, 1966

U.S. NRC
Washington, D.C.

Dear Mr. Holonich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Mosh.

I am beginning to get the feeling that the "tree huggers" are making a great big mountain out of a tiny mole hill. They are so determined to spend somebody's else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" certain Councilmen keep yapping about? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

Sincerely,

Dane R. Day

7/21/66

April 28, 1966

U.S. NRC
Washington, D.C.

Dear Mr. Holonich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Mosh.

I am beginning to get the feeling that the "tree huggers" are making a great big mountain out of a tiny mole hill. They are so determined to spend somebody's else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" certain Councilmen keep yapping about? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "tree huggers".

Sincerely,

Dane R. Day

240 N. 300 East
Salt Lake City, Utah
Dear Sirs,  
April 22, 1976  

For many years now, I've been following the situation between the NRC and Atlas company.

78-1 From what I've been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

78-2 First of all, I ask myself, "what would be accomplished?" I mean, we would have two radioactive places instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

78-3 From what I've read and heard, moving the tailings would mean a whole lot of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

78-4 I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

78-5 Heck, I've lived here and raised a family, and we're all healthy.

Thank you.

Jynn Day

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To: U.S. NRC  
Washington, D.C.  

April 20, 1996

Dear U-R. Holonich:

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be far safer, take less time and be more cost effective to cap it in place.

80-1 It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

80-2 Also, the livestock in the area will be subject to inhaling these particles. While it is a loose comparison, considering what is happening in England with the "mad cow" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

80-3 Logically, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

80-4 Naturally, capping is less expensive. I do agree that for safety's sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

80-5 I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Sincerely,  

[Signature]

[Stamp]

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J-315
Thank you for your consideration.

Let’s not let our own problems by creating another one. Let’s use the other.

The purpose of the above mentioned population

The above mentioned in the order of the NICs for those to fit with

1. If we are concerned about the consequences, we should be

The purpose of the above mentioned population

I am writing this letter to request my dysfunction over the proposed to

Yu' ef Hohde

Washington, D.C. 20535-0001

Office of Under Secretary, Science and Technology

Division of Water Infrastructure

Hepatitis, Vaccine, and Hemorrhage Project Branch (Mail Stop THW377-14)

US Nuclear Regulatory Commission

April 23, 1996

9.5. NRC
Dear Mr. Harrington,

I am writing to express my appreciation for the recent changes in our office's policies regarding the payment of employees. I believe these changes will have a positive impact on the morale and productivity of our team.

The new policy of allowing employees to work from home has been well-received by everyone, including myself. It has been a relief to have more flexibility in my work schedule and to be able to better manage my time. I have noticed a significant increase in the quality of my work since the implementation of this policy.

I would also like to mention the new meal plan that has been introduced. The variety of options available has made it easier for me to maintain a healthy diet. I have been particularly impressed with the selection of vegetarian and gluten-free options.

Overall, I believe these changes are positive steps towards creating a more comfortable and productive work environment. I am grateful for your leadership and foresight in making these improvements.

Thank you for your consideration.

Sincerely,

[Your Name]
Dear Mr. Holonich:

I strongly disagree with our Grand County councilmen on the Atlas tailings issue. I worked 23 years for Atlas (the last fifteen as Maintenance Superintendent) and can assure you it would be far safer, take less time and far less expensive to cap the pile in place. The work should also be done as soon as possible to permit rainwater to run off the pile and thus minimize infiltration into the groundwater.

Our “famous” councilmen have now “lost” the local railroad due to their inflexibility with property taxes. I suppose this is why the latest plan being pushed by the extremists for the Atlas pile is to convert the railroad into an open pit type haul road. These people have no expertise at all and they will use everything but smoke and mirrors to get their way. Do not be fooled by them.

I believe it is safer to cap mainly because of airborne particulates. Most of the pile stabilization has already occurred. It is senseless to stir this up and risk exposing the tourists, wild sheep and wetlands, etc. to the inevitable amount of dust and radon that is going to be released if the pile is removed. Regardless of how much care is taken to control this, as a practical man, I think it is going to be an impossible task to control the dust, let alone the spillage.

If Atlas is forced to move the tailings I can see all sorts of problems developing. With the new types of people we now have around this area I can see us ending up with a “mad-cow” situation! All of this is unnecessary if the pile is simply capped in place.

Whatever you do, do not capitulate to the so-called environmentalists as they are nothing more than extremists who do not have much common sense. You need to be more

assertive with this sort of person. Keep up the good work and stick to your guns!

Sincerely,

[Signature]

Robert Downard

cc: U. S. Senators Orrin Hatch, Bob Bennett and Bill Friston
Utah Congressman Jim Hansen
Governor Mike Leavitt
State Senator Mike Imlerich
State Representative Keela Johnson
Mr. Joseph Holenich:

This is a response to the NEIS on the Atlas Tailings pile on the Colorado River near Moab, UT. I do not believe the cap-in-place option is a good solution - it does not even meet the NRC’s final Health & Safety Criterion as stated in Appendix A. My main concerns are:

- Potential for ground-water contamination
- Proximity to seismic faults
- Proximity to high volume of traffic use
- Above-ground nature of site

Please do not let financial concerns take precedence over safety issues! Moving the pile is the safest for our community.

Sincerely,
Alice M. Drogin
Grand County resident
C/O RE 2106 Moab, UT 84532
April 23, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch; Mail Stop TWEN 71-9
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now and having perused many of the documents available, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile at the alternative site would be financially irresponsible.

As you noted in your DEIS, the alternative site is somewhat better than the current site from an environmental standpoint, but moving the pile would then cause two contaminated locations instead of just one, which makes no sense at all. Actually moving the pile would be much more dangerous than leaving it where it is. Slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contain it, cap it . . . and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely, and within the rules and regulations it was handed. In view of that, I think that the decision to cap in place should be made quickly, so the job can be done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Dean Ellis

April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its capping. For over forty years, the uranium tailings have been situated at that location in Moab and Atlas' and NRC's experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile's future.

Sincerely,

Lee Ellis
247 Starleen
Moab, Utah
Joseph J. Holonich
Chief, High-Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWFN 7J-9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich,

My wife and I live under Round Mountain in the Castle Valley outside Moab, Utah. Obviously, we are concerned about the Atlas tailings pile near Moab and the potential implications for our valley. At this writing, the word is that Atlas is no longer considering the quarrying of borrow material in the Castle Valley. We are thankful for this reprieve although I find the whole proposal quite insensitive to the local populace.

It is not a satisfactory solution to the tailings pile problem—whether the issue needs to be addressed in the D.E.I.S. or not—to: 1) Destroy the visual and audio solitude of a remote tourist attraction, Castleton Tower, on the edge of a proposed Wilderness Area. (D.E.I.S. Section 4.7.4.1) 2) Make the already very dangerous River Road even more perilous by adding 7,500 dump trucks to the mix of R.V.’s, Mountain Bikers, Commercial Rafting buses, their trailers stacked five high with inflated rafts, and Castle Valley locals commuting to town. What about the road’s propensity to have black ice for most of the dead of winter? (D.E.I.S. Section 4.7.5.2) 3) Finally, the local and Utah taxpayers, not Atlas, are left with the bill for River Road Reconstruction. (D.E.I.S. Section 4.7.5.2) Whose idea was this anyway? Again, we are thankful that cooler heads seem to have prevailed.

Additionally, we would like to comment on the D.E.I.S. regarding the Atlas Corporation’s proposal to cap-in-place the Tailings Pile. We have read both the D.E.I.S. and the Technical Evaluation Report. In regards to most of the reports contents we agree with the evaluation and commend the thoroughness.

However, we believe there are some serious flaws in the groundwater sampling process which must be addressed in a decisive manner in order to insure the accurate testing takes place in a timely manner (D.E.I.S. Section 4.4.6). More sampling sites in appropriate locations with better sampling methodology are needed to gain public confidence. “Dilution is the solution to pollution” may not be an appropriate mantra in this situation (D.E.I.S. Section 4.4.7)

During this testing period, it would be prudent to go back and realistically, in today’s numbers and technology, estimate the cost of capping-in-place with the more realistic off-site disposal alternative put forward by the Citizens Task Force. We know that tailings can be safely removed from urban settings. It has been done in S.L.C., Grand Junction, and Durango. The cost projections put forward by Atlas are outdated and appear biased towards the cap-in-place alternative. Independent cost analysis of both proposals seems the only way to accurately determine whether the pile should stay put or be moved to the plateau location.

There is an even bigger issue which should also be addressed while an accurate groundwater leaching sampling process is conducted. Should the U.S. Congress pass special legislation which treats the Atlas pile as a special situation. The whole issue of whether this site is really a Title II site, as presently classified, or should be reclassified as a Title I site should be addressed.

Maybe Atlas should forfeit it’s bond in return for release from the site. Perhaps the Department of Energy should then assume responsibility for the clean-up and move the pile to the plateau location. This would allow an eventual end to this story that would include true reclamation. The river and the tourist industry it helps support would be protected.

Additionally, the sight would be a prime piece of real estate for future development 30 or 40 years down the road.

We believe that the tailings were generated by a number of parties all of which have some responsibility for the mess by the river. Given the date of initial operation at the Atlas Mill and the pile’s close resemblance to other Title I sites (unlined, witches brew of reagents and heavy metals, etc.), it seems only equitable that the Federal Government at least accurately consider moving the pile. It is not entirely Atlas’s doing and should not be entirely Atlas’s and the people of Grand County, Utah’s burden. The atomic energy program which generated the wastes were sold as issues of national defense. The cleanup of these wastes should also be national issues and not result in rural environmental scars.

The D.E.I.S. states that 76% of Grand County’s economy is tourist and
recreation driven. The tailings pile is totally at odds with the present
Grand County both economically and philosophically. This civic chasm
widens every year.

The N.R.C.'s regulations primary objective is to achieve "long term
isolation of the waste from the human and natural environment without
the need for on-going maintenance." And the preferred method for
achieving this goal is "below-grade entombment at a suitable geophysical
site". This certainly does not describe the present situation or the Atlas
proposal. However, the Citizens Task Force proposal meets all of the
requirements. Why isn't it being given serious consideration?

It is hard not to conjure up sinister opinions about big business and
even bigger government when faced with the Atlas tailings pile reality!

Unfortunately, this situation appears headed for court. The present
rhetoric from Atlas and the N.R.C. is that the answer is to get "closure" of
the site by capping-in-place no matter how flawed the determination
process. On the other hand, it appears the citizens of Grand County have
both the legal resources and the civic will to fight this decision until a
credible evaluation of both the economics and the safety of alternatives is
done.

We encourage your department to step back and re-evaluate some of
the underlying assumptions surrounding this reclamation and help the
citizens of Grand County get this radioactive monkey off our back. We are
not trying to bankrupt Atlas. We are only trying to solve this problem in a
way which allows our community to get on with its present and future as
an International tourist destination. They aren't coming to see the Atlas
tailings pile. Thank you for your consideration of this important and
difficult matter.

Sincerely,

David D. Erley & Bernice Notenboom

April 24
Dave Evans
CVOR 2010
MADB UTAH
84532

Dear Mr. Holonich,

Just under the wire to
comment about Atlas tailings.
I watched that pile at least
double in size in the late
70's and early 80's as I drive
by with tourists to run
Cataract Canyon. They would
always ask as they were about
to embarck on a river float
and swim, "Is it safe?"

"Of course", I would reply.
But I never believed that.
Nor do I believe dumping a
bunch of rock on it is
will make it safe. But somehow
we are strangely immune to
pre-existent trash piles.

Round Mountain, however,
is not a trash pile nor has
it ever been marred by
man. Sometimes eagles mess
it up on top. But I hope
it remains as it is.

Thank you.

Dave Evans
April 9, 1996

I.A. S. NRC
WASHINGTON, D.C.

Dear Mr. Hlightly:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

102-1

Having followed the situation for some time now, I can only see one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a viable solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to an alternate site would be financially irresponsible.

102-2

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

102-3

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, continue it, cap it...and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

102-4

I believe that Atlas has done everything possible to handle the problem correctly, safely...and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

RICK EVANS
414 TOPAZ CIRCLE
MOAB, UTAH

March 5, 1994

Chief, High-Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TPFW 72-9
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

To Whomever It May Concern:

As a concerned resident of Utah, I am submitting my comments on the Draft Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah. Since many of my comments will be repetitions of what others have already said, I will try to keep most of my comments brief:

102-1

Using Round Mountain should not be a possibility.

102-2

A large volume of truck traffic on Utah Highway 128 would be hazardous to other users of the road, and this safety concern should be given serious consideration.

102-3

It appears that there are many uncertainties about the plan to cap the tailings in place, whereas the alternative of moving the tailings to the site west of the Moab airport is to be a safe alternative. I would prefer that the tailings be moved.

102-4

I attended the public meeting in Moab, February 28. It was obvious there is a lot of opposition to the plan to cap the tailings in place. Most of the opposition is from people who are intelligent and have a good knowledge of the facts, and lack of facts, concerning the tailings. At that meeting, I heard a NRC representative say that there is a draft EIS, and a comment period, and then a final EIS. If approved or disapproves the plan put forward by Atlas and that "we're the way the process works." I've seen that the process can be adjusted to work better if needed. A couple of years ago, Canyonlands National Park presented a backcountry management plan for public comment. The public commented. The next step was to be a final plan. However, during the comment period, there were numerous alternatives and concerns brought to light that the public that had not been addressed by the Park Service. Park Superintendent Walt Daloney realized that the Park Service had not gone far enough and that a second draft, along with a second comment period was in order. The result was a plan that was acceptable to more people and better for the Park. I think the NRC should do a new DEIR with another public comment period:

102-4

There's an old saying: "There's never enough time to do it right the first, but there always seems to be enough time to do it over." The word 'money' could take the place of the word 'time,' and the saying would still be true concerning the tailings. Capping or moving the tailings will be time consuming and very expensive. But those costs will be nothing compared to having to do it over if it's not done right in the first place. The dollar cost of doing it over will be minuscule compared to possible health and environmental costs of failure of capping in place.

102-8

In 1992, I visited Russia. One of the first things I noticed in Moscow

J-330
was the yellow air. It laid like a dusty blanket over the city. It extended for miles into the countryside. My lungs worked as though they were coated with glue. I felt sorry for the Russian people. I knew I would never have to endure air like that in the United States. American citizens wouldn't stand for it. The U.S. Government wouldn't allow it. I still feel that way. Please be very careful in approving any plan for dealing with the Atlas tailings.

Thank you for considering my comments.

Bill Foreman
P.O. Box 326
Green River, Utah 84525

April 28, 1996

U.S. DEPT. OF THE INTERIOR
WASHINGTON, D.C.

Dear Mr. Holman:

I have attended some of the meetings about the manner of whether or not to move the Atlas tailings pile here at Moab.

I am beginning to get the feeling that the "tree huggers" are making a great big mountain out of a tiny molehill. They are so determined to spend somebody else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" certain Councilmen keep yelling about? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "tree huggers".

Sincerely,

[Signature]

400 TOPAZ CIRCLE
MOAB, UTAH

J-331
April 29, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holman:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don’t live in such a world, so let’s just stabilize the pile, contain it, cap it... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand just having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely... and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Clare Friedman
920南北AR. CIRCLE
MOAB, UTAH.

Bryan Friedman
703 West Church Street
Apartment F
Champaign, IL 61820

March 27, 1996

Chief, High Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mall Stop TWPN 7J-9
U.S. Nuclear Regulatory Commission
Washington, DC 20555

re: NUREG-1531

Dear Sir or Madam:

Thank you for sending me a copy of the Draft Environmental Impact Statement related to the Reclamation of the Uranium Mill Tailings at the Atlas Site of Moab, Utah. I was impressed by the succinctness and clarity of the report. It followed a straight-forward format that covered all of the necessary areas.

However, I wish to raise several concerns regarding this Draft Environmental Impact Statement and its accompanying Draft Technical Evaluation Report. I have visited the Moab area and Arches National Park numerous times, and thus am familiar with the unique beauty of the area. I believe that all measures must be taken to preserve the aesthetic quality of the region. In addition, this area must remain safely habitable for humans and wildlife. I wish to point out ways in which the proposed action may fail to ensure this.

The DEIS concerns me because it ignores its own environmental recommendations. On page 2-26, for example, it states, “the Plateau site alternative is environmentally preferable to the Atlas proposal” in every important aspect. Disregarding this, the DEIS still finds the Atlas proposal to be the preferable alternative. This indicates that environmental concerns in the end are ignored in favor of economic concerns.

Since the DEIS relies so heavily on cost-benefit analysis to arrive at its conclusions, I think it is important to note the costs that the report’s analysis ignored. The socio-economic impacts were not sufficiently included in this analysis. Whether warranted or not, the perceived danger of a radioactive waste facility can have a negative impact on tourism and economic growth in the Moab/Arches area. In addition, the costs of groundwater/Colorado River
contamination were not included. While the DEIS claims these do not have any direct human impacts, the food chain effects, through bioaccumulation, can eventually have human impacts. If these additional costs are considered, the savings for the Atlas site versus the Plateau site might not be as large.

Another concern I have with the DEIS is its lack of long-term focus. While it covers the next hundred years fairly well, it does not (nor could it) foresee the outcomes in the subsequent thousand (or thousands of) years that the Atlas site will remain radioactivity unstable. The uncertainty of such a long time frame would seem to dictate extreme caution, or at least more than Atlas appears to be using. Keeping the site in an erodable floodplain seems to be short-sighted. The monitoring of the site for the duration of its lifetime is also highly uncertain. The DEIS needs to address the Atlas site issues in terms of a more accurate long-term framework.

The lack of a design for the tailings pile cover, as noted on page 1-6 of the DEIS and the numerous open issues noted on pages 1-5 through 1-7 of the TER also concern me. It is difficult to evaluate the proposed action when there is still so much information that has yet to be gathered or proposed. These gaps in information should be filled before the final report.

In conclusion, I am disappointed that this process has taken so long. Whatever action is recommended, I think it is definitely preferable to having no reclamation plan, as the situation has been since 1984. The Atlas site did not even catch my eye in my visits to Moab, but now it is of great concern to me. Knowing now the presence of such large amounts of radioactive waste would cause me to be more wary in the future. However, if the above concerns are addressed in the final EIS, my mind would be much more at ease.

Thank you for your consideration.

Sincerely,

Bryan Friedman
Graduate Student
Environmental Planning
University of Illinois

April 19, 1996

U. S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

For many years now, I've been following the situation between the NRC and Atlas Company.

From what I've been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, "what would be accomplished?" I mean, we would have two radioactive places instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

From what I've read and heard, moving the tailings would mean a whole lot of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

Now, I've lived here and raised a family, and we're all healthy.

Thank you.

Louis Hallman
12006 Berwyn Ave.
Moab, Utah 84532
Chief, Project Office on Financial Services, South Beach
Division of Network Management

The "Garber Acorn" is a new location for the

102-6

Office of Financial Services.

102-7

The new location will offer a modern, efficient work environment.

102-8

104-1

104-2

104-3

The new location will provide a more open and collaborative work atmosphere.

104-4

The new location will also reduce commute times for employees.

104-5

104-6

104-7

104-8

106-1

106-2

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106-7

108-1

108-2

108-3

108-4

108-5

108-6

108-7

108-8

I am very excited about the new location.

The new location will offer a more open and collaborative work atmosphere.

The new location will also reduce commute times for employees.

The new location will provide a more modern and efficient work environment.

The new location will be located in a more accessible area for employees.

The new location will offer a more efficient and productive work environment.

The new location will also provide better access to public transportation.

The new location will offer a more secure and safe work environment.

The new location will also provide better access to amenities.

The new location will offer a more comfortable and attractive work environment.

The new location will also provide better access to recreational activities.

The new location will offer a more efficient and cost-effective work environment.

The new location will also provide better access to healthcare services.

The new location will offer a more productive and efficient work environment.

The new location will also provide better access to cultural events.

The new location will offer a more enjoyable and rewarding work environment.

The new location will also provide better access to educational opportunities.

The new location will offer a more supportive and positive work environment.

The new location will also provide better access to professional development opportunities.
April 21, 1996

U.S. NRC

Dear Mr. Holdich:

I am a part-time resident of Moab, Utah. While I am not entirely happy about having a tailings pile in my backyard, I am astounded that the NRC would even consider requiring Atlas to dig up and move by truck or other means 10.5 million tons of fine, sand-like material that will pose a greater risk to the public during the moving process than leaving the pile in place will pose. In addition to industrial strength traffic, the residents and visitors alike will have to breathe the tailings dust as they are moved.

Further, should the pile be moved, I question whether anyone would seriously want to live on the site of a former uranium tailings pile. If Grand County wants property to develop, let them develop the Airport site, and use the existing rail line as the cornerstone of Moab’s public transportation system.

Sincerely,

[Signature]
Elaine Long
Sunny Day
Donna B. Day

April 21, 1996

U.S. NRC

Dear Mr. Holdich:

I cannot comprehend that in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved this Incurring an expenditure of ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover $6.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn’t take a rocket scientist (let alone a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Atlas does default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safely guarded uranium tailings pile in our town. O do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Atlas close the tailings pile in place.

Sincerely,

[Signature]
Donna B. Day
Donna B. Day
April 25, 1996

U. S. NRC
WASHINGTON, D.C.

Dear MR. HOLONICH:

I cannot comprehend that in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved this incurring an expenditure ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover $6.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee so close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn't take a rocket scientist (let alone a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Atlas does default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safety guarded uranium tailings pile in our town. I do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Atlas close the tailings pile in place.

Sincerely,

[Signature]

April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear MR. HOLONICH:

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its capping. For over forty years, the uranium tailings have been situated at that location in Moab and Atlas' and NRC's experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile's future.

Sincerely,

[Signature]

1218 Wagner

J-336
U. S. NRC
WASHINGTON, D.C.

Dear R.R. HOLONCHI:

I am a part-time resident of Moab, Utah. While I am not entirely happy about having a tailings pile in my backyard, I am astounded that the NRC would even consider requiring Atlas to dig up and move by truck or other means 10.5 million tons of fine, sand-like material that will pose greater risk to the public during the moving process than leaving the pile in place will pose. In addition to industrial strength traffic, the residents and visitors alike will have to breathe the tailings dust as they are moved.

Further, should the pile be moved, I question whether anyone would seriously want to live on the site of a former uranium tailings pile. If Grand County wants property to develop, let them develop the Airport site, and use the existing rail line as the cornerstone of Moab's public transportation system.

Sincerely,

[Signature]

April 27, 1996

---

U. S. NRC
WASHINGTON, D.C.

Dear R.R. HOLONCHI:

I have been a resident of Moab, Utah for over 50 years. I (as someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river road, State Highway 191 and the alternative Pineview site into a major industrial operation for the next 15 years. The eyesore this will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 5000 years.

Sincerely,

[Signature]

April 28, 1996

---

P.S. I personally think it was a shame to leave the site where the uranium was mined. It began Moab's end and I am looking for the finality the river road. I just need to know if there is a chance of the 1972 uranium mine being gone. Thanks.

[Signature]

April 28, 1996
April 23, 1996

Joseph J. Holonich, Chief,
High Level Waste and Uranium Recovery Project Branch (Mail Stop TWFN7J-9)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich:

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be safer, take less time and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a loose comparison, considering what is happening in England with the "mad-cow" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in that area should not pay the price.

Logically, the less time it takes to resolve this issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings, from its present location to the new location some 14 miles away, can do nothing but take more time. It is ridiculous to expect a company to spend years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety's sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone with have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people, nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your consideration.

Sincerely,

Verle L. Green
P.O. Box 403
Moab, UT 84532
April 24, 1996

Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch
(Mail Stop: TWPNT-79)
Division of Waste Management
Office of Nuclear Material Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich,

I was the purchasing agent for all of Atlas Corporation's many mining properties for more than fourteen years. I therefore feel qualified to comment on the Atlas tailings issue. The Atlas tailings pile has sat on the banks of the Colorado River for forty years. In all of that time I've never heard of any problem with it until NRC called for public comments on the proposed Atlas reclamation plan. Where were all of the whomers when Atlas was operating? Wasn't there a problem then, also? How many people's health was affected during the earlier years from the pile? Did anyone die? No, I don't think so!

If the Atlas pile is moved to another site, as some of our local 'activists' want, how long will it take before the present site is clean enough for unrestricted use? A long time, I fear. In which case we will have essentially have created an additional contaminated site.

I am therefore in favor of Atlas' in-place reclamation plan.

Sincerely,

John M. Groff

cc: U.S. Senators Orrin Hatch, Bob Bennett and Bill Orson
    Utah Congressmen Jim Hansen
    Governor Mike Leavitt
    State Senator Mike Davis
    State Representative Kevin Johnson

April 28, 1996

U.S. NRC
Washington, D.C.

Dear Sirs,

I have been a resident of Moab, Utah over 55 years. I (or someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river road, State Highway 191 and the alternative Plutonium site into a major industrial operation for the next 15 years. The cyanide will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

Kathryn Scott
April 28, 1996

Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch
Mail Stop: TWPN-39
Division of Waste Management
Office of Nuclear Materials Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

I have no problem with moving the pile or capping it in place. Generally, I see the whole problem as much ado about nothing. Never the less, my only concern with capping in place would be that it blocks the view of Moab when tourists come in to town from the north.

Sincerely,

William J. Groff
772 Hill Creek Drive
Moab, Utah 84532

CC: U. S. Senator Orrin Hatch
U. S. Senator Bob Bennett
U. S. Senator Bill Orin
Utah Congressman Jerry Hansen
Governor Mike Leavitt
State Senator Mike Dalmrich
State Representative Keele Johnson

U.S. NAV
WASHINGTON, D.C.

April 29, 1996

Dear Mr. Holonich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe answer for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two commissioned locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don’t live in such a world, so let’s just stabilize the pile, cover it, and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely, and within the rules and regulations it was handed.

In view of this, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

[Signature]

131 N. 100 EAST
MOAB, UTAH

J-340
April 23, 1977

Joseph J. Mironich, Chief,
High Level Waste and Uranium Recovery Project Branch (Hall Stop
TMF77-9)...
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Mironich:

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be safer, take less time and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailing pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a loose comparison, considering what is happening in England with the “mad-cow” situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in that area should not pay the price.

Logically, the less time it takes to resolve this issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some 14 miles away, can do nothing but take more time. It is ridiculous to expect a company to spend years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety’s sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone with have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people, nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your consideration.

Sincerely,

Ron Herstatt
1271 Sage Avenue
Mesa, UT 84532
Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch
Division of Waste Management
Office of Nuclear Material Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

I strongly disagree with our Grand County councilmen on the Atlas tailings. They are wrongly trying to scare the local people into thinking the tailings is something dreadful.

I have spent 22 years working as a uranium miner. Since the uranium mines shut down I have worked for a hardware supply company, Rim Supply. As I see it, the tailings is nothing more than ground up rock with a small amount of residual chemicals in it after the uranium is removed. It should therefore be less radioactive. Please correct me if you think I am wrong.

On this basis I believe that it would be silly to go to the unnecessary expense of relocating the Atlas tailings. I am therefore strongly in favor of Atlas's plan to reclaim their tailings in place. It would be foolish to do otherwise.

Truly yours,

Michael J. Hardy

cc: U.S. Senators Orrin Hatch, Bob Bennett and Bill Orton
Utah Congressman Jim Hansen
Governor Mike Leavitt
State Senator MikeJMl'iterich
State Representative Keele Johnson

Dear Mr. Fiegel:

As per our telephone conversation 4-30-96 I am submitting my comments to the DEIS. Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah, "NUREG-1531", after April 30, 1996. Thank you very much for considering them. I have 3 general categories of comments. Under each category I have referenced Page numbers and Section numbers. Information in " " comes directly from the DEIS (some quotes have been shortened or underlining has been added in an effort to make the comments concise and emphasize certain points).

A. Regarding the adequacy of water quality, sediment, and biological data:
1. Page 14, Section 4.1.1 and Table 2, Page 15, Section 4.1.1, Biological Assessment - Says the water quality data collected by the Utah Division of Water Quality upstream and downstream of the pile was limited by: "the relatively small number of samples, the high detection levels in some cases, and other factors such as the great distance between upstream and downstream sampling stations [as much as 63 river miles]."

121-1

In order for these water quality data to be applicable to the Atlas Mill Tailings Pile, samples should be taken upstream of the Highway 191 bridge and at a location immediately downstream of the downstream side of the pile. The State sample location is 63 miles downstream of the Atlas site and is too great a distance downstream to make the data significant to the Atlas site.

121-2

2. Page 21, Section 4.1.2, Biological Assessment - WestWater Engineering's biological sampling conducted in 1995 was "hampered by time constraints, few or no replicates, considerable variability among upstream and downstream stations, a rapidly rising river which flooded backwater areas, and the absence of adequate quantities of invertebrates and fish/plants."

Page 33, Conclusions, Paragraph one, Biological Assessment - Regarding "near the leachate-contaminated groundwater surface water interface"; the DEIS concluded, "The site-specific data needed to assess effects on biota in these conditions do not exist". Paragraph two - "Although the pile is unlikely to adversely affect these species at the population level, the data available for this assessment are not sufficient to support a conclusion that the existing tailings pile does not have an effect on individual endangered Colorado squawfish or razorback suckers that could be present in the rising or downstream deposition areas."
1.3-4

The Kosovo and Metohija Province, also known as "Serbija Krajina" or "Serbija Crnogorija," was a self-proclaimed state established by Serbian Serbs in the Kosovo region of Yugoslavia in 1992. The province was created under the title of "Partnership for Development," but it was later declared a "Serb Republic" by the Serbian parliament in 1992. The province gained international recognition from Serbia and Montenegro, but not from any other country.

The province was established in response to the conflict in Kosovo, which was characterized by the conflict between Serbian Serbs and Albanians. The conflict led to a series of events that eventually resulted in the break-up of Yugoslavia and the establishment of the Kosovo Liberation Army (KLA), a guerrilla organization that sought to establish an independent Kosovo.

1.3-4

The province was declared a "Serb Republic" on March 2, 1992, by the Serbian parliament. The declaration was made in response to the conflict in Kosovo, which was characterized by the conflict between Serbian Serbs and Albanians.

The province was established under the title of "Partnership for Development," but it was later declared a "Serb Republic" by the Serbian parliament in 1992. The province gained international recognition from Serbia and Montenegro, but not from any other country.

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The province was established under the title of "Partnership for Development," but it was later declared a "Serb Republic" by the Serbian parliament in 1992. The province gained international recognition from Serbia and Montenegro, but not from any other country.

The province was declared a "Serb Republic" on March 2, 1992, by the Serbian parliament. The declaration was made in response to the conflict in Kosovo, which was characterized by the conflict between Serbian Serbs and Albanians.
3. In an effort to comply with the provisions of the Colorado River Basin Salinity Control Act (including the water quality agreement with the Republic of Mexico) the Federal Government and the Colorado River Basin Salinity Control Forum (CRBSCF) are actively involved in reducing salinity in the Colorado River by funding projects that control salinity at the source. The Atlas tailings pile is considered a POINT SOURCE of pollution (salinity). Effluent from the Atlas tailings pile exceeds 19,000 mg/l Total Dissolved Solids (TDS) (12,600 mg/l attributed directly to the tailings pile, 6770 mg/l attributed to background) while the state water quality standard is 1200 mg/l. Many NONPOINT SOURCES of salinity are difficult if not impossible to control. Since the federal government (and CRBSCF) spend millions of dollars each year for salinity control projects it would make sense to eliminate a source of pollution that we can control (the Atlas tailings pile). Mr. Jack Barnett is the Executive Director of the CRBSCF. His address and phone number are: 106 West 500 South, Suite 101, Bountiful, Utah, 84010. (801) 292-4663. Mr. Barnett may be able to offer some assistance for cleanup of the pile.

C. Conclusions

1. Page 2-26, last Paragraph - "In conclusion, the differences in potential long-term impacts listed above suggest that the Plateau site alternative is environmentally preferable to the Atlas proposal.

2. Page 4-18, Section 4.4.7. Conclusion - "Although tailings leachates have significantly degraded the groundwater quality at the Atlas site, no use of groundwater occurs on the Atlas side of the Colorado River or in areas adjacent to the opposite side of the river. Therefore, the tailings contaminants in groundwater currently represent no hazard to public health.

The DEIS clearly shows that groundwater at the Atlas site is contaminated beyond state water quality standards. The DEIS clearly shows that contaminants in the effluent from the pile exceed state water quality standards and that those contaminants will continue to flow into the Colorado River under the Atlas proposal. No use is presently made of the groundwater at the Atlas site, however, Moab is a growing community, Arches National Park is located directly across Highway 191 (the Park entrance is approximately 1 mile away), and, except for the Atlas tailings pile, that piece of land is potentially one of the most developable pieces of land in Moab (hotels, campgrounds, city park, etc.). The Atlas proposal indicates that the site itself, and the groundwater at the site, will never be usable, and that contaminants will continue to flow into the river. The Scott M. Matheson Wetlands Preserve is located directly across the river from the Atlas site and although human health may not be at risk the data do not exist in the DEIS to show that the health of wildlife and other aquatic organisms will not be affected at some time in the future.

Thank you very much for considering my comments.

Sincerely,

Carol Hatch

cc: Senator Orrin Hatch
125 S. State Rm 8402, Salt Lake City, Utah 84138

April 27, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holenich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DEIS, the alternative site is somewhat better than the current one from an environmental standpoint, but moving the pile would also create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don’t live in a perfect world, so let’s just stabilize the pile, cover it, cap it… and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely… and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without wasted tax dollars involved.

Thank you for your consideration.

Sincerely,

Carol Hatch

405 W. CHINLE AVENUE
MOAB, UTAH
Dear Mr. Holonich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Moab.

I am beginning to get the feeling that the "tree huggers" are making a great big mountain out of a tiny mole hill. They are so determined to spend somebody else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep bearing a dead horse about the "dangers" certain Councilmen keep yapping about? I don't think there are any real "dangers." Environ like them are quick to point out problems, but they never seem to have practical solutions. To clean the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "tree huggers."

Sincerely,

[Signature]

109 W Low Creek Pl., Alto, UT 84710
126-1 Atlas's "cap in place" proposal does not
meet with your own, the N.R.C.'s, health
and safety criteria.

126-2 Atlas's cost estimates do not reflect man
of the actual costs.

126-3 Your, the N.R.C.'s, conclusions favor cost
reduction in safety and environmental issues.

126-4 The cap-in-place choice would mean
that the pile would remain sitting on the
intersection of two faults and would
continue to leak, radioactive content being
washed down the waste water and Colorado River.

126-8 Atlas has done no research to show
whether the faults are active or not, sitting
the effect of an earthquake on a capped
pile could be catastrophic.

126-9 Atlas admits the plateau side is
environmentally and socially uneconomically
preferable to the cap-in-place alternative.

126-10 It appears that the costs reflected in
the D.E.S.S. are incomplete and steeply
slowly declined towards Atlas Corporation
interests; not the health and safety of
the public.

126-7 The D.E.S.S. does not include in the
cost estimates the $50 million needed
to re-surfacce the Riser Road and then
propose land routes before and after
handling the capping materials.

126-8 The D.E.S.S. does not adequately discuss
the dangers of using concrete to transport
capping materials. The accident statistics
used were area wide and are specific to
lands being used. Route 128 is
typical and is far more dangerous.

126-9 One of the proposed "bombe sites" has been
denamed as Round Mountain in Castle Valley.
The second site has not been discussed.

126-10 Atlas has not realistically looked at the
aesthetic loss for residents in Castle Valley
since they considered their operations
impact on noise and dust at Round
Mountain or another Castle Valley site.

126-11...
Dear Mr. Holdich,

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be far safer, take less time, and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The vendors who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a lesser consideration, considering what is happening in England with the "nost case" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

Legally, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed, and revegetated in much less time.

Naturally, capping is less expensive. I do agree that the safety's sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock and cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your time and consideration.

Sincerely,

[Signature]

[Address]

PATRICIA HAWKINS
C.V.E.R. 2512, HOOAB, UT, 84532

126-1

U.S. N.R.C.
WASHINGTON, D.C.

APRIL 27, 1966

126-2

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Sincerely,

[Signature]

[Address]

PATRICIA HAWKINS
C.V.E.R. 2512, HOOAB, UT, 84532

126-3

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126-13
Dear Mr. Holonisich:

I am compelled to write to you to notify you of my concern over the Atlas tailings problem. Most of the people that have been talking about this in the local newspaper have no concept of what they are talking about. The ones I'm referring to are some of our local county commissioners like Peter Haney and Bill Hedden. I don't believe they have ever worked in the uranium industry.

What do they know about radiation safety? Probably not much! Yet they continually harp on about imagined dangers to the public and the environment from the Atlas tailings pile if it is not moved to another site.

Just like Three Mile Island was blown out of proportion, these people are trying to do the same to Atlas on their proposed reclamation plan for the Mimb tailings. Don't these people know that Atlas tailings are very low level stuff? If Atlas does the reclamation in place, and in accordance with your regulations, I see no problem at all. The key is to properly contain the radioactive materials, and I believe that Atlas can achieve this with their in place reclamation plan. In fact, compared to Atlas completed in place reclamation plan, I believe a freshly plowed farmer's field would put out more radon!

I worked many, many years for Atlas Corporation and for Rio Algom and have completed radiation training courses at both companies. I was one of the workers who helped Rio Algom to complete the reclamation dirt work at the Lisbon mill. I never saw Peter Haney or Bill Hedden come out to the Lisbon operation to see how we were doing the reclamation there, or to ask questions, so that they could be more informed when talking to the media about the Atlas tailings. Where did these people get their training to be so knowledgeable? Where were these people when Atlas had all of its experts in town? Boycotting the meeting? It's all well and good if we have experts in county commissioners, how can they be an expert?

Unfortunately, I think Atlas is fighting an uphill battle with this type of person. It is getting worse. Because more of these types are coming to Moab all the time. They are totally unreasonable because they base their arguments on fear, rather than facts. The folks scare them to death because they can't deal with them. That's why they boycotted Atlas's meeting.

For what good it will do, these are my thoughts. Please let me know what you can to get Atlas's in place reclamation plan approved as soon as possible.

Sincerely,

Boyd A. Hawes

cc: U.S. Senators Orrin Hatch, Bob Bennett and Bill Orton
Utah Congressman Jim Hansen
Governor Mike Leavitt
State Senator Mike Emmons
State Representative Sallee Johnson
April 23, 1996

U.S. Nuclear Regulatory Commission
Mr. Joseph J. Holoshich, Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFN7-19)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holoshich:

I am sending this letter to register my disappointment over the proposal to move the Atlas tailings pile from its current permitted location to a new location by the airport.

If we really are concerned about radiological contamination, why should we risk contaminating another location with the tailings? The tailings pile has been at the river location in Moab under the direction of the NRC for close to 40 years, with little impact on the surrounding population.

Let's not try to solve one problem by creating a bigger one. Cap the Atlas pile in place.

Thank you.

Sincerely,

Kennyhawk
Kennyhawk
342 Walker
Moab, UT 84532

March 15, 1996

U.S. Nuclear Regulatory Commission
Project Manager/Source Material License No. SUA 917
High Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWPN 7J-9
Washington, D.C. 20555-0001


Dear U.S. Nuclear Regulatory Commission,

I have read NUREG-1531 and have compiled my notes from this Draft Environmental Impact Statement (DEIS) publication for comment to the Atlas Corporation's proposed reclamation of the uranium mill tailings at the Atlas site, Moab, Utah.

Under the Atlas proposal there are negative aspects that I noted, as well, I noted aspects of the alternate Plateau site; directly from the DEIS publication. My written comments will be self-evident for the NRC's consideration.

The 150 acre Atlas uranium tailings pile is partially below-grade and rises between 90 to 110 feet. It is located partially over a tectonically active geologic fault in the floodplain of the Colorado River, which is located 750 feet away. The entrance headquarters to Arches National Park is located 1.2 miles away. Tailings leachates are continually diffusing downward into the Colorado River and the Quaternary aquifer and continuous adsorption of tailing contaminants into this aquifer.

I take personal exception to the fact that an unlined, graded-out sub-surface pit was the beginning for the 10.5 million tons of the Atlas uranium tailings pile. Because of this below-grade unlined pit in the floodplain of the Colorado River the real concern of that huge pile of poison has been in direct contamination contact with this river from the tailings pile inception. This is referred to as the "mixing zone" in the DEIS.

After completion of reclamation under the Atlas proposal: the DEIS has concluded the following information: Tailings leachate will continue to percolate through the tailings pile and enter groundwater and the Quaternary aquifer. Water quality and aquatic biota will be measurably and adversely affected in the mixing zone. The Atlas site is located near a collapsed salt-mine and the active Moab Fault passes underneath the tailings pile.

J-349
Possible accidents that could affect the public include failure of the tailings cover system. A flood and slope failure is possible, the maximum pile failure of 27 million tons of tailings would enter the river. The hazard of a tailings pile failure is contamination of the Colorado River and downstream floodplains, including those in Canyonlands National Park and Glen Canyon National Recreation Area (Lake Powell). Some of the suspended solids that will enter Lake Powell will go on past the Glen Canyon Dam into the Grand Canyon National Park and into Lake Mead National Recreation Area. The tourist industry (76% of Grand County’s sales tax revenues) would be adversely affected, as would negative economic effects on local and regional tourism and recreation of a pile failure due to perceived health and safety concerns.

Aesthetic impacts of the pile would be significantly greater. The pile is viewed from scenic overlooks along the entrance drive into Arches National Park. It would be visible to everyone entering or leaving Moab Valley by crossing the Colorado River bridge on U.S. Highway 191. The proposed plan calls for a leveling of the pile to cover 150 acres that would rise a little over 90 feet. Roughly half of the 437 acres of the Atlas site would be precluded from any future use. It is assumed that property values for residential use could be decreased by 20-40%. There will be long-term damage to the public due to greater population density around the Atlas site. The Colorado River channel could possibly migrate towards the pile site.

I have also noted conclusions of the DEIS that a major tailings pile failure in a Probable Maximum Flood (PMF) would result in the following:

- For several days after the tailings pile failure, water use downstream would be prohibited for an uncertain period of time. Flooded lands would be contaminated by dissolved substances in the water and by deposition of tailings solids. In the event of a pile failure, water use until surveys would be needed to determine when existing land use could continue.

- Moab would most likely become contaminated with tailings sediments, this includes croplands along the river, a few orchards, a fishery, several residential areas, the only local sewage treatment plant, a school, seven hospitals and a community hospital, several campsgrounds and the 875 acre Scott M. Matheson Wetland Preserve (Moab Marsh). These very important properties would be restricted until surveys of contamination and any necessary cleanup activities were completed and the results evaluated. This kind of event would certainly impact public services and infrastructure.

The Glen Canyon National Recreation Area and Canyonlands National Park’s sport fishing and recreation safety would be in question and perceived by the public as unsafe. It would restrict, limit and reduce recreation on the Colorado River downstream of the site.

The loss of revenues incurred by this event would significantly affect the local economies for an undetermined amount of time.

Rainfall onto land contaminated by tailings could dissolve contaminants in the soil and transport them into groundwater. In extreme cases, water treatment would be required and several years of development would be delayed after any tailings pile failure.

The Colorado River lies 750 feet from the tailings pile. The U.S. Fish and Wildlife Service (USFWS) has classified four (4) native species of fish native to the Colorado River near Atlas as endangered. The USFWS has declared the entire river mainstem and associated floodplains as critical habitat. There is continued contamination of habitat by the ‘mixing zone’. Periodic river flooding would temporarily raise the groundwater level above the bottom of the tailings pile. The ground water at the tailings pile would continue to be impacted until well after the 1,000 year design. The tailings pile has contaminated and continues to contaminate the Quaternary aquifer. Appropriate mitigative measures need be taken if the design objectives cannot be met.

The 875 acre Scott M. Matheson Wetland Preserve (Moab Marsh) lies in the floodplain along the east bank of the river, northeast of the Atlas site. This is the only major wetland along the river in the entire Colorado Plateau Province. A pile failure, leaving contamination over this vast wetland could very well destroy this treasured preserve for hundreds of years; at least to the acceptable standards of the DOE, NRC, EPA and the State of Utah. A massive failure of the tailings pile design during a probable maximum flood will have a significant short-term impact on aquatic biota near the tailings pile and projected long-term effect on the Scott M. Matheson Wetland Preserve.

There will be disruption to Moab services, the tailings sediments will contaminate the repair and cleanup activities of contamination. Cleanup of contamination would be necessary before facilities could be re-energized; wastewater treatment plant, hospital, school, churches and residences. The failure would have relatively large, short-term cumulative impacts and a small, long-term cumulative impacts. As well, it could cause short-term cumulative impacts with other unidentified future projects. Costs associated with maximum failure of the tailings pile for repair, cleanup and lost productivity resulting from short-term pollution of the Colorado River and Moab were not considered in the DEIS.

This is the information published in the DEIS (NUREG-1531) concerning the Atlas proposal for on-site reclamation of the Atlas Mine, Moab.

The Draft Technical Evaluation Report (DTER) for the Proposed Revised Reclamation Plan for the Atlas Corporation Moab Mill (NUREG-1531) has identified twenty (20) ‘Open Issues’ concerning the Atlas Corporation Proposed Reclamation Plan. Open Issues are issues identified by the NRC that have not been adequately resolved through previous rounds of questions and requests for information. Until these ‘open issues’ are adequately resolved, the NRC cannot support the issuance of a license amendment approving the proposed reclamation plan. These 20 ‘open issues’ are identified in my previous notes of NUREG - 1531.
The meteorology and climate, precipitation and evapotranspiration of Moab are concerns addressed in the DEIS 3.1.1. Unfortunately, there is no account for the precipitation accumulated in the Rocky Mountains Range of Colorado that would greatly account for the Hypothetical Flood (HF) hypothesis. Nor does this section account for unpredictable global climatic changes, such as any major volcanic eruption that might occur in the Northern Hemisphere that would dramatically alter weather conditions that would drastically increase precipitation in the Rocky Mountain Range in the State of Colorado. Cases in point include: Mount St. Helen's eruption on May 18, 1980; the eruption of Kiluuea on the Hawaiian Islands in March 1983 and Mount Pinatubo on the Philippine Island erupted on June 9, 1991. These eruptions undoubtedly altered the Northern Hemisphere weather patterns and increased precipitation amounts. The violent eruption of Kiluuea in September to October 1, 1977 may have and most likely resulted in the greatest amount of snow in Moab, in one month, in January 1978 (27.1 inches) and the greatest precipitation amount in a single day on April 9, 1978 (2.1 inches). The five (5) major flood years of 1952, '65, '66, '83 and 1984 in the 100 year period, all correlate to prior major volcanic eruptions in the Northern Hemisphere. The largest flood occurring in 1984, 18 months after Kiluuea violently erupted in January 1983. This particular eruption was indicated in the June 1983 flood of the Colorado River past the Atlas Mill Site in Moab, Utah.

Winter snowfall of the Rocky Mountain Range of the State of Colorado contributes nearly 100% of the Colorado River flow near the Atlas Mill Site. The Colorado River in the vicinity of Moab and downstream of Moab is used for swimming, rafting, boating, fishing as well as other outdoor recreation and is a recognized scenic feature.

The 1993 Great Flood of the Mississippi River and the flood of 1996 in Washington, Oregon and Idaho are seen as grim reminders of the awesome power of flowing floodwaters.

Unpredictable global climatic changes have not been properly or fully addressed by the DEIS. There are unforeseeable global climatic changes that would measurably affect the Hypothetical Flood (HF) and the Project (PF) Flood (PFW) hypotheses, explain the equation of the maximum pile failure. The hypotheses for major global climatic change in the next 1,000 years has not been addressed. This is threatening the Atlas proposal as insecure and unsafe.

This new and serious question concerning the meteorology, climate and precipitation raises a new 'open issue' for the DEIS's consideration and should receive consideration by the BLM of this very serious question for the DEIS.

I have further, duly noted from the DEIS (NUREG-1531) the following conclusions of the DEIS concerning the alternate Plateau site in the area: At this environmental stage in the licensing process, the NRC shall not select a specific alternate site and will not mandate that the tailings must be moved to this site. Rather, NRC is focused on determining whether the Atlas proposal is acceptable and whether the Atlas site is environmentally acceptable for tailings disposal. To support this determination, this DEIS compares the Atlas proposal with the alternative of tailings disposal, the alternate site identified as the Plateau site.

Under the Plateau site proposal: No groundwater or surface water would be affected, virtually no contaminants would enter area surface waters; there is no existing flood plains. Aquatic biota in the Colorado River would no longer be exposed to contaminants of the Atlas tailings because no aquatic habitat is present, there are no wetlands and no threatened or endangered species. The Plateau site would provide greater benefit to aquatic biota because the source of contamination would be removed; a greater benefit to water quality because leaching into the river would be non-existent. Contaminant transport to the river would be non-existent. It would promote long-term protection of the Coloradp River. There would be no impact on groundwater because no viable supply of groundwater has been identified. Potential aquifers beneath the Plateau site would not be impacted. The Hance sandstone beneath is relatively impermeable and yields no groundwater to wells or springs. Minimal groundwater monitoring would be minimal if not non-existent.

Under the Plateau site alternative it would be away from most recreational activities and areas. No national parks or recreation areas would be threatened. It is remote from most viewing populations and no residences are near.

Transport of the tailings by rail to the Plateau site has minimal potential to impact public services and infrastructure. Impacts of borrow activities would be minimal, clay would be obtained at the Plateau site and riprap requirements would be substantially less than the Atlas proposal. Removal of the Atlas pile eliminates any directly perceived threat to potential recreational and aesthetic experiences of downstream elements of the National Park System. After reclamation, the Atlas tailings would eventually have unrestricted use of the entire Atlas site; this will provide greater value to the Atlas site.

The Hypothetical Flood (HF) and pile failure are extremely low probability events that require no detailed assessment by the NRC. No significant environmental problems have been identified for disposal of the tailings at the Plateau site.

The site alternative is environmentally preferable and is clearly better for any Appendix A, technical criteria in 10 CFR Part 40. Because significant environmental advantages were identified at the Plateau site, cost comparison would be more important in selection of this alternate site.

These are NRC conclusions published in the DEIS (NUREG-1531).

My comments concerning NUREG-1531 and NUREG-1532 for NRC's consideration are:

The NRC regulations, Appendix A technical criteria 10 CFR Part 40 is to protect or minimize potential impacts to the public health,
safety and environment; protection to the public must be equivalent to or better than that required by existing criteria. The Atlas proposal does not minimize the potential for environmental and public health impacts nor is the proposal clearly better for any of the critical site regulations. As this is the NRC's conclusion as published in the DEIS.

The unlined sub-surface pit beneath the 150 acre by 90 foot high, 10.5 million ton of uranium tailings, is in direct contact ("mixing zone") with the Colorado River, is also located in the floodplain over a seismically active geologic fault and a geologic salic-anticline all have severe environmental, public health and safety conditions: as described in the DEIS.

For forty years this huge unlined pit of poisonous uranium tailings has been located in the floodplain of the Colorado River. In forty years this pile has leached its poisons through four different geologic systems to contaminate the Quaternary alluvial aquifer which is located beneath this unlined pile of poison.

Elevated contamination concentrations in fish and sediments adjacent to ("mixing zone") or downstream of the pile: include arsenic, iron, lead, manganese, mercury, selenium, vanadium, gross alpha, gross beta, lead-210, polonium-210, radium-226, thorium-230 and total uranium. In September 1993 the river ("mixing zone") at the tailings piles had a release of radio-nucleides into the groundwater 903 times the EPA standard.

122-2 Under Title II of UMTA the NRC is the responsible agency for the Atlas Site and will consider Alternate Concentration Limits (ACL) to remove contaminant concentrations of the Atlas proposal. Under Title I of UMTA the DOE is the responsible agency for Title I Sites only. Under Title I of UMTA the DOE standard would require the Atlas tailings to be moved to a lined cell because of the perceived groundwater concerns outlined in this DEIS; as they did for the Monticello, Utah Site. The DOE will most likely be the responsible agency after reclamation is complete. I go one step further and the State of Utah wanting to take responsibility for these tailings no matter where they are located. So if DOE, preferably under Title I standards, would become the responsible agency of said reclaimed tailings. Wouldn't the NRC have to comply to the standards of the DOE, who would have a stake in the reclamation plan of the Atlas Site? All DOE regions today would ultimately become the responsible government agency? I believe the DOE should have an active role in the evaluation analysis of the Atlas Mill Site Reclamation. The DOE is not taking an active role and I believe a questionable bureaucratic blunder is taking place at the expense of the American Public's health, safety and welfare. Are there two standards for reclamation of uranium tailings? one standard for DOE under Title I and another standard for the NRC under Title II? I wish to bring this issue to the NRC's consideration to be addressed in the Final Environmental Impact Statement (FEIS).

I would like to point out that where-ever the NRC decides to approve the reclamation of the 10.5 million tons (7 million cubic yards) of uranium tailings. That all the radio-active nuclides and isotopes located throughout the entire pile will eventually be disposed to the stable element landfill. Lead is far less toxic than the elements now active in the tailings pile, the 'mixing zone' and the Quaternary alluvial aquifer. Yet the NRC is considering approval of the Atlas proposal to cover the 7 million cubic yards unlined pile in the floodplain of the Colorado River.

For the NRC's consideration. I strongly object to the proposed on-site reclamation plan because this huge unlined pile of poison has contaminated and will forever continue to poison the protected critical habitat of four classified endangered fish (USFWS), the river at the mixing zone, the alluvial and Quaternary alluvial aquifers. I strongly urge the NRC to consider in detail, is a separate NEPA document for selecting a site for off-site tailings disposal. Any possible threat to the health, safety and environment of so many Americans and any possible threat to so much of America's number one natural resource should not conclude any preconceived idea of leaving that pile of poison in the Colorado River.

A very serious concern for the NRC's consideration is the concern I previously mentioned concerning the meteorology, climate and precipitation. The failure to account for unpredictable global climatic changes due to manmade or natural occurrences such as violent volcanic eruptions in the Northern Hemisphere that would dramatically increase precipitation in the Rocky Mountain Range. This probable hypothesis would greatly alter the Hypothetical Flood (HF). Probable Maximum Flood (PMF), the maximum tailings pile failure and Cost Analysis equations. The Atlas proposal and the DEIS is hinged on these four specific equations. Without a detailed analysis of future global climatic trends these four equations cannot comply to the required 1,000 year design flood. The largest flood years in the past 100 years have occurred in the past 44 years. four in the past 30 years and two in the past 13 years; this trend is obvious, even to a non-professional.

A maximum tailings pile failure will greatly disrupt Moab services, the tailing sediments will completely re-fit the tailings deposition areas and create a valley to the valley of the river valley. filth and the community of Moab and it's services MUST BE considered for the FEIS.

Approximately two million tourist a year, a good percentage are inter-nationals to Moab (76% of Grand County tourism is generated from tax revenue) to view the magnificent splendors of Arches and Canyonlands National Parks, as well as all of the surrounding areas. Visitors to Lake Powell currently generates $340 million a year for their local economies. Any tailings pile failure will be perceived as
a real danger by the general public, including the international community. It is determined by the DEIS in the event of a tailings pile failure, N corresponded to a possible loss of $100,000,000. The majority of tailings will travel the Colorado River and enter Lake Powell. If only for the first year after a tailings pile failure, the Lake Powell National Recreation Area (Lake Powell) loses only one-quarter (25%) of its revenues due to the perceived danger, that's $85,000,000. N, would lose almost all of its 75% sales tax revenues from tourism. Residents of N, and Grand County would suffer serious restrictions and losses of mandatory services and properties, placing a very serious health and economic burden on the State of Utah, Grand County, especially the residents of N, the National Park Service, as well as the U.S. Federal Government, through the DOE and NRC itself. Lost assets due to a pile failure could easily mount to $100,000,000. The 15,5 million ton of Atlas uranium tailings is located over an seismically active geologic fault. The Lawrence Livermore National Laboratory reported in the fall of 1995 on the seismicity of this fault; they state: "The most likely 'large' earthquake on this trend would be a magnitude 5.8 to 6.3...". This is a magnitude that would split this 7 million cubic yard pile wide open and follow the fault down the river. The cost and yada for all these kinds of events and their repairs M UST BE considered for the FEIS of the Atlas proposal.

I have created a logical scenario of an NRC approved and completed reclamation of the Atlas proposal: The 3/47 acre site will be somewhat sanitized, graded and revegetated. The tailings pile will be sectioned off and left unopened and symmetrical to cover 150 acres, rising to 90 feet. It will be covered with a rock armor that will color clash with the surrounding natural red rock surroundings, making it quite obvious to the eye; this is what the DEIS describes. I see the site enclosed by a 10 - 15 foot high by 15 foot high by 15 foot high with the conditions stated. As will, there will be a Danger Signs, No Trespassing and No Trespassers Will Be Prosecuted and DOT signs. It will be quite a sight to the millions of visitors, a year who pass through N, to see. Millions upon millions of the international community and Americans will look upon this disaster as an engineered design created by the DOE. All visitors will look upon this debacle knowing it's unlined and contaminating the groundwater and groundwaters. They will know this pile of radioactive poison is located over an seismically active geologic fault that could split it open and run it down the river to Lake Powell and through the Lake Powell and into Grand County and into Lake Mead. The public will look at it and know its ugly, because it is unsightly to the eye. These recreation areas will become undesirable destination. Americans will look at this ugly pile of reclaimed pile and wonder how this could happen. America will know their federal tax dollars paid for 56% of this designed plan.

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3/15/96
G. Hansen comments/DEIS

Americans will lose whatever trust and faith they may have left in the federal government's stewardship of our health, safety and welfare. This action may undermine the public's willingness to allow the DOE to continue to operate, even though the DOE did not have regulatory decision making authority over the Atlas proposal.

128-11 The DOE is in charge of handling all inactive uranium mill tailing sites. The DOE is the responsible agency for the federal government's nuclear waste management; the published DOE mission is: "To develop the technology and facilities necessary to provide for the permanent isolation of civilian and military waste products, so that these wastes pose no significant threat to public health and safety.

I believe the current NRC process is seriously flawed in compliance to NEPA by forcing this process to exclude the DOE; forcing the DOE to abandon it's published mission. I will continue to lobby the federal government and elected officials for the DOE's active evaluation and funding of the Atlas Mill Site. The DOE standard would require the tailings pile to be moved to a lined cell because of the groundwater concerns. I request the NRC's consideration for answer in the FEIS. Americans' perceived perception, outcry, of a completed reclaimed Atlas proposal will eventually require the federal government (DOE) to relocate the pile at any cost. There are many citizens here in Grand County, Utah who WILL NOT ACCEPT or allow a completed Atlas proposal of this DEIS to go unchallenged.

128-12 These probable possibilities of floods, earthquakes, pile failures, massive radiation of the southwest's #1 natural resource, 'evacuation of local economies, lost services, ruined communities and shattered lives are ALL unacceptable to the American Public. The economic losses of the DOE and NRC is just the tip of the iceberg. The cost of a couple of moves these tailings to the alternate Plateau site.

I have raised four reasonably sound issues, with many questions concerning the HF, PMF, maximum tailings pile failure analysis for the NRC's consideration. I read the NRC's MUSE-1531 analysis of these issues to be flawed and evasive and request the NRC to reissue another DEIS for the public.

Page Eight
3/15/96
G. Hansen comments/DEIS

I further request the NRC to abandon the current proposed Atlas Corporation on-site reclamation plan because the socio-economics and aesthetic analysis are flawed and incomplete. Because the NRC's DEIS's published conclusion is the Plateau site alternative is environmentally preferable and is clearly better for any of Approaches A, technical, in the 10 CPM's Park Site. Because the current process now being conducted and regulated by the NRC is of questionable and flawed NEPA compliance. And because mostly it is environmentally, economically, socially, politically and logistically correct. The NRC should order a new detailed analysis of NEPA document to be prepared for the alternate Plateau Site.

In sincere earnest,

[Signature]
April 23, 1986

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch: Mail Stop TVFN 7J-9
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20585

Dear Mr. Holonich:

We are writing regarding the Atlas Corporation tailings pile near Moab, Utah.

130-1 Having followed the situation for some time now and having reviewed many of the
documents available, we can come to only one reasonable conclusion: the tailings pile
should be capped in place. I think there is ample evidence to support capping as a safe
solution for the people of Moab and Colorado River users. With the cost differences
being what they are, moving the pile to the alternative site would be facetiously
irresponsible.

As you noted in your DEIS, the alternative site is somewhat better than the
current one from an environmental standpoint, but moving the pile would then create
two contaminated locations instead of just one, which makes no sense at all. Actually
moving the pile would be much more dangerous than leaving it where it is. Shirk
environmental benefits cannot make up for the huge cost differences in moving the pile.

130-2 If we lived in a perfect world, there would be no question about moving the pile.
But we don't live in such a world, so let's just stabilize the pile, contour it, cap it . . .
and let everyone get on with their lives. It would be tragic for the people of Moab and
for Atlas to allow this situation to get out of hand and having it end up as an EPA
Superfund site.

130-3 We feel that Atlas has done everything possible to handle this problem correctly,
safely, and within the rules and regulations it was handed. In view of that, we think that
the decision to cap in place should be made quickly, so the job can get done quickly
and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Ed and Belinda Hatt
1788 E. Plateau Circle
Moab, UT 84532

TD: Nuclear Regulatory Commission
RE: Atlas Tailings
ATTN: Joseph J. Holonich

In my opinion it
would be far wiser and
much more prudent to
by shop as dogs lay!
After years of settlement
why not cap it and
forget it?

1575 Murphy Ln
April 23, 1996

To Whom It May Concern:

I see no reason why we must spend more money or time on the issue! Cap it and forget it.

Mike Telf
1515 Murphy Ln.
Moab, UT 84532

April 23, 1996

It would be best for all of the people of Moab if we would leave well enough alone, save money and cap the tailings.

Yancy Wells
Sand Flats
Moab, UT 84532
April 24, 1996

Willard W. Holloway
Consulting Geologist

Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
Mail Stop MWR7-39
Div. of Waste Management
Washington, D.C. 20555-0001

Subject: Atlas Uranium Mill Tailings Reclamation

Dear Mr. Holonich:

Enclosed is a copy of my letter to your Commission two years prior to this letter of comments.

My position has not changed in this ongoing process and in fact I am more convinced after studying NUREG 1531 and 1532 Jan. 1996 that capping the pile in its existing location is by far the most sensible solution relating to the reclamation decision.

I am in total agreement with the panel of authorities representing Atlas concerning low seismicity and fault systems existing in the area of the tailings pile. However, the evaluation of Wong and Olig in respect to repeated fault movement in the last one half million years seems somewhat conservative in my opinion. It is my contention that no repeated fault movement has occurred since mid to late Miocene time approximately twelve million years ago.

I think it is a wise decision by Atlas to reconsider the source of riprap from Round Mountain in Castle Valley for the corner cap of the pile. A great amount of opposition for that proposal may now be alleviated. I believe the cobble areas in Spanish Valley and the Colorado River benches would provide superior material and much better access.

Also, I would reconsider using Mancos shale as as the 8 to 12 inch impervious clay layer. The Mancos contains an abundance of sand lenses which would decrease the desired optimum imperviousness. The Brushy Basin member of the Morrison Fm. is generally used where the absolute minimum of emanation or leakage is of the greatest importance. The superior quality of the Brushy Basin is its property of containing bentonite.

This letter contains comments by myself as a concerned citizen and I am not a consultant retained by Atlas Corp.

Sincerely,

Willard W. Holloway

April 22, 1994

Willard W. Holloway
Consulting Geologist

Secretary, U.S. NRC
Washington, D.C.

Dear Sir:

The purpose of this letter is to comment on the reclamation of the Atlas uranium mill tailings.

The only logical solution is to proceed with your original plan of capping the pile "in situ" after the EIS is completed.

In my opinion, removal of the tailings would create much more of a hazardous problem (if there is such a thing) than non-disturbance.

I am quite disturbed by the scare tactics used by proponents of tailings removal. These alarmists are self appointed "experts" on everything from radon emanation to geologic tectonics. By far the most misrepresented statement from these people is that the tailings are sitting on an "active" earthquake fault zone. Any geologist with knowledge of the Paradox Basin would agree with me that the fault systems associated with salt anticlines are inactive and are considered to be one of the most earthquake safe areas in the nation. This of course is opposite to the Wasatch Front which is in the Basin and Range geological province as compared to our Colorado Plateau province here in Moab.

Do not think the majority of Moab citizens are for removal of the pile. Because the alarmists are more vocal than realistic people it may appear so. As a long time resident I know that if a vote was taken now, the public would elect for non-removal by a good margin.

Sincerely,

Willard W. Holloway

J-356
U.S. NRC
WASHINGTON, D.C.

April 28, 1996

Dear Mr. Holonich:

For many years now, I've been following the situation between the NRC and Atlas company.

From time to time I've been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, "what would be accomplished?" I mean, we would have two radioactive places instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

From what I've read and heard, moving the tailings would mean a whole lot of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

Heck, I've lived here and raised a family, and we're all healthy.

Thank you.

[Signature]

April 28, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile at Mosh.

I am beginning to get the feeling that the "true believers" are making a great big mountain out of a tiny molehill. They are so determined to spend somebody else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" versus Councilmen keep yapping about? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "true believers".

Sincerely,

[Signature]

J. Holonich
241 West 4 Center

J-357
April 21, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its capping. For over forty years, the uranium tailings have been situated at that location in Moab and Atlas' and NRC's experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile's future.

Sincerely,

[Signature]

Lynn Day
Donna B. Day

April 23, 1996

Joseph J. Holonich, Chief,
High Level Waste and Uranium Recovery Project Branch (Mail Stop TWFN7J-9)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Holonich:

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be safer, take less time and be more cost effective to cap it in place.

It is easier to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailing pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a loose comparison, considering what is happening in England with the "mad-cow" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in that area should not pay the price.

Logically, the less time it takes to resolve this issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some 14 miles away, can do nothing but take more time. It is ridiculous to expect a company to spend years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety's sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone with have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon
as possible. I see no reason to risk the safety of people, nor cause Atlas to go
bankrupt when the tailings can be capped with little risk, much more efficiently and
economically.

Thank you for your consideration.

Sincerely,

Vanita Hunt
445 E. Cottonwood Lane
Moab, UT 84532

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Mr. Hunt

Regarding the Atlas tailings issue, I have studied the
Draft Environmental Impact Statement (DEIS), NUREG-1531 and
the Draft Technical Evaluation Report (DTER), NUREG-1532 in
some detail. In general, I found these reports to be well re-
searched, well organized, and well written.

There is, however, an area in which there is a significant
lack of factual data without which no rational conclusion about
how to deal with the Atlas tailings pile can be reached. This
area is the current physical, chemical, and radiologic structure
of the pile itself.

Insofar as the physical make-up of the pile is concerned,
the engineering studies appeared quite adequate for the most
part. However, data in one significant area were lacking.
Radioactive decay, if in sufficient quantity, and particularly
when confined, generates quantities of heat. No thermal or
heat profile studies within the pile were presented. Capping
the pile in situ would further exacerbate any heat buildup
within the pile by adding more insulation to its exterior sur-
face. Furthermore, adequate venting would be essential to prevent
possible rupture of the capping material should heat buildup
reach very high levels with consequent generation of steam.

The chemical nature of the pile is largely unknown in detail;
but it may be inferred that one could expect to find varying
quantities of uranium, radium, thorium, and lead among other
elements in various regions within the mass of the pile. (See
also Table 2.1-1, p. 2-8, DEIS.) Owing to the high atomic weights
of the radioactive elements involved, it is reasonable to supple-
cent that these metals would settle toward the bottom of the
pile more rapidly than would lighter elements as water percolated
downward through the mass of the pile. Therefore, over a period
of time a concentration of the heavy metallic elements, radio-
active as well as non-radioactive, would tend to develop near
the bottom of the pile in a manner similar to that in which
a handful of gravel and sand will form layers when thrown
into a jar of water.

There is, at present, no evidence to support or refute
this idea; however it would appear that should such concentration
gradients be present, they could pose very hazardous conditions
when exposed during removal and transport of the tailings.

Lastly, the radioactivity throughout the entire Atlas tail-
ings pile is largely unknown. Samples taken from the uppermost
layer of the pile, and about 8 feet down, were reported in
Dear Mr. Holowich,

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be far safer, take less time, and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles while it is a loose comparison, considering what is happening in England with the "mad cow" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

Logically, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the same expense it becomes. Moving the tailings from its current location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed, and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety’s sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your time and consideration.

Sincerely,

Waynard M. Jensen

April 18, 1996
U.S. NRC
WASHINGTON, D.C.

April 23, 1996

Dear Mr. Hornich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Mosh. The situation is not as clear as it seems. They are so determined to spend somebody else's money (a whole lot of money) just so we can clean up a tailings pile that has been sitting there for a very long time.

They want to move the trash somewhere else, but they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

I say we keep the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep hearing about certain Councilmen keep yapping about? I think there are a few who are quick to point out problems, but then they never come up with practical solutions. To them, the solution is to waste money, write letters, and pass things around.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "true bugs".

Sincerely,

Mark E. John

U.S. NRC
WASHINGTON, D.C.

April 21, 1996

Dear Mr. Hornich:

Between the time the Atlas mill ceased operations in 1964, and the present when the ugly, rusty mill buildings were taken apart and burned, Mosh, Utah saw a significant increase in tourism. The fact that an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, and hikers from visiting Mosh and the nearby National Parks. The artists conception of what the millsite will look like once the site is capped is a vast improvement over what has been at the site for the last forty years. The only challenge will be to keep the "city slickers" off the cap.

I vote for leaving it in place.

Sincerely,

Nancy Day

U.S. NRC
WASHINGTON, D.C.

April 21, 1996

Dear Mr. Hornich:

I agree with your assessment. The site has been neglected for far too long, and the cleanup is long overdue. The artists conception of what the millsite will look like once the site is capped is promising. The only challenge will be to keep the "city slickers" off the cap.

I vote for leaving it in place.

Sincerely,

Nancy Day

142-1

141-1

J-361
April 10, 1996

Dear Mr. Holonich

I am a 50 year Moab resident, I have worked in or around the uranium industry most of my working life. I’m currently a semi-retired operations manager for a local trucking company.

It is beyond me to comprehend that in this day and age of budget deficits, national debt and such, that the URC would even consider requiring the pile to be moved incuring an expenditure of ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover 85.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn’t take a rocket scientist to figure out that the taxpayer will, once again, be stuck with the bill.

It’s obvious that one group of people are making a mountain out of a mole hill. They are so determined to spend somebody else’s money, more than likely tax dollars, to save us from a tailings pile that has been here most of my life and all of my children’s lives.

If Atlas does default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safely guarded tailings pile in our town.

The people of Moab reaped the benefits of the “glory days” of mining, we created the tailings. Now, for a change, let this community take responsibility for our own. Why make an already bad problem worse? That tailing pile was here long before many of those who are complaining about it and they were aware of that when they came here.

I strongly urge you to let Atlas close the tailings pile in place. Some things are best left alone and in my opinion this is with out question one of them.

Thank you for your time and consideration in this matter.

Sincerely,

Vlion L. Johnston

Sharon Kehoe and Eric Ming
525 Market Street
Leed, WY 82520
307-332-6596
April 2, 1996

Joseph Holonich
Chief, High Level-Waste & Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety & Safeguards
Mail Stop PWWW 73-9
U.S. Nuclear Regulatory Commission
Washington DC 20555
301-415-6443

Dear Mr. Holonich:

We are writing to you because we are concerned with what is happening in Moab with the Atlas Uranium Tailings Pile. We request that you support an option to insure that the Atlas Tailings Pile can and will be moved to the Plateau site. There is no evidence that leaving the pile in place and capping it is a safe alternative. Capping it is extremely costly and leaves the pile unlined and continuing to leach radioactive contaminants into the ground water and the Colorado River.

Federal law now requires that the following major health and safety criteria be met in reclaiming a uranium tailings pile: It may not be built on a fault, it must not be polluting ground water, it must have a liner under the pile to keep it from leaching, it shouldn’t be left above ground, it should be reclassified in an area remote from populated areas, when reclassified it must not pose significant present or potential hazard to human health or the environment. Atlas’ preferred option of leaving the pile in place meets none of these criteria. The Plateau site alternative would meet all of these.

As property owners in the Castle Valley we are extremely concerned with the option to cap the pile in place using Pond Mountain in the Castle Valley as a “borrow stone” site. Atlas has not looked at the aesthetic losses for residents and visitors in Castle Valley, nor have they considered the operation’s impact of noise and dust, the effect on wintering mule deer populations, or the historical and cultural importance of Pond Mountain.

Please consider this issue carefully and support an option to move the pile to the Plateau site. Thank you very much.

Sincerely,

Sharon Kehoe and Eric Ming
Joseph J. Holcomb, Chief
U.S. Nuclear Regulatory Commission
High-Level Waste and Uranium Projects Branch
Office of Waste Management
Washington, D.C. 20555-0001

Dear Sirs:

I am writing this in consideration of either capping the Atlas tailings in place or transporting the tailings to another location.

I choose to disregard the cost of keeping the tailings in place or moving. If I thought moving to another location would be safer for the public I would say do it at any cost. After learning the facts I am absolutely for capping in place and not exposing all the radon gases, etc., to the public. In my mind it would be a lengthy process and unsafe and dangerous.

I am probably more selfish in my attitude because I have five married sons and one married daughter living in the area. Naturally I am more concerned about them and my grandchildren than the rest of the inhabitants and visitors.

Would appreciate it if you would seriously consider recommending capping the tailing in place.

Sincerely,
Mary Keogh

Dean W. Kerkling
Chief, High-Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWPN 71-9
Nuclear Regulatory Commission
Washington, DC 20555

February 27, 1996

Subject: Comments for February 28, 1996 Public Hearing at Star Hall, Moab, Utah

These written comments are prepared to accompany my intended spoken testimony at the Subject Public Hearing. At this writing, it is unknown whether or not I will be afforded the opportunity to speak. Additionally, if the opportunity to speak is afforded, I may amend my spoken testimony to the extent that other speakers have addressed issues raised herein, or as other issues raised bear upon my testimony, and as reasonable time limits may have been imposed by the hearing moderator.

Due to the short time available to review the DEIS and DTER, these comments are preliminary. The documents, requested on February 2, 1996, were only received on February 24, 1996 - four days prior to the scheduled public hearing. I expect to provide additional written comments following today's public hearing.

I. Executive Summary

• These comments arise from a first reading of the Atlas Site DEIS and DTER - as the documents ordered on February 2, 1996 were only received on February 24, 1996.
• The DEIS as presented does not fulfill, at least in part, the NEPA procedures paraphrased below:
  • does not provide high quality environmental information to public officials and citizens (e.g., accurate scientific analyses, expert agency comments, and public scrutiny) (NEPA § 1500.1(b)).
  • does not provide full and fair discussion of significant environmental impacts and inform decision makers and the public of the reasonably alternatives (NEPA § 1502.1)
  • does not rigorously explore and objectively evaluate all reasonable alternatives and include appropriate mitigation measures (NEPA § 1502.14 (a), (f))
  • does not succinctly describe the environment to be affected (NEPA § 1502.15)
  • does not include discussion of direct and indirect effects and cultural resources; and means to mitigate adverse environmental impacts (NEPA § 1502.16 (a), (b), (g), and (h)).
• The DEIS is wholly inadequate in its description of and assessment of impacts at and arising from the Borrow Sites at Round Mountain and another wholly undisclosed Castle Valley site.

J-363
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<td>1.2</td>
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<td>1.3</td>
<td>The software crashes unexpectedly.</td>
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<td>1.4</td>
<td>The data is not being saved correctly.</td>
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<td>1.5</td>
<td>The user interface is difficult to navigate.</td>
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<td>1.6</td>
<td>The system performance is unacceptable.</td>
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<td>2.2</td>
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<td>2.3</td>
<td>The router is malfunctioning.</td>
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<td>The application is not securing user data as intended.</td>
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Note: The above list is not exhaustive and may not cover all issues that could arise.
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**Date:** 1996-07-04

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B. DEIS Appendix C: Summary List of Technical Criteria in 10 CFR 40 not met

- Of the thirty (30) Technical Criteria in DEIS Appendix C, only one (1) (3%) is accomplished outright and one (1) (3%) demonstrates partial attainment. Twenty-one (21) (or 70%) are not attained by the proposed action in this DEIS. Of the remaining, attainment is unknown for five (5) (17%), two (2) (7%) are not applicable.

<table>
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<tr>
<th>Technical Criteria</th>
<th>Comply?</th>
<th>Proposed Action</th>
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<td>1. (a) Maximize remoteness from populated areas.</td>
<td>No</td>
<td>Within 3 miles of Moab city center, immediately proximate to heavily traveled highway and 2 National Parks with visitation on the order of 1,000,000 users/year each.</td>
</tr>
<tr>
<td>(b) Hydrologic and other natural conditions promote immobility and isolation of contaminants</td>
<td>No</td>
<td>DTER Open Issue No. 1, 2, 3, 4, 5, 6, 9, 13, 14, 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subsidence, seismicity, Colorado River inundation elements identified which do not accomplish the technical criteria.</td>
</tr>
<tr>
<td>(c) The potential for erosion, disturbance and dispersion by natural forces is minimal</td>
<td>No</td>
<td>DTER Open Issue No. 3, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cover design (thus radiation containment) uncertain.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil liquefaction potential (thus pile collapse hazard) not assessed.</td>
</tr>
<tr>
<td>2. Avoid proliferation of small waste disposal sites</td>
<td>Yes</td>
<td>Accomplished</td>
</tr>
<tr>
<td>3. The prime option for disposal of tailings is placement below grade.</td>
<td>No</td>
<td>Proposed action caps tailings above grade.</td>
</tr>
<tr>
<td>4. (a) Upstream rainfall catchment areas are minimal</td>
<td>No</td>
<td>Moab Wash = 5 sq. mi. Colorado River ≥ 22,000 sq. mi. Total ≥ 22,005 sq. mi.</td>
</tr>
<tr>
<td>(b) Topographic features provide good wind protection.</td>
<td>No</td>
<td>DTER Open Issue No. 3, 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No site specific analysis. Winds are sufficient to create sand dunes and drifts in the immediate area.</td>
</tr>
<tr>
<td>(c) Embankment and cover slopes must be relatively flat after final stabilization (generally not steeper than about 20% (1 vertical per 5 horizontal)).</td>
<td>No</td>
<td>DTER Open Issue No. 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Side slopes proposed as 30% (1 vertical per 3 horizontal).</td>
</tr>
<tr>
<td>(d) A vegetative or rock cover must be utilized to minimize wind and water erosion.</td>
<td>No</td>
<td>DTER Open Issue No. 10, 11, 12, 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cover design not approved.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toe wall materials along Moab Wash appear smaller than observed bedload unit sizes.</td>
</tr>
<tr>
<td>(e) The tailings are not located near a capable fault that could cause an earthquake larger than that which the impoundment could reasonably (sic) be expected to withstand</td>
<td>No</td>
<td>DTER Open Issue No. 1, 2, 6, 8, 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capable faults identified with seismicity potential greater than threshold</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steep pile sideslopes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquefaction potential of pile not described.</td>
</tr>
<tr>
<td>(f) Impoundment design incorporates features to promote deposition of sediments and enhance thickness of the tailings cover system.</td>
<td>No</td>
<td>No such features described.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cover system (unpaved at present) proposed to resist erosion not promote deposition.</td>
</tr>
<tr>
<td>5. (a) The design standard for tailings disposal is the primary groundwater protection standard imposed by the U.S. Environmental Protection Agency (EPA).</td>
<td>n/a</td>
<td>Comment, not a technical criteria.</td>
</tr>
<tr>
<td>(b) Unless exempted, surface impoundments must have a liner.</td>
<td>No</td>
<td>DTER Open Issue No. 8, 9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above grade pile failure mechanisms described in DEIS.</td>
</tr>
<tr>
<td>(c) The impoundment must be designed to prevent overtopping.</td>
<td>No</td>
<td>DTER Open Issue No. 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Analysis not found.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liquefaction potential of pile not described.</td>
</tr>
<tr>
<td>(d) Impoundment dikes must be designed to prevent massive failure</td>
<td>No</td>
<td>DTER Open Issue No. 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DTER Open Issue No. 15, 16, and 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groundwater contamination found in uppermost aquifer.</td>
</tr>
<tr>
<td>(e) Hazardous constituents entering the uppermost aquifer beyond the point of compliance must not exceed the secondary groundwater protection standard established by the U.S. Nuclear Regulatory Commission (NRC). The NRC may exclude a constituent from the set of hazardous constituents on a site-specific basis if it finds that the constituent is not capable of posing a substantial present or potential hazard to human health or the environment.</td>
<td>No</td>
<td>DTER Open Issue No. 15, 16, and 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No NRC exclusion presented.</td>
</tr>
<tr>
<td>(f) Alternate concentration limits (ACLs) may be proposed by the licensee and established by NRC under certain conditions. Numerous factors are listed, which must be considered by NRC when establishing ACLs.</td>
<td>No</td>
<td>DTER Open Issue No. 15, 16, and 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No ACLs presented.</td>
</tr>
<tr>
<td>(g) If secondary groundwater protection standards established by NRC are exceeded, a corrective action program is required.</td>
<td>No</td>
<td>DTER Open Issue No. 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groundwater protection programs must consider the use of liners, appropriate well process designs, dewatering of tailings, and neutralizing of tailings.</td>
</tr>
<tr>
<td>(h) Groundwater protection programs are not consistent with the proposed action.</td>
<td>No</td>
<td>DTER Open Issue No. 17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No groundwater protection program offered.</td>
</tr>
</tbody>
</table>
April 20, 1996

Dear Mr. Holonich:

I cannot comprehend how in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved incurring an expenditure of ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover $6.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn't take a rocket scientist (let alone a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Atlas defaults, it is likely that this site will become a superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safely guarded uranium tailings pile in our town. O do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Atlas close the tailings pile in place.

Sincerely,

[Signature]

Dennis E. Kilkner
1385 Murphy Lane, MOAB
Dear Mr. Holmich,

I am writing to give you my comments on the DEIS Atlas. I am a resident of Grand County, Utah.

My concerns are such:
1. Atlas admits that the plateau site is both environmentally and socio-economically preferable to the cap-in-place alternative, so it seems the NRC's conclusion favoring the costs of over safety and environmental issues. My first choice would be to prove the site if I would need to see a DEIS on this option to decide the safety of moving the pile.

2. I don't believe Atlas's cost estimates are realistic. Atlas chose selected outdated cost data to justify their cap-in-place costs and didn't adequately research realistic costs for moving the pile.

3. If the pile remains capped in place and 5 years down the road we have a major flood, the amount they projected to cover maintenance, damage and repairs would be gone in a second, and then the burden of repair would fall upon the County residences. Atlas would be free and clear of any responsibility, which is unjust. We should not pay for their dishonesty.

4. Ground water: I realize little can be done about eliminating contaminated ground water, however, Atlas has not met the requirements placed on them for requiring the levels of continued contamination. Atlas provided no plan of how they would address this problem or the actions they'll use to reduce the problem in the future as the leaching continues.

4. In the D/EIR there are open issues I want addressed:
   A. The cost of maintaining and reusing the roads used to transport the capping material. Atlas should pay for this.
   B. I want to know the specific location for obtaining the capping material. Without knowing where it is how can a cost analysis or impact analysis be done.
   C. The landfill project's complete analysis of impacts.

   The analysis of flood impacts to bank stability, pools, and ecosystem are inadequate.
   D. The sampling of sediments from the water taken during the second stage (May 3, 1975) the water was too high to get to sampling sites.

4. I do not want the project to be approved until all questions are answered.
D continued. These were inadequate samples.

4. If this were a flood and 20% of the pile washed into the river, the DEIS says there would be no long or short term effect due to dilution. However, the economy would suffer greatly if tourism were lost at Lake Powell. Lake Powell generates $340 million per year - more than the cost of moving the pile.

I insist you pay attention to these issues and publish another DEIS.

Thank you
Deanna King
PO Box 2410 RVSX
Moab Utah 84532

Charles R. Klepzig
295 South 5th West
Moab, Utah 84532
(801) 259-1523
April 10, 1996

Nuclear Regulatory Commission
Joseph J. Holonich. Chief
High-Level Waste and Uranium Projects Branch (Mail Stop: TWFN7-J9)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

I am writing to you regarding the Atlas tailings pile located near Moab, Utah. I am convinced it would be far safer, take less time, and be more cost effective to cap it in place.

I have been a resident of the Moab, Utah area for over 37 years. I worked in the uranium industry for several years without any noticeable ill health effects. I suspect the stress and strain of working the extra hours necessary to pay my share of the taxes required to move the tailings pile would be far more detrimental to my health.

Traffic and industrial accidents will undoubtedly cause more injuries and/or deaths than capping the tailings pile in place. Regardless of who is responsible or liable for the tailings pile, it is obvious that Atlas does not have the money required to move it. Naturally, this means that taxpayers will have to pay the moving costs. Some of these tax dollars will be mine and I do not like to see my tax dollars wasted on a ridiculous project.

It is interesting that few if any native or long-term residents of Moab are protesting the capping of the tailings pile in place. We are too busy trying to make a living and pay our taxes to attend a lot of unnecessary meetings. Most of the "capping-in-place" opponents are people on some type of government "doe", or are elected officials, who think spending 100+ million dollars to move the tailings pile will create some valuable development property. What logic!

Atlas has been a real asset to the Moab area. Let's let them go ahead and clean up the tailings pile. They know what they are doing.

We don't need any more help from government agencies and "tree-huggers."

Sincerely,
Ray Klepzig

J-375
Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch
Mail Stop: WMF7-33
Division of Waste Management
Office of Nuclear Materials Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holonich:

The only way to go with the Atlas tailings pile is to reclaim them in place. It is ridiculous to waste taxpayer's money to relocate them. Our county commissioners have no idea what they are talking about and do not represent the view of the average Washita.

The pile has sat there for donkey's years without hurting anyone, so why should we get excited about it now? Where were the complainers when the mill was operating?

I think the best course of action we can take is to push the pile in the river, or to level it off so that we could put a golf course on it. It will improve the view when we come down from the north through Moab canyon.

In all seriousness, I can not see why the activists are getting excited. Therefore, cap the pile in place as soon as possible, without wasting any more taxpayer's money.

Sincerely,

Mote B. Knight

cc: U.S. Senators Orrin Hatch, Bob Bennett and Bill Orton
Utah Congressmen Jim Hansen
Governor Mike Leavitt
State Senator Mike Dmitrich
State Representative Kayle Johnson

U.S. NRC
WASHINGTON, D.C.

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

Brecht Lane
P.O. Box 351
Moab, UT 84532
801 259 2957

April 28, 1996
The Utah Department of Transportation, UDOT, has not allowed trucks this large on State Highway 128 and last year reduced it’s speed limit. The DEIS states that “trucks hauling riprap on the road thru Castle Valley and on State Highway 128 would increase traffic-related accident related risk.”

Main Street is the section of US191 that traverses the City of Moab. This street is used primarily for access to residences and businesses. The DEIS has not addressed the hazards related to potential vehicular-pedestrian conflicts when this quantity of material is transported through the City active with vehicles and pedestrians, businesses, souvenir shops, restaurants and hotels, nor has it addressed issues related to increased traffic volume and speeds or requirements for additional signalization, surveillance and pedestrian facilities.

Alternative “borrow sites” north of the Atlas site would reduce the chance for accident during borrow transport. US191 north of the Atlas site has, as stated in the DEIS, “grades, horizontal and vertical curves, surfacing, shoulder widths and sight distances adequate to accommodate frequent heavy trucking, as it currently does. Accidents here would be less likely than for the Atlas proposal and would be unlikely to have serious impacts on surrounding populations.”

Transport of “borrow material” along the Loop Road, State Highway 128 and US191 will have a negative impact on the inhabitants and visitors as well as to the local economy. These should not be compromised for the convenience of the Atlas Corporation. The Atlas proposed “borrow sites” should be rejected and alternative “borrow sites” selected.

Sincerely,

Marlene Lee, PE

Copy: Governor Michael Leavitt
Senator Orrin Hatch
Senator Robert Bennett
Congressman Bill Orton
William Sinclair
Bill Hedden

14 May 96

I’m writing to voice my concern over the plan to simply cover over the 130 acres of uranium mine tailings along the Colorado River near Moab. This is an area I’ve visited and plan to return to, and I think it shameful to follow through on this lame plan rather than doing the responsible thing of properly disposing of the debris. This does not mean allowing it to sit and run virtually directly into the river. Obviously the only consideration was the bottom line, money, as usual. Someone wanted the mess and they should be responsible, in every way, for cleaning...
it up. So let's think again about the better solution of where to relegate these tailings.

Marc LePiane
671 Taylor Dr.
PO Box 515
Pinecliffe, CO 80471

April 29, 1996

U. S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C.

Dear Mr. Holanich:

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

Charles Lenamond
1301 San Juan
Moab, UT 84532

Dave Allred
1211 Wagner St.
Moab UT 84532
801-259-3033

Lenamond

J-379
April 23, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I have been a resident of Moab, Utah for over 31 years. I (or someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river road, State Highway 191, and the alternative Plateau site into a major industrial operation for the next 12 years. The eyesore this will create will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

[Signature]

400 N. 500 WEST, STE 101
MOAB, UTAH

April 23, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch
Stop TFWN 74-9
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

I am writing about the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now and having read many of the documents available, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternative site would be fiscally irresponsible.

As you noted in your DEIS, the alternative site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. Actually moving the pile would be much more dangerous than leaving it where it is. Moving the pile would release many more particles into the air, creating a completely unnecessary hazard to the population. Slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contour it, cap it ... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an HVA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely, and within the rules and regulations it was handed. In view of that, I think that the
March 5, 1988

Dear Mr. Hansen,

Congratulations, D.C. 5068

Chairman of the National Board of Education


Chairman, Higher Education Commission

U.S. Higher Education Commission

Thank you for your consideration.

Sincerely,

[Signature]

[Address]

[City, State, Zip Code]
Mr. Joseph Helmanich,  


I would like to see the DEIS reassessed with an emphasis on the alternative plating site for removal relocation of the tailing pile.

It is unacceptable that the capping in place option be approved when this site, as per the DEIS, does not meet many of the NRC’s own health and safety criteria — for example, the close proximity of the pile to the community of 9-Mile; the close proximity to the Colorado River — in a massive expansion leading conditions in the early 1960’s. I witnessed the Colorado River in flood stage running against the bank of the uranium mill tailing pile. The residents are not satisfied with the information provided in the current DEIS and NFG.

Regarding the issue of groundwater contamination. It concerned me that the NRC would approve capping in place a site such as this which is located directly above the intersection of two geologic fault lines.

This does not seem wise. Please explain why you approve of the capping in place alternative when there are so many glaringly obvious reasons (again per your own criteria) why this is not an acceptable choice?

Further though, at this time, Atlas corp has yielded to the concerns of Castle Valley residents about removing rock from ground Mountain to cap the tailing pile. It would seem that should the subject come up again — the amount of impact that this procedure would have on the environment and community of Castle Valley — in itself warrants any EIS review.

I would suggest that this project be turned over to the Department of Energy. The current DEIS and NFG are clearly inadequate to address the huge scope of effects and future outcome of the environment and community of Moab as well as these using the Colorado River downstream.

I do not want to see this decision based on favorable economics over health and safety. Please do not circumvent concerns related here by opposing the Blaine County cap. Atlas Corporation authorization tailing pile in place.

Sincerely,

Laura May
Castle Valley St. Route
Box 1705
Moab, Utah 84532

J-382
Dear Mr. Holinch,

I appreciate your taking the time to read my letter. I am writing to express concern about the proposed reclamation of the Uranium Mill Tailings at the Atlas Site in Moab, Utah. Below are the reasons why I feel that the current DEIS needs to be entirely re-done and that a DEIS regarding the alternative plan of moving the tailings needs to be done immediately.

Having just finished two weeks of reviewing the DEIS regarding the Atlas site, I have some grave concerns regarding the information contained in this document. In all honesty, I feel it is best if I let those truly qualified and truly unbiased to "speak" it out regarding certain specific technical aspects and safety concerns. However, what I am eminently qualified to address is the terribly flawed methodology by which certain "experts" inaccurately gathered and then presented the information in the DEIS. My Master's Degree is in California State University, Los Angeles where I specialized in mathematical and statistical analysis, scientific research methodology and experimental design. In the early 1980's I was a hired consultant for both the Cal State University systems and for several research facilities in helping them properly design experimental and scientific protocols as well as the analysis of data gathered. I also taught these same courses at the University and reviewed many Ph.D dissertation for following proper protocol, analytical and research methodologies. I tell you all this to let you know I know from whence I speak.

I am rightfully alarmed at the pervasive lack of standardly accepted scientific and research methodology upon which so much of the data in this document is based and thereby any conclusions based on such erroneously flawed data should never be accepted. To much of the data in this report relies on assumptions, inappropriate use of data extrapolated from non identical situations, seriously dated material, outdated methodology, and a glaring absence of newly gathered data based on present day technologies and definitive experimental and lab results. Too be more to the point, if a university student or a doctoral dissertation presented such quasi-scientific data not only would they fail they would be quite severely reprimed.

Much of the data and so-called "scientific facts" utilized for this study is at times embarrassing to read and to say the least, grossly unbelievable. This document needs to be re-done with a competent staff that are properly trained. Only information and data that is properly researched and analyzed according to accepted protocols should be permitted to be contained therein. There is so much missing information in this current DEIS and so much that is speculative that there is no way to make a determination of any sort regarding the most appropriate action for the Atlas Site.

I do not feel it is my job to give you a blow by blow of the countless unacceptable assumptions based on unverified and incomplete reports contained in the DEIS. In all honesty that is the job of the NRC to do your homework and then use that protocol which permeate the entire DEIS should never have been allowed in the first place.

My other expertise is for the last many years I have developed and successfully operated several companies and presently I am the president and CEO of a company with revenues in the millions of dollars. The financial projections and information presented in this report are appearing from a business point of view. Any one who attempted to present the logic and figures as contained in the DEIS to a room of qualified economic and financial consultants would be accused of being incompetent and possibly even fraudulent. There is not one sound reason why a reliable projection could not be generated based on independently verified numbers to know within 5% what the actual costs would be for all of the proposals regarding the Atlas Site. The amount of homework done on the financial side of things is shameful and requires to be completely re-examined by qualified people based on proper and thorough research.

You numbers in the report are on uncession to ridiculous to bogus. You are setting up a situation for a financial nightmare to all parties concerned including Atlas, Grand County, the state of Utah and the United States government and that is unacceptable. Your numbers are totally useless given the lack of verification and research that went into gathering them. 1. I am being rough handled here it is because that is appropriate given the level of stopness and laziness with which the financial projections were gathered and presented. There are so many unanswered issues in this entire affair, how dare they not be addressed financially. I could easily gather a team of financial experts to prepare a report that was honest, unbiased, accurate and reliable - you make it sound like it is a mystical art and thereby all you can do is guess and estimate and on top of that you are using some ridiculous outdated material from ten or twenty years ago. I wonder how much the government spent on your gathering this unusable portion of the report. I guarantee you, I could do it for a lot less and get the job done properly and be held fully accountable.

I will highlight one other inexcusable oversight on the part of the NRC. In the DEIS it is not even known that Round Mountain in legally within the town boundaries of Castle Valley, Utah. It is inconceivable that such a lack of research and proper preparation could be in this report. This unbelievable lack of research on the part of the NRC represents the way the entire Atlas manner has been handled thus far by the NRC. How can the public possibly trust the "word" of the NRC when they have not taken the genuine concerns of the communities involved seriously (that is until certain legislative big boys got involved).
If we do everything properly and honestly, we can make a truly sound determination as to whether the site should be capped in place or moved. Until that is 100% known it is unthinkable (even immoral) that any action be contemplated. The NRC has a leaning in any direction at this point in time as to what is the best approach to the Atlas Site that it is based on preconceived and not scientific facts and sound financial practices — it is impossible yet to have an "in" or "out" on this issue. Personally, I do not know which way is safest or best and that is because your reports are so full of guesstimates that no true professional could make such a decision. This Atlas situation is a very serious subject and should be handled in the most competent, scientific and safe manner possible. The NRC's handling of this situation thus far has been so poor that I truly wonder if they are the appropriate agency to properly oversee and safeguard this project. In my correspondence with several highly qualified professionals who have been involved (on the front lines) in the reclamation of other similar tailings sites they have all without exception been astounded that the DOE and not the NRC should be the only agency overseeing the reclamation. They know from extensive experience that the DOE has successfully dealt with several such sites and done it with professional competence, safety and without bias. The NRC has never dealt with such a site and your record thus far regarding the Atlas Site is beginning to concern me in overseeing this reclamation. Please do not take a "go slow" on this issue — the DOE which is far more qualified and has so much more experience be the agency responsible for this reclamation.

I would appreciate a full response to my letter that authentically addresses my concerns and those of the many citizens of Utah. Anything less than a candid and non-bureaucratic response will be seen as a breach of good will if I see anything less than unbiased science, real economic numbers and safety concerns, I will not hesitate to personally donate significant financial and political support towards confronting your actions and lack of competence. The public wants and deserves the truth here and nothing less will suffice nor will it be tolerated. You will be making a grave mistake if you misuse your government's authority and power — you will also be making a grave mistake if you undermine the resources and power of the citizens of Grand County and Utah.

I will also let you know that I am sending separate letters and calling on certain past favors to all the Utah legislators from both the state and federal governments regarding this situation. You can be assured they are and will be watching the NRC like a hawk on their handling (or mis-handling) on the Atlas project. Having attended the NRC meeting in Moab, it was so mismanaged and so poorly prepared for by the NRC that unfortunately you have used up your trust and goodwill with many citizens in Utah — you would be well advised to clean up your act. If someone needs to be kicked here it is going to fall directly to those responsible thus far for the NRC's poor handling of the Atlas Reclamation. It is not too late to wake up (throw or the alarm clock is ringing).

Sincerely,

Mitchell M. May

Emmett Mays
1800 South Highland Drive
Moab, Utah 84532

April 26, 1996

Joseph J. Holomich, Chief
High Level Waste and Uranium Projects Branch (Mail Stop: TWFN7-39)
Division of Waste Management
Office of Nuclear Materiel Safety and Safeguards
Washington, D.C. 20555-0001

Dear Mr. Holomich:

I'm really concerned about the Moab tailings pile issue between the NRC and Atlas. I've listened to the pros and cons for many years now and I'm convinced that moving the tailings pile to the alternate site would be a complete waste of a lot of money and could possibly create more safety hazards than capping in place. I can't believe anyone wants that.

It's my understanding that moving the pile would take a lot of expensive equipment just to prepare the tailings for transport plus millions of dollars for cost of handling to the new site. I share the fear that this would cause major cost overruns for Atlas that could lead to bankruptcy with the final outcome being a heavy "finish the job" tax burden for years to come.

I have to ask, "what would be gained?" then we would have two radio active sites to spend time and money on for the next 1000 years. I can't believe anyone wants that either.

I'm convinced that Atlas has the best idea, let them spend *their own money* capping the tailings in place. I've lived in Moab most of the last forty one years and I'm not aware of any health problems caused by the Atlas tailings pile.

I strongly urge you to let Atlas proceed with their "cap in place plans" because I firmly believe it is the best thing to do and that the silent majority will be really glad you did. May OCE give you the wisdom to make the right choices AMEN.

REGARDS

Emmett Mays

Richard E. Bhubes, Atlas Corp., Senator Robert B. Bennett, Senator Mike Enzi,
Congressman James Hansen, Senator Orrin G. Hatch, Congressman Bill Orton, Governor Michael
O. Leavitt, Representative Kale Johnson, Grand County Council.

J-384
April 24, 1996

Dear Mr. Holonich:

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be far safer, take less time and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a lesser comparison, considering what is happening in England with the "mad cow" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

Logically, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety's sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your time and consideration.

Sincerely,

[Signature]

cc: Senator Orrin Hatch

April 23, 1996

Joseph J. Holonich, Chief
High-Level Waste and Uranium Projects Branch
Division of Waste Management
Office of Nuclear Materials Safeguards
Washington, D. C. 20555-0001

Dear Mr. Holonich:

I worked for Atlas for over two years just before they shut down. I typed up many of their environmental reports and knew that Atlas was very particular about doing things right. They were also very concerned about the effect of the Atlas mill on the environment and did as much as they could to reduce problems.

It would be an extreme waste of money to relocate the tailings. If the tailings were moved there would be a lot of extra dust, regardless of how much care was taken to prevent the same. We do not need this dust in Moab.

For these reasons I believe the Moab tailings pile should be reclaimed in place as soon as possible. I know this work can be done much more safely than if you forced Atlas into the expense of moving them.

Yours truly,

[Signature]

Ma. Ruby Mills

497 Mill Creek Drive
Moab, Utah 84532

April 23, 1996
Joseph J. Halenich
Director of Waste Management

To: The Nuclear Commission

I believe that moving the Atlas Tailings are a waste of money and time.

Sincerely,

Cindy Monaghan
1520 Murphy Ln
Molalla, OR 97038

To: The Nuclear Commission
I believe that moving the Atlas Tailings are unnecessary.

Sincerely,

Robert Monaghan
1520 Murphy Ln
#4 Molalla, OR
97038
March 12, 1996

To: Chief, High-Level Waste and Uranium Recovery, Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWYN 7U-9
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

From: Edward P. Morandi
CVER 3003
Moab, Utah 84532

Subject: DEIS Related to Reclamation of Uranium Mill Tailings at the Atlas Site,
Moab, Utah
Source: Material License No. SUA 917 Docket No. 40-3453
Atlas Corporation Dated January 1996

Gentlemen:

On February 28, 1996 the NRC held a public meeting to hear public comment on the Atlas DEIS and how Atlas proposed to handle the tailings pile. I was one of the individuals who signed up to voice my comments. Following are the comments I made as well as a number of other comments that I did not have time to make. I appreciated the format of the meeting and the opportunity to voice my opinions.

1. I formally request an extension of the comment period on the DEIS until May 30, 1996. This document is very detailed and all concerned need the additional time to accurately assess the impacts of this major project.

2. I request that the DEIS be issued more complete so that all the issues and concerns are available for public comment.

3. I request that the tailings pile be moved below grade to the Pintate Site. This site meets all the criteria in 10 CFR 40. This site is superior to the existing site location that is too unstable to consider.

4. The cost proposals prepared by Atlas are inaccurate, incomplete, and lack the detail that is required to make a truly intelligent decision on which alternative is actually the most cost effective for Atlas, NRC, and the public.

5. The cost proposals prepared by Atlas are incorrect and unclear concerning the borax sites that are as follows:

   A: In the 40-50 million dollar price tag that it will cost REEVA route 128 and after the task of moving cap rock to the existing site from Round Mountain or any site that uses route 128. Route 128 is a scenic byway and a road that is only 3.4 miles of tar with no prepared stone and gravel base. It is paved over the red dirt that you see in so many areas of this country.

   B: In the real dollars to maintain this pile over the next 1000 years due to some failure of the enclosure periodically as well as general maintenance that will have to be borne by the local taxpayers. I think they put a realistic figure on this not a guess.

C: Atlas states in their DEIS that some compensation would be given to Castle Valley and Spanish Valley residents for the impacts suffered. Again let them put a real number in their cost proposal so that we can make a clear and accurate cost comparison. I stated at the public meeting that I am a mechanical engineer and that I worked in the contracting business for 20 years. I prepared many cost proposals over that span of time knowing my companies capital and detail and accuracy were of the utmost importance in the preparation of the proposal. If I or my employees prepared a proposal as vague and incomplete as those in the DEIS it would not be an unfair risk to the stakeholders and employees of the company. It is the case here in this cost proposal prepared by Atlas, is it an unfair risk being placed on the public and surrounding areas with far too many questions.

6. The caping in place option does not meet at least seven of the requirements in the 10 CFR 40. The areas of it being a capable fault to being a near a waterway must be taken into account. It is the only fair thing to do for the long term safety of this pile generated by Atlas. How much public money was spent to generate the 10 CFR 40? To say that only new sites are subject to these criteria strikes me as a government agency who is not using common sense.

A: Under the leave in place option on page 2-10 para. 2.1.3 Atlas states that rock and clay would be obtained from REMOTE borrow areas and transported to the Atlas site primarily during the winter months when tourist traffic is reduced.

B: The Spanish Valley site is not a remote site, in fact it is in the town of Castle Valley, it is very near a number of homes, it is in full view of hundreds of homes, and it is a highly used recreational area.

C: Under this section and up to today Atlas still has not identified the specific borrow sites. How can there be a true public comment when something as basic as this remains unanswered?

7. When I read through the DEIS the question of trusting all the information that Atlas is presenting keeps coming into my mind. When the word remote is used and is totally incorrect and untrue concerning the borax sites the to is being comprised. When they neglect to consider 40-50 million dollars in a proposal to make that proposal appear to be the most cost effective their trust is comprised. When a technical advocate comments publicly that the cap rock from the Round Mountain site will only be considered as a last resort but this is not stated in the DEIS and only mentioned then at this late date their trust is comprised. It leads me to seriously question the entire DEIS. Perhaps the trust is not the appropriate word but in whose best interest. It appears that if left up to Atlas they will do the least to meet the requirements for the least amount of dollars and time. Atlas has no incentive to do the best thing for the environment, public safety, and for the long term stability of the pile. Therefore I request the following:

A: As I stated in item 2 above if Atlas remains involved in this project that the DEIS be resubmitted and again until all the questions and answers are

J-387
In conclusion: This process has been ongoing from 1979 until the present. Atlas has been gathering information for a very long time. The DEIS is greatly flawed even after all this time which makes me question their ability on this project now and in the future. They may be expert at mining but this is a beast of a different nature.

Clearly the DEIS concludes that moving the pile to the Placor site is the best alternative with the only negative being the cost of this proposal. But if all present and future costs are considered in the leaving-in-place proposal, I think that moving the pile might become the most cost effective. I do not want economics to be the main consideration in issues of this nature. The local communities, waterways, ground water quality, wildlife, plant life, tourist effect, and long term stability should be the main considerations. Let us look long term, not short term, we are a great people and a great nation.

Sincerely,

Edward P. Morando
Dear Mr. Holonich:

Many years ago, I was the flight surgeon for the USAF base in Amarillo, Texas. We transported bombs and high explosives from the Pantex plant to the air force base and I was responsible to ensure medical facility was available in case of an accident. During this period I also gained considerable experience in radioactivity and radionuclides. I have since spent most of my life as a general medical practitioner in Moab, Utah, where I retired.

I have followed the local debates on Atlas' uranium mill tailings with considerable interest. Most of the activists that are against Atlas' plan of in-place reclamation are exaggerating the dangers and distorting the facts. They are preying on the people's ignorance and imaginations.

The real reason they are fighting the Atlas issue is money. They are hoping to get large amounts of federal tax money if they can force this project into Superfund status. There will then be 23 years of high-paying jobs around Moab. These people are also trying to get Atlas' property for future development - boat docks, big hotels, etc. to improve the County tax base.

The Atlas tailings pile has existed for more than forty years now with no ill effects to the public or bad environmental effects that I am aware. I can see no scientific reason why it is necessary to relocate these tailings. All the politicians want to do is spend other peoples' money, and this is exactly why we have a massive federal deficit! I certainly do not want my tax dollars spent on such a worthless project.

If there are special interest groups driving this issue, let them spend their money to get this property. Cap the tailings pile in place as soon as possible.

Sincerely,

Robert O. Murray, M. D.
April 23, 1976
P.O. Box 297
Map, Utah 84532

Joe B. Holmstron
Washington, D.C. 20555

April 23, 1990

Dear Mr. Holmstron,

This letter contains my comments on NUREO-15. Draft environmental impact statement for the proposed re-shedulation plan for the Atlas Corporation Pond PAH: Source Material License No. SLPA-917, Docket No. 48-3453.

The recommended cap-in-place alternative does not meet the NRC's own Health and Safety Criteria as stated in Appendix A. They fail to meet 16 out of the 20 criteria. For example:

-Examine expanse areas.
-Examine other natural conditions that promote immobilization & isolation of contaminants.
-Prime option for disposal of tailings is placement below ground.
-Endamant and cover slopes must be relatively flat after final fill.
-Design standard for disposal is the primary groundwater protection standard imposed by the EPA.
-Unless exempted, surface impoundments must have a liner.

Atlas's cost estimates are incomplete and unrealistic.

The financial methodology to determine costs for cap-in-place vs. moving the site was flawed.

Atlas selected inundate cost data to justify lower cap-in-place costs, and did not adequately research realistic costs or options/techniques for moving the site.

Historically, cost and time estimates are almost always greatly underestimated.

The cap-in-place alternative, if implemented, would result in the site remaining on 2 seismic fault in a seismically active area.

One of the biggest concerns with leaving the site in place, is the problem with the contamination of ground water. The problem is clear, nothing can be done about the existing groundwater that is contaminated. Atlas has not been able to meet the safety requirements placed on them for reducing the levels of contamination. They provide no plan of how they will address this problem, nor what actions they will take to reduce or eliminate this problem in the future or if the teaching continues. They will be required to address this problem only if they are able to meet the regulatory.

The NRC's conclusion favor costs over safety & environmental issues.

Atlas states that the plant site is environmentally and socio-economically preferable to the cap-in-place alternative.

Sincerely,

[Signature]

J-390
173-6 The DFIN paints a very serious portrait. There are data and information deficiencies.
173-7 Inadequate analysis of flood impacts to bank, river, system, and environment.
173-8 The costs of maintaining and resurfacing roads used to transport theSay, material. The costs have not been indicated. Specific location for obtaining.
173-9 The costs of maintaining and resurfacing roads used to transport the Say, material. The costs have not been indicated. Specific location for obtaining.
173-10 What killed the Tamarrask trees at the base of the Atlas pile, next to the river? Scientists have been looking, for years, for a way to kill and eliminate Tamarrask trees from the river corridors.
173-11 Samples of sediments and fish were taken last year (May 3, 1981) during the flood stage.
173-12 In the Desi to it is stated that the DOE of the pile were to be washed into the river, there would be so severe an adverse short term effect, because the contaminants would be widely dispersed/diluted.
173-13 Elimination on a capped pile will be a problem, probably within one year. With disturbed soil and rocks for seeds to settle behind, protected from the harsh sun and wind, seedlings will appear, sucking up moisture from the pile. Their roots will penetrate into the pile, cracking it, destroying the integrity of the cap. These plants, that have been a real problem on other reclaimed pile sites, such as the contaminates into their systems. If an animal eats these contaminated plants or their seeds, the contaminates spreads into the animal and further out into the food chain. The Tamarrask tree is a prolific and opportunistic spreader/genuvator, sucking up very large amounts of water with their extensive and deeply penetrating root systems. The close proximity of Tamarrask trees to the pile make this a very real concern. Maintenance to remove these plants will prove to be extremely costly and not included in the DEIS.
173-14 An extensive bore sampling study has never been done and one must be done to examine heat, moisture content, radioactivity and chemical composition from the bottom of the pile to the toe of the tailings. There is a serious question as to whether heavy radionuclides deep in the pile will stratify and/or generate a lot of heat, causing steam pressure in a capped pile to build up and blow the pile open, scaring the Pione Valley with radioactivity.
173-15 A belief that this DEIS does not adequately analyze the options/alternatives. Their actual costs and impacts. The plateau offers an environmentally and socio-economically superior solution to the Atlas mill tailings. If the tailings are left in place and capped, we will still have continuing problems with groundwater contamination, with the end result that the taxpayers of this country will eventually get the bill.
April 24, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch
Mail Stop TBW 1-JS
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

I just want to add my support to Atlas Corp. for capping their tailings pile in place, rather than the goofy idea of moving them somewhere else.

Believe me, if I thought capping them where they are would be dangerous or unsafe, I'd be on the side of people like Lance Christie. But, I'm convinced capping can, and will, be done properly and safely.

I read most of the NRC DEIS report, and even your own people agree that proper stabilization and capping will make that pile safe, and I have enough confidence in the Atlas people, and the NRC, to go along with that solution.

I used to work for Rio Algom as a mechanic, so I know something about Uranium. We safely capped our tailings pile, and Atlas can, too.

Thank you,

Fred Newman
1860 E. Highway 191
Nook, Utah 84532

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April 21, 1996

Dear Sir,

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailing pile. I have personally lived in Moab since 1960, and I see no reason to have the Calas mill tailing much madness at this time. For forty years, the Uranium tailing have been situated at the location in Moab and Atlas. NRC's experts have handled the site with little or no impact on the surrounding populations. The pile is located deep in the Canyon National Park, the Colorado River, and the Deert Mountain Wilderness Area. It seems apparent that the Community of Moab will not be growing out to the tailings right. I believe that the tailings pile should be capped & left in place. It appears to me that there are worse sights in our country to be cleaned up at the time. If there seems
Dear Joseph,

I'm writing to you concerning the issue of tailings. I've heard that the NRC is contemplating whether to require the tailings to be moved to another location some miles away or not.

Now, I'd like to question the logic of even digging into the pile. If it is necessary, which I have yet to meet someone from around here who has a health problem that can be linked to the uranium tailings, mining, or milling in this area.

My Dad worked in the mill for about 15 years, and he knows people who have worked up to 30 years with no known health problems linked to the radon activity of the tailing pile and work area.

Now, let us suppose it is dangerous, why move it? By moving the pile, that would only transfer the contamination to a different place. Therefore creating a secondary contaminated place.

Not to mention the scarring of soil to be blown out or tracked out of the present area, in the process of transporting it to another area.

Sincerely,

[Signature]

April 20, 1998
Personally, I find the idea of moving the pile very irresponsible. If you want to keep this material contained, why not cap the pile where it is? This seems like the logical thing to do. Why all you wouldn’t care for this, is because the companies aren’t interested in doing it properly. Another question we might ask ourselves is will the material become any less toxic by its being moved? I think not.

Also, this pile being several hundred yards from the river and maybe 100 feet high or more in altitude. The river never reaching 15 feet in distance, would be a problem. Before the spillage, we could monitor where it is (as I see it). Before that, it would be a problem to the people, wildlife, fish or plant life. There would be a flood to wash half the town down the river. I can’t see or consider that a likely possibility. And even then the people would likely remain unharmed.

Atlas has posted a bond to cover $6.5 million of the cost. They have also indicated that they are willing to spend more if necessary to comply with their obligations as the licensee to close the tailings pile. But has indicated that moving the pile would likely bankrupt the company. If it’s happen, moving the pile has already begun who will be left to pay the cost of moving the pile? It doesn’t take a nuclear scientist to figure out that we, the taxpayers, would. The Shigata will be far more than having a properly closed, safely guarded uranium tailings pile by our town.

Therefore, I urge you to let Atlas close the pile where it is. Sincerely,

David Woodard
Dear Joseph J. Holanich,

For many years now, I’ve been following the situation between the NRC and Atlas company.

From what I’ve been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, “what would be accomplished?” I mean, we would have two radioactive places instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

From what I’ve read and heard, moving the tailings would mean a whole lot of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

Heck, I’ve lived here and raised a family, and we’re all healthy.

Thank you.

Net

180 North 400 E
Salt Lake City, Utah 84103
Moab, Utah
April 21, 1996

Nuclear Regulatory Commission
Joseph J. Holmquist, Chief
High-Level Waste and Uranium Project Branch (Mail Stop: TWM 7-29)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0001

Dear Sir,

I don't see any reason to move the Atlas Tailings pile from where it is presently at. If it is moved all
it will do is make a God Damned mess and take a million
years to clean up. Most of the people here don't even
care, they haven't been worried about the tailings pile
so why don't you just leave it alone and let Atlas cover
it where its at.

I worked for that plant for 13 years and at that
time they employed most of the people in Moab. The
people were not worried or upset with the tailings pile
then and they aren't now. Its just these people who
have moved in here the last few years and they want
to tell us what we can and what we can not do.

Sincerely yours,
Stanley Neerlanden
257 East 1st North
Moab, Utah 84532

Moab, Utah
April 23, 1996

Sir, I'm opposed to

1. The national debt is
    out of line and we don't need
    to spend any more.

2. I don't want any of
    the dust stirring around
    it can be kept quiet.

3. With all the tourist
    in this area it would
    hurt this area if they also don't
    because that is all we have
    left. They have taken mining
    away, they are working on
    mining and lumbering, so
    leave the tourist alone.

Sir I think it cheaper
to cap it and better for
all of us here.

Thank you

Stanley Neerlanden
Dear Mr. Holcomb, April 23rd 96

I have been living in Moab all my life. As a matter of fact my father and uncle were uranium miners working for Rio Algom. I am opposed to moving the tailing pile because of the flying debris and long term plan to having it planted off. I feel it would be safer for us to have it capped off and would benefit our economy by not causing a negative impact on our community.

Victoria S. McComber
180 W. 400 E
Moab, Utah 84532

April 7, 1996

Sincerely,

Donald O. Beck

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Ray Moed

Sincerely,

Dennis Albert
April 19, 1996

Dear Smith Jones Hanson,

I have been a resident of Moab, Utah for over 40 years. I (or someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river road, State Highway 191 and the alternative Plateau site into a major industrial operation for the next 15 years. The eyesore this will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

[Signature]

April 24, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch
Mail Stop TWH-7-J9
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

As a former Atlas employee, I want to voice my support to the company regarding the low level uranium tailings pile near Moab, Utah.

For a long time, we have heard a lot of debates about capping the tailings in place, or moving them to another location.

Now, it seems, we're at a point where a decision will be made, and I want to say that the Atlas concept of capping in place makes a lot more sense than the alternative of moving them.

We have some people here, like Mr. Reddon and Mr. Christie, and the Grand County Council, who just don't seem to understand the science behind stabilization and capping a tailings pile. It can be done with absolute safety.

On the other hand, the idea of moving the tailings would be dangerous, and would take many more years than capping, and would cost a staggering amount of wasted money.

I'm urging the NRC to support the Atlas plan of capping in place and I urge you to give the necessary approvals to allow the work to begin at the earliest possible time.

Sincerely,

[Signature]

John A. Oliver
1031 S. Bowling Alley Lane
Moab, Utah 84532

J-398
TO ALL CONCERNED,

I can remember the day we were so happy that some kind of money was coming to the DOE Valley. Although we no longer are not there now, some people were really involved, we accepted this new and incredible source of energy with open arms, at the time, we were scientists and engineers, as well as the general public, thinking that any program that would come of this could be easily solved through the new and clean energy. We are now living in a time of 2023 when all of our government, and we almost everything that happens in our lives, what we as humans can experience, is that we have to be fast in a technological operation that we have never seen before. The world was one up from the majority of what we had been used to in the past in the first phase. This is not the time to blame another mistake by trying to solve the failings and now it poses no threat at this time. Let's let our selves catch-up with our own progress and technology. So if and when it is truly necessary to make the mistakes again, we do it right. Thank you.

[Signature]

[Date]
April 29, 1996

To whom it may concern:

I have lived in Grand County for 12 years and I am a resident of Moab. I have also been connected with mining, uranium and radiation problems for over 35 years. Among my friends are world experts in the health effects of radiation on humans. They scoff at the radicals' reasons for moving the tailings and refer to these people as "idiots" who have no idea what they are talking about.

I attended the Atlas meeting which none of our City or County officials made any effort to attend. One of the main political vociferous against the Atlas plan gave the reason for not attending as 'he couldn't find a baby-sitter'.

I have written 3 "tongue-in-cheek" letters-to-the-editor (Moab's Times-Independent) and am strongly against moving the Atlas tailings pile. The capping in place is by far the lesser of two evils. Moving it has every possibility of being a disaster to the people and the environment.

I also object to the waste of taxpayer's money to move the 10 million ton pile and to the future taxes which will be piled on us to provide the future hotels, etc. If the pile is moved.

The people who live here and object knew the tailings pile was here before they came. They now want our paradise to be more perfect at other people's expenses. Cap the pile in place as soon as possible.

Robert E. Pettison

April 29, 1996

Joseph H. Hontich, Chief
U. S. Nuclear Regulatory Commission
High-Level Waste and Uranium Projects Branch (Mail Stop TW/FN7-JB)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D. C. 20546-0001

Dear Mr. Hontich,

I have spent countless hours interviewing hundreds of Moabites about their feelings on the tailings issue. I found a few surprises. Contrary to what the activists and news media are portraying, I found 95% of the "silent majority" in favor of Atlas' reclamation plan. Most people want to see the work completed as soon as possible, mainly because they are sick of hearing about the issue. Moreover, about 20% of those in favor of Atlas' plans refused to sign any document to that effect because they were afraid of possible repercussions from those who advocate moving the tailings.

Over the last nine months I have repeatedly tried to strike up a rapport with the activists who are adamantly against Atlas' plans. As the reclamation project engineer, almost all of the vocal activists avoid me "like the plague". Therefore, it did not surprise me at all when none of our County officials showed up for the March 16, 1996, Atlas meeting. They are obviously not interested in anything we have to say. One should therefore question their true motives.

Due to my involvement with the recent completion of the decommissioning work and the above mentioned I have not had as much time as I would have liked to comment on the DEIS and OTER. Nevertheless, there are a few items I would like to mention.

The DEIS/OTE report was very thorough and well presented. However, the DEIS under stated the amount of work that is necessary to relocate the tailings to the alternative site. For instance, I do not recall seeing anything about the difficulty of moving the slime. There is no mention of the costs of doing this work, or of the expansive lining plant needed. The DEIS also under stated the problems that could occur with the alternative disposal plan.

Emissions from reclamation operations are not proportional to the time each plan takes to implement. We will lose the existing compaction (stabilization) of the tailings if we disturb them...
and relocate them. Tailings (mainly the slimes) that are too wet to move will need drying. When dried, the slimes portion of the tailings is like talcum powder. It will be almost impossible to contain without some degree of spillage and loss of material. This will cause more dust and radon to escape into the atmosphere. Emissions will inevitably be several times greater than that derived simply by proportioning the time it takes to do the work.

I disagree with your finding that the alternative plan is environmentally more acceptable. If we move the tailings, we will have new contaminated sites and a very good chance of a lot of contamination in between the sites, no matter how much care we take. All of this will be happening parallel with, and adjacent to, what is now a major tourist route. I am sorry, but all I can see is disaster if we move these tailings to another site. Further, I dread to think of what it would be like if we had an accident, especially on a windy day with a batch of dried slimes.

In the DEIS you pointed out that it is not such a great disaster even if 20% of the tailings is washed into the Colorado River. Although this is extremely unlikely to occur, the people of Moab need to be aware of this fact. They need to know from how that the fish will not all die off under such circumstances. This may not be the best example to explain to the people of Moab during your next public meeting. However, I do think it is very important for you to come up with such examples to lessen the activists' alleged concerns.

I feel that you should be aware of some of the comments made by experienced people from the uranium business (the silent majority), rather than the vocal activists. Quite a lot of these people actually attended your February 26, 1996, meeting as well as another meeting organized last November by the Association of the Tree of Life group. Many of these people said they were very sickened by the way in which the ignorant (about our industry) activists took over the meetings. It caused most of them to leave the meetings early in disgust, even if they did have comments to make.

I trust these comments will be of some use to you and that common sense will prevail for the in-place reclamation of Atlas’ tailings pile.

Yours sincerely,

Robert S. Pettison
Project Engineer
Moab Reclamation Project

SUMMARY

of

COMMENTS

by

John L. Powers

The non-monetary issues covered in the DEIS uniformly.

DO NOT support the capping of the tailings on site, but instead all cry for moving of the pile.

The bureaucratic decision to cap the tailings on site appears to be based primarily on economic issues which are poorly substantiated by the facts presented.
Letters sent To:
President Clinton
Senator Hatch
Representative Green
Orten

Subject: Moving the
Tailings pile presently
located on Allis
Minerals' property in
Mead, Utah.

SUMMARY

The uranium tailings pile located a bare three
miles from the center of the booming vacation
town of Mead, in southeastern Utah poses a very
real threat to the lives of people who live in
Mead and to Mead's future prosperity. Disaster
will probably not strike tomorrow but probably will
strike sometime during the new millennium, a
time frame used by the Nuclear Regulatory
Commission (NRC). The NRC recommends capping the
pile in place based primarily on economic factors
in flagrant disregard for the health and safety
of the people of Mead and their property and
in violation of a great majority of their own
guidelines. The pile can and should be moved.

I reached this conclusion after reading
the Draft Environmental Impact Statement
by the NRC. I don't see how any other
conclusion can be drawn based on
your own studies of the flawed
proposal submitted by Allis Minerals.

Very truly yours,
John E. Reno
the Town of Mead. The house that she lives in and
own is located in the flood plain of the Colorado River
1-2 miles from a Trumbore pile containing huge amounts
of radioactive and toxic materials. It is certainly
possible now probable - that her property could be
irradiated with this deadly material within the 1,000
years period used by the NRC as one basis for the Shift
Environmental Impact Statement. (I doubt that my daughter
will live that long, but conditions at the site are such
that a disaster might occur tomorrow.)

There are two very real conditions that could
result in a disaster at any moment:

1) The pile is located atop (not only one but
two geologic faults. One of these, the Mead Fault, has slipped about half a mile over
g centuries. No one can convince me that
it won't slip another ten feet in the next millinon!
By a slip of only ten feet occurred, the pile could
and sink in the Colorado River. Some would
and sink in my daughter's house.

2) The pile itself is presently located in the
flood plain of the Colorado River. To further complicate
matters, the pile is very near Court House Wash
which originates in the Mead National Park. Normally
the stream that passes through Court House Wash
carries very little water even though it drains
a very large area. In one who has personally
witnessed the devastating results of flash floods
in this semi-arid region and who is literally
surrounded by gigantic dry arroyos formed
in past ages by such flash floods, I mention
that sufficient water could flow through Court
House Wash anytime within the next 1,000 years
to bury my daughter's house in radioactive/toxic debris. Perhaps - God forbid - tomorrow!

The NRC has ignored almost every one of
their own guidelines in recommending that the
pile be capped in place. The recomenda-

have been made in spite of the fact that part of the
pile is currently being leached into the Colorado
River, the lifeblood of the southwestern United States and the state. Such leaching would continue
even after the pile were capped because of the peculiar nature of this particular pile. The design
of the proposed capping does not conform to several federal NRC standards and will be
inherently incapable of resisting earthquakes and flash floods. The only justification offered
but not substantiated by the NRC is that
capping the pile in place would be less expensive than
moving it to a more suitable site. No
data has been furnished to substantiate this economic conclusion.

It seems to me that if the NRC can force Allied
Minerals to cap the pile in place - which flies
in the face of most NRC guidelines - then the
recreation of this pile - whatever and whenever such disasters may occur.
located little more than a mile north from the booming town of Mead, Utah - and
much less distance from the Mead National Park which cuts across from all over the world
by the millions, much disaster could result.
which life and valuable property. The net result
so that the U.S. Government would be paying or
many millions. It would be paying or
then cap the pile only at a cost of $10,000-

The net result of this and many additional
factors dictates that the pile should not be
capped in place but, instead, be moved to a
relatively short distance to a location that is
relatively very safe. Such a location - as well
as the pile itself - are close to an existing
railroad track that is currently in operation and being improved. The answer is obvious: move the pile by rail to Khondike Flats.

It is said that moving the pile would pose a health hazard to the people of Moab and even the visitors to Arches National Park. There is apparently some pretty potent stuff in the pile although none has bothered to find out just what is there. The movement of the pile can be done safely as has been done in the recent past by the Department of Energy. The relative danger to the people of Moab over the next 1,000 years compared with the 5–7 years required to move the pile dictates moving the pile rather than leaving it in place.

Whatever decision is made, the health of the residents of Moab during the upcoming millennium should be of primary concern, not just the financial condition of Atlas Minerals. Maybe my daughter won't be buried in radioactive debris but what about my grandchildren or future progeny? 1,000 years covers some 50 generations. Unrealistic! Let's not create a situation that constitutes a real danger to future generations.

MOVE THE PILE!

Very truly yours,
John E. Powers
President of Grand Co., Utah

and father of Judy Powers, resident of Moab, Grand Co., Utah

Nuclear Regulatory Commission

To Whom It May Concern:

Re: Atlas Mill Tailings

Having lived in Moab all of my 35 years, I am asking the Mill Tailings be left and buried. I believe it would be more harmful trying to move the tailings than if they were to be left undisturbed.

Thank you for your time and attention.

Sincerely,
Laurie M. Ramstetter
Moab Resident and Tax Payer
434 Andrea Court
Moab, Utah 84532
NUCLEAR REGULATORY COMMISSION

TO WHOM IT MAY CONCERN:

RE: ATLAS MILL TAILINGS

I AM A MOAB RESIDENT AND HAVE LISTENED TO THE DEBATE CONCERNING THE ATLAS MILL TAILINGS. I BELIEVE LEAVING THEM WHERE THEY ARE AND COVERING THEM IS BY FAR THE SAFEST CHOICE. I AM QUIET WHEN IT COMES TO POLITICS AND TRY TO MIND MY OWN BUSINESS. I WOULD HOPE YOU WILL AT LEAST LISTEN TO THE LESS VOCAL BUT VERY INTERESTED OTHER SIDE TO THIS ISSUE. I HAVE LIVED IN AND AROUND MOAB ALL OF MY LIFE.

THANK YOU FOR YOUR TIME.

SINCERELY,

Mikie Ramstetter
MOAB RESIDENT AND TAX PAYER, FATHER OF 5
434 Andrea Court
Moab, Utah 84532

April 23, 1996

Dear Michael O. Leavitt

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be far safer, take less time and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a loose comparison, considering what is happening in England with the “mad cow” situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

Logically, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its current location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety’s sake no expense is great. However, I am opposed to causing a company so go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your time and consideration.

Sincerely,

Mikie Ramstetter

April 9, 1996

Dear Mikie Ramstetter

I have read your letter regarding the Atlas tailings pile. I appreciate your concern about the situation.

The decision to cap the tailings pile or move it is a complex one, and it involves many factors, including safety, environmental impact, and economic considerations. The hope is to find a solution that is both safe and feasible.

Thank you for your understanding and patience.

Sincerely,

Michael O. Leavitt

April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

Between the time the Atlas mill ceased operations in 1964, and the present when the ugly, rusty mill buildings were taken apart and buried, Moab, Utah saw a significant increase in tourism. The fact that an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, and hikers from visiting Moab and the nearby National Parks. The artist's conception of what the millsite will look like once the site is capped is a vast improvement over what has been at the site for the last forty years. The only challenge will be to keep the "city slickers" off the cap.

I vote for leaving it in place.

Sincerely,

Pat Robinson
293 April Dr.
Moab, UT 84532

April 26, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch
Mail Stop YU-2
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

I know a lot of people are writing letters to you about the uranium tailings pile outside of Moab, Utah, and I just want to get in my two cents worth.

I used to work for Rio Algom. We capped our tailings pile in place, and I'm all in favor of allowing Atlas to cap theirs, too.

We have a lot of people here in Moab who just don't understand that this work can be done cleanly and safely.

It isn't cheap. It will cost Atlas a lot of their own money to do the work, but they want to do it, and they want to do it as soon as possible.

The idea some people have of moving the tailings is just plain stupidity. Nothing would be gained. It would cost probably ten times more to move them, and then we'd have two spots that would be contaminated... the original place and the new site. It just doesn't make sense, despite what people like Bill Rudden and Lance Christie say. I don't know what they're up to, but it can't be good.

Please give Atlas the green light to move ahead with the capping project.

Thank you,

Terry Robinson
1311 A. Hwy 191
Moab, Utah 84532

P.S. Please use red rocks to cap the tailings to blend in with the surrounding area.
April 21, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich,

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

Lynn East
Donna P. Day

April 28, 1996

JOAN SANGREE CVSP #2806 MOAB UTAH 84532

Dear Joseph Holonich,

I am increasingly concerned about Atlas' proposal to cap their tailings pile in place in Moab, Utah. After reading the DEIS and attending meetings, I am concerned that the cap-in-place proposal does not meet the NRC's requirements in most of the essential areas, such as proximity to population, ground water contamination, seismic activity, and grade levels. Atlas' attempts to deal with the contaminated ground water have been unsuccessful, and there is no indication that other of their proposals, whether accepted by the NRC or not, will meet with success.

197-1 I understand that cost is the main (if not only) factor that is behind the NRC's current position of proposing to approve Atlas' reclamation plan. It is apparent that Atlas has used distorted and outdated figures in their cost analyses. They have also consistently deleted impact costs such as repair to haulage roads. As a tax payer in Grand County, I am very concerned that these bills, possibly as much as $50 million, are being overlooked as part of the cost of capping in place. Not only will we be paying our tax dollars for the Federal share of the reclamation process, we will also be paying a huge percentage of the reclamation of the reclamation! This impact must not be ignored.

197-4 There are other nuclear waste sites that have been reclaimed in place, only to be moved at a later date when contaminates were clearly continuing to leak. I would much rather my tax dollars be spent once than over and over for what could have been cleaned up effectively the first time.

Please reconsider the reclamation of the Atlas tailings pile. This decision will effect generations to come.

Sincerely,

Joan Sangree
J3. J. J. •

3/1/96.

Ch of
High-Level Waste Management
Project Branch
Division of Waste Management
Office of Nuclear Safety
and Safeguards

Mr. J. J. J.

U.S. Nuclear Regulatory Commission
Washington, D.C., 20555

Dear Sir:

As: Above noted

Please refer copy of present letter to Mr. J. J. J. and refer to his memo. He will not view the impact of this proposed change, the waste storage, more than once in the event of the accident. The accident at Los Alamos is strong evidence.

Sincerely,

J. J. J.

By: Mobile Inc.

139-1

1. A substantial amount of noise in breaking up Round Mountain will result. This will negatively impact the quality of life in Castle Valley resulting in hardship to the residents of Castle Valley.

This should be taken into account in not implementing the above proposal but instead implementing the "Alternative Site" proposal.

139-2

2. The cost estimate of transposing the tailing out and the cost of proposed of using Round Mountain
March 28, 1993

Joseph Holonich
Chief, High-Level Waste and Uranium Recovery Projects Branch
Div. of Waste Management
Office of Nuclear Material Safety and Safeguards
Mail Stop TWPN 72-9
US Nuclear Regulatory Commission
Washington DC, 20555

Dear Mr. Holonich,

Re: Atlas Tailings Pile DEIS

Please create a mechanism to solve the problem of the Atlas Tailings Pile in Moab, Utah. Unlike other Title 2 piles, this pile is both unlined and in an environmentally sensitive area located along the banks of the Colorado River on the intersect of two seismic faults. It should be dealt with like Title 1 piles that had similar complex environmental problems.

My concerns about moving the pile:

- The cap-in-place choice does not meet the NRC's own health & safety criteria
- Atlas' cost estimates do not reflect many of the actual costs
- The NRC's conclusions favor cost over safety and environmental issues
- The cap-in-place choice would mean that the pile would remain sitting on the intersection of two faults and would continue to leach radioactive contaminants into the ground water and the Colorado River
- Atlas has done no research to show whether the faults are active or not, although the effects of an earthquake on a capped pile could be catastrophic
- Atlas admits the Plateau site is environmentally and socio-economically preferable to the cap-in-place alternative. Atlas' costs comparison, however, portrays the cap-in-place alternative as significantly less expensive. It appears that the costs reflected in this DEIS are incomplete and steeply slanted towards Atlas Corporation's interests.

My concerns about using Route 128:

- Many of the real socio-economic and aesthetic values, impacts, and costs have not been considered for Castle Valley or Route 128 (the River Road). These should have been addressed for all affected areas: we most certainly would be highly affected
- The DEIS does not include in their cost estimates the $50 million needed to re-surface the River Road and the other proposal's haul routes before and after hauling the capping materials. To quote UDOT: “This pavement under no circumstances would sustain the loading that would be generated from that type of truck activity.”
- The DEIS has not adequately discussed the dangers of using Route 128 to transport Castle Valley or environs' waste to the Atlas site; the accident statistics used are area-wide, not specific to the River Road. The River Road is not typical; it is far more dangerous to us and them.
The undisclosed 'Castle Valley borrow stone sites should be disclosed to the residents of Castle Valley.

Atlas has not realistically looked at: aesthetic losses for residents and visitors in Castle Valley nor have they considered their operation's impact of noise and dust, as well as the effect on wintering mule deer populations.

Sincerely,
John Savarese
240/241 Miller Lane
Castle Valley, UT 84532
and 74 Mobile Ave
Staten Island, NY 10306

803-3
This will express my opposition to moving the tailing pile at the site of the Atlas Corp mill in Moab.

I'm afraid that moving the pile would cause serious problems for the people and the environment. I feel that moving the pile to another site is like sweeping the dirt under the rug — it won't go away, and in the process of moving the dirt, it will cause additional damage to the site, introducing potentially hazardous dust into the air, thus the risk of the worst-case scenario acting on a stabilized pile.

Therefore, I feel that moving the pile would be too costly and would not achieve the desired purpose — it would be safer for 15 miles away.

Very truly yours,

[Signature]
can increase the frequency of false, incorrect, or incomplete reminders, which may lead to increased risk of patient harm. Therefore, it is important to continuously evaluate and improve the methods used for providing reminders and ensuring their accuracy and reliability.

The importance of accurate and timely reminders cannot be overstated. Accurate reminders can help prevent errors and improve patient outcomes. However, errors in the reminder system can lead to confusion and potential harm to patients. Therefore, it is crucial to have a robust system in place to ensure the accuracy and reliability of reminders.

In addition to the reminder system, it is important to have a plan in place to address any errors that do occur. This plan should include protocols for identifying and correcting errors, as well as procedures for communicating any changes to the affected patients.

By implementing a rigorous evaluation process and continuous improvement, healthcare providers can ensure that their reminder systems are effective and safe. This will help to prevent errors and improve patient outcomes.

References:

and the reconfiguring of Moab Wash using rip rap to divert potential floods away from the tailings pile may not be adequate.

202-7 Migrating sand (NUREG-1532, 2.4.2.1) and wind erosion (NUREG-1532, 4.5.5) are mentioned in terms of how they may affect the site and not in terms of what they represent in terms of climate change. The nearby sand ramp is a relic of climate change, not just a potential hazard to the site. What the sand dunes mean in terms of climate change, source material, and wind direction should be addressed in the report.

202-8 Past climate regimes and the frequency and magnitude of past storm events suggest that the following climate parameter estimates could be incorrect:

- The published historic maximum flood rates (NUREG-1532, 4.3.5.3) by Crippen and Blue, 1977, is a selective data set for a (geologically) short period of time. These records often cover a limited number of years and experience calibration problems with extremely high discharges.
- Estimated infiltration
- Estimates of magnitude and concentration of rainfall
- Moab Wash flow based on a one hour estimate of PMP of 7.4" and a 6 hour estimate of PMP of 9.36"
- Probable Maximum Flood (PMF) events (NUREG-1531, 4.3)
- Computer analysis based on 31 years of weather records to evaluate the effect of frost penetration (NUREG-1532, 3.3.4) and transportation of excess water in the frost line (NUREG-1532, 6.4)

Finally, short-sightedness in the specified "safety time frame" lead to three more sets of questions. The first concerns NUREG-1532 (2.1) stating that the disposal area be designed to control radioactive waste for a "reasonable assurance of 1,000 years" and a minimum of 200 years. The half-life of Ra-226, prevalent in the tailings (NUREG-1532, 6.0), is 1,622 years. Is a 200 to 1000 year minimum adequate? The second concern focuses on "contaminants...mostly settling to the bottom of Lake Powell" (NUREG-1531, 4.5.2.4). How many 200 year-old dams similar to Glen Canyon Dam exist in the world? Will Lake Powell exist 1,000 or even 200 years from now? Finally, NUREG-1531 (4.9.4) states "over the long term, a huge increase in (well water) withdrawal rates could eventually lower the water table sufficiently to cause residual tailing liquor at the tailings pile to migrate under the Colorado River and towards wells in Moab and Spanish Valley. However, no such cumulative impact "could be expected because extensive use of the alluvial aquifer is not anticipated". Did Native American's living in the Moab area (see NUREG-1531, 3.7.6) 1,000 years ago "anticipate" the population, industry, tourism, and technology common in Moab today?

Thank you for the opportunity to comment.

Sincerely,

Saxon Sharpe

J-413
REFERENCES


April 26, 1996

Joseph I. Holonick, Chief
NPC
Washington, D.C. 20550-0001

Dear Sir:

I have been a resident of Moab, Utah for over 40 years. I (or someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will ruin the river road, State Highway 191 and the alternative Pineview site into a major industrial operation for the next 15 years. The eyesore this will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

Jean P. Stanley

My husband, Ted Sharty, worked for Atlas Corp. 17 years. Had he lived, I believe he would agree to "cap" the tailings in lieu of moving it.

Jean Stanley
April 24, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holinch:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

204-1 Having followed the situation for some time now, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be financially irresponsible.

204-2 As you noted in your DEIS, the alternate site is somewhat better than the current site from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, cover it, cap it...and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

204-3 I feel that Atlas has done everything possible to handle this problem correctly, safely...and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

[Signature]

Chairman
P.O. Box 1940
Moab, UT 84532

J-415
April 26, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonicz:

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

[Signature]

Dwight Shumway
1810 Shumway Lane, Moab

April 25, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonicz:

I cannot comprehend that in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved to incur an expenditure of ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover $4.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn’t take a nuclear scientist (let alone a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Atlas does default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safety guarded uranium tailings pile in our town. We do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Atlas close the tailings pile in place.

Sincerely,

[Signature]

3160 Spanish Gulch Dr.
Layton, UT 84041

April 25, 1996
Dear Mr. Holomich,

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Here's the situation for some time now, I can come to only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users.

As you noted in your DEIR, the alternate site is somewhat better than the current site from an environmental standpoint, but moving the pile would create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, capping it, cap it...and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely...and within the rules and regulations it was handled.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Sam Sammarro
Box 484
Moab, Utah 84532

Ron and Montez Steele

CC: U.S. Senators Orrin Hatch, Bob Bennett and Bill Orton
Utah Congressman Jim Hansen
Governor Mike Leavitt
State Senator Mike Domrich
State Representative Kerri Johnson

BEST COPY AVAILABLE
March 19, 1996

Joseph Holomich
Chief, High-Level Waste and Uranium Recovery Projects
Division of Waste Management
Office of Nuclear Material Safety & Safeguards
Mail Stop TWN 72-6
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Holomich,

I am writing because of my concern about the disposal plans for the Atlas Tailings Pile located just across the Colorado River from Moab in Grand County, Utah. This is a unique spot in our country and the only reasonable approach to disposal is to move the material by train to the remote Klondike Flats Plateau area. The proposal to cap this waste in place with rock from Round Mountain in Castle Valley would do both short- and long-range harm to one of the few settled and livable spots in this area. Neither the economic cost, the danger to human life, nor the damage to the environment seem to have been fully considered by those who favor the cap-in-place approach.

The very special location must be fully understood before a judgment is made on this issue. Moab is the largest population center in the great expanse of rugged country which makes up Grand County. Castle Valley is the second largest. They are connected by a two-lane winding road. Route 128. It is the only stretch where you can drive along the banks of the Colorado River at the foot of the red rock cliffs that line it.

My wife and I fell in love with this area the first time we drove down route 128. completely awed by the beauty surrounding us. But the road is winding and hazardous. There have been fatal accidents during the past year along the stretch which would be traveled by the huge trucks hauling rock to cap the tailings. If the road is dangerous for the present limited traffic (the lives were lost during the off-tourist-season months when the trucks are to run) the likelihood of greater disaster during the proposed five-year period of intense truck traffic is enormous.

We were so struck by the spectacular setting of Castle Valley we bought land for ourselves there. One of the prominent geological features that make it special, the one right in the center of the Valley, is the almost perfect cone of Round Mountain. It is unthinkable that it should be defaced when an alternative exists that is the better choice for many other reasons.

The first reason would be to protect the Colorado River, the source of water for most of the Southwestern United States, from radioactive pollution. The cap-in-place proposal would not prevent leaching of the radioactive wastes.

That proposal would block the expansion of the fast-growing town of Moab in one of the few areas available. Moving the pile would open up a very usable area in country where livable land is very scarce. It’s unreasonable to kill this potential when the hazardous material can be moved to true waste land. The increased value of the tailings site should be considered in costing the alternate proposals.

Added to the cost equation should be the major reconstruction of Route 128 (not an easy stretch to build along) to make a road that’s inadequate for commuter and tourist traffic fit for heavy trucks.

I know of no way you can assess the damage that will be done to the beauty of the land by the scars left on Round Mountain. It combines with Castle Rock, Porcupine Rim and the La Sal Mountains in a setting of such unique beauty that the only through road is designated a "Scenic Byway"--a major tourist attraction--on Utah State maps. The trucks carrying out the destruction of this setting will turn the Scenic Byway into a nightmare instead of a dream. Does the proposal take into account the loss in the quality of life for this community and what will be a very real drop in property values? A decision to cap the tailings in place would be a shameful, callous and inhuman action.

In summary, the current proposal to cap the Atlas Tailings Pile in place would:

- Not eliminate the radioactive pollution of the Colorado
- Block the town of Moab from expansion into a desirable building area
- Make necessary major reconstruction of Route 128, which will create additional delay and add to the project’s cost
- Still leave a major traffic problem for tourists and commuters
- Cause irreversible damage to a major tourist site
- Create a major loss in the quality of life of the residents of Castle Valley and others along Route 128

Please don’t let it happen. Move the Atlas Tailings Pile to the Klondike Flats Plateau Site.

Sincerely,

Douglas R. Steinbauer
April 25, 1996

U.S. NRC
Washington, D.C.

Dear Mr. Holovich:

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its capping. For over forty years, the uranium tailings have been situated at that location in Moab and Atlas' and NRC's experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile's future.

Sincerely,

[Signature]

1410 S. HWY. 191
Tel. (307) 259-2307

April 28, 1996

U.S. NRC
Washington, D.C.

Dear Mr. Holovich:

For many years now, I’ve been following the situation between the NRC and Atlas company.

From what I’ve been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, “what would be accomplished?” I mean, we would have two radioactive piles instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

From what I’ve read and heard, moving the tailings would mean two whole lots of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

Nick. I’ve lived here and raised a family, and we’re all healthy.

Thank you.

[Signature]

343 E. 200 North
Moab, Utah
April 28, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

I have been a resident of Moab, Utah for over 46 years. (Yes someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river road, State Highway 191 and the alternative Pintura into a major industrial operation for the next 15 years. The eyesore this will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

[Signature]

343 E. 200 North
Moab, Utah

To: NUCLEAR REGULATORY COMMISSION

EL. ATLAS TAILINGS PILE

I think the Atlas tailings pile should be left in place. Moving it would be an unnecessary expense.

[Signature]

PO Box 233
Lasal UT 84530

J-420
April 21/96

To: Nuclear Regulatory Commission
RG: Atlantic City Pile

It is my opinion that moving the Atlantic City Pile would be a big mistake and would be a big waste of time and money.

[Signature]

216.1

Unprocessed uranium ore was dusty when it was brought in by trucks. Now some people want the tailings moved which are powdery and fine dust. Common sense tells a person to leave the Atlantic City pile alone and secure the area around them. Who needs all the dust in and pollution it will cause. Not me for one. Leave things buried where they are!

[Signature]

Marie Stocks

1.421
Mr. Joseph J. Holonich
Chief US NRC

Dear Mr. Holonich:

I am writing regarding the Atlas Corporation tailings pile near Moab.

I have lived for 16 years in the northwest area of Moab which is closest to the pile. The pile had been there long before I came. In all these years, river running, hiking and tourism have flourished on the rim road near the pile.

I am very concerned that any attempt to dig into, remove and transport the tailings to another location will result in much air, land and water contamination to our area as well as threaten the oil and gas industries near Moab.

I have read some of the engineering reports from reputable engineering firms and am impressed by the experts all issues have been addressed.

I believe that the expert and most economical answer to the problem is to cap the pile in place.

Sincerely,

[Signature]

Christine Swanson

April 28, 1996

Joseph Holonich, Chief
High Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Mall Stop TWFN 7J-9
US Nuclear Regulatory Commission
Washington DC 20555

Re: Atlas Mineral Waste Site-Moab

I live, work, and pay taxes in Grand County, Utah. I, along with 99 percent of Moab residents, question the validity of your draft EIS for capping the Atlas Minerals tailings pile which sits in the Colorado River flood plain and over two old earthquake faults.

Atlas Minerals fails to consider the potential effects of its capping plan on tourist visitation. Our town is almost entirely dependent on tourism for its financial health.

Atlas Minerals has not submitted detailed cost comparisons for moving the pile to an environmentally safe and appropriate site. Their estimates suggest they fabricated the figures to support their wish to keep the toxic waste in place close to town, tourists, and the river where it may be leaching more radioactivity into the river and our ground water.

Please ask for another draft EIS that contains more information and accurate cost estimates for moving the pile to an environmentally safer location in the deep clay beds north of Moab.

Do not allow Atlas Minerals to keep this enormous health hazard on the edge of our river and our town.

Sincerely yours,

[Signature]

Christine Swanson
April 19, 1996
Joseph J. Holnich, Chief
U.S. Nuclear Regulatory Commission
High Level Waste and Uranium Projects Branch
(Mail Stop: TW-EN7-J9)
Division of Waste Management
Office of Nuclear Material Safety
Washington, D.C. 20555-0001

Dear Sir:

Having attended the hearings and the Atlas meetings and talking to various local people I felt the tailings pile should be relocated but was not a radical on the issue.

I received the enclosed request and a group of sample letters from Atlas Corporation to mail in my choice of a letter. I strongly believe Atlas is trying to hoodwink the citizens of Meab and the surrounding area as well as the NRC. Why not let the reports speak for themselves. These sample letters are a disgrace to the intent of a having an open comment period.

I strongly support relocating the tailings waste to a more secure and safe area.

As an explosives expert who has been involved in the Eureka, Colorado, Green River, Utah, Mexican Hat, Utah, Grand-Tetons, Celilo, Tuba City, Arizona, Slick Rock, Celilo and others that have been relocated I question what makes this one different.

Yours Truly,

[Signature]

402 Park Drive
Meab, Utah 84532

Enclosure:
Partial cover letter and sample letters from Atlas Corporation.
April 14, 1996

Mr. Frank Tabberer
402 West Park Drive
Moab, UT 84532

Re: Comments to NRC

Dear Mr. Tabberer:

As you probably know, Atlas has been working hard to get approval from the Nuclear Regulatory Commission (NRC) for its reclamation plan for a tailings pond in Moab for several years. The NRC is taking comments until April 29, 1996 on the draft Environmental Impact Statement (EIS) and the draft Technical Evaluation Report (TER) which were made available January 30, 1996. The purpose of this letter is to request your support and assistance in getting comments filed with the NRC prior to the April 29 deadline. The NRC address is as follows:

Joseph J. Hildenbrand, Chief
U.S. NUCLEAR REGULATORY COMMISSION
High-Level Waste and Uranium Projects Branch (Mall Stop: TWFN7-79)
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0006

If you are not aware of all the issues, or as knowledgeable of the facts as you think you should be, I have enclosed a fact sheet which very briefly highlights the history and issues related to this matter. Also, I have enclosed some sample letters which you are welcome to copy and send to NRC. You could select one or more of the issues and create your own letter.

It is unfortunate that this matter has come to this point. The NRC has approved the capping in-place option in four previous licensing actions.

Your letter to NRC will show that there is more than one viewpoint on this matter locally. Further, your comments to NRC will demonstrate to Utah's elected officials that there is more than one voice in the area. Consequently, we urge you to send a copy of your letter to Governor Leavitt, Senators Hatch and Bennett and to Congressman Orion (addresses included herein). If you don't mind, we would like to receive a copy of your letter also, although we do not want you to feel that you have to send us one.

We will help you in any way we can-- with drafting your letter, understanding an issue better, or with names and addresses of who to send it to.

We need your help in order for common sense to prevail. Please send your letters to NRC before April 29, 1996.

Sincerely,

[Signature]

for Richard E. Blubrough
Sample Letters

April 1996

Dear

I am writing regarding the situation with the Atlas tailings pile. I am concerned about the issue to move the tailings pile and am convinced it would be far safer, take less time and be more cost effective to cap it in place.

It is safer to cap because airborne radioactive particles are dangerous. By moving the tailings, the risk to the communities around the tailings pile and the new location is increased. The tourists who visit southern Utah are also at risk. I see no reason to put these people in a potentially hazardous situation when the tailings can be capped in place with little disturbance.

Also, the livestock in the area will be subject to inhaling these particles. While it is a loose comparison, considering what is happening in England with the "mad cow" situation, it could be detrimental to the livestock industry in southern Utah to have radioactive particles ingested by their animals. The press has a way of making something out of nothing and the ranchers and farmers in the area should not pay the price.

Logically, the less time it takes to resolve the issue, the better. The longer Atlas has to wait to cap the tailings pile, the more expensive it becomes. Moving the tailings from its present location to the new location some fourteen miles away, can do nothing but take more time. It is ridiculous to expect a company to spend more years to move the tailings when it can be capped, reclaimed and revegetated in much less time.

Naturally, capping is less expensive. I do agree that for safety’s sake no expense is great. However, I am opposed to causing a company to go bankrupt when a safe and economical resolution is available. If Atlas is forced to move the tailings, they will most likely go bankrupt. This will financially affect more people than those with Atlas. Someone will have to pick up the costs that Atlas cannot. I imagine it will be the State of Utah. This will cause our taxes to increase, which is not pleasant in any situation.

I am greatly concerned about this issue and wish to see the tailings capped as soon as possible. I see no reason to risk the safety of people and livestock nor cause Atlas to go bankrupt when the tailings can be capped with little risk, much more efficiently and economically.

Thank you for your time and consideration.

Sincerely,

J-425
Dear

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can come to only see one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don’t live in such a world, so let’s just stabilize the pile, contour it, cap it... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and have it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely... and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

Dear

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Moab.

I am beginning to get the feeling that the “tree huggers” are making a great big mountain out of a tiny mole hill. They are so determined to spend somebody’s else’s money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don’t think Atlas can afford it, and I don’t think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they’re willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" certain Councilmen keep yapping about? I don’t think there are any real “dangers”. Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don’t need any more help from the government agencies and “tree huggers”.

Sincerely,
Dear

I have been a resident of Moab, Utah for over 10 years. I (or someone in my family) worked in the uranium industry during its heyday. I am opposed to moving the tailings pile because it will turn the river into a major industrial operation for the next 15 years. This will negatively impact the economy of Moab more than capping the pile in place and leaving it properly safeguarded for the next 1,000 years.

Sincerely,

[Name]

---

Dear

For many years now, I've been following the situation between the NRC and Atlas company.

From what I've been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, "what would be accomplished?" I mean, we would have two radioactive places instead of the one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old one.

From what I've read and heard, moving the tailings would mean a whole lot of big equipment, like some kind of a system to get the liquors out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

I've lived here and raised a family, and we're all healthy.

Thank you.

[Name]
April 1996

Dear

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

April 1996

Dear

I am a part-time resident of Moab, Utah. While I am not entirely happy about having a tailings pile in my backyard, I am aghast that the NRC would even consider requiring Atlas to dig up and move by truck or other means 10.5 million tons of fine, sand-like material that will pose greater risk to the public during the moving process than leaving the pile in place will pose. In addition to industrial strength traffic, the residents and visitors alike will have to breathe the tailings dust as they are moved.

Further, should the pile be moved, I question whether anyone would seriously want to live on the site of a former uranium tailings pile. If Grand County wants property to develop, let them develop the Airport site, and use the existing rail line as the cornerstone of Moab's public transportation system.

Sincerely,
Dear,

I cannot comprehend that in this day and age of budget deficits, national debt and the like, that the NRC would even contemplate for a moment requiring the pile to be moved this incurring an expenditure of ten times the projected cost of closing the pile in place. Atlas has posted a bond to cover $6.5 million of the cost. Atlas has indicated that it is willing to spend some more money to comply with its obligations as the licensee to close the tailings pile, but has indicated that moving the pile would likely bankrupt the company. If this happens, and moving the pile has already begun, who will be left with the bill? It doesn’t take a rocket scientist (let alone a nuclear scientist) to figure out that the American taxpayer will be stuck with the bill. If Atlas does not default, it is likely that this site will become a Superfund site, and the stigma associated with that will be worse than the stigma of having a properly closed, safely guarded uranium tailings pile in our town. O do not want to live in a Times Beach and I do not want my grandchildren to have to pay the economic price for decisions that were made by the United States Government years ago.

I urge you to let Atlas close the tailings pile in place.

Sincerely,

[Signature]

April 1996

Dear:

I am writing in regard to the decision currently before the Nuclear Regulatory Commission regarding the Atlas mill tailings pile. There has been a lot of talk around Moab by those who purport to be experts about the pile and the technical matters associated with its capping. For over forty years, the uranium tailings have been situated at that location in Moab and Atlas, and NRC’s experts have handled the site with little or no impact on the surrounding population. I believe that these experts should be left to make any decisions regarding the pile’s future.

Sincerely,

[Signature]

April 1996
April 24, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch
Mail Stop TWH 7-39
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

I'm writing to you as a former employee of Atlas Corporation. Both my wife, Susie, and I agree that the tailings pile should be capped in place.

I know what's in that pile, and I also know it can be capped safely. Moving that pile to another site doesn't make any sense.

To us, Lance Christie and his people are just wasting everyone's time and money by prolonging the issue. We don't know where he gets his crazy ideas, but I do know he's completely out of line.

We're inclined to go along with the people we trust, Atlas and the NRC (although I admit I don't have a lot of faith in most government agencies), rather than a trouble maker like Christie.

NRC's DEIS has already shown that capping will be a safe alternative, so let's not delay any longer.

Sincerely,

[Signature]

Karl and Susie Yangren
Box 302
Moab, Utah 84532

-----

April 1996

Deer,

Between the time the Atlas mill ceased operations in 1984, and the present when the ugly, rusty mill buildings were taken apart and buried, Moab, Utah saw a significant increase in tourism. The fact that an ugly industrial site was located next to the Colorado River did nothing to deter the influx of tourists, mountain bikers, and hikers from visiting Moab and the nearby National Parks. The artists conception of what the millsite will look like once the site is capped is a vast improvement over what has been at the site for the last forty years. The only challenge will be to keep the "city slickrockers" off the cap.

I vote for leaving it in place.

Sincerely,
April 24, 1996

U.S. Nuclear Regulatory Commission
Joseph J. Holonich, Chief
High Level Waste and Uranium Recovery Project Branch
Mail Stop TWHN 7-29
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

Dear Mr. Holonich:

I know a lot about uranium and uranium tailings piles because I used to work for Rio Algom.

If I didn’t think it was safe to let Atlas cap their tailings, I’d be the first to say no. But it will be safe. Even your own DEIS indicated that if the pile is stabilized and capped properly it will be safe for a long time.

That’s sure good enough for me. Let’s start capping that pile as soon as we can.

The idea of moving the pile, like Lance Christie and Bill Heddon want to do, is just plain nuts. It would take forever and cost a lot more money than those guys can even dream of.

I fully support capping the tailings in place. Let Atlas go about their work and get it done.

Sincerely,

Kim Tatman
735 Locust Lane
Moab, Utah 84532

To Whom It May Concern,

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can come to only see one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be fiscally irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don’t live in such a world, so let’s just stabilize the pile, contour it, cap it...and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely...and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

H. Burke Taylor
498 Carlos Court
Moab, Utah 84532
April 28, 1996

U.S. HRC
WASHINGTON, D.C.

Dear Mr. Holmich:

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here in Moab.

I am beginning to get the feeling that the "nay buggers" are making a great big mountain out of a tiny mole hill. They are so determined to spend somebody's else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep hearing a dead horse about the "dangers" certain Councilmen keep yapping about? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "nay buggers"

Sincerely,

TERRY F. TYND
% 2420 E. OLD CITY PARK RD., MOAB.

April 22, 1996

Dear N.R.C.,

My name is Manuel Torres. I am a long time resident of Grand County. I've lived here for the past 27 years, and during that time I served as a County Commissioner. I have a great concern about moving the Atlas tailings in our area. I realize the impact that it is going to have in the transportation phase of the operation, and the great cost it is going to impose on the tax paying citizens of the nation.

I worked in the mining industry for 2 1/2 years, (with Rio Algom). I worked in the Engineering Department, so I think I understand the problems with the two ideas being addressed by both parties. First you have to understand that most of the long time citizens of Grand County support Atlas in a well thought out way of resolving this situation we have.

I Urge you to use common sense, and accurate information obtained by both sides. If this is accomplished, I trust that you will come up with the same conclusion I have. Thank You for your time and listening ear.

Sincerely Yours

[Signature]

J-433
Dear Mr. Stick Johnson,

For many years now, I've been following the situation between the NRC and Atlas company.

227-1 From what I've been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

227-2 First of all, I ask myself, "what would be accomplished?" I mean, we would have two radioactive places instead of one we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

227-3 From what I've read and heard, removing the tailings would mean a whole lot of big equipment, like some kind of a tower, to get the liquids out of the tailings so they could be moved. Then you would need at least a bunch of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

Heck, I've lived here and raised a family, and we're all healthy.

Thank you.

Cc: U.S. NRC

April 9, 1996

Dear Orin D. Hatch,

I have attended some of the meetings about the matter of whether or not to move the Atlas tailings pile here at Moab.

I am beginning to get the feeling that the "tree huggers" are making a great big mountain out of a tiny molehill. They are so determined to spend somebody else's money (a whole lot of money) just to make us safe from a tailings pile that has been sitting there for a very long time.

They want to move that darn thing somewhere else, and they want somebody else to pay for moving it. I don't think Atlas can afford it, and I don't think the government should waste the money.

Atlas says they have a good, safe plan to take care of the pile right where it is, and they're willing to spend their own money doing it. I say let them go ahead and get it over with, and the sooner the better.

Why do we keep beating a dead horse about the "dangers" when certain Councilmen keep yapping about it? I don't think there are any real "dangers". Enviros like them are quick to point out problems, but they never seem to have practical solutions. To them, the solution is to waste money, without getting anything done.

Just leave Atlas alone, and let them go ahead and clean up the pile. They know what they are doing.

We don't need any more help from the government agencies and "tree huggers".

Cc: U.S. NRC

April 9, 1996

Sincerely,

[Signatures]
April 9, 1996

Dear Bill Atton,

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can see only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be financially irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contour it, cap it... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely... and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

[Signature]

April 24, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holmich:

I am writing regarding the Atlas Corporation tailings pile near Moab, Utah.

Having followed the situation for some time now, I can see only one reasonable conclusion: the tailings pile should be capped in place. I think there is ample evidence to support capping as a safe solution for the people of Moab and Colorado River users. With the cost differences being what they are, moving the pile to the alternate site would be financially irresponsible.

As you noted in your DEIS, the alternate site is somewhat better than the current one from an environmental standpoint, but moving the pile would then create two contaminated locations instead of just one, which makes no sense at all. And slight environmental benefits cannot make up for the huge cost differences in moving the pile.

If we lived in a perfect world, there would be no question about moving the pile. But we don't live in such a world, so let's just stabilize the pile, contour it, cap it... and let everyone get on with their lives. It would be tragic for the people of Moab and for Atlas to allow this situation to get out of hand and having it end up as an EPA Superfund site.

I feel that Atlas has done everything possible to handle this problem correctly, safely... and within the rules and regulations it was handed.

In view of that, I think that the decision to cap in place should be made quickly, so the job can get done quickly and without added tax dollars involved.

Thank you for your consideration.

Sincerely,

[Signature]

1260 S. HWY. 191, MOAB
April 25, 1996
3140 Kimball RD
Moab, UT 84532

Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
High-Level Waste and Uranium Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555-0021

Dear Sir,

I have been a resident of Moab for a least 28 yrs, and would like you to know I oppose the removal of the Atlas tailings to another site, because of the public's health. There are at least several million of tons of fine sand-like material that has carcinogenic in it that can and will make people very sick of to the point of dying of cancer...

And if you don't believe that people can't get sick from these dust particles, I have medical information of a dust storm that came through Moab several years ago that didn't have the radioactive particles that Atlas tailings would have on animals and people, but my 2 horses became very sick, and had to be put on antibiotics to help them get well.

Please don't waste our tax dollars in moving this material, just cap it where it is, because it will cost for generations to come...

Thank you,
Sincerely, Anne Renee Walker

April 29, 1946

To Whom It May Concern,

I am a resident of Elrod Cornet, Moab, Utah. This note is in regard to the Atlas 8625.

We have listened to and read much about the decision to move the tailings from a Cap in place! Much has been done to the proper thing for all of us, and I can't truly say the proper thing has been done that I really people the tailings pile under all ground!! Then thought down to the same answer it seems it surely with the expense... What will the cost be if the wrong decision is made? Don't glad...
Assumptions drawn from the EIS

In preparing my comments, I have assumed that the following information given in the EIS is correct and true:

- The Atlas site uranium mill tailings pile is made of 9.5 million metric tons (10.5 million tons) of material which needs to be reclaimed for long term disposal (EIS, page 1-1).
- The majority of the ore for the Atlas Mill came from Big Indian Uranium District, approximately 120 km (80 miles) to the southeast. The ore was trucked to the mill, and ground there, producing the tailings pile (EIS, page 2-6).
- The primary activities on the site during reclamation would be grading and earth hauling required to reconfigure Moab Wash, grading required to contour the surface of the tailings pile, and the cover system, and operation of earth-hauling vehicles and trucks providing cover materials from borrow areas and mill haul debris to the debris disposal sites. Earthwork would occur mainly from May to September (EIS, page 2-9).
- Atlas proposes to perform reclamation in five 15-week phases. Approximately 30 weeks would be devoted to the transport, placement, and compaction of clay and rock material. The remaining 45 weeks would be devoted to earthwork. The truck transport of clay and rock would be conducted primarily during the winter, when trucker traffic is reduced (EIS, page 2-10). Clay for the tailings pile cover would be obtained and transported by truck from the Platau site (EIS, page 2-10). Less than 10 Atlas employees would continue working at the site during reclamation. A small number of other reclamation workers would be obtained from contractors. The average number of workers at peak periods is estimated to be about 25 (EIS, page 2-10).
The Scale of the Project

For anyone familiar with large scale mining operations, 10.5 million tons (\(\approx\) about 11.5 with contaminated soils) is not a lot of material for a mining operation to move. Typical mining operations function around the clock, and are only interrupted under the most extreme weather conditions. The equipment is very expensive, and depreciation figures are high, so the more the operations continue, the more the mining company can cover these costs and turn a profit.

Mining operators think in terms of units of material, where ‘start up’ mines move as much as 30,000 metric tons per day (ore, tailings, everything), but fully operating mines move anywhere from 100,000 to 200,000 metric tons per day. To give you some perspective, at 200,000 metric tons per day (365 days per year), the Atlas tailings pile and all of it’s associated contaminated soil (estimated at 10.5 million metric tons) could be moved in 32 days and 12 hours. That’s less than two months. At 100,000 metric tons per day, the pile could be moved in 105 days. For any mining company, this is not a big job.

Also, the 16 miles from the current site to the Plateau site is no great distance, by rail or truck. In fact, the Atlas pile came from about 80 miles away, and was hauled there by truck (EIS page 2-6).

The EIS Cost Estimate

The EIS provides the following cost estimates

- Atlas Site disposal - US$13 to 16 million
- Plateau Alternative - US$94 to 114 million

The Atlas proposal is assumed to require five years to complete, using five 15-week work seasons. At 7 days per week, this comes to 525 days total. The first 210 days involve the transport of clay and rock, while the remaining 315 days involve earthwork at the site. Comparatively, the Plateau alternative is said to take 12 years, or 1,624 weeks to complete (11,368 days). Both projects involve at least 14-15 heavy equipment operators amongst a total of 30 local workers, and an additional 30 employees provided by outside contractors. Brief descriptions of required equipment are provided, and unit-cost comparisons of the Plateau alternative to another tailings rail transport project. This is precious little from which to derive conceptual cost estimates. Other details were presented in the Atlas Cost Estimate, but unfortunately they were not available until the last weeks of the comment period.

The NRC, in basing it’s preliminary decision to accept the Atlas proposal on the excessive costs of the Plateau alternative while at the same time allowing Atlas to delay public release of details and methods used in cost estimating, has crippled the public’s ability to critically review the NRC’s decision. As a public citizen aware of the implications of

Jan Whiting

2 4/20/94

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NRCC's original decision not to disclose Atlas' cost estimating information, I am appalled at the NRCC's disrespect of public disclosure regulations. I have had experience working with mine operators and cost estimators, and Atlas' current cost estimates are undoubtedly conceptual at this point. I would like to know why release of these early estimates would jeopardize Atlas.

Regardless of Atlas' conceptual estimates, the job will most likely be put out by Atlas for bid by mining contractors, who will each provide their own detailed estimate. Monono-Kinross is a good example of a large scale mining contractor, who owns many mine haul trucks and other forms of heavy mining equipment, and is contracted out by companies such as Atlas to perform specific mining operations. If Atlas no longer has the appropriate equipment available to conduct these operations, it would be totally unreasonable for them to actually purchase the equipment, pay for it, and do this project themselves. The capital costs for equipment will actually be carried by a contractor hired by Atlas to do the job, until that job is bid. Atlas' cost estimates are purely conceptual and could represent an entire order of magnitude difference from the actual cost.

This presents a problem for the NRCC, because their decisions are based on Atlas' ability to pay for any alternative. What level of certainty does the NRCC require in cost estimates? Have more efforts been undertaken to achieve more accurate estimates? If not, why not?

The Plateau Alternative

The Plateau alternative as presented in the EIS contains many unnecessary costs. The most important cost outlier is the decision to transport the tailings and contaminated soils via rail. Having received the cost estimates at such a late date, I've mostly used the EIS, and pieced together a conceptual cost estimate that compares the activities and costs of transporting the pile via mine haul truck. The second inflated cost is the duration of the required activity. These flaws are examined below.

Rail vs. Off-Road Mine Haul Transport

In general, cost estimators in the field of mining and metals use the following rules of thumb for calculating the US$ direct operating cost per metric ton kilometer:

- Road Truck: $0.12 - $0.20
- Mine Haul Truck: $0.03 - $0.05
- Railroad: $0.03 - $0.05
- Barge: $0.005

It may seem on the surface that the cost of using mine haul trucks (which transport anywhere from 100-300 tons per load) would be the same as the cost for using rail cars (which carry approximately 100 tons per car). However, this is certainly not the case for the Atlas site.

As mentioned in the EIS, the per-unit cost of rail transport remains about the same until you reach transport requirements of 200 miles (EIS page 3-5). Per-unit costs take into account the cost of equipment for handling as well as transport. To operate rail, one has to have equipment to move the material from the pile to the conveyors (loaders, trucks), rail gondola cars and locomotives (locomotive at either end and if track turning space and materials are not provided at both sites), extremely expensive gondola car off-loaders (upwards of US$ 3.1 million each), trucks at the disposal site, and earthmovers at both sites.

With these one-off, heavy equipment cost requirements, rail transport cannot compete with mine haul or even conventional road truck transport over short distances. Mine haul and truck transport only requires the loaders, the trucks, a road to drive on, earthmovers to shape the disposal site, and more gasoline. Even if you had more than one train with a 10-truck passing lane in the middle, and twice as many cars (30 instead of 25) on each train, the operational cost of rail would do nothing to the total unit cost of transporting the pile, and the total estimate would probably be at least as high as the current Atlas quote.

The most cost-effective mode of transport from the Atlas site to the Plateau site would be off-road, mine haul truck. While the EIS suggests that all feasible routes are currently occupied by public roads, discussions with local residents, Grand County representatives, the Bureau of Land Management and the National Park Service have revealed possibilities for dirt road construction along an old park entrance road, and on top of the existing rail right of way (with wheel tires straddling the tracks). I would think the BLM and NPS would be amenable to temporary use of portions of their land for this use.

Assuming that an appropriate sized and supported road bed could be constructed for the mine haul truck (they're wider than a 2-lane road, but their roads do not require paving) along the 29 kilometer (18 mile) distance from Atlas to the Plateau site, the direct operational cost of transporting a grand total of approximately 10.3 million metric tons of material (9.5 million metric tons of tailings and a rounded 800,000 metric tons of contaminated soil) would be a minimum of US$ 8,652,000, and a maximum of US$ 14,420,000 (See Table 1).

This estimate includes labor and equipment depreciation / leasing. It's a total cost for transport. It does not include the cost of preparing the dirt road for mine haul trucks, or the excavation activities. A list comparing the required activities for the Atlas proposal to an Off-road mine haul truck transport alternative is provided on Table 2. Here are some rough cost estimates for these activities:

- Atlas proposes a new 34 kilometer, 15 cm water pipeline for the Plateau site alternative, compete with two or three pumping stations and a 757,000 L surge tank. I would like to suggest that the cost of this pipeline be compared to the cost of hiring contractors with water trucks, and installing a local water system with a storage tank.

This is why my list shows the use of water trucks for both the Atlas proposal and the
### Table 1

**Handling Cost Variables**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range of Operating Cost</td>
<td>0.03 $ / metric-ton kilometer</td>
</tr>
<tr>
<td></td>
<td>0.05 $ / metric-ton kilometer</td>
</tr>
<tr>
<td>One-way Distance from Atlas to Plateau</td>
<td>28 kilometers</td>
</tr>
<tr>
<td>Tailings Material</td>
<td>9,500,000 metric tons</td>
</tr>
<tr>
<td>Contaminated Soils</td>
<td>726,000 metric tons</td>
</tr>
<tr>
<td>Total Material to be Moved</td>
<td>10,226,000 metric tons</td>
</tr>
<tr>
<td>Rounded for error</td>
<td>10,300,000 metric tons</td>
</tr>
</tbody>
</table>

**Handling Cost Estimates**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Calculation</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>At 0.03 per metric-ton kilometer</td>
<td>$0.03 \times \frac{10,300,000 \text{ metric tons}}{\text{kilometer}} = $309,000 \text{ per kilometer}</td>
<td>$309,000</td>
</tr>
<tr>
<td></td>
<td>$309,000 \times 28 \text{ kilometers} = $8,652,000</td>
<td></td>
</tr>
<tr>
<td>At 0.05 per metric-ton kilometer</td>
<td>$0.05 \times \frac{10,300,000 \text{ metric tons}}{\text{kilometer}} = $515,000 \text{ per kilometer}</td>
<td>$515,000</td>
</tr>
<tr>
<td></td>
<td>$515,000 \times 28 \text{ kilometers} = $14,420,000</td>
<td></td>
</tr>
</tbody>
</table>

---

**Table 2**

**Comparison of Activities**

<table>
<thead>
<tr>
<th>Atlas Proposal</th>
<th>Off-Road Mine Haul to Plateau Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Similar Features:</strong></td>
<td></td>
</tr>
<tr>
<td>Earthmoving at disposal location</td>
<td>Earthmoving at disposal location</td>
</tr>
<tr>
<td>Clean up of mill site</td>
<td>Clean up of mill site</td>
</tr>
<tr>
<td>Use of water trucks</td>
<td>Use of water trucks</td>
</tr>
<tr>
<td>Excavating sand from Atlas site for cover</td>
<td>Excavating sand from Atlas site for cover</td>
</tr>
<tr>
<td><strong>Differences:</strong></td>
<td></td>
</tr>
<tr>
<td>Hauling from clay borrow site</td>
<td>&quot;S&quot;haring mine haul road</td>
</tr>
<tr>
<td>Hauling from rock borrow sites</td>
<td>Excavating tailings, contaminated soils</td>
</tr>
<tr>
<td></td>
<td>Transporting tailings, contaminated soils and sand</td>
</tr>
<tr>
<td></td>
<td>Hauling from rock borrow sites</td>
</tr>
</tbody>
</table>

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Jan Whittington

4/30/98

J-440
<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>1,989.6</td>
<td>kg</td>
<td></td>
</tr>
<tr>
<td>Labor</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHERS</td>
<td>11.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,546.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- The above table represents the total quantity and cost breakdown for the project. The table includes materials, labor, and other expenses.

**Other Information:**
- The project is currently on schedule and within budget.
- Regular meetings are held to discuss progress and address any issues that arise.
- The project team is working diligently to ensure the successful completion of the project.

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**Subtotal:** $2,546.2

**Grand Total:** $2,546.2
Atlas Cost Estimate

233-6

Why does the 1996 Atlas Cost Estimate include US$17 million for this EIS? Completion of the EIS is not a factor discounting the costs or benefits of rapping in place or moving the pile. And why does this estimate include about US$500,000 for "NRC Oversight"? Does the NRC really get paid to do their job by Atlas?

Conclusion

233-7

The crux of the NRC decision lies in the cost-benefit analysis. Does the cost of moving the pile to the Plateau site outweigh the potential damage to human and environmental health from leaving the pile in place? The EIS clearly notes to the human and environmental health advantages of moving the pile, but the alternative of transport via rail is far too expensive and therefore not feasible for Atlas to implement. However, given the rough estimates I've provided for an alternative transporting the material via mine haul trucks, a new possibility emerges.

Now I ask the NRC, if it is not feasible for Atlas to pay US$94 - 114 million, is it feasible for them to pay US$23 - 35 million? Does this cost outweigh the potential hazards to human and environmental health from leaving the pile in place? If not, why not?

Respectfully yours,

Jan Whittington
995 Dolores Street
San Francisco, CA 94110

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Amounts</strong></td>
</tr>
<tr>
<td>Tons Material</td>
</tr>
<tr>
<td>Contaminated Soils</td>
</tr>
<tr>
<td>Total for Transport</td>
</tr>
<tr>
<td>One-way Distance</td>
</tr>
<tr>
<td>Cycle Distance</td>
</tr>
<tr>
<td>Mine Head Speed</td>
</tr>
<tr>
<td>Total Cycle Time</td>
</tr>
<tr>
<td>Operating Time</td>
</tr>
<tr>
<td>Cycles per Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cnr. cy per site per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Truck</td>
</tr>
<tr>
<td>Medium Truck</td>
</tr>
<tr>
<td>Large Truck</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenarios for Duration of Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) A fleet of 10 small trucks (12 total, accounting for spares and parts)</td>
</tr>
<tr>
<td>10 trucks X 1,200 tons = 12,000 tons</td>
</tr>
<tr>
<td>11,300,000 tons X 1 day = 11,300,000 tons</td>
</tr>
<tr>
<td>(2) A fleet of 10 medium trucks (12 total, accounting for spares and parts)</td>
</tr>
<tr>
<td>10 trucks X 2,400 tons = 24,000 tons</td>
</tr>
<tr>
<td>11,300,000 tons X 1 day = 11,300,000 tons</td>
</tr>
<tr>
<td>(3) A fleet of 10 large trucks (12 total, accounting for spares and parts)</td>
</tr>
<tr>
<td>10 trucks X 3,600 tons = 36,000 tons</td>
</tr>
<tr>
<td>11,300,000 tons X 1 day = 11,300,000 tons</td>
</tr>
</tbody>
</table>

Jan Whittington 5 6/30/96

J-442
COMMENTS ON THE
U.S. NUCLEAR REGULATORY COMMISSION'S
JANUARY, 1996
DRAFT ENVIRONMENTAL IMPACT
STATEMENT
IN WHICH THE NRC'S PREFERRED OPTION IS
TO PERMIT 14 MILLION TONS OF
RADIOACTIVE CONTAMINANTS TO REMAIN
ON THE BANKS OF THE COLORADO RIVER IN
THE PATH OF AN HISTORIC FLOODPLAIN, ON
TOP OF AN EARTHQUAKE FAULT, AT
MOAB, UTAH

Dr. J. Dennis Willigan
Castle Valley Star Route, Box 2702
Moab, UT 84532
E-mail: dennis.willigan@mcc.utah.edu

ABSTRACT

The NRC's DEIS is grossly flawed, seriously incomplete, and inexcusably
evasive on key environmental and public health issues. Many of the technical
contributions to the DEIS from the Atlas Corporation can only be described as
bordering on 'junk science.' The possibility for fully informed public
comment, as clearly envisaged by Congress in the National Environmental
Policy Act (NEPA), has been
systematically thwarted by this
prematurely released DEIS. The only
socially responsible, legal course of
action for the NRC is to issue a revised,
technically competent DEIS that meets if
not exceeds expected NEPA standards
for state-of-the-art scientific quality
and comprehensiveness. Details follow:

February 1996
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ABSTRACT 2

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DEIS Deficiency #34: Flawed Seismic Analyses

The information that has been provided by Atlas and which NRC staff has obtained from other sources has not enabled the NRC staff to reach a conclusion whether or not the Moab fault is a capable fault. The NRC staff's seismic potential analysis provided in the DEIS would prove to be erroneous if the Moab fault is found to be a capable fault. Atlas has not accurately addressed the likelihood that the tailings pile will be subject to subsidence. Subsidence data provided by Atlas is not specific to the Atlas site and therefore the NRC staff are unable to conclude what an appropriate design basis for subsidence should be. Atlas has not provided the NRC staff with current borehole data and seismic reflection data.

State-of-the-art, conclusive research findings regarding these critical issues should have acquired prior to the release of the DEIS.

234-2

DEIS Deficiency #2: Flawed Sediment Migration Potential Analyses

The NRC staff have found that sand dunes, sand ramps, and sand sheets will likely be deposited near or near the current Atlas site and that they will potentially affect the performance of the planned erosion barrier or drainage of the pile, pile slopes or drainage system related to pile stability. Atlas has not presented data to the NRC staff regarding the future potential for sand migration and its effects.

234-3

DEIS Deficiency #3: Flawed Landslide Potential Analyses

The relatively huge Poison Spider Mesa escarpment above the site is reorienting through rock falls and landslides. Atlas has not presented to the NRC staff current information regarding landslide potential emanating from the Poison Spider Mesa escarpment. The NRC staff assert that they lack sufficient information on which to reach a conclusion about the hazard from escarpment landslides encroaching onto the planned tailings pile's erosion barrier.
234-4 DEIS Deficiency #4: Flawed Earthquake Potential Analyses

According to the NRC staff, Atlas has not addressed earthquake data relevant to the Atlas site (e.g., the magnitude 6.5 floating earthquake that took place in the northwest corner of Colorado discussed by McGuire et al. [1982]). Atlas has not identified the maximum random floating earthquake for the seismic design basis of the site containment facility. Atlas has failed to identify the maximum earthquake that could be generated by the fault system identified by Wong and Humphrey [1989] and ignored the relationship between seismicity and basement faulting. The NRC staff have found that the current seismic design basis for the Atlas site is incomplete. Specifically, the NRC staff have found that bedrock and geomorphic stability have not been adequately addressed in the proposed site containment design.

181 GEOTECHNICAL INSTABILITY

234-5 DEIS Deficiency #5: Inadequate Piezcone Analyses

The NRC staff have concluded that Atlas' characterization of the tailings and contaminated materials, and evaluation of the embankment with respect to stability and potential settlement, are inadequate. The NRC staff are requiring Atlas to submit additional piezcone data along with a field exploration program for the piezcone investigation.

234-6 DEIS Deficiency #6: Flawed Tailings Pile Slope Stability Analysis

Based on a review of Atlas' inappropriate pseudo-static method of slope stability the NRC staff cannot conclude that slopes of the disposal cell (i.e., the capped tailings pile) would be designed to endure the effects of geologic processes and events, including resistance to earthquake and settlement, to which they may reasonably be expected to be subjected.

234-7 DEIS Deficiency #7: Outdated Liquefaction Analysis

The NRC staff's liquefaction analysis review has been suspended until Atlas reevaluates its flawed interpretation of the potential for liquefaction of site contents that might occur during a major seismic event.

234-8 DEIS Deficiency #8: Inadequate Radon Barrier Analysis

Atlas has failed to provide NRC staff with suitable construction specifications that include a quality assurance program incorporating criteria (temperature, time interval, and placement moisture) for field testing the moisture content of the radon barrier soils between lift placement.

234-9 DEIS Deficiency #9: Flawed Testing and Inspection Quality Control

Atlas' reclamation plan is grossly deficient. NRC staff have found that technical specifications have not been updated to be consistent with revised reclamation designs. Atlas needs to specify more workable lift thicknesses of the tailings pile fill or describe applicable procedures for verifying that satisfactory compaction will be achieved.

1C1 SURFACE WATER HYDROLOGY THREATS AND EROSION

234-10 DEIS Deficiency #10: Flawed Potential Maximum Flood (PMF) Analysis

Atlas reviewed existing flood data and studies of floods in the area. However, NRC staff consider that the selection of a design flood event should be based on the extrapolation of limited historical flood data, due to the unknown level of accuracy associated with such an extrapolation. The NRC staff contacted the USBR who reported that they have not performed any comprehensive flood studies of the Colorado river at Moab. Such a study should have been completed before the current DEIS was released for public comment.

234-11 DEIS Deficiency #11: Inadequate Colorado River Migration Analysis

The NRC staff are concerned that there is a potential for the Colorado river to migrate and possibly reach the toe of the reclaimed tailings disposal area. Atlas has reported that erosion will occur during minor flood events and that erosion is currently ongoing in the immediate site area. This erosion is obvious to visual inspection from the river. The Colorado river may have once been located north
of the tailings pile, and according to NRC staff there is no assurance that it could not migrate northward to this location again. Atlas has claimed that the probability for such migration is very low but when NRC staff asked Atlas to provide quantitative evidence to support this conclusion, they were not able to do so.

DEIS Deficiency #12: Inadequate Sizing of Erosion Protection: Analysis
Riprap (rock) sizes reported in the DEIS have only been informally transmitted to the NRC by Atlas and conflict with information previously submitted. The NRC staff has taken the position that until Atlas formally submits rock sizes, layer thickness, and gradations, the staff cannot conclude that the overall riprap design is adequate.

DEIS Deficiency #13: Inadequate Southwest Diversion Channel (SWDC) Analysis
Since no satisfactory analysis has been done regarding the potential for severe landslides in the site area it is impossible at this time to know if the Southwest Diversion Channel (SWDC) design is capable of accommodating expected sediment input. If landslides are likely, the proposed SWDC will be unable to effectively accommodate potential maximum flood flow and the stability of the tailings site will be threatened.

WATER RESOURCE CONTAMINATION

DEIS Deficiency #14: Inadequate Hydraulic and Transport Properties Analyses
The tailings impoundment area is situated on the relatively flat bottom lands along the river which are within the historical floodplain of the Colorado. The Moab Wash originally passed through part of the tailings area. While a part of the Wash has been rerouted and is planned to be further rerouted, its historical path could be reopened in a major flash flood, affecting the integrity of the tailings pile. This issue has not been adequately considered by the NRC in the DEIS. The NRC staff might benefit by observing what happens during a major flash flood in the Moab desert/slickrock area. The NRC staff have found that no data have been acquired regarding the hydraulic properties of the bedrock units beneath the alluvium at the site. The NRC staff have found that Atlas collected no data for the hydraulic properties of rock units in the adjacent mesas and uplands. The NRC staff have concluded that Atlas has not provided adequate hydraulic and river stage data to derive a reliable estimate of hydraulic diffusivity for the alluvium. The NRC staff have found that Atlas interpretation of ground water flow direction and gradient is not supported by available site data for the area associated with the southern extent of the tailings near the Colorado River. The interpreted flow directions in this area are not corroborated by the containment concentration contours provided the NRC by Atlas. The NRC staff have discovered that no data have been collected on ground water flow directions or gradients within the deeper brine or of the bedrock units beneath the alluvium at the site.

DEIS Deficiency #15: Flawed Water Contamination Analysis
In measuring the extent of water contamination by materials in the tailings pile it is necessary to establish the nature of the uncontaminated water nearby (i.e., the background conditions). Atlas originally attempted to establish background conditions with a monitoring well ATP-1. However, NRC staff report that water quality in this well does not appear to be representative of site conditions within the alluvium near the river, where the tailings pile is located. Atlas later established a new background monitoring well AMM-1 but has yet to show that water in this new well is not being contaminated by a nearby former ore storage pad. To the extent that Atlas' background monitoring wells are contaminated or otherwise unrepresentative of background conditions, comparative measurements of ground water contamination by the other monitoring wells are rendered scientifically useless because comparative analyses will systematically misrepresent the extent of ongoing water contamination. Atlas has collected and analyzed ground water samples from the alluvial aquifer downgradient of the tailings pile on a sporadic basis. The monitoring program has changed several times over the years, and the collected data lack consistency in the sampling points, constituents analyzed, and laboratory methods used. The NRC staff have concluded that Atlas' monitoring program changes make a complete evaluation of the contamination history at the site difficult. Several metallic and radiological compounds designated as hazardous constituents are known to have been seeping from the impoundment area into the
alluvium soils beneath the tailings pile and impacted the ground water in the alluvium. Hazardous constituents eventually travel to the Colorado River where water is used by downstream campers and river runners who swim in the river and who drink the water using no or only limited purification/filtering devices. The DEIS fails to even mention this obvious potential threat to public health. The downstream monitoring station is 63 miles away from the Atlas site! The NRC staff concludes that the lateral extent of the contamination within the alluvial aquifer has not been adequately determined. Colorado River water contamination will continue if the tailings pile is left in place.

DEIS Deficiency #16: Flawed Conceptual Design Features to Protect Water Resources

The NRC staff have found that Atlas has presented no calculations or analysis to support its claims for the permeability of the reclamation site. Furthermore, Atlas' reclamation plan does not indicate that a specified permeability was used to determine compliance with the ground water protection standard for the site.

| E | RADON RADIATION BARRIER DESIGN DEFECTS |

DEIS Deficiency #17: Flawed Characterization of Tailings and Ore Material

The radioactive Ra-226 values for the top slope fine and coarse tailings were derived by Atlas from samples composited over various depth levels. The NRC staff has determined that this is not an appropriate method since there is evidence that the Ra-226 concentration varies. Since Atlas has not demonstrated that the Ra-226 concentration associated with its samples was homogeneous, the NRC staff consider the Ra-226 value for the coarse tailings derived by Atlas to be inconclusive. The NRC staff consider Atlas' test procedure to estimate long-term moisture content value for the fine tailings to be possibly inappropriate. Atlas has failed to incorporate a Ra-226 testing program in its reclamation plan.

DEIS Deficiency #18: Inadequate Testing of Moab Wash Soil for Radioactive Contamination

NRC staff have expressed concern that significant concentrations of windblown radioactive contamination can be found in the Moab Wash sandy soil that Atlas proposes to utilize in the radon barrier for the tailings pile. Atlas has utilized gamma surveys to distinguish tailings contaminated soil from uncontaminated soil. However, the NRC staff has observed that gamma meter readings do not correlate well with Ra-226 concentrations in the range of concern (approximately background) for tailings cleanup in the Moab Wash borrow area. If Atlas proceeds as planned it may place significant amounts of Ra-226 into the tailings pile cover violating NRC criteria.

DEIS Deficiency #19: Inadequate Analysis of Klondike Flats Clay to be Used in the Tailings Pile Cover

Atlas has failed to identify the borrow site and complete a characterization of the clay located on Klondike Flats. While Atlas has done some analyses, NRC staff note that the diffusion coefficient value Atlas used is significantly different (i.e., less conservative) from the value derived by the Department of Energy after extensive testing of the Grand Junction clay at the same moisture content approved for the Atlas clay. A low diffusion coefficient of the radon barrier clay is critical. Atlas has also failed to demonstrate that the clay to be used in the tailings cover does not exceed background levels of Ra-226.

DEIS Deficiency #20: Flawed Radon Barrier Cover Bioinfiltration Analysis

Atlas claims that bioinfiltration of the radon barrier is unlikely to occur because of the rock layer in the cover, other than some shallow-rooted grasses. However, inspection of many broken rock sites in the Moab area show that numerous desert plants and trees with extremely long invasive root systems can thrive in the type of environment planned to be created to cover the tailings pile. Tens of thousands of small cavities between the rocks will be present all over the cover that will fill with windblown soil that will in turn absorb the small amounts of moisture needed to establish a wide variety of desert plants whose seeds will be wind-deposited over the cover.
OTHER SERIOUS FLAWS REQUIRING URGENT ATTENTION BY THE NRC

DEIS Deficiency #21: Applicable Criteria Established by Federal Law in Appendix A to 10 CFR 40 Will Not be Met
The proposed reclamation at the Atlas site violates federal standards in 10 CFR 40 (numbers below refer to criteria in Appendix A to 10 CFR 40) because:
1. (a) It is not going to maximize remoteness from populated areas (over 1,000,000 people/year visit Arches National Park which is across the road from the existing site). Thousands of recreationists use the Colorado River downstream from the site;
2. (b) Hydrologic and other natural conditions do not promote immobilization and isolation of the contaminants;
3. (c) The potential for erosion, disturbance, and dispersion by natural forces is not minimal;
4. (d) The tailings will not be disposed of by placement below grade;
5. (e) Embankment and cover slopes will not be relatively flat after stabilization (generally not steeper than about 20% - Atlas proposes 30%);
6. (f) The tailings may be located above a capable fault that could cause an earthquake larger than the impoundment could reasonable be expected to withstand;
7. (g) Atlas has failed to submit a corrective action program to deal with violation of secondary ground water protection standards established by the NRC.

DEIS Deficiency #22: Flawed Cost/Benefit Analysis -Part A-
The DEIS concludes that no aspect of the alternative Plateau site (whose exact location has not been identified in the DEIS) would have a potentially significant, adverse, environmental or socioeconomic impact and that it is environmentally preferable to the Atlas proposal. Cost is identified as the only significant disadvantage of the Plateau site alternative. The DEIS is inconsistent in not subjecting Atlas' comparative cost analysis to strict scrutiny as it has done with other Atlas data submissions. Then to make this comparison the deciding factor in choosing between the two sites in favor of Atlas' proposal is illogical if not scientifically irrational. The cost comparisons provided by Atlas between Atlas' desired solution and the Plateau alternative are as suspect and flawed as most of the other data provided by Atlas but the DEIS glosses over this problem. More on flawed cost estimates later.

DEIS Deficiency #23: Inadequate Land and Water Use Analysis
The DEIS authors do not adequately consider the relatively heavy human land and water use in the areas immediately downstream of the Atlas site on the banks of the Colorado River, above on Poison Spider Mesa, and downstream of the site by mountain bikers, campers, hikers, backpackers, and river runners. The DEIS' characterization of "grazing" as the most extensive land use in the area is gross mischaracterization. The DEIS virtually ignores the potential harm to fishers, river runners, swimmers, and campers who make use of and are exposed to downstream Colorado River water and bankside mud that may contain dangerous levels of contaminants leaching out of Atlas' tailing pile. It is known that the Atlas tailings pile has contaminated the Quaternary aquifer at the Atlas site and that this aquifer is used to irrigate crops during the growing season and may also serve as a domestic water supply.

DEIS Deficiency #24: Inadequate Terrestrial Species Analysis at the Castle Valley and La Sal Mountains Riprap Borrow Sites
Because Atlas has not identified the exact locations of its proposed riprap borrow sites in Castle Valley and the La Sal Mountains no surveys for endangered and/or threatened birds (e.g., peregrine falcons, observed by the author around Round Mountain) and plant species (e.g., Jones cycladenia, known by the PWS to occur in Castle Valley and which may be present in the small hills that are immediately adjacent to the base of Round Mountain) have been conducted. Peregrine falcons occasionally use crevices near the top of Round Mountain as nesting sites. The USFWS has stated that no construction activities are allowed within 1 mile of an active
peregrine falcon nest. Other rare plant taxa may exist in the Round Mountain area but no field research has been undertaken to identify them. This lack of wildlife research is obviously a serious violation of the intent of NEPA. Specifically, how are the residents of Castle Valley and the general public expected to comment on the DEIS in an effective manner when gross omissions of data mandated for analysis by NEPA, such as for the above-mentioned species, occur throughout the document? Why is Atlas permitted by the NRC to withhold locational details of the proposed riprap borrow sites in Castle Valley "to protect a cost structure believed to be sensitive to premature disclosure"? Without this locational information and the subsequent NEPA mandated threatened and endangered species surveys, a legally adequate DEIS is impossible. Promises in the DEIS to perform such surveys after Atlas reveals the locations of its desired borrow sites in Castle Valley are inappropriate. These surveys should occur before the DEIS is issued not follow it.

DEIS Deficiency #25: Racially Biased Treatment of Historical Resources

The DEIS discussion of the history of Southerneastern Utah is written almost exclusively from a narrow European-American perspective. Native American perspectives regarding land rights and the nature of historical hostilities with non-Hispanic white settlers in this region are ignored. Round Mountain, for example, may have been and continues to be a sacred site by Utes. Thus this uniquely beautiful and dramatically scenic rock formation should be evaluated for protected status under the Freedom of Native American Religion Act before it is blasted apart and ravaged as an Atlas quarry. Ute rock art can be found in Castle Valley and there are remains of Native American pit dwellings on the Valley floor. The Ute Tribe are not even listed on the distribution list for the DEIS although 11% of Grand County is occupied by the Ute Reservation in contrast to the only 5% of land that is privately owned.

DEIS Deficiency #26: Inadequate Discussion of Borrow Operations in Castle Valley

The two Castle Valley riprap borrow sites have not only not been clearly located in the DEIS but no analysis is provided regarding possible noise levels impacts upon the Valley's humans and wildlife due to the use of high explosives and heavy equipment required to size riprap to specifications prior to truck transport out of the Valley.

The upper end of Castle Valley where Atlas' undisclosed borrow sites are likely to be found has unique meteorological features not considered in the DEIS. This area is frequently subject to gale force winds due to the temperature differentials between the 12,000+ feet La Sal Mountains and the Valley floor. These winds generally blow away from Round Mountain toward the numerous homes in Castle Valley. Air quality impacts due to fugitive dust associated with projected riprap excavations will not be negligible. The possibility of an unintentional range fire being ignited by borrow operations or by borrow site crew members during high wind conditions is also not negligible and could sweep through the Valley leading to considerable loss of life. Obtaining riprap from Castle Valley will likely have major impacts on the quality of life of Castle Valley residents by disfiguring highly scenic, historical landmarks and unique igneous rock formations. The DEIS does not adequately address many of these important environmental and public health issues other than by making totally vague recommendations regarding "compensating" Castle Valley residents.

DEIS Deficiency #27: Grossly Unrealistic Expectations of the Aftermath of a Major Tailings Pile Failure on Tourism

The DEIS considers a hypothetical flood in which 2.1 million tons of radioactive and hazardous heavy metal tailings are washed into the adjacent Colorado River. After this disastrous event which would undoubtedly gain considerable national and international news coverage, the DEIS authors conclude that "For several days after the tailings pile failure, water use downstream might be prohibited" (emphasis added). In reality, the socio-economic impact arising from public perception of a major tailings pile failure with millions of tons of hazardous contaminants flowing downstream through Canyonlands National Park into the Glen Canyon National Recreation Area, continuing past the dam, and into the Grand Canyon: National Park could ruin the region's most important sources of income: Colorado River related tourism.

DEIS Deficiency #28: Inadequate Monitoring of Aquatic Biota

Monitoring of aquatic biota in the vicinity of the tailings pile has been limited to a single day's effort yielding an unreplicated sample of fishhead minnows for analysis of contaminant concentrations. This single sample is insufficient to yield reliable overall estimates. Thus,
DEIS Deficiency #29: Flawed Traffic-Accident Risk Probabilities for Scenic Highway Route 128

The DEIS does not satisfactorily address issues of snow and ice, safety factors, and road durability on State Highway 128. Atlas proposes using this officially designated Scenic Highway to transport ripp rap from Castle Valley to the Atlas site. This would require thousands and thousands of 20-ton or smaller truck trips over several years. Grades, horizontal and vertical curves, surfacing, shoulder widths, and sight distances are not adequate on this Scenic Highway to support the frequent heavy trucking proposed by Atlas. Area-wide accident data cannot be used unmodified, as they are in the DEIS, to estimate the probabilities of the expected numbers of dump truck related road accidents on this highway since an historically unprecedented level of truck traffic is anticipated during winter months which local residents know to be a very dangerous road in the winter months. Black ice caused by river condensation in shaded areas of the road and narrow shoulder widths dropping off into freezing Colorado River water are major winter hazards. While the DEIS is willing to adjust air turbulence data (4-5) that was not specific to the Atlas site to arrive at estimates more in line with what would be expected near the Atlas site and to provide more a conservative assessment, the DEIS is inconsistent in not similarly adjusting area-wide accident data to provide a conservative estimate of the number of Atlas dump truck related traffic accident fatalities on Highway 128. The likelihood of a catastrophic accident involving the Castle Valley public school bus carrying many of the Town's children back and forth to Moab week days and a 20-ton dump truck driven by a haul truck driver hired from outside the area who is unfamiliar with winter conditions on this dangerous road, from which certain heavy trucks are already banned by the State of Utah, is not negligible. Resurfacing the public roads before and after the riprap transport is estimated to cost upwards of $50 million. Where would this money come from to protect the public from disintegrating roads? It is not included in Atlas already flawed cost estimates. The DEIS' truck accident probabilities in Table 4-7-1 are another example of unrealistic 'junk science.'

DEIS Deficiency #30: Flawed Radiological Impact Analysis

During reclamation at the Atlas site wind-blown dusts containing radionuclides will increase for a period a several years. NRC regulations specify that the radiation dose to individual members of the public, in unrestricted areas, may not exceed 1.0 mSv (100 rem) per year. An estimated population dose was calculated for the town of Moab. However, a number of National Park rangers reside across the highway from the Atlas site at Arches National Park, and over one million Park visitors a year pass through the Park's Visitor's center a relatively short distance away from the Atlas site. Also, winds from the Atlas site often blow directly toward the National Park's personnel's homes and the Park's Visitor Center leaving dust residues. Population doses should have been estimated for these areas and reported in the DEIS. The soil around the Park Visitor's Center and Park Rangers' homes should have been analyzed for the presence of radionuclides following windstorms blowing from the Atlas site toward these area and that data should have been included in the DEIS. This is especially the case since the NRC staff have concluded that estimated external radionuclide dose rates on and near uncovered tailings piles can be significant. The DEIS states that CAP88-PC was used by an Atlas subcontractor to calculate doses from radionuclides with the tailings pile. However, the NRC staff point out that one of the most important limitations of CAP88-PC is that the effects of complex terrain on radionuclide concentrations cannot be modeled and thus uncertainties can be very high. Complex terrain tends to increase disperion and as the NRC staff notes, the area around the Atlas tailing pile represents complex terrain. It would appear that Atlas' radionuclide screening risk assessment estimates using CAP88-PC is another example of 'junk science.'
DEIS Deficiency #31: No Consideration of the Local Sociological Phenomenon Known as “Monkey-Wrenching” in the Cultural Resources Section of the DEIS

While the DEIS mentions Ed Abbey’s Desert Solitaire in which he refers to the Atlas tailings site, no citation is provided for Ed Abbey’s equally important work, The Monkey Wrench Gang. Both of these books provide significant sociological insights into important aspects of contemporary, local Moab/Castle Valley subcultures. They explain why attempts to blast the uniquely beautiful volcanic core known as Round Mountain into an Atlas “borrow site,” turn the “river road,” Scenic Highway 128, into a highly dangerous dump truck corridor for years, continue to permit hazardous radioactive contaminants to flow into the Colorado River and to be carried by the wind into adjacent Arches National Park, will be met with unending, intense public resistance, some of which may take the form of what Ed Abbey enshrined under the concept of “monkey-wrenching.” Many real-life equivalents of Ed Abbey’s quasi-fictional Monkey Wrench Gang live today in Moab and Castle Valley and are committed to protecting local wilderness values and local environmental quality from faceless Atlas and NRC bureaucrats who live thousands of miles away in pathologically polluted urban environments.

DEIS Deficiency #32: Flawed Cost/Benefit Analysis

Part B-

Potential socioeconomic impacts that could result from soil, air, and river water contamination during and after reclamation, and impacts on tourism which is the principal basis of the local economy should have been included in cost comparisons of the Atlas and Plateau sites. This issue was identified during the Scoping process (see D-5) and has been largely ignored. The costs associated with the hypothetical, maximum failure of the tailings pile, such as repair, cleanup, and avoidance of the Moab area by tourists due to fear of radioactive contamination, should have been considered in cost comparisons between the two sites. The costs of expected lawsuits filed against Atlas and the NRC due to flawed environmental analyses associated with keeping the tailings at the Atlas site are also not considered. If all of these missing cost estimates and others, such as engineering expenses that Atlas may not want to absorb, noted in the DEIS, and the effects of possible “monkey-wrenching,” were included

in the cost-benefit analysis, the Plateau site would appear much more financially attractive. Since the Plateau site has been found to be superior to the Atlas site for every environmental criterion considered in the DEIS, the NRC decision to favor the Atlas site solely on economic grounds would logically have to be reversed in favor of moving the tailings to the Plateau site, pending release of a new, revised DEIS.

Executed in Castle Valley, Utah:

[Signature]

Date 2/86/96

Dr. J. Dennis Willigan
Dear Mr. Holonich:

I think it is about time for Atlas Corp. to go ahead and finish their work and cap their uranium tailings in place. After reading a lot of material about capping and moving the tailings, it seems to me that capping a safe procedure, could be done years earlier than moving the tailings, and would cost a lot less money.

I know Bill Heddon doesn't agree, and he doesn't really care how long it would take to move the stuff or how much it would cost. Look, I trust the judgment of NRC, and I trust the judgment of Atlas, to do the right thing. So let's get on with it.

Thank you.

Clark Wilson
482 South Walker
Moab, Utah 84532
Dear [Name],

Enclosed please find our letter regarding the Atlas Tailings in Moab, Utah.

We are not technically literate about the subject but we do feel that something in the current plan is quite one requires further research & public input.

Thus - our is enclosed.

Thank you for your time.

Sincerely,

[Name]

End.

2 page letter

36, LiLin \ NN Nowell
1005 20th Street
Ogden, Utah 84401
801 399-9261
801 394-5018

To Whom it May Concern,

In our opinion it is unsafe & unreasonable to consider moving rocks on 20 ton trucks from Bamo Mountain to the tailings pile of the Atlas Mine on highway 23. We are aware that something has to be done however. The tailings are leaking unsafe levels of from a radioactively into the ground water that could have enormous consequences - being as though the Colorado River is a source of recreation & water for many people - not to mention the wildlife.

In our opinion the safest & best alternative would be to move the tailings to near the airport where it could be buried in clay & is one of the largest areas - it could be made by truck & would preclude much exposure to the public via roadways.

Regarding using the rocks of Bamo Mountain for a capstone.

The thought of 20 ton trucks every few minutes on a road which is already treacherous is in my opinion laughable. I understand it would have been done for 5 years in the winter. School buses run that time of year as well. Black ice - sharp curves etc.
I understand that the cost of repairing the roads is not included in the Environmental Impact Study. Would that be a burden for the tax payers? Taxes on our land doubled this year, and are way out of line already.

Yes, we do own property in Castle Valley. Before our property was taken by the unspoiled views - Pano mountain being part of that same beauty. It is unbelievable that this area, so close to a million beautiful community, could be thought of as only a quarry. Leaving a capped mountain is not something I would take kindly to. The traffic isn't either. The damage to the roads for a continuous amount of time and the burden of that damage is not either.

Please reassess your options and consider the community. Take a close look in person and consider the facts and an accurate assessment of the figures and dollars before making such a decision that has such tremendous impact.

In my view, there is only one viable solution here.

Thank you for your time and attention.

Sincerely,

[Signature]

April 6, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich:

For many years now, I've been following the situation between the NRC and Atlas company.

From what I've been able to determine, it seems to me that it would really be a waste of money to move the tailings pile to another place.

First of all, I ask myself, "what would be accomplished?" I mean, we would have two radioactive places instead of one as we have now. It seems to me that you would be spending at least twice as much trying to make a new disposal place, and cleaning up the old place.

From what I've read and heard, moving the tailings would create a whole lot of big equipment, like some kind of a system to get the liquids out of the tailings so they could be moved. Then you would need a lot of trucks to haul the loads carrying either the tailings or the rock to cover them.

I think Atlas has the right idea. Let them spend their money capping the tailings right where they are. I believe them when they say they can make the place safe.

God, I've lived here and raised a family, and we're all healthy.

Thank you,

[Signature]

May 14, 1996

2465 Old City Road

[Signature]
Mr. Joseph J. Holonich, Chief
Department of Environmental Quality
2055 E Street, N.W.
Washington, D.C. 20555-0001

Dear Mr. Holonich,

I am providing a written statement of my concerns at the public hearing held Feb. 28th in Mohe.

My name is Milt W. Young and I am a prospective buyer of the top end of Castle Valley. I own 40 acres. I am very active as an off-road enthusiast and believe that the mountain will have an adverse impact on the value of my property and substantially affect the aesthetic and environment in the area.

I am familiar with transportation issues, and have been president and general manager of Wagon Company, Inc. for 20 years. We operated several hundred trucks.

I am a recent area resident.

Picking Dragon Industries, a substantial...

Mr. Joseph J. Holonich

I am concerned with the ongoing use of large equipment in the area for 10 years. The mine and its related operations are an accident waiting to happen. The explosion of a confined area will result in a catastrophic conflagration along the nort...
Mr. Joseph J. Holovitz

Dear a report in time

Managing today, a copy of which

I enclose that states the U.S.

Nuclear Regulatory Commission

is being negligent for being

grossly deficient in the duties

with regard to enforcement of

strict regulation at nuclear

plants to lower their operating

costs.

With this information being

reported now, can you expect to

maintain any credibility to a moron

like this?

Sincerely,

Max W. Young

821 Forest St.

802-259-4532

Chairman Jackson

Nuclear Regulatory Commission

J-457
Two gutsy engineers in Connecticut have caught the Nuclear Regulatory Commission at a dangerous game that it has played for years: routinely waiving safety rules to let plants keep costs down and stay online.

**By ERIC POOLEY**

GEORGE BETANCOURT LOOKED UP FROM HIS DESK AT George Callos in New York, "I'm surprised to see you here," Callos replied. "It's been a long time since we last spoke." "I know," Betancourt said. "And we're not doing any more business with you, either."

Callos declined to comment further. "We're just conducting business as usual."

But Callos's refusal to comment did not go unnoticed by the NRC. The agency had received a number of complaints from concerned citizens about the company's safety practices. One of them was the recent incident at the Millstone plant, where a reactor vessel had been damaged by an explosion. The NRC had been monitoring the situation closely, but Callos's refusal to comment only added to the uncertainty.

Betancourt, on the other hand, was not about to give up easily. He had been working closely with the engineers at Millstone for years, and he knew they were capable of handling even the most difficult situations. But he also knew that the NRC was playing a dangerous game, and he was determined to make sure that the safety rules were followed to the letter.

"I think you should be very concerned," Betancourt said. "The NRC is playing a dangerous game, and they're not doing it for the safety of the public."

Callos sighed. "I know," he said. "But we have a lot of work to do."

Betancourt shook his head. "You're not going to get away with that," he said. "We're going to make sure that safety comes first."
Calets tells it differently. In March 1989, he had been cut from the nuclear umbrella. Neutron in Millstone L, one of three nuclear plants procured on a new lease of land that came directly into Long Island Sound from the shore of northeastern Connecticut. He was checking specifications for a replacement part for a backup fuel system in the spent nuclear fuel reprocessing system. To order the proper part, he had to know the exact size. So he pulled up a safety report that should contain the relevant data.

But they weren't there.

"The report didn't contain the safety analysis for what we were doing," says Calets. "My boss said, 'Can you get a rotation?' I sent him a note saying that it was billed to me. "And once they had a back-up, they began designing that the first discussion had taken place." Later, in June he sped the plant to warn the new owner, a Nuclear Regulatory Commission, not in its own design, which had not been reviewed by the Nuclear Regulatory Commission. "I didn't want to say more," he said. "I was just trying to keep the report to my boss."

On October 27, 1991, the Nuclear Regulatory Commission received a letter from a senior executive at the Nuclear Regulatory Commission, stating: "The information you provided is not accurate."

"I had marked it," Calets said. "I had made an effort to keep it on my desk."

"I had asked for the report," Calets said. "I had asked for the report to be checked."

"But the report wasn't there."
April 21, 1996

U.S. NRC
WASHINGTON, D.C.

Dear Mr. Holonich,

I am writing to register my dismay over the proposal to move the Atlas tailings pile from its current permitted location to a new pristine location. If we really are concerned about radiological contamination, why risk contaminating another location with the tailings? The tailings pile has been in place at that location in Moab under the direction of the NRC for close to forty years, with little impact on the surrounding population.

Sincerely,

Brandon J. Ziller
1591 W. Home Rule Blvd. Apt #22

April 26, 1996
P.O. Box 325
Salt Lake City, UT 84103

Dear Mr. Holonich,

Following are my comments on the Draft Environmental Impact Statement related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah.

In many cases, critical information is not provided for analysis and public comment, which clearly violates the intent of NEPA. Missing items include specific borrow locations for riprap and cobble material (pages 2-10 and 3-35), the twenty or so open issues in the Draft Technical Evaluation Report (DTER), and more detailed information on the Plateau alternative.

The borrow site that was disclosed is located within the town limits of Castle Valley. The town has 'no quarrying' and watershed ordinances which would make such an operation illegal. No attempt was made by Atlas or the NRC to discuss this with town officials. On page 3-34, Round Mountain is described as standing above the 'undeveloped Castle Valley floor'. I beg to differ with that description, as my cabin lies five blocks from Round Mountain, and those of my neighbors lie within a quarter mile of mine. One mile down the valley are another 300+ lots, one-third of which have residences on them. This valley is far from undeveloped. The health, socio-economic, and aesthetic impacts on it by such a borrow operation would be huge.

On page 4-4, it says that the borrow operations are not expected to stir up much dust, but no study is cited, and no figures are given to back up this claim. My property lies one-half mile from this proposed borrow site, and the area constantly experiences very high winds. There is no way dust will be adequately controlled there. The noise impacts in this very quiet valley are not discussed at all in the DEIS. The destruction of this scenic landmark, and the effects of that on the tourism in the area, the currently pristine quality of the upper Castle Valley area, and the large wintering mule deer herd based there were not addressed in the DEIS. Neither does the DEIS address the issue...
of the drop in property values in Castle Valley once the borrow operations
began. The 11 million dollar figure for capping in place. Finally, on page 4-93, it is
stated that there is no land-use project that would be impacted by the
proposition for the borrow sites. The state land around Round Mountain is prime
real-estate, and is worth much more as a scenic living site than as neighbor
to a borrow pit. Basically, the borrow operations in Castle Valley would have
permanent aesthetic, and thus monetary, impact.

Transport of borrow materials is another area which is not adequately
and properly discussed in the DEIS. It states that this transport would not
produce a significant impact. Highway 126 is a narrow, twisting, dangerous
road, especially in winter. All residents, including schoolchildren, must use it.
Several tragic traffic fatalities have already occurred along it. The addition
of these many large, heavy trucks would most certainly cause more problems.
On page 4-57 it says that the trucking would be done in winter when "lack of
snow kept the roads passable." When there is that little snow, the tourists
to continue to come and populate the areas along highway 126. Table 47-1 is
flawed. It uses the same numbers of trips for each alternative when the
differences are in actuality quite significant. Thus, the conclusions based
this table are invalid. In addition, UDOT states that the road would need to
be rebuilt both before and after the transport operation, at a cost of about 50
million dollars. Atlas didn't figure that cost into its 11 million dollar figure
for capping in place. The Utah taxpayer shouldn't have to carry that one for
Atlas.

Transport of cobbles material on highway 191 through Moab certainly
has its share of problems as well. 10-12 trucks per hour in town spells
trouble, accidents, possibly fatalities. This is NOT insignificant.

The effects on wintering bald eagles in the tailings pile area were not
addressed, though it is well known that they use the Moab Marsh. In fact, it is
likely that there are more eagles using the area now, as the national
populations are recovering, than there were in the 1970s when the mill was
still operating. Rustler need to examine this and also to back the conclusion
listed about peregrine disturbance (page 4-43).

In analyzing tailings pile failure, the short-term impacts are glossed
over and essentially ignored, despite the fact that they may have a
catastrophic effect on the local populations, both human and otherwise. This
is a large oversight, and needs to be factored into the analysis. The DEIS says
on page 4-9, "For several days after the tailings pile failure, water use
downstream might be prohibited." It is unclear how the many river-runners
and other back-country users along the river would be adequately protected at
such a time.

On page 4-10, no studies are cited showing that the tailings will
mainly pass through the Portal rather than depositing near Moab. I am aware
of recent geologic research that shows that such sediments do NOT just
flush right on downstream, but in fact pulse slowly down the river, depositing
in various places for long periods. This would have significant impacts on
recreation, biota, and agriculture that are not adequately addressed in the
DEIS. Similarly, on page 4-39, it says that "tailings contaminates would
probably become semi-permanently sequestered in the bottom sediments of
Lake Powell, expected to have little adverse impact", but no data is given to
support this. And how do we know that contaminates won't concentrate along
bottoms and beaches inside Canyondlands National Park? Again, without studies, the
DEIS is flawed.

One of the most glaring holes in the Atlas data is the "single day
sampling campaign" (page 4-27) conducted by Westwater Engineering to
determine the effects of sediment contamination on biota. There is no way to
get statistically significant data from the limited sampling done by
Westwater, as their researcher admitted to me in the Atlas Corporation
meeting held in Moab in March of 1996. Therefore, nothing can be said about
the effects of these sediments, and the DEIS is incomplete. No "reasonable
assessment of potential effects on biota" can be made (page 4-33).
On page 4–50, the DEIS states that "the available data do not indicate that the existing tailings pile has more than a minimal impact on the water quality of the Colorado River" and thus that "leaving the pile in place would therefore have little adverse impact." This is a completely illogical and unscientific conclusion. The point made in the DEIS just before these statements is that there is not enough data to tell what the Atlas pile impacts truly are. Therefore no conclusion... impact can be made. If one must jump to conclusions, jump to a worst-case scenario to protect the public!

The DEIS itself states that "the Plateau site alternative is environmentally preferable to the Atlas proposal, the high financial cost of moving the tailings may be the only significant disadvantage of the Plateau site alternative." And yet, the cost analysis presented in the DEIS is seriously flawed. As mentioned above, costs for repairing the roads used by borrow trucks were not included, and are very significant. Compensation for all 300+ lots in Castle Valley as property values drop is not mentioned. There is no line item breakdown between the two alternatives. This is not adequate, especially since cost is, as stated in the DEIS, the deciding factor.

In summary, due to inadequate scientific data, necessary information not available for public comment, and a seriously flawed and incomplete cost analysis, the conclusions reached in this DEIS are invalid. Fill in these holes, and let's do it right.

Sincerely,

Barbara Zinn
Survey (UGS) and the DTER agree that rock is encountered at varying depths under part of the pile, and is not encountered at all under the southern edge. The DTER does not encompass the UGS field survey cross-sectional information presented in March, 1993, concerning the geology of the tailings site. What the UGS displayed in its cross-sectional drawings was that the majority of the Spanish Valley salt collapse feature has a salt anticline (7000' thick under the pile according to the DTER, perhaps 12,000' according to Barnes) underneath sedimentary fill. Leaching of salts out of the top of the salt anticline by the flow of glacial water caused a soft sandstone to form out of the compressed non-soluble grains of sand in the Paradox Formation. Thus, in most of Spanish Valley, there is a layer of soft sandstone from 150 to 300 feet thick separating the glacial alluvium which contains fresh groundwater from the Paradox salt. The UGS did not find this rock layer consistently underlying the Atlas tailings site.

We therefore ask: How predictable and severe are the results of seismic movement, e.g., on the West Branch of the Moho Fault down the Colorado River, as interpreted through different geologic structures underlying different parts of the tailings pile? The specific issue here is could the part of the tailings pile underlain only by wet alluvium and salt move differentially to the part of the pile underlain by drier, thinner alluvium and rock on top of the Paradox Formation? Could a seismic event accelerate subsidence or otherwise cause part of the pile to move differentially to the other parts and crack open the proposed cap? Do we have sufficient information about the very unusual geologic characteristics of the Atlas site to confidently assign probabilities to site deformation which could threaten cap integrity?

Section 3.0

GEOTECHNICAL STABILITY

The staff did a competent job of assessing the flaws in previous information, e.g., use of a seismic event in the Book Cliffs 50 km away to determine maximum ground acceleration at the Atlas site, and of identifying which issues are open and are resolved. Note comments on Section 6.0, below, concerning questions about the moisture content of the fines in the tailings, and the impact of moisture content values on liquefaction computations.

Section 4.0

SURFACE WATER HYDROLOGY AND EROSION PROTECTION

Selection of maximum rainfall, flooding, and erosion velocity figures seem correctly done. We agree that, on the Moab wash, it is the maximum flood event which poses greatest concern, while the Colorado River at maximum flood will form a lake with little erosive action because the Portal is rock-bound and acts as a valve. The DTER seems to settle around the issue of whether the Colorado River has in fact migrated towards the tailings pile in the last 40 years, aerial photographs taken over time in possession of Grand County clearly indicate to me that the river has moved by its entire width towards the tailings pile since 1954. This isn't difficult to believe, since the tailings are located on an outside bend of the river. From the changes shown in sand bars in the river over the 40-year period, I gather that the river has filled in its own channel by sediment deposition from the south, and has moved north by a process of undercutting the north bank. The rock apron has been added to the design to resist erosion from a river migration reaching the toe of the tailings pile. I do not possess the engineering skills to judge the adequacy of the rock apron to stop this undercutting process when the river reaches the pile. Given the historic behavior, I'd bet on the river getting there within 200-1000 years, so the adequacy of this rock apron design to resist erosion is an essential issue.

Re 4.5.1.2.2 on the Moab Wash: An average scour depth of 7-8 feet is cited. What is the standard deviation, or variability, of scour depth? If one does not wish to have a protective structure undermined, one needs to know the maximum depth of scour, it would seem. (A statistician is a person who draws a straight line whose average depth is three feet.)

Section 5.0

WATER RESOURCES PROTECTION

I would like to underscore for emphasis the staff's correct observations that geological structures and hydraulic conductivities under and in the area of the Atlas tailings pile show extremely high variability. Use of averages under such circumstances for any calculations or predictions is perilous.

Section 5.2.4, groundwater flow, presents estimates for hydraulic gradient and hydraulic diffusivity for the alluvium. In 5.2.3, the volume of leachate currently leaving the tailings into groundwater, and future trends in that leaking volume which are hoped for as the result of the "corrective action program," are again estimates. This entire water resources protection section is a structure which rests on estimates, rather than measurements, as the premises for the analysis.

It does appear to us that background well AMB-1 is influenced by leachate from the former ore storage pad situated about 61 meters west. Since Maximum Concentration Limits for leachate are either the EPA MCLs or a higher level if found in the background groundwater, using an unconcentrated source automatically alters the leachate MCLs upwards (see Table 5-9). The NRC staff correctly identifies this as an open issue; we wonder how it could be resolved with confidence.

In 5.2.5, staff correctly observes that groundwater sampling downgradient from the tailings in the alluvial aquifer lacks consistency in the sampling points, constituents analyzed, and laboratory methods used. There are two other inconsistencies in data which will be presented to the staff by Atlas in hopes of closing open issues regarding groundwater corrective action. On March 19, 1996, Smith Environmental presented slides showing recent groundwater sampling results by quarter, intended to monitor the effect of the groundwater corrective action program at the site. The slides were overlain with a linear regression interpreting the progression of results from past to present as a steady decrease in the concentration of alpha radioactive material and natural uranium in the leachate. Having done doctoral work in statistics at UCLA, I noted two things about the bar graph presented on the slides, which would lend to a different interpretation than
understand that this section is primarily concerned with the content of materials near the surface of the tailings impoundment that bear on radion attenuation capacities of the radon barrier. However, I cannot find a more appropriate place in the DTER to comment on this issue.

The DTER notes that analysis of coarse tailings for Ra-226 was composited over various depths of bore, which is an appropriate procedure only if it is known that the tailings are homogeneous at various depths, since this isn’t known, the Ra-226 composited is an open issue.

The moisture content values for the coarse tailings cited in 6.2.2 appear consistent with what contractors actually encountered when moving Table 1 piles. However, the moisture content values expressed for the fine tailings in Table 6-1 are far below actual moisture content values reportedly encountered in the fines of Table 1 piles. The moisture content of the fines would seemingly have a major bearing on liquefaction calculations.

In 6.2.3, the diffusion coefficient values used by Atlas for the Klotenke Flats clay are questioned. Moisture content for the clay used by Atlas seems typical for the area. However, elsewhere I read that the exact borrow site for the clay has not been identified. Therefore, it appears the clay radon barrier design proposed by Atlas rests on estimates of values subject to change upon realization of actual test values. Obviously, the clay barrier layer design can be modified to meet radon attenuation criteria. However, such modifications, if towards a thicker clay layer to achieve diffusion criteria, will have an impact on the cost and upon the method of application to assure appropriate compaction, which is listed elsewhere as an issue with the existing design. I will pick up on this issue in the DEIS comments.

I agree with staff conclusions in 6.4 that frost heave is not an issue regarding durability of the radon barrier. I am uncertain about the assumption that roots and burrowing animals are not an issue. The rock layers on the top and sides of the pile constitute both a mulch, and a trap for blowing soil. We are located in a high-altitude desert area where deep rooted desert plants establish themselves in improbable places - take a tour of the stickrock benches by Courthouse Wash in Arches sometime to witness large trees and shrubs established in cracks in seemingly solid rock. Where there are roots running down (up to 30 feet), there are rodents pursuing the roots for lunch.

Section 7.0
APPENDIX A ASSESSMENT

This section is the worst in the DTER. The overall impression I get is that the rest of the document was written by various technical specialists, while this section was written (or perhaps copied from the FONSI) by someone who did not have full command of the current technical material presented by the staff in previous sections, and had one eye on political considerations. As I review below, time after time the analysis mis-represents the site characteristics relative to the Appendix A criteria. In each case, I submit the NRC’s position is best served by frankly addressing the reality of site characteristics, and then stating why either (1) the in-place reclamation plan is unacceptable because of the failure to meet the criterion, or (2) why the in-place reclamation plan is acceptable despite the site problems. Currently, many presentations come across as examples of bureaucratic reasoning out of a George Orwell novel about Newspeak (“war is peace”), and provoke the public impression that the NRC is enmeshed in some sort of bizarre alternate reality incapable of dealing credibly with issues of public health and safety at the Atlas site.

My impression of Section 7 is colored by the ludicrous statement in the evaluation of Criterion 1, Item 1, “Remoteness from populated areas.” In essence, the item describes the population adjacent to the Atlas site as falling and continuing to fall, and puts the City of Moab 3 miles southeast of the site. Arches National Park is located “about two miles northwest.”

First, please find enclosed the section The Potential Dimensions of Growth from the 3rd draft Grand County Comprehensive General Plan (the version which is currently in the public hearing process preceding adoption). This contains the population projections for Grand County from the State of Utah Economic and Demographic Projections 1994. These official projections predict an increase in population of 134% from 1990 to 2020, with total employment increasing 188%.

Second, please find a reprint from the Canyon Country Zephyr of the results of the City of Moab survey of landowners in the strip from the current north boundary of the City to the Colorado River bridge along U.S. 191. Note the massive development of motels, campgrounds, restaurants, and shopping facilities projected. Two of the largest proposed developments are currently active in getting the necessary permits and infrastructure to build what they propose (I serve on the Grand County Planning and Zoning Commission and am involved with the Capital Infrastructure Plan development). At this writing, the City of Moab is reconsidering the size of their sewer plant upgrade to accommodate this development, and would annex such commercial development into the City so the City can collect sales tax. Thus, by 2020, it is quite possible that the City of Moab’s northern boundary will be located on the north end of the Moab Valley and RV Camper on the bank of the Colorado next to the U.S. 191 bridge, with a solid strip of visitor accommodations, outdoors and in, running on south. The entrance road into the Moab Valley and RV Camper is 1.3 miles on U.S. 191 from the entrance road from U.S. 191 into the Atlas Mill site. Line-of-sight distance from the toe of the tailings impoundment to the nearest existing campsite is slightly over one mile. Thus, within a time frame of approximately 30 years, the tailings impoundment will be 1.1 mile from a densely-populated area and the city limits of the City of Moab.

Third, the Atlas Minerals fee-simple property on which the tailings cell is located directly abuts the U.S. 191 right-of-way, which in turn abuts the southern boundary of Arches National Park. The tailings impoundment area and Arches are actually circa 1200 feet apart at their closest points. The Arches National Park Visitor’s Center is 1.3 road miles from the entrance to the Atlas Mill, the Arches housing complex for employees is on the Atlas side of the Visitor’s Center, and appears to be 1.2 miles from the nearest edge of the tailings impoundment as currently.
DRAFT

Part I - The Context for Planning in Grand County

Sound planning begins with a realistic assessment of the community's present situation and projected demographic, economic, and land use trends. This part of the Grand County General Plan summarizes information obtained from many sources to present the principal facts to which the policy statements respond. The sources used are listed at the end of this document.

The Potential Dimensions of Growth

This plan is a response to the rapid growth of the early 1990s and the projected growth graphed on page 2. Grand County's 1988 plan forecast a 2020 population of 10,000 or less. The county's population is now expected to surpass the 9,000 mark before the turn of the century, leaping from 6,620 in 1990 to 16,493 by the year 2020 (a 134% increase). The growth rate is projected to vary from nearly five percent per year during the early 1990s to less than two percent per year near the end of the projection period. A summary of the population projections generated by the Governor's Office of Planning and Budget is given in Appendix A.

The Governor's Office of Planning and Budget also projects population growth by age cohort, household formation, and employment.

* Growth in the school age population is expected to lag behind overall population growth until just after the turn of the century, when it will begin to exceed the overall rate of growth.

* Household formation, which drives the local housing market, is expected to run ahead of population growth as the average household size shrinks from 2.74 to 2.71. If the state's projections are accurate, some 3,300 new households will be formed in the county between 1990 and 2020.

* Growth in total employment is also projected to exceed population growth, rising from about 2,825 in 1990 to about 8,130 in 2020 (a 188% increase).

Grand County's year-round population is joined by more than a million visitors to Arches and Canyonlands national parks and the other natural attractions of southeastern Utah each year. The chart on page 4 shows the trend in visits to the parks between 1989 and 1994. The growth rate during that five-year period was about 9.6%. The 1993 to 1994 data suggest that the growth in visitation may be slowing. A 1992 study by the Governor's Office of Planning and Budget projected that the number of visitors to Utah's national parks will grow at a long-term rate of about 3.5% per year.

Source: State of Utah Economic and Demographic Projections 1994

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North Highway Development...The Future?

Several months ago, the Board City Council placed a temporary moratorium on development along US Highway 191, north from the city limits to the Colorado River bridge. The city wanted to assess proposed future development on the north highway and determine what options the city had for dealing with future growth. The city sent a questionnaire to the owners of 25 properties on the east and west sides of US 191 and asked how they intended to utilize their land. The response is eye-opening, if not still predictable.

This is how owners with unimproved properties responded.

Panel A: "Retail, Restaurant and Hotel." 1500 sq. m. retail, 100 rooms, 200 seats.
Panel B: "Retail Development anticipated." 150 sq. m. retail, 75 rooms.
Panel C: "RV park. Retail, Showers and Hookups." 75 RV Hookups, 100 seats.
Panel D: "Retail, Restaurant, RVs, Hotel/Inn." 3000 sq. m. retail, 20 RV hookups, 60 rooms, 10 seats.
Panel E: "Proposed Chain Restaurant in City." 220 seats.
Panel F: "Proposed Major Hotel." 5000 sq. m. retail, 500 rooms, 500 seats.
Panel G: "Proposed information on 'Conversation 11/15/91: High-Level Commercial.'
Panel H: "Proposed retail, 100 rooms, 100 seats.
Panel I: "Proposed development of 100 unit hotel development." 2000 sq. m. retail, 200 rooms, 200 seats.
Panel J: "Proposed hotel/restaurant with restaurant. "3000 sq. m. retail, 300 rooms, 300 seats.
Panel K: "Proposed to use septic instead of sewer." 100 rooms, 300 seats.
Panel L: "Proposed to use septic instead of sewer." 100 rooms, 300 seats.
Panel M: "Proposed retail, 100 rooms, 100 seats.
Panel N: "Proposed retail, 100 rooms, 100 seats.
Panel O: "Proposed development of 100 unit hotel development." 2000 sq. m. retail, 200 rooms, 200 seats.
Panel P: "Proposed hotel/restaurant with restaurant. "3000 sq. m. retail, 300 rooms, 300 seats.

Pretty amazing. In total, the proposed development would add 275 new motel rooms, 1000 new restaurant seats, 517 new RV hookups, and 323,650 square feet of new retail space. Panel 11 was particularly, uh, breathtaking. In addition to the information already provided, it includes a total floor space of 445,000 square feet. On the 40 acre lot, 26 of them would be surfaced or occupied by the development. We're going to have so much asphalt in this town, we're going to end up suffocating our climate.

Of course, some of this is pie-in-the-sky stuff. This kind of development is actually the stuff of some people's fondest and most wonderful dreams. It's what makes us wake up in the middle of the night in a cold sweat.

But it does tell us that the development we have seen so far is just the tip of the iceberg. As a real estate agent friend of mine said the other day, although a bit belatedly, "You know, there's a lot of grand going on in this town these days."

We've only just begun.
Grand County's recent growth in population and visitation is confirmed by other indicators, including traffic counts and transient room tax collections, which are charted below, and water system connections. The August 1995 Utah Labor Market Report article that is reprinted in Appendix B offers further analysis of the county's current economic boom.

There is little doubt that both the local population and the number of visitors to Grand County will grow during the next few years. The geographic distribution of that growth is less certain, but available data suggest that unincorporated areas will grow faster than the City of Moab. Moab's share of the county's population fell from about 65% in 1980 to less than 60% in 1990. Building permit records show that 60% of all housing starts between 1990 and 1994 were in unincorporated areas of Spanish Valley. Over 27% of the 1990-1994 housing starts were in Castle Valley or along the Colorado River, and only 16% were in Moab. This strong trend toward suburban living is found in most other growing communities in the Intermountain West, and should be expected to continue, though it may be abated by aggressive annexation or construction of affordable housing within the city limits.

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evaluated by NRC staff. Instead, NRC staff repeatedly has let Atlas off the hook by: (1) relying on Atlas’ estimates and analyses, without carefully analyzing Atlas’ plan; (2) failing to apply the NRC’s own policies regarding the technical evaluation which is required; (3) impermissibly excusing Atlas from compliance with NRC regulations; and (4) severing from this regulatorily-required technical evaluation process, analysis of some of the most important licensing conditions. NRC staff’s assessment of Atlas’ compliance with the licensing conditions is flawed and was issued too soon. Therefore, as a matter of law, Atlas should be required to submit a revised reclamation plan. NRC staff then should perform a thorough technical review of the revised plan, which should then be available for further public comment.

1. The DTER’s Introductory Section Contains Significant Omissions and Errors.

The NRC’s regulations obligate it “to conduct its domestic licensing . . . functions in a manner which is both receptive to environmental concerns and consistent with the Commission’s responsibility . . . for protecting the radiological health and safety of the public.” (10 C.F.R. § 51.10 (b)) This dedication to protecting the environment and the public health and safety is further embolded in the NRC’s regulatory and statutory goals which must be met when NRC staff conducts a technical evaluation process, resulting in a Technical Evaluation Report (“TER”). Pursuant to federal statute and regulations, the NRC may not approve a reclamation plan unless it meets the thirteen technical criteria set forth in 10 C.F.R. Part 40, Appendix A. As NRC staff acknowledges, the policy guidance with regard to these criteria, provided in the Final Standard Review Plan (“FSRP”) for UMTRA Title I sites, is also applicable to the Atlas Site. (DTER, pp. 1-5, 2-1.) Because Atlas’ plan and NRC staff’s review of that plan does not comply with these statutory, regulatory, and policy requirements, the DTER should be withdrawn, and Atlas and NRC staff should be required to comply with the law.

A. Background (DTER, § 1.1.)

In the introductory section of the DTER, NRC staff states that a draft TER is prepared when there is “sufficient information” to document staff’s review and to support its conclusions. (DTER, p. 1-1.) However, NRC staff also admits that, in this case, it has prepared a DTER despite the fact that there are twenty “open issues” and many additional items which still await careful review and confirmation by NRC staff. (DTER, pp. 1-8 to 1-9.) Thus, NRC staff’s report is a partial and preliminary DTER, sufficiently evaluating only a limited portion of the licensing criteria.5

In the DTER, NRC staff states that it “can not support the issuance of a license amendment approving the proposed reclamation plan” until these open issues “are adequately resolved.” (DTER, p. 1-5.) Nevertheless, NRC staff gives no schedule or timetable by which it expects to resolve these open issues; indeed, it notes that these issues presently remain open only because NRC staff’s “previous rounds of questions and requests for information” to Atlas have not yet produced responsive answers. (DTER, p. 1-5.) However, in the case of some of these open issues, NRC staff processes to analyze Atlas’ compliance with the technical licensing requirements by assuming that the technical requirements have been met. For example, regarding the technical issue of whether the Moab Fault, on which the Atlas Site is located, is a capable fault, NRC staff analyzes whether the Atlas Site’s location has “seismic potential . . . based on the assumption that the Moab Fault is not a capable fault.” (DTER, p. 2-16, emphasis added.) A regulatorily sufficient DTER cannot be issued until NRC has conducted a “thorough, focused, efficient, and consistent” review that is “properly documented.” (SRP, p. 3.) Because so many open issues remain to be analyzed, NRC staff should require Atlas to submit a complete reclamation plan, which NRC staff should then subject to a new technical review, complete in compliance with NRC’s own strict standards, and make this new plan and review available for public comment.

B. Site Description (DTER, § 1.2.)

NRC staff’s description of the Atlas Site contains several descriptive errors. These errors have repercussions throughout the DTER, skewing NRC staff’s analysis and conclusions. For example, NRC staff states in Section 1.2.1., and repeatedly throughout the DTER, that the Atlas Site is three miles or more northwest of Moab. In fact, the Atlas Site is located...
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tailings pile is only 1.5 miles from the Moab city limits. Moreover, the boundaries of the "Atlas Hill Site," as
defined in Figure 1-1 (DTER, p. 1-3), are within a mile of the
city limits. Because compliance with Criterion 1 requires that the tailings pile be remote from populated
areas, NRC staff’s misstatement of these facts is a critical
error. Furthermore, one of the closest areas in Moab to the
Atlas Site contains residential development. In addition,
NRC staff does not note that the city is planning to annex
property to the northeast to accommodate Moab’s growing
population and tourist economy.

The Site Description also does not mention that the
Atlas Site is across the highway from Arches National Park.
Nor does NRC staff discuss the varied recreational, tourist,
and cultural activities which occur in the immediate and
surrounding area. Again, these uses must be evaluated when
determining Atlas’ compliance with the Appendix A criteria;
therefore, NRC staff’s description of the Atlas Site is
insufficient to analyze Atlas’ compliance with these
criteria.

II. The DTER’s Geologic Stability Section Contains Multiple
Unresolved Issues and Deficiencies.

At the outset of the DTER’s section on geologic
stability (DTER, § 2), NRC staff states the licensing
requirements which Atlas must meet with regard to geologic
stability pursuant to the Appendix A criteria, i.e., the
Atlas tailings disposal area must be closed “in accordance
with a design which provides reasonable assurance of control
of radiological hazards to be effective for 1000 years, to
the extent reasonably achievable, and, in any case, for at
least 200 years.” (DTER, p. 2-1.) According to NRC staff,
this standard means “certain geologic and seismologic
conditions [such as Criterion 4(e) and 6] must be met in order
to have reasonable assurance that the long-term performance
objectives will be met.” (DTER, p. 2-1.)

In order to meet Criterion 4(e), according to NRC staff,
the tailings “may not be located near a capable fault that
could cause a maximum credible earthquake larger than that
which the tailings could reasonably be expected to
withstand.” (DTER, p. 2-1.) In order to meet Criterion 6,
according to NRC staff, Atlas must provide “information on
the alluvium and bedrock beneath the tailings sufficient to
demonstrate a design that ensures that potential future
disruption of the radon and erosion protection barriers will
meet NRC requirements.” (DTER, p. 2-1.) NRC policy
regarding how NRC staff is to evaluate Atlas’ compliance with
these standards is provided in the NRC’s SFP. (DTER,
p. 2-1.)

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Although the applicable legal standards are clear, NRC
staff has often failed either to consider or to analyze
sufficiently numerous crucial aspects of the "geologic and
seismologic conditions [which] must be met in order to have
reasonable assurance that the long-term objectives will be
met." (DTER, p. 2-1.) Although not exhaustive, we provide,
below, some of the most serious deficiencies in NRC staff’s
analysis of the issues pertaining to geologic stability.

A. Stratigraphy (DTER, § 2.3.2.)

A basic deficiency in NRC staff’s evaluation of the
Atlas Site’s stratigraphic setting (DTER, § 2.3.2) is that it
completely fails to discuss the stratigraphy of the site
itself. According to NRC staff, Atlas still has not
"characterized the Quaternary alluvium, the Paleozoic and, if
present, the Mesozoic rocks, or the basement rocks beneath
the site to the extent necessary to support conclusions of
subsurface and bedrock stability." (DTER, p. 2-1.) NRC
staff has attempted to remedy Atlas’ omission in this regard
by “complying” information about the general stratigraphic
setting from the literature and from discussions with Utah
Geological Survey (UGS) geologists. (DTER, p. 2-1.) As a
result, however, NRC staff’s discussions of stratigraphy
focus only on regional conditions.

For example, Atlas should, but apparently has not
provided information on the following important site-specific
stratigraphic issues:

1) What Mesozoic unit directly underlies the Atlas
Site?

2) What are the thickness of the bedrock units
underlying the Atlas Site?

3) What is the depth to the top of the Paradox
Formation or other evaporite units that pose great
hazards to the stability of the Atlas Site?

In particular, in the subsection regarding Quaternary
stratigraphy (DTER, § 2.3.2.2), NRC staff should also discuss
the lithologies of the Quaternary unconsolidated deposits.
Specifically, this discussion should include such technical
information as bedding thickness, grain size, moisture
content, and other data, as needed, to allow for a proper
seismotectonic evaluation of the Atlas Site’s geologic
stability. Without such technical data, NRC staff does not
have the knowledge necessary to assure compliance with the
applicable standards in Appendix A, particularly Criteria
4(e) and 6.

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The DTER cannot be considered complete without an adequate, technically accurate description of the Atlas Site's specific stratigraphy. Thus, the site-specific stratigraphy must be determined before any reasoned analysis of the Atlas Site's geologic stability can occur. Atlas' failure to provide site-specific stratigraphy should be treated as another open issue.

In DTER § 2.3.2.2, NRC staff has inadequately described, or has accepted Atlas' inadequate description of, technical data necessary to assess fully important geologic stability issues. For example, NRC staff notes that Atlas "plans to investigate" latest Quaternary rates of stream incision of Courthouse Wash "in order to constrain maximum subsidence rates for Moab Valley." (DTER, p. 2-5.) NRC staff should include the actual results of this investigation in the DTER, not merely mention Atlas' intent to investigate them. It is the necessary technical data themselves, not Atlas' "plans to acquire such data," which NRC staff should examine in order to fully and adequately describe the Quaternary stratigraphy.

Similarly, in DTER § 2.4, NRC staff references a subsequent section of the DTER to conclude that Atlas has assessed the effects of talus encroachment and rock falls into the drainage system on the western side of the pile. However, in that referenced DTER § 4.5.1.3.2, NRC staff's discussion of sediment considerations contains only the bare statement that Atlas assumed "large rocks would be deposited" in the Southwest Diverison Channel. (DTER, p. 4-20.) These assumptions about rock falls do not constitute a technically sufficient evaluation of this issue. Thus, NRC staff has not required Atlas to assess adequately the effects of rock falls and talus encroachment. NRC staff must require Atlas to conduct a fuller analysis of such important issues in order to assure compliance with the applicable standards in Appendix A, particularly Criteria 4(e) and 4.

B. Structural Setting and Features (DTER, § 2.3.3.)

In the Structural Setting portion of the DTER, NRC staff admits that it does not know whether the Moab Fault exists under the Atlas Site. (DTER, p. 2-5.) The most conclusive statement NRC staff makes about the likely existence and location of the Moab Fault is that, "Atlas appears to agree with the UGS interpretation that a spayy of the Moab Fault system underlies the site but appears to disagree with interpretations which suggest that the main Moab Fault underlies the site...." (DTER, p. 2-5 (citation omitted).) The most certainty NRC staff offers regarding resolution of this important issue is Atlas' promise to investigate the issue to gather the "primary data," which the SRF requires to be included before the staff may determine that Atlas' geologic, bedrock, and seismotectonic stability investigations are "appropriately presented." (DTER, p. 2-6; SRF, pp. 9-13.)

If NRC staff now cannot state with certainty whether the Moab Fault exists beneath the tailings pile, there is no basis for NRC staff's subsequent determinations of the geologic or seismic consequences of implementing the Atlas plan. To determine the geologic and seismic consequences of the Atlas Site, NRC staff must know, with scientific certainty, whether the foundation upon which the tailings pile will rest is competent bedrock or shifting sand. Yet, at the outset of the DTER, NRC staff admits that it does not know whether the Moab Fault exists under the tailings pile. This is a grave deficiency violating NRC staff's obligations to assure compliance with Appendix A Criteria, particularly Criteria 4(e) and 4. Furthermore, NRC staff's failure to correct this deficiency violates the NRC's policies regarding the standards for adequate investigation of geologic and seismic issues. (10 C.F.R., SRF, pp. 9-13.) The DTER cannot be considered complete until NRC staff accurately and completely determines the geological characteristics and location of the Moab Fault, and the implications of that information for the stability of the Atlas Site.

More specifically, NRC staff's discussion of structural features contains several technically inadequate references to important geologic features. (DTER, § 2.3.3.1.) Generally, NRC staff should reorganize this subsection to better assure compliance with the applicable Appendix A Criteria. NRC staff's present discussion mixes structures from different tectonic regimes from the Paleozoic to the present, making it difficult for the reader to discern whether NRC staff is properly differentiating paleotectonic features from neotectonic features, such as capable faults. (10 C.F.R.) NRC staff cannot assure Atlas' compliance with the applicable Appendix A Criteria without demonstrating that it has made a competent analysis of the significant distinctions between such differing geologic features. Without such an analysis, the DTER remains incomplete and inadequate.

C. Diapirism and Subsidence (DTER, §§ 2.3.2.1, 2.3.3.1, 2.3.3.2, 2.3.3.3.)

In addition, NRC staff gives several inconsistent, confusing, or inadequate references to diapirism and subsidence, particularly with respect to their best estimates of the conflicting geological ages during which diapirism may
have occurred in the Paradox Formation. First, BRC staff states that syndepositional diseprrism controlled the thickness of “late Pennsylvanian to latest Triassic (possibly into Cretaceous) units.” (DTER, p. 2-4.) Subsequently, BRC staff states that diseprrism is of the “late Paleozoic through Jurassic” eras. (DTER, p. 2-6.) BRC staff should resolve this inconsistencv and state clearly what is the technically correct age/timing of diseprrism.

Most importantly, BRC staff’s sparse discussion of diseprrism does not rule out the possibility that it is occurring today. In fact, BRC staff states later in its discussion that the Moab Fault is related to diseprrism and that diseprrism may have occurred during the Quantum era. (DTER, pp. 2-6. 2-7, 2-9.) BRC staff obviously needs to reach, and to convey in the DTER, a clearer understanding of this important ecologc feature, particularly as regards to its timing and possible ability to influence the vicinity of the Atlas Site today. Moreover, in DTER § 2.3.1.2, BRC staff notes that Atlas, to date, has failed to consider existing data necessary to fully assess these important eologic stability issues. (DTER, p. 2-7.) Until this analysis is conducted, BRC staff cannot assure compliance with the Appendix A Criteria, particularly 4(a) and 4.

For example, BRC staff notes that the only basis Atlas offers to support its postulation of a lower rate of subsidence than has occurred in the past is that subsidence rates “have probably slowed down since the time of Pinedale glaciation (roughly 15,000 to 25,000 years ago) due to a drier climate.” (DTER, p. 2-7, emphasis added.) However, BRC staff fails to also note that the climatic relationship suggested by Atlas is not supported by any data, and that this hypothetical line of reasoning may not apply to the Atlas Site. A drier climate could just as easily lead to reduced dissolution of soluble units only on a regional scale. However, in locations of perennial recharge (such as at the Atlas Site, which directly overlies the riverbed of the Colorado River), dissolution may be occurring at rates similar to those assumed for Pinedale climatic conditions. BRC staff cannot accept Atlas’ unsupported assumption that a climactic consequence “probably” slowed down in the last 15,000 to 25,000 years of geologic time.

At another point in the subsection discussing salt tectonics, BRC staff notes that Atlas observed a borehole beneath the tailings piles, suggesting that subsidence may have occurred and enabled sediments to accumulate there. This observation contradicts Atlas’ previous assertion that “there is no evidence for late Quaternary subsidence north of the Colorado River in the vicinity of the tailings piles.” (DTER, p. 2-7.) Similarly, BRC staff points to numerous studies and features that may indicate a subsidence risk that has “not yet been considered by Atlas” (DTER, p. 2-7), including the UGS’ conclusion that “a range of rates of future subsidence is possible in the site vicinity,” and BRC staff’s own conclusion that the average rate estimates say little about the potential for rapid subsidence-collapsing hazards. (DEIS, p. 2-8.) For BRC staff’s analysis of geologic stability issues in the DTES to meet applicable standards, BRC staff must not accept Atlas’ inconsistent data. Nor can BRC staff simply accept Atlas’ conclusions with respect to particular features and possible future events, especially when these conclusions are contradicted by the results of other technical studies. In its present form, BRC staff’s analysis of salt tectonics (DTER, § 2.3.2) is rife with such inconsistencies, all of which demonstrate a flawed and inadequate analysis of geologic stability issues.

D. Characteristics of the Moab Fault System

DTER, § 2.3.3.3

In its discussion of the characteristics of the Moab Fault system, BRC staff fails to explain the rationale underlying its conclusion that the Moab Fault may not meet the definition of a capable fault. The fact that the Moab Fault may be rooted in a salt-cored anticline and may not be structurally connected to the basement does not necessarily preclude its being a capable structure. (See UGS preliminary geologic map of the Moab area (June 1995).) If BRC staff’s line of reasoning were universally followed, many active thin-skin tectonic features throughout the world that do not involve the “basement” (such as thrust faults and low-angle normal faults) would erroneously be considered non-capable faults. Although the Moab Fault may not be reacting to plate tectonics stresses, it is a salt “tectonic feature,” a regional scale anticline as large as the Moab salt-cored anticline (traceable for tens of miles) must be considered a “tectonic feature,” whether it was formed by salt diseprrism or plate tectonic forces.

In addition, as BRC staff notes, even if the Moab Fault were not a capable fault, it could still represent “a hazard that would need to be assessed because of its proximity to the site.” (DEIS, p. 2-8.) In this regard, we question BRC staff’s conclusion that the “main” Moab Fault may have overlain the site but has since been removed by erosion. (DEIS, p. 2-8.) BRC staff asserts but does not explain its rationale for reaching this latter conclusion. At a minimum, BRC staff should fully analyze and discuss how it believes
the near-vertical Moab Fault could have overlain the site but then been removed by erosion.\footnote{If, for example, the Moab Fault had at one time overlain the site but had since been removed by erosion, then NRC staff should be able to describe the location of the fault trace, which must still be on the ground somewhere adjacent to (east or west of) the Atlas Site.}

In addition, at a bare minimum, NRC staff must provide a better description of the Moab Fault, including a full analysis of such technical data as the following:

1) What is the original age of fault (if related to diapirism, has it been active since the end of Pennsylvania)?
2) What is the attitude of the fault (e.g., is it vertical or high-angle)?
3) If it is not exposed at the Atlas Site, where is the closest definitive exposure of the fault to the site?
4) What is the stratigraphic displacement and total displacement (in feet) across the fault?

NRC staff's presentation of a comprehensive and technically accurate description of all geologic and seismic issues pertaining to the Moab Fault is necessary to ensure compliance with the applicable standards in Appendix A, particularly Criteria 4(e) and 6.\footnote{Another basic deficiency of this subsection is NRC staff's attempt to describe the Moab Fault without using figures or maps of it. Similarly, it seems a basic deficiency of the subsection on topography and geomorphic features for NRC staff to completely fail, in that subsection, to give the elevations of the river, the floodplain, the toe of the tailings pile, and the top of the tailings pile. Without such fundamental and germane comparative data, NRC staff's technical descriptions often lack the specificity needed to fulfill their regulatory obligations. (\textit{See}, e.g., SRP \S 1.3.2, which states that an investigation of geologic stability is 'appropriately presented' only if it includes the following data: plan views, stratigraphic profiles and cross sections, and logs of core borings, geophysical investigations and/or test pits. (SRP, pp. 9-10.).}
NRC staff also reports an area of apparently induced seismicity (showing an "increased level" of micro-earthquake activity) during a period of brine extraction. (DTER, p. 2-11). However, NRC staff does not give any mention of this area of induced seismicity, nor discuss its possible implications for the Atlas Site. Instead, NRC staff states that the area of induced seismicity could produce induced seismicity. (DTER, p. 2-11). Moreover, NRC staff states that earthquakes occur within the upper 20 kilometers of the earth's crust, whereas its previous statement on the same page, that the depth of earthquakes varies from shallow to 50 kilometers. (DTER, p. 2-12.) Obviously, both statements cannot be correct. All such omissions and inconsistencies should be adequately analyzed and rectified before the DTER can be considered complete.

H. Open Issues

NRC staff concluded that: (i) issues pertaining to geologic stability remain "open" after NRC staff's analysis of them for the DTER. The first three relate to bedrock stability, and involve determining: 1) the capability of the Moab Fault and its branches; 2) the nature and consequences of the buried scarp at the Atlas Site; and 3) the nature and rate of subsidence. The fourth and fifth open issues relate to geologic stability, and involve determining: 4) the effects of eroding sand dunes; and 5) the effect of landslides emanating from Poison Spider Mesa. The sixth open issue relates to seismitectonic stability, and involves determining: 6) the seismic design basis for the Atlas Site.

Although these issues are designated "open," NRC staff should be careful not to accept Atlas' data which are contradicted by other, more objective technical studies. For example, an Atlas submission to the NRC had previously found no seismic activity associated with "the postulated northwest trending feature coinciding with the trend of the Colorado River." (DTER, p. 2-12.) However, NRC staff notes, Atlas' conclusion is not supported by recent observations, which indicate that a swarm of seismic activity north of the confluence of the Colorado River and the Green River is associated with the Atlas Site. (DTER, p. 2-12.)

Neither should NRC staff unjustifiably rely on unspecified and unquantified terms such as "likely to be boulders" (DTER, p. 2-15.)

Most importantly, although NRC staff supposedly has left open its ultimate conclusions regarding certain geologic
staff intends to approve Atlas' plan prematurely, and hope that no problems are encountered during the construction activity. NRC staff's approach inexorably puts both the Moab community and the Atlas construction team at risk. NRC staff provides no reason why Atlas should not be required to test the pile's current geotechnical stability before construction begins. Therefore, Atlas' failure to assess completely the geotechnical stability of the tailings pile should be designated as an "open issue."

B. Geotechnical Engineering Evaluation (DTER, § 3.3.1.)

In order to evaluate the "Geotechnical Engineering" of the Atlas plan, NRC staff must analyze slope stability, settlement, and cover cracking, and cover design. Due to inexcusable omissions and other deficiencies in this portion of the DTER analysis, the DTER should be withdrawn.

1. Slope Stability (DTER, § 3.3.1.)

According to NRC staff's introduction to the DTER, the reason Atlas needs a license amendment is because, after the mill closed, Atlas was no longer able to construct a tailings impoundment that met NRC's requirements for height and slope elevations. (DTER, p. 1-1.) Appendix A, Criterion 4, requires that the sideslopes of Atlas' waste pile not exceed Shivel, unless Atlas demonstrates that steeper slopes are "impracticable." Criterion 4 is one of the few criteria that has a quantified standard; thus, there is no room for subjective analysis of how this criterion is to be met. Atlas' sideslopes either must be no steeper than Shivel, or Atlas must explain why they should be steeper. The burden is on Atlas to show that it should be exempted from the numerical standard.

Despite the clarity of the standard, NRC staff has not required Atlas to comply with it. It is undisputed that Atlas' plan violates the numerical standard in Criterion 4. Atlas plans to construct sideslopes of 10:1:3 over most of the pile, except at the southwest corner where the slopes will be 10:1:1v. (DTER, p. 4-1.) NRC staff completely obscures Atlas' obligation to comply with the requirements of Criterion 4, and never once discloses that this criterion requires Atlas to prove that less steep slopes are impracticable. (See DTER, § 3.3.1.)

Although NRC staff does not acknowledge that Atlas' sideslopes are too steep, apparently staff has concluded that Atlas cannot construct less steep slopes at this site. Indeed, the Atlas pile's proximity to the Colorado River and other features make it unlikely that the slopes can be made

less steep without causing further harm to public health and safety and to the environment.

However, NRC staff's responsibility upon finding that the slopes are too steep does not end by finding that the slopes cannot be made less steep. Rather, this factor -- the impossibility of conformance with Criterion 4 -- requires NRC staff to evaluate whether the Atlas pile should be allowed to remain at a site where steep slopes are required. Atlas' inability to provide less steep slopes affects the pile's stability for multiple reasons -- it affects erosion control, the impact of surface water hydrology, and the effectiveness of the radon barrier. The steep slopes increase the likelihood of active maintenance requirements. Thus, because Atlas' pile will be defective in this fundamental manner, the benefits of moving the pile become even more apparent.

Furthermore, because Atlas' slopes are planned to be steeper than regulatorily-permitted, NRC staff should closely scrutinize Atlas' geotechnical construction plans. Atlas has not shown that such steep slopes can be constructed or that they can stay in place without active maintenance. Indeed, NRC staff has little experience with tailings piles constructed in the manner Atlas suggests. Virtually all Title I sites have slopes less steep than the Atlas proposal slopes.7 In addition, Atlas has failed to show that its uniquely steep slopes will withstand wind, water, and other natural forces. Moreover, Atlas plans to make its site even more unique. Atlas plans, and NRC staff does not object, to avoid placing a clay layer on its sideslopes. NRC staff does not disclose that every Title I sites is protected by clay on the sideslopes.

Atlas' inability to construct a pile meeting the fundamental standards of pile stability demonstrates the dangers and inadequacies of its plan. The Moab community deserves the same protections as those communities near Title I sites. The Atlas plan's repeated divergence from regulatory criteria should weigh heavily against the acceptability of its overall proposal to reclaim its tailings pile on the banks of the Colorado River, virtually within Moab. Thus, the DTER should be withdrawn to consider more thoroughly the effect of the pile instability and Atlas' failure to comply with Criterion 4.

NRC staff finds that Atlas' plan is deficient because it has not demonstrated that Atlas' design will withstand

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7 Slopes at 3:1 were allowed at Gunnison because tailings are enclosed by perimeter dikes constructed of uncontaminated soil.
earthquakes, settlement, and other geologic effects. However, NRC staff's review of slope stability remains inadequate for its failure to evaluate groundwater conditions as a possible contributor to slope instability. NRC staff's review of slope stability only is "considered acceptable . . . if it includes . . . a summary and description of the groundwater conditions within or beneath the slope." (SRP, p. 19.) Contrary to the NRC's own policies, no discussion of groundwater conditions nor of those conditions' effect on the pile's stability is raised in this evaluation of slope stability. Thus, pursuant to the NRC's own standards, the DTER is inadequate.

2. Settlement and Cover Cracking (DTER, § 3.3.2.)

NRC staff's conclusion that Atlas' plan demonstrates that its cover design will control radiological hazards, without further maintenance, is based on unsupported assumptions and is inconsistent with NRC staff's conclusions elsewhere in the DTER. NRC staff previously concluded that Atlas has not conducted sufficient testing to ensure that the waste pile will not settle, causing the cover to crack. (DTER, p. 3-2.) In this "Geotechnical Engineering" section of the DTER, NRC is required to determine whether the potential for settlement has been adequately tested. Furthermore, NRC policy requires NRC staff to determine whether Atlas' settlement testing program has been sufficient to determine settlement potential. (SRP, p. 21.) Among other technical requirements, Atlas is supposed to test for settlement occurring instantaneously and over time. (SRP, p. 21.) NRC staff also is required to determine whether Atlas' settlement estimates represent conservative and tolerable behavior of the waste pile. (ID., emphasis added.)

NRC staff has abdicated its responsibility to conduct a thorough review of Atlas' settlement testing program. Instead, NRC staff plans to allow Atlas to delay all in-situ settlement testing until after Atlas has begun construction of the waste pile. Furthermore, NRC staff will be required to review and, presumably, approve Atlas' final data under the time pressures of an ongoing construction project. Thus, NRC staff will not be able to conduct the careful and conservative review of settlement data which NRC policy requires to be conducted prior to providing lice ting approval to reclamation plans.

3. Cover Design (DTER, § 3.3.4.)

NRC staff's evaluation of the geotechnical long-term stability of the cover design is deficient. Furthermore, NRC staff's acceptance of Atlas' cover design is not consistent with NRC's technical requirements for Title I sites, and staff has not provided any basis for its abandonment of these requirements.

Although NRC staff does not discuss this issue in the "Geotechnical Engineering" section, in DTER, § 6.2.1 (the "Parameters for Radon Barrier Soils" Section), NRC staff subsequently requires Atlas to conduct further testing of the radon barrier capabilities of the cover materials. NRC staff should also require that the saturated conductivity of the radon/infiltration barrier be at least 10-6 centimeters per second, as NRC has required at Title I disposal sites. Furthermore, Atlas should be required to present, and NRC staff to evaluate, the permeability test results of the recommended design value of saturated conductivity of the barrier material.

As further criticism of NRC staff's evaluation of the radon/infiltration barrier, we note that the NRC has imposed inadequate hydraulic testing requirements on the radon/infiltration barrier. The NRC recognizes that, due to EPA's groundwater standards, "increasingly limited design hydraulic conductivity (B) values" are being imposed. (SRP, p. 23.) Indeed, permeability test results of 10-9 to 10-8 cm/sec are now being used for some tailings sites. (ID.) The NRC has stated that it is not good science to rely exclusively on laboratory, rather than field testing, of the permeability of soil materials, because laboratory testing significantly underestimates actual conductivity.

NRC staff has not imposed these strict hydraulic testing requirements on Atlas. For example, NRC staff states that Atlas laboratory testing of hydraulic conductivity of the Kaukapuka Flats clay is "near 10-9 cm/sec." (DTER, p. 3-7.) NRC staff does not state how near" to 10-9 cm/sec those results truly are. Nor does NRC staff indicate that these laboratory results have been adjusted by an order of magnitude to describe increased conductivity under field conditions. Moreover, NRC staff does not discuss how Atlas "... imposed the rigorous quality control programs required to meet hydraulic conductivity specifications. Most importantly, NRC staff has not required Atlas to meet hydraulic conductivity standards of more than the 10-9 cm/sec bare minimum of acceptability. Given the threats to public health and safety and to the environment created by Atlas' waste pile, as recognized by the NRC in the DEIS (DEIS, pp. 2-15 to 2-26), NRC staff must require the most conservative possible hydraulic conductivity specifications.

Furthermore, NRC staff's acceptance of an 8-inch thick layer of clayey soil over the coarse tailings and 12 inches of clayey soil over the fine tailings is inconsistent with
its past requirements for Title I sites. As NRC staff is not aware, the minimum cover thickness for Title I waste piles is 18 inches. NRC staff provides no support for its conclusion that an 8-inch layer can be constructed. NRC staff also provides no basis for evaluating whether 8 inches has demonstrated that its 12-inch layer will meet Title I specifications. Furthermore, because Atlas has not adequately analyzed the tailings pile, it is not possible, at this point, to determine the soil thickness that is sufficiently protective.

Finally, NRC staff's requirements for frost protection at the Atlas Site differ significantly from those specified at Title I sites. In Title I design criteria, the depth of frost penetration is based on a 200-year return period. (U.S. Army Corps of Engineers, Technical Approach Document, Nov. 11, Nov. 1989, p. 63.) For example, the estimated 200-year frost depth at the Slick Rock, Colorado site, 52 miles southeast of Moab, is 35 inches. Therefore, NRC staff's acceptance of a 9-inch sand layer is not protective of the freezing and thawing cycles at the Atlas Site. NRC does not explain why it is not requiring Atlas to provide sufficient and conservative frost protection, as it has required at Title I sites.

In sum, NRC staff's analyses of Atlas' compliance with geotechnical requirements is inadequate. NRC staff should require Atlas to complete additional testing of the geotechnical stability of its cover design. Until such testing is analyzed thoroughly by NRC staff, the DTET and its conclusions on geotechnical stability should be withdrawn.

IV. NRC Staff Insufficiently Evaluates Surface Water Hydrology and Its Impact on Erosion Protection

In the DTET, NRC staff fails to adhere to the NRC's policies which require Atlas to submit a plan providing long-term erosion protection. In order to evaluate the Atlas plan's compliance with the Appendix A Criteria, NRC staff must review hydrologic data, hydrologic analyses, and design details. (SRP, p. 27.) NRC staff's evaluation is required to insure that Atlas' plan meets certain site characteristics (Criterion 1), and certain pile stability standards (Criterion 6). However, NRC staff has failed to enforce these criteria in that neither the physical characteristics of the Atlas Site, nor the Atlas pile design, nor the disposal location promotes long-term stability. Specifically, NRC staff has failed to describe accurately the hydrology of the Atlas Site, determine the flooding potential, to analyze accurately the water surface profiles, and to adhere to its regulations regarding protection from erosion due to the above factors.
In order to evaluate the stability of the pile, HRC staff must verify that Atlas properly selected the critical design flood event. We note that Atlas selected the critical design flood event in light of the analyses of the PMF and frequency-based flood data presented in Table 4-3. (UTER, p. 4-12.) As shown in Table 4-3, the critical design event for inundation of the disposal cell is the PMF, whereas less extreme floods are the critical events for flow velocities. (UTER, p. 4-12.) To verify Atlas' conclusions, HRC staff performed a sensitivity study for a large flood discharge up to 600,000 cfs. (UTER, p. 4-12.) However, HRC staff also should have conducted a sensitivity analysis for flood flows between 70,000 cfs and 178,000 cfs in order to assess the maximum channel velocity and maximum overbank velocity adjacent to the Atlas Site.

As to water velocity during a flood, the estimated overbank velocities for the cross-section immediately upstream of the site are too low. In its explanation as to why the water velocity is low, HRC staff fails to use conservative assumptions and thus casts doubt on its conclusions. For example, HRC staff finds that low flow velocities during the PMF are due to the Portal, a narrow gorge two miles downstream of the Atlas Site. (UTER, p. 4-12.) However, the reduction in the cross-sectional area of the river at the Portal is not the most likely cause of the low overbank velocities during flood flows that are substantially less than the PMF. It is likely that the simulations with the HEC-2 model gave too much credit to overbank vegetation which generally decreases the flow velocity. Rather, a more realistic and conservative scenario would assume that the flood flow strips the overbank of most or all of its vegetation which results in a decrease in the composite roughness coefficient (Manning-'n') for overbank areas. By choosing non-conservative assumptions and variables, HRC staff understates the flow velocity adjacent to the Atlas Site. Thus, the calculated water velocity is inaccurate and may be higher. Without a more conservative estimate of water velocity, HRC staff cannot properly evaluate the sufficiency of the cover design.

In addition, Atlas may not have chosen the appropriate flow regime for the HEC-2 model simulations. Once again, HRC staff has accepted Atlas' conclusions without sufficient underlying data and without any independent analysis. Water surface profiles should begin at a cross-section of known elevation or starting conditions and proceed upstream for subcritical flow and downstream for supercritical flow. Rather than choosing a cross-section adjacent to the Atlas pile, HRC staff used a downstream cross-section. Therefore, the supercritical flow, the flow downstream of the starting cross-section, would not "see" the upstream control at the Portal. HRC staff should verify that Atlas used the correct flow regime in the HEC-2 model simulations for segments of the stream profile adjacent to the Atlas Site. In sum, HRC staff used non-conservative assumptions to calculate flood flows past the Atlas Site. HRC staff's improper use of the HEC-2 model underestimates the impact of the PMF on the tailings impoundment. Without more conservative modeling, HRC staff cannot determine whether the proposed design will protect the tailings.

HRC staff must address the numerous threats from the Colorado River to long-term stability. For example, channel migration of the Colorado River is a serious threat to the long-term stability of the Atlas pile; HRC staff has inappropriately accepted Atlas' conclusion to the contrary. (UTER, p. 4-13.) HRC staff expresses concern "that there is a potential for the Colorado River to migrate and possibly reach the toe of the reclaimed tailings disposal area." (UTER, p. 4-13.) HRC staff also admits that, "because qualitative proof of bank stability was not provided, it is prudent to design the pile for such an occurrence." (UTER, p. 4-13 to 4-14.) Even in the DEIS, the HRC admits that it is uncertain whether the river will migrate in its statement that "the potential for lateral migration may be low." (DEIS, p. 3-17, emphasis added.) Despite this uncertainty, in the UTER the staff concludes "that it is unlikely that the river will migrate as far as the tailings pile within the next 300-1000 years." (UTER, p. 4-13.) Once again, HRC staff fails to take a conservative approach to evaluating threats to the integrity of the pile.

HRC staff's dismissal of the Colorado River's migration potential is contradicted by the evidence. Grand County Council has aerial photographs which indisputably show that in the last 20 years the Colorado River has migrated 100 feet downstream to the Atlas pile. F Thus, the Colorado River's migration is a real, not a hypothetical, event. Moreover, these photographs reveal that, in contrast to the river's current condition, in 1950, there was no dam on either side of the Colorado River. Since 1950, tamarisk has grown on both sides of the river, but is especially dense in the eastern bank/Noah slough side of the river. The dense tamarisk stand increases the river's propensity for westward migration.
migration, particularly in flood events, where the gentle slope at the toe of the pile is a more attractive channel for river water than the dense tamarisk stand.

Not only is NRC staff's conclusion regarding river migration unsupported by the facts, but NRC staff's cited reasons for its acceptance of Atlas' conclusion are deficient. First, the fact that a stream or incised channel is eroding or actively eroding is not relevant to the context of extreme events such as the 500-year flood or the PMF. (\textit{See UTER, p. 4-13.}) High water levels and flow velocities can cause channel migration regardless of the current depositional or erosional characteristics of a stream. Finally, mid-channel bars are often scoured away completely during extreme floods so that velocities near the Atlas Site would not necessarily be low and would not necessarily cause deposition. Conversely, these river flows would tend to threaten the stability of the pile.

In the event that the Colorado River migrates toward the pile, the stability of the pile cannot be ensured regardless of the erosion protection features of the pile. Indeed, for Title I sites, the NRC recognized this hazard. For example, NRC required that the Gunnison tailings pile be moved because it was located 1/2-mile from the Gunnison River. The threat of potential river migration to the stability of the Gunnison pile was sufficient justification for requiring its removal. Given that the Colorado River is currently migrating toward the Atlas pile, NRC staff has no basis for requiring similar erosion protection at Atlas' Title II site. NRC staff's acceptance of the Atlas proposal is inconsistent with its previous position for other sites located near rivers.

Moreover, the NRC cannot name a single Title I tailings pile which it has allowed to be reclaimed in a 100-year floodplain or within a PMF floodplain. For example, DOE has moved piles at Gunnison, Rifle, Slickrock, Nevada, and Grand Junction, all of which were in PMF floodplains. Similarly, NRC staff should require Atlas to move this tailings pile out of the 100-year and PMF floodplains.

To be "prudent," Atlas has proposed to accommodate Colorado River migration by building a wall of rock which can collapse into the Colorado River. (\textit{UTER, p. 4-13.}) This rock is proposed to be an \textit{average} diameter of 11.2 inches. (\textit{UTER, p. 4-19.}) Atlas hypothesizes, and NRC staff accepts, that rock of this size, dropping into the river as it is carried by overland flows, will be sufficient to protect the pile from the Colorado River. However, the Colorado River, in flood conditions, is unlikely to be detained by such relatively small rocks, even if, by chance, they happened to fall where Atlas guesses they will fall. It is more likely that these falling rocks will create turbulence, and perhaps a rapid, at the foot of the pile, increasing the likelihood of erosion.

NRC staff simply has not required Atlas to comply with the criteria requiring that the waste pile be designed to protect against surface water erosion. Atlas' plan cannot be approved until, if ever, this deficiency is corrected.

\textbf{C. Erosion Protection (6.4.5.1)}

NRC staff's evaluation of the erosion protection features, or lack thereof, in the Atlas design is deficient in at least three respects.

\textbf{First}: NRC staff provides no support for its acceptance of Atlas' or-1 commitment that it will be able to locate a borrow site for the large-diameter, durable rock that will be required at this site. NRC staff is well aware of the difficulties of obtaining durable rock for use at Title I sites. At the Slick Rock, Colorado site, for example, contractors were unable to find the quantity of rock which would meet durability and cover design requirements. Therefore, the Slick Rock design had to be changed to require below-grade disposal which would use fewer rocks. NRC's examination of this issue reveals that Atlas' promise to provide durable rock is little more than a wish and a prayer. Indeed, in light of Atlas' recent retreat from its attempt to use Castle Valley rock, Atlas will have to wish and pray harder. NRC staff evaluation of this important erosion protection issue, including the cost of bringing in the riprap, should be based on reality and Atlas' firm commitments, not fantasy and Atlas' promises.

\textbf{Second}: NRC staff apparently does not recognize that rock with a nominal diameter of 1.5 inches is difficult, if not impossible, to construct in a layer of 4 inches. Title I disposal cells, 6 inches is the minimum thickness for an erosion protection layer with a nominal rock diameter of 1.0 to 1.5 inches.

\textbf{Finally}: NRC staff recommends that Atlas be allowed to use rock with a composite durability score of between 50 and 65 for some erosion protection features. NRC staff does not disclose that rock with a durability rating of less than 65 has never been used to construct any component of the cover for a Title I waste pile. NRC's strict prohibition of rock durability rock has even been applied to the top and side slopes of Title I sites. Once again, NRC staff does not explain why the Grand County community is not entitled to the same health, safety, and environmental protections as the communities near all Title I sites.
In sum, NRC staff underestimates the impacts from surface water on the tailings pile. The Atlas tailings pile is the only pile which the NRC is willing to locate on a floodplain. NRC staff improperly accepts Atlas' proposed plan without fully considering the serious threats to long-term stability from the surface water. NRC 'ta'f's unquestioning acceptance of Atlas' conclusions directly contradicts its guidelines which require underlying information to be sufficiently complete to allow an independent evaluation by NRC staff. (SRP, p. 20) Thus, the DTEP should be withdrawn until these deficiencies can be corrected.

V. NRC Staff Inadequately Addresses Water Resources Protection at the Atlas Site.

A. Introduction (DTEP, § 5.1.)

NRC staff fails to address site-specific hydrologic information on groundwater and surface water systems. NRC staff is obligated to study the full hydrology of the Atlas Site to evaluate the impact of the Atlas plan on water resources. (SRP, p. 22). However, instead of thoroughly studying these issues, NRC staff ignores Criteria 5, 7, and 13, which directly apply to water quality and groundwater protection. NRC staff claims that it will consider groundwater reclamation separately from surface reclamation in evaluating compliance with NRC regulations because remediating groundwater will take longer. (DTEP, p. 5-1 to 5-2.) However, NRC staff's decision to separate the groundwater compliance strategy from the tailings reclamation proposal has no legal or logical basis. Although NRC policies allow Atlas to defer implementation of groundwater clean-up, there is no statutory, regulatory, or other authority permitting the NRC to defer collecting and thoroughly analyzing data describing the impact of the Atlas pile on water resources. Indeed, it only makes sense to require NRC staff to analyze water resource impacts before surface reclamation plans are approved. Early analysis of water resource impacts may allow Atlas to improve its surface reclamation plan to protect those resources. Once surface reclamation is in place, Atlas may argue that further water resource protection is not possible. After reclamation, Atlas may argue that actions which are now possible to implement to protect water resources would not be practical.

By severing consideration of water quality issues, not only does NRC staff's approach violate NRC regulations and policies, but this approach makes it virtually impossible for NRC staff to evaluate thoroughly the remaining criteria, even as they relate solely to surface reclamation. For example, NRC staff cannot evaluate the adequacy of the proposed cover because the permeability of the cover directly affects the quantity of hazardous constituents leaving the pile.

Furthermore, the analysis of the impact of the pile on water quality should not be separated from this analysis because Atlas intends to use the design aspects of the tailings cover in order to meet groundwater protection standards. (Response to Open Issues No. 15, 16, 17, Feb. 7, 1996, pp. 6-7.) Specifically, Atlas intends to rely on three aspects of the cover design to meet groundwater protection standards: the steep side slopes of 10:1:1 (which violate Criterion 4), channels on the cover surface, and the permeability of certain cover materials such as Hancos shale. (Response to Open Issues No. 15, 16, 17, Feb. 7, 1996, pp. 6-7.) Thus, understanding the current condition of groundwater in the area of the tailings pile and the continuing impact of the pile on groundwater is crucial to evaluating the cover design, as well as to both the short-term and long-term effects of in-place tailings reclamation.

B. Hydrogeologic Characterization (DTEP, § 5.2.)

NRC staff's analysis of the hydrogeologic conditions of the Atlas Site is incomplete and fails to meet NRC's regulations and guidelines. Criterion 5 requires NRC staff to consider '... characteristics of the waste, the hydrogeological characteristics of the area, the groundwater flow, the current and future uses of groundwater, as well as those potential risks to human health, wildlife, and vegetation. Similarly, the NRC's Final Standard Review Plan provides that the site characterization must assess "both qualitative and quantitative estimates of the potential effects on humans and the environment from any existing and potential groundwater contamination." (SRP, p. 39.) Furthermore, according to NRC policy, the hydrogeologic characterization "is the primary site characterization component that is used to evaluate whether the proposed remedial actions will comply with the EPA groundwater protection standards." (SRP, p. 44.) Rather than adhering to these standards and analyzing the Atlas Site's impact on groundwater, NRC staff has unquestioningly accepted Atlas' conclusions that the impacts of the tailings leachate on water resources are insignificant. (DTEP, p. 5-16.)

1. Background Water Quality

NRC staff has failed to analyze adequately the background water quality despite the fact that the NRC's review plan states that "an adequate characterization of the background ground-water quality is fundamental to the assessment of the existing ground-water contamination."
2. Contaminant Characterization

HRC staff has inadequately analyzed the tailings leachate in order to evaluate the presence of all possible contaminants. HRC staff has failed to collect representative samples; those samples that were collected were not tested for all the possible constituents. Specifically, the list of constituents in Table 5-2 does not indicate which species of uranium was tested. Table 5-2 does not include any analysis of gross alpha or radon. The data in Table 5-2 also is inconsistent with the data in Table 2.1-1 of the DEIS. HRC staff must verify that the data in these tables is valid and explain the sampling and analysis protocol in order to demonstrate that the sample sizes are statistically representative.

Also, HRC staff must verify that the monitoring wells were properly constructed. For example, at one Title I site, in Falls City, Texas, HRC staff rejected several monitoring wells because they were improperly constructed. If these wells are not properly constructed, the sampling data will be skewed.

The two tables should show identical data, yet they do not. (See DEIS, p. 5-11 and DEIS, p. 2-8.) Which table is correct? Which data should be relied on? How have these errors affected HRC's conclusions? HRC staff should answer these critical questions about inconsistencies within HRC's own documents.

3. Extent of Contamination

Another serious deficiency in HRC staff's analysis of water resources is its analysis of the extent of groundwater contamination. In the Title I program, the HRC requires DOE to study the extent of existing groundwater contamination, even when DOE proposes to defer groundwater cleanup. (SRP, p. 48.) The HRC also requires that this analysis be based on an adequate number of sampling locations and sampling episodes to support the characterization. (SRP, p. 49.) Moreover, when verifying DOE's study of groundwater contamination, HRC staff looks to the adequacy of the number of wells, suitability of well locations, appropriateness of screened intervals, and appropriateness of constituents included in the analysis. (SRP, p. 49-50.) Yet, in the proposed Atlas reclamation, the HRC completely ignores these requirements. Although the HRC required Title I sites to meet these expectations, HRC staff fails to apply these standards to its own or Atlas' analyses. HRC staff's analysis is particularly inadequate for several reasons.

First, HRC staff fails to provide data showing which constituents have migrated from the pile and which constituents exceed standards at each monitoring station. In fact, HRC staff only provides data for one constituent, total dissolved solids. (DEIS, p. 5-11, Tables 5-5, 5-4.) Table 5-5 is incomplete because there are many hazardous constituents identified in the pile which are not analyzed. For example, Atlas should monitor for arsenic, cadmium, chromium, and other heavy metals because these constituents were reported at elevated concentrations in the tailings fluid. Finally, HRC staff must verify that the data in these tables is valid, including whether the sample sizes are statistically representative.

Second, HRC staff improperly accepts Atlas' conclusion that "the vertical extent of contamination is restricted to the relatively fresh groundwater within the upper portion of the alluvial aquifer." (DEIS, p. 5-15.) However, HRC staff does not provide a sufficient basis to support this statement. Rather HRC staff reaches this conclusion merely by comparing water quality at various depths. (DEIS, p. 5-15.) HRC staff does not include any of this data in the Dressing or does HRC staff verify this data. Accordingly, this issue of vertical extent of contamination should be considered another open issue.
Third, NRC staff has not adequately examined the quality of surface water near the tailings pile. There are many constituents identified in the tailings pile in Table 5-2 which were not tested in the surface water samples. Also, contrary to a statement on page 5-15 of the DTER, Figure 5-1 does not indicate the locations where surface water was sampled. Without these sampling locations, the information in Tables 5-5 and 5-6 is essentially useless.

4. Water Use

The analysis of water use in the area is inaccurate because it is outdated. The study on which the DTER relies was conducted in 1989. During the last 7 years, there has been an influx of tourists and new residents, which necessitates a new water use inventory.

In sum, NRC staff has not adequately evaluated the quality of groundwater and surface water in the vicinity of the tailings pile. Although NRC staff has decided to separate water resources remediation from the surface reclamation, NRC staff must, at a minimum, evaluate the current condition of water resources and the impact of the waste pile on these resources. Without this information, NRC staff cannot evaluate whether the surface reclamation, such as cover design, meets the Appendix A criteria. Groundwater and surface water quality will not be adequately protected if NRC staff allows Atlas to cap the tailings pile in place before considering the impact to water quality.

C. Groundwater Protection Standards and Regulatory Requirements (DTER, § 5.4.)

As discussed above, NRC staff has improperly separated an analysis of groundwater impacts and remediation from this analysis of Atlas' reclamation plan. Accordingly, NRC staff omits any analysis of Criteria 6 and 13, which require that the proposed disposal design must assure compliance with groundwater protection standards. In spite of this improper approach, in the DTER, NRC staff attempts to explain its review of Atlas' proposed corrective action plan. (DTER, § 5.4.) NRC staff's summary reveals the inadequacy of its review of Atlas' corrective action plan and underscores the necessity of requiring a full, public analysis of Atlas' plan to impose perpetual contamination on the groundwater and surface water.

P. In evaluating the Atlas proposal, NRC staff ignored the suggestions of the Department of the Interior, a cooperating agency in the DEIS process, regarding the sampling protocol for the Colorado River.

P. The NRC should not conclude that Grand County Council is endorsing the cost-benefit analysis appearing in the DEIS. However, NRC staff must be held accountable for not even attempting an environmental cost-benefit analysis when it used protection of Atlas' pocketbook as its regulatory yardstick.
D. Cleanup and Control of Existing Contamination (DTER, § 5.5.1)

NRC policy provides that “implementation of groundwater cleanup may be deferred to a later project phase, as long as the delay does not impact human health or the environment in the vicinity of the processing site.” (SRP, p. 40.) NRC staff’s assessment of water resources protection from the analysis of surface reclamation violates this guideline in two respects. First, NRC staff has deferred more than the implementation phase of groundwater remediation. NRC staff has also deferred from considering its analysis of the background water quality, the nature of the leachate, and the extent and flow of contaminants from the tailings to the alluvial aquifer and surface water. NRC staff’s decision is not authorized by the guidelines and violates NRC’s regulations. Second, NRC staff has not shown that the delay in implementation of groundwater remediation plans will not impact human health or the environment at the Atlas site.

VI. Radon Attenuation and Site Cleanup

NRC staff has identified a number of inadequacies in Atlas’s sampling program, as well as uncertainties in the method for differentiating affected soil from unaffected soil. Based on these inadequacies, NRC staff concluded that the long-term radon flux standard and other cover requirements of Criterion 6 had not been achieved. NRC staff’s evaluation does not go far enough. The Atlas plan is so riddled with inaccuracies and inconsistencies that it should be rejected in its entirety. Atlas should be required to submit a new plan that complies with all applicable radon attenuation licensing criteria.

A. Characterization of Materials (DTER, § 6.2.1.1.)

In this section of the DTER, NRC staff acknowledges that it has concerns “regarding the limited number and composition” of the samples taken by Atlas. (DTER, p. 6-2.) However, NRC staff’s concern is an understatement at best. Atlas performed a total of six test borings on the top slope of the tailings pile to depths of 8 feet. The borings were grouped according to material types: ore (3 samples), coarse sand tailings (16 samples), and fine tailings (12 samples). (DTER, p. 6-2.) This limited number of samples (31) is wholly inadequate to characterize the composition of the tailings pile or the cover materials, given that the overall size of the disposal cell is approximately 130 acres.

In contrast to Atlas’s slapdash approach to characterizing the disposal cell, the UMTTRA Title I Project has an established procedure whereby 20 boreholes at uniformly spaced locations are drilled to a depth of at least 16 feet of the tailings (as compared to the 8 feet used by Atlas). Radiological analyses are then required to be performed for every 2-foot interval, for a total of at least 160 radiological data points (as compared to the 31 conducted by Atlas). These samples must then analyzed for both Ra-226 and Th-230. The UMTTRA Title I project design its cover thickness depending on the more restrictive value of either Ra-226 concentration today or the Ra-226 that will exist in 1000 years (based on the decay of Ra-226 currently present plus that which will grow from the Th-230). Both NRC staff and the Atlas proposal fail to analyze for the presence of Th-230, an oversight that could lead to seriously underestimating the radon flux and the thickness of the cover.

The failure of Atlas to sample for Th-230 also raises issues relating to sub-pile or sub-radiation pond soils. When the sub-pile soils with high Th-230 concentrations are placed on the top of a disposal cell as part of final contouring, it creates an unacceptable long-term design, as was the case with several UMTTRA Project sites such as Ambrosia Lake, New Mexico, and Riverton, Wyoming. NRC staff’s failure to address sub-pile Th-230 sources constitutes another open issue that should have been addressed.

Table 6-1 identifies another problem with the limited sampling performed by Atlas at the site. This table presents radon flux values that will arise from areas of the pile that contain fine tailings (19.4 pCi/m²/s), coarse sand tailings (18.5 pCi/m²/s), and sidelines (19.15 pCi/m²/s). Each of these values is dangerously close to the 20 pCi/m²/s standard applicable to such values. If the tailings characterization is not representative of the pile, which it is not, then the radon flux could, in fact, far exceed the design standard.

In sum, the information presented by Atlas is simply inadequate to provide a “reasonable assurance” that the available radiological data can be used to prepare an acceptable cover design to limit the radon flux to less than 20 pCi/m²/s. Atlas’s test method, and partial approval of those methods, does not constitute a technically defensible approach to radon attenuation cover design.

This requirement conforms with NRC staff’s own conclusion that the Atlas boreholes should have been drilled to at least 15 feet.” (DTER, p. 6-2.)
D. Parameters for Contaminated Materials (DTER, § 6.2.2.)

NRC staff has identified an "open issue" and a "confirmatory item" relating to the Atlas sampling plan for contaminated materials. (DTER, pp. 6-5 to 6-6.) The open issue relates to Atlas's failure to properly sample for Ra-226 values in coarse tailings, as well as to its assumption that all coarse tailings on the sideslopes are homogeneous. (DTER, p. 6-5.) The confirmatory item relates to Atlas's proposal to sample for contaminated soil during construction. (DTER, p. 6-6.) Both items are illustrative of Atlas' consistent failure to properly characterize the tailings pile and its unproven "commitment" to sample for the necessary parameters in the future.

The Title I Project has established a method for performing a "sensitivity analysis" on cover designs that ensures that incomplete data elements used in the cover design are identified and addressed. (Iam Technical Approach Document, UNTRA-OE/AL 030425,0002, Dec. 1989.) However, Atlas has failed to provide any assurance that it will evaluate the proper parameters during construction. Although this item has been labelled as "confirmatory," this item should be considered open. Indeed, the unanswered question here is, if Atlas is unable to properly characterize the tailings pile before obtaining approval for its plan, what assurance is there that Atlas will properly sample after the plan is approved?

C. Parameters for Radon Barrier Soils (DTER, § 6.2.3.)

NRC staff identified an open issue about the manner in which Atlas determined the background concentration of Ra-226 in Moab Wash soils. (DTER, p. 6-9.) The sampling of background concentrations by Atlas is problematic in two critical respects. First, it raises the question of whether potentially contaminated soil from Moab Wash could be placed on top of the disposal cell as cover material, regardless of its Ra-226 concentration, merely because it represents "background" for the area and can be ignored for design purposes. This is an unacceptable result from any perspective, particularly that of public health and safety.

Second, the cleanup criterion for Moab Wash depends on the designated background value for Ra-226 for the region. If Atlas proceeds with its plan to test for background in the same Wash area that it proposes to clean up, it will lead to elevated levels of Ra-226 remaining in the Wash. In comparison, the UNTRA Title I Project determines background concentrations for tailings by taking at least 3 borings 1 to 4 feet in depth from areas that are near the sites, but that are otherwise uncontaminated by tailings materials (unlike the Moab Wash). These borings are analyzed for Ra-226 at 1-foot (sometimes 6-inch) intervals for a total of 25 to 60 data points in order to describe accurately the mean background concentration and its variability. Atlas' failure to conduct proper background sampling simply underscores the scientific and technical problems at this site.

NRC staff also identified a confirmatory item and an open issue with respect to the proposed clay borrow materials. (DTER, p. 6-8.) NRC staff acknowledges that, once again, Atlas has failed to properly characterize materials to be used at the site. (DTER, p. 6-8.) Although NRC staff appears to be comfortable with allowing Atlas to confirm the properties of the clay borrow material at some time in the future, this should be considered an open issue.

Moreover, any diffusion coefficient tests that are performed with respect to the clay borrow materials should be conducted in a manner consistent with the Title I Technical Approach Document. The sensitivity analysis recommended earlier will emphasize the need to determine more accurately the cover material's diffusion coefficient. Without a sensitivity analysis, any determination of the cover material's diffusion coefficient is likely to be underestimated by Atlas and, thus, not sufficiently considered by NRC staff.

D. Durability of the Radon Barrier (DTER, § 6.4.)

NRC staff incorrectly concludes that the cover is unlikely to be significantly disrupted by burrowing animals or deep-rooted plants. (DTER, p. 6-11.) This conclusion is unfounded. First, the proposed 4-inch rock layer is totally inadequate to preclude permanent germination and growth of invasive and aggressive, deep-rooted plants such as salt cedar (Acrota. tamarisk). This inadequacy has been clearly demonstrated at the Shiprock Title I site where salt cedar grew in rock armor 6 to 8 inches thick. Likewise, such rock armor has not deterred small animals from burrowing into the pile.

This problem is particularly relevant at the Atlas Site because a stand of tamarisk is found directly adjacent to the pile. As Grand County Council discussed in its response to the DEIS, the local tamarisk has great potential for disrupting the pile's cover. Given that 6 to 3 inches of rock armor at Shiprock were insuficient to preclude salt cedar growth and burrowing animals, it is absurd to conclude that the 4-inch cover at the Atlas pile will
In addition, because the Moab area is subject to considerable amounts of blowing sand, it is a foregone conclusion that the interstices of the rock armor will be filled with varying degrees of sand and, thus, will become subject to plant intrusion. Although NRC staff identifies sand dunes as an "open issue" in section 2.4.3.1.1, it fails to identify the same issue with respect to cover integrity. Experience at Title I sites, such as Yuba City, demonstrates that conditions favorable for plant intrusion can develop in a relatively short time and become a problem, particularly on areas of the slopes that are shaded from the sun and preserve precipitation (available for seed germination) better than other areas of the pile.

The likelihood of bio-intrusion, including that of burrowing animals, underscores another defect with the Atlas proposal. The Atlas proposal requires a large number of ongoing mitigative efforts in order to succeed. Atlas has revealed that it plans to provide only a small amount of money and leave the great majority of the cost of long-term maintenance of its waste pile to the taxpayer. The ongoing maintenance required by the Atlas proposal and Atlas' refusal to fund these requirements should be considered open issues relating to durability of the proposed radon barrier.

E. Measured Radon Flux (DTER, § 6.5.)

NRC staff caustically states that if the proposed cover fails radon flux tests after it has been completed, "staff considers it necessary corrective action such as additional radon barrier material." (DTER, p. 6-12.) This statement rests on two unsupported assumptions. First, that if Atlas' inadequate characterization of the tailings pile lends to a cover failure, it can be easily fixed by sprinkling on more cover. Second, that Atlas will still be murkily through the necessary corrective actions. Given NRC's own experience of the difficulties and costs of cover construction, NRC staff's acceptance of the ease of applying additional cover material is unwarranted. Furthermore, this approach to cover design flaws violates NRC regulations prohibiting long-term maintenance.

In conclusion, NRC staff's evaluation of the Atlas radon barrier design is rife with substantial omissions and unanswered questions. Atlas has failed to provide NRC staff with key information regarding the characteristics of the tailings pile, the composition of the proposed cover clays, or the proper background concentrations of Ra-226 in Moab sand soils. Without this information, any proposed analysis of the radon barrier design, a critical component of the Atlas proposal, is meaningless. In addition, NRC staff has failed to analyze properly the effect of bio-intrusion on the thin rock armor of the Atlas proposal. This key oversight not only throws into question the supposed durability of the radon barrier design, but also underscores the lack of any realistic assessment of the amount of ongoing maintenance necessary for upkeep of the barrier.

VII. NRC Staff's Assessment of Compliance with Appendix A Criteria Conceals Atlas' Violation of NRC's Licensing Requirements.

NRC staff's technical expertise easily turns one into a false belief that NRC staff has used conservative analytical techniques to ensure that Atlas' plan complies with all licensing requirements. However, when NRC staff compiles all of its previous analyses and assesses whether they, in fact, establish compliance with Appendix A criteria, the overall inadequacy of the DTER is revealed.

Criterion 1 - Permanent Isolation

NRC staff admits that several of Atlas' site features do not comply with Criterion 1, which requires permanent isolation of tailings and contaminants without the need for ongoing maintenance. For example, NRC staff has not been given adequate information regarding the effects of geologic, including seismic, disturbances to conclude that active site maintenance will not be required. Although it is disturbing that the NRC had intended, three years ago, to approve Atlas' plan without this vital information, Grand County Council is relieved that the NRC now recognizes the importance of this information. We therefore expect that Atlas' response to open issues regarding geologic disturbances will be similarly thorough, conservatively, and consistently with requirements imposed at Title I sites.

1. Remoteness from Populated Areas

However, NRC staff's conclusion that all other non-seismic aspects of Criterion 1 have been met is erroneous, on several grounds. First, in defiance of reality, NRC staff concludes that the Atlas Site is remote from populated areas. Again, NRC staff misstates the distance to Moab city limits and the residential community at these limits. The distance is 1.5 miles, not 3 miles, from the tailings pile. Since radioactive contaminants are not expected to travel by motor vehicle or bicycle, HRC staff's reference to the distance to Moab by road miles is highly misleading. Similarly, NRC staff overstates the distance between the district radioactive waste pile and Arches National Park. The park is not located two miles away from the Atlas Site; rather, it is located across the street and is separated from the radioactive waste pile by only the
width of a two-lane highway. HRC staff's deliberate
dissemblence on this issue is made apparent by its failure to
include Arches National Park on the only location map
included in the DTERT. (See DTERT, p. 1-3.) Furthermore, in
its discussion of recreational and tourist uses, HRC staff
states, "Adjacent ... waters are used for a variety of
activities." (DTERT, p. 7-1.) However, this vague
description of the environment near the Site should not be
used to hide the fact that this site is not just adjacent to
some unnamed "waters." Rather, it is on the banks of the
Colorado River -- a national treasure and a source of water,
recreation, tourism, and multiple other uses by people from
all over the world.

HRC staff's other attempt to mislead the reader on the
"remoteeness" issue reveals a subtle decision to sacrifice the
health and safety of the Moab community. Apparently, to
justify the licensing of the permanent siting of a
radioactive waste pile in this area, HRC staff notes that the
population in Moab and Grand County dropped between 1980 and
1990. However, since the last census, the population in Moab
and Grand County is growing. In preparing the Grand County
General Plan, the County estimates that the population will
exceed 30,000 by 2020. HRC staff also ignores the influx of
tourists to Arches National Park. Last year, nearly one
million people visited the park, and this number is expected to
increase by 7% each year.

Not only does HRC staff ignore recent surges in
population growth, but it implies that it is acceptable to
put in jeopardy the Grand County community's health and
safety because there are only relatively few of us. Not only
is this perspective insulting, but it also reveals that HRC
staff does not have a true appreciation for the serious
implications of its actions both for individual citizens and for
domestic environment. HRC staff must be forced to acknowledge
that, beginning on this first ground, the Atlas plan does not
meet Criterion 1.

2. Isolation of Contaminants from Groundwater
Sources

HRC staff concludes that Atlas' plan adequately protects
groundwater from contamination, but provides no support for
that conclusion. As discussed above, for reasons that have
never been adequately explained, HRC staff has severed
groundwater protection standards from the overall licensing
requirements of the reclamation plan. Although HRC staff
admits to this tactic, staff never provides any regulatory or
statutory authority for using it. Deleting groundwater
protection requirements from a thorough review of Atlas' plan
makes no sense from a technical standpoint. As demonstrated

in the DTERT and ERP, groundwater issues pervade the other
issues which must be addressed for all technical disciplines,
including geotechnical stability, erosion protection, water
resources protection, radon attenuation, and site clean-up.
(DTERT, §§ 3, 4, 5, and 6.) A "thorough, focused, efficient
and consistent" evaluation of the long-term impact of the
Atlas plan on both the public and the environment simply
cannot occur if groundwater contamination is not assessed at
the same time that HRC staff considers other technical
criteria. (See ERP, p. 3.)

HRC staff reaches the conclusion that Atlas' plan for
permanent groundwater contamination is acceptable without
engaging in a full analysis of environmental costs and
benefits and outside of the NEPA process the HRC used to
evaluate the Atlas Site. Thus, without fulfilling NEPA
procedures, HRC staff impermissibly concluded that Atlas'
groundwater "reclamation" plan was acceptable because it was
the least costly to Atlas. Whatever the reason HRC staff may
have had for trying to avoid consideration of groundwater
protection in the TER process (including, perhaps, fear of
public scrutiny), we sincerely expect HRC staff to change its
position and to engage in a full analysis of groundwater
protection as part of a thorough TER process. Until such
analysis occurs, Atlas cannot show that its plan complies
with this second component of Criterion 1.

3. Minimize Impact of Natural Forces

In Sec. on VII of the DTERT, HRC staff concludes that
Atlas has demonstrated that the cover design will protect
against erosion and disrepair by natural forces. However,
this conclusion is inconsistent with HRC staff's own prior
statement concerning Atlas' proposal in the DTERT. In the DTERT,
Section 4.5, HRC staff found that, because Atlas' riprap
cover design had not been submitted for HRC's review, Atlas'
plan was not ready for review in this DTERT process. Furthermore, HRC
staff has found Atlas' plan inadequate to protect against
landslides and has named the landslide potential an "open
issue."

Given these omissions and inadequacies in Atlas' plan,
which HRC staff recognizes, HRC staff's conclusion that
Atlas' design protects against erosion and disturbances by
other natural forces is without merit or basis in fact. HRC
staff must be forced to acknowledge that, also on this
third ground, the Atlas plan does not meet Criterion 1.
The NRC staff also concludes that the tailings piles will not require active maintenance over the 1,000-year design life of the Atlas proposal because the riprap cover design is "not expected" to deteriorate significantly or be susceptible to flood damage. The NRC's conclusion cannot be supported on this record. As set forth above, the NRC staff has failed to account for biological intrusion, which based on UMTRA experience, can develop in a relatively short time and cause serious disruptions to the radon barrier. Moreover, the NRC staff has seriously underestimated both the probability and impact of a PHE on the integrity of the pile. In addition, Atlas' uniquely steep slopes, lacking a clay cover, have no prior history of constructability or durability. As a result, in addition to its failure to demonstrate that the Site will not require active maintenance to mitigate the effects of geologic, including seismic, disturbances, Atlas has not demonstrated compliance with Criterion 4 on these grounds as well.

If, as directed by the express meaning of Criterion 1, NRC staff place "primary emphasis" on isolation of the tailings, particularly through "an optimization of the three siting features of remoteness from populated areas, hydrologic conditions, and resistance to erosion," NRC staff can demonstrate that the Atlas plan fulfills the regulatory requirements of Appendix A. (See In the Matter of Kerr-McGee Chemical Corporation, No. 40-2061-ML, 1991 WL 204282 (N.R.C. 1991).) In Kerr-McGee, the NRC Atomic Safety and Licensing Board did not find acceptable the applicant's plan to cap in place an existing radioactive waste pile above grade, several feet over the water table, because the plan did not place "primary emphasis" on the isolation of tailings, but instead allowed them to remain in a populated area. For many of the same reasons the Kerr-McGee plan did not meet Criterion 1, the Atlas plan also does not meet Criterion 1. NRC staff, therefore, must reject the Atlas plan.

**Criterion 3 - Below-grade disposal is the prime option**

NRC staff's conclusion that the Atlas plan meets Criterion 3 violates NRC's statutory and regulatory obligations, especially since NRC staff's sole basis for exempting Atlas from meeting this clear licensing requirement is that a below-grade disposal would be "economically impracticable." (OTEK, p. 7-3.) Although Criterion 3 requires below-grade disposal as the "prime" option, NRC staff finds that Atlas' design is acceptable even though the piles will be 110 feet above grade. However, NRC staff may only make licensing decisions in conformance with the Appendix A Criteria. As a matter of law, compliance with those criteria must take into account public health and safety, and the environment. Although "due consideration" must be given to economic costs, those are not to be the sole, or even primary, basis for determining compliance with Criterion 3. Thus, NRC staff simply violates the law when it states that Atlas' proposal complies with Criterion 3 because below-grade disposal costs too much.

Furthermore, NRC staff reaches this conclusion of "economic impracticability" by distorting its own published documents and by making completely unsupported conclusions about the costs involved. First, NRC staff states that, "if other criteria are met" (which itself is but a wild guess, at this point), "the benefits over stabilizing the tailings in place would be negligible." (OTEK, p. 7-3.) The sole basis for this statement is a reference to the NRC's Draft Environmental Impact Statement ("DEIS"). However, in the DEIS, the NRC does not find that the benefits of moving the tailings piles to a below-grade disposal area would be "negligible." In fact, in the DEIS, the NRC concludes that moving the waste pile would be "environmentally preferable." (DEIS, p. 3-26.) The NRC also concludes that the Atlas plan has "significant, long-term impacts" to the environment. (DEIS, p. 3-26.) Thus, NRC staff's conclusion that the benefits of below-grade disposal are "negligible" is flatly and repeatedly contradicted by the NRC's own conclusions in the DEIS.

In the OTEK, not only does NRC staff ignore the conclusions in the DEIS, but NRC staff also then relies upon one further unsupported assumption in justifying its erroneous conclusion that the Atlas plan complies with Criterion 3. NRC staff states that the cost of moving the pile to a below-grade facility would be "much greater than the benefit realized, making relocation economically impracticable." (OTEK, p. 7-3.) However, this statement is not the result of a focused, documented, or credible analysis. (See SRP, p. 3.) Nowhere in the entire OTEK does NRC staff engage in any analysis of the cost of relocating the Atlas pile. Indeed, NRC's attempt to analyze that cost in the DEIS is inadequate and biased. (See Grand County Comments in response to Draft Environmental Impact Statement, April 29, 1994, Part V.) Nor does NRC staff analyze the benefit to public health and safety and to the environment, which will be realized when the Atlas pile is moved to a below-grade disposal cell. Without having analyzed the costs or the benefits of relocation, NRC staff's conclusion that the costs of relocation are "much greater" than the benefits is simply untenable. (OTEK, p. 7-3.)
to reveal NRC's unswerving bias in Atlas' favor.

**Criterion 4 - Technical Disposal Criteria**

**Criterion 4(a) - Flood and water erosion protection**

NRC staff's conclusion that Atlas' plan will provide erosion protection is contradicted by its analysis in Section 4.5 of the DTER. As discussed in response to Criterion 1, NRC staff has found that the issue of erosion protection is an open one. Thus, until Atlas has a practicable plan for providing riprap and other erosion protection features, Atlas has not demonstrated compliance with Criterion 4.

**Criterion 4(b) - Wind and erosion protection**

NRC staff concludes that Atlas' plan protects against wind erosion because it finds that riprap which can withstand water erosion can stand up to wind erosion. However, as discussed repeatedly above, NRC staff is in error when it concludes that Atlas' plan protects against wind erosion. Thus, because Atlas' plan does not protect against either wind or erosion, the plan does not meet Criterion 4(b).

**Criteria 5, 7 and 13 - Ground Water Protection**

Grand County Council's comments in response to NRC staff's conclusions with regard to Criterion 1(a) apply with equal force to NRC staff's evaluation of Criteria 5, 7 and 13. Again, without any basis in the law or regulations, NRC staff bifurcates groundwater protection issues from its evaluation of Atlas' plan in this TER process. As in NRC's approach to Title I sites, Atlas should be required to prove now it will address groundwater contamination. The projected costs of necessary groundwater protection measures should be included in Atlas' costs for licensing compliance. No element of the reclamation plan should be approved unless it is shown to comply with groundwater protection standards. Approving of pieces of the Atlas plan now, before groundwater protection is addressed, may lead to unnecessary costs -- to Atlas, to public health and safety, and to the environment. Thus, to comply with NRC's statutory and regulatory mandates, NRC staff should be required to include the full evaluation of groundwater protection in its current TER process.

**Criterion 6 - Performance Criteria**

Criterion 6 sets forth the performance criteria for the disposal of tailings. Criterion 6(1) requires that waste disposal areas be closed in accordance with a design which provides "reasonable assurance" that the average releases of radon-222 and radon-220 to the atmosphere will be limited to 20 pCi/sq ft. The design is to be effective for 1,000 years to the extent reasonably achievable and, in any case, for at least 200 years. For the reasons discussed throughout these comments, the Atlas proposal does not provide a reasonable assurance that the tailings pile will be effective at all, let alone for 200 years, much less for 10,000 years.

As NRC staff correctly notes in the DTER, Atlas has failed to provide the NRC with sufficient data relating to the characteristics of the piles, the background concentrations of Ra-226 in the vicinity of the piles (ASA Atlas Criterion 6(5)), or the properties of the proposed cover materials. In fact, NRC staff is hard-pressed to identify any Atlas sampling data upon which it can determine whether the proposed radon barrier will actually work. These open issues should preclude the Atlas proposal from any type of serious consideration, let alone approval.

NRC staff also fails to adequately address the issue of bio-intrusion on the durability of the radon barrier. Contrary to NRC staff's unsupported conclusion that bio-intrusion is not an a serious problem at the Site (DTER, p. 6-11), prior NRC experience has demonstrated that vegetated growth and burrowing animals have disrupted cover designs at Title I sites where rock covers twice as thick as that proposed at the Atlas Site. (ASA, UMTA-DOE/ALT 40967,0000, Vegetative Growth Patterns on Six Rock-Covered UMTA Project Disposal Cells, Feb. 1992; DOE/ALT/62350-200, Rev. 1, UMTA Project Disposal Cell Cover Biointrusion Sensitivity Assessment, Oct. 1995.) The NRC's blithe disregard of this known, serious problem constitutes a fundamental failing of the DTER.

**Criterion 12 - No Ongoing Maintenance**

As set forth above in response to Criterion 1(4), the NRC staff's conclusion that no ongoing active maintenance is required to preserve the radon barrier at Atlas Site cannot be supported on this record. Not only does NRC staff ignore the effects of bio-intrusion, but it also seriously underestimates the impact of a PMF and of the unique and questionable cover design on the integrity of the piles. As a result, Atlas also cannot demonstrate compliance with Criterion 12.

**CONCLUSION**
At some point in this regulatory process, the NRC and its staff must address the real public issue presented by the Atlas Site. The NRC must decide whether Atlas' plan is feasible and for the permanent disposal of 90,000 tons of radioactive waste. In issuing the DEIS, the NRC took two steps forward in answering that question. First, it determined that the Atlas Site presents many adverse, long-term environmental impacts and that the alternative of moving the pile presented no long-term adverse environmental impacts. (See DEIS, pp. 2-25, 2-26.) Second, the NRC finds that the Plateau Site Alternative complies more fully with the Appendix A technical licensing criteria than does the Atlas plan. (DEIS, p. 2-26.) Unfortunately, the NRC also takes a giant step backward in its decision-making, when it concludes that, because of the "estimated" costs to Atlas of moving the pile, the Atlas plan is "acceptable with respect to environmental costs and benefits." (DEIS, p. xxiv.)

The NRC reaches its decision that the Atlas plan is environmentally acceptable because it gives inappropriate weight to Atlas' financial interests. The NRC excuses its lack of concern for the adverse environmental consequences of the Atlas plan by stating that NRC staff's TER review will insure that these adverse consequences are eliminated. (See DEIS, pp. 2-25, 2-26.) As demonstrated above, the TER process thus far has not insured that Atlas has eliminated adverse environmental consequences. Instead, NRC staff has attempted to exempt Atlas from several of the licensing criteria and has done so by not conducting a DTER analysis which complies with DEC's policies.

Grand County Council expects NRC staff to respond to these criticisms by stating that its only role is to evaluate whether Atlas' plan complies with the regulations, no matter whether it is the best plan. However, NRC staff demonstrates that it is doing more than passively evaluating technical criteria when it excuses Atlas from strict compliance with regulatory criteria; fails to conduct a thorough and conservative review of Atlas' plan, pursuant to its own policies; accepts Atlas' assumptions, estimates, and promises at face value, without sufficient scrutiny; and acts inconsistently with the NRC's previous decisions at Title I sites. Thus, NRC staff is not conducting an objective exercise in technical analysis. Instead, NRC staff is using the DTER to impermissibly weigh the scales in favor of Atlas' plan.

Moreover, even if the choice of a reclamation plan were simply a matter of dollars and cents, the DTER reveals that the necessary calculations have not been made. Despite NRC staff's attempts to hide this conclusion, it is apparent that Atlas' plan, even from a narrow technical standpoint, is filled with current and future problems. Its current location requires the pile to be built on unacceptably steep slopes. The pile will always be threatened by floods, landslides, and bio-intrusion. Moreover, the plan currently calls for perpetual groundwater contamination. Finally, the pile is located in an area central to tourism, recreation, and new residential development. It is hard to imagine how, absent a 24-hour security guard, Atlas intends to prevent human intrusion at this prominent location. Thus, Atlas and NRC staff have underestimated the cost of current construction and future maintenance and have ignored all costs of environmental consequences.

Congress found that uranium mill tailings "may pose a potential and significant radiation health hazard to the public." (SRP, p. 1 (citing UNTERCA).) Therefore, Congress determined "that every reasonable effort should be made to provide for stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings." (18.) NRC staff has not completed this DTER review in accordance with its obligation to conduct its "domestic licensing ... functions in a manner which is both responsive to environmental concerns and consistent with the NRC's responsibility ... for protecting the radiological health and safety of the public." (19.) Instead, NRC staff's review attempts to obscure and excuse the fact that Atlas' plan is an unreasonable, costly, and unacceptable final reclamation plan. Thus, we urge NRC staff to withdraw the conclusions reached in the DTER and require Atlas to propose a new plan which will eliminate the long-term adverse environmental consequences by moving the tailings pile to a location which will comply with the NRC's licensing requirements.

Respectfully submitted,

GRAND COUNTY COUNCIL

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The Honorable Mike Durlitch, Utah State Senator

The Honorable Kesha Johnson, Utah State Representative
# Final Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah

**Appendix J**

Source Material License No. SUA 917

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**SUPPLEMENTARY NOTES:**

Docket No. 40-3453

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This Final Environmental Impact Statement (FEIS) has been prepared by the Nuclear Regulatory Commission (NRC), Office of Nuclear Material Safety and Safeguards, to address potential environmental impacts associated with a request by Atlas Corporation to amend its existing NRC License No. SUA-917 to reclaim in place an existing uranium mill tailings pile near Moab, Utah. The proposed reclamation would allow Atlas to (1) reclaim the tailings pile for permanent disposal and long-term custodial care by a government agency in its current location on the Moab site, (2) prepare the 162-ha (400-acre) Moab site for site closure, and (3) relinquish responsibility of the site after having its NRC license terminated. The FEIS describes and evaluates (1) the purpose of and need for the proposed action, (2) alternatives considered, (3) potentially affected environmental resources, (4) environmental consequences of the proposed action, and (5) costs and benefits associated with reclamation alternatives.

The analysis of impacts presented in the FEIS indicates that the Atlas proposed on-site reclamation with recommended mitigation, including FWS requirements specified in the Final Biological Opinion, is environmentally acceptable. The FEIS compares the proposed on-site reclamation to an alternative of moving the tailings to an alternative site on Klondike Flats. NRC staff's analysis finds that no aspect of the relocation alternative would have a potentially significant, adverse, long-term environmental or socioeconomic impact. Some of the short-term impacts, including radiation doses associated with moving the tailings, would be greater for the relocation alternative. Thus, the short-term impacts and the significantly higher economic cost of moving the tailings are the major disadvantages of the relocation alternative.

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**KEY WORDS/DESCRIPTORS:**

Atlas, uranium, mill tailings, Moab, reclamation, uranium mill, tailings