40-3453

June 25, 1996

MEMORANDUM TO: Leo J. Norton
Acting Inspector General

FROM: Carl J. Paperiello, Director (Original signed by J. Greeves for)
Office of Nuclear Material Safety and Safeguards

SUBJECT: OBJECTIVITY OF STAFF REVIEW OF THE PROPOSED ATLAS RECLAMATION

In response to the Draft Environmental Impact Statement (NUREG-1531) and the Draft Technical Evaluation Report (NUREG-1532) related to Atlas Corporation's proposed reclamation of its uranium mill tailings near Moab, Utah, the staff received over 200 comment letters. Most of the comments expressed opinions or raised technical issues with respect to the proposed reclamation. However, a few comments asserted that the staff had ignored its regulations, while others questioned the staff's objectivity in the process.

Attached are copies of four comment letters, in which we have highlighted such comments. Based on our review of all comments, these are the only such comments we have identified. This is for your information and to take whatever action you deem appropriate.

Attachments:
1) Jenner & Block DTER comments - 4/29/96
2) Jenner & Block DEIS comments - 4/29/96
3) John E. Powers - 4/28/96
4) Grand County Utah - 5/15/96

CONTACT: Myron H. Fliegel, NMSS/DWM
415-6629

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DATE	06/20/96		06/20/96		06/21/96		06/25/96		06/25/96	

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April 29, 1996

BY HAND DELIVERY

Joseph J. Holonich
Chief, High-Level Waste and
Uranium Recovery Projects Branch
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop TWFN 7J-9
Washington, D.C. 20555

Re: Draft Technical Evaluation Report for the Proposed Revised Reclamation Plan for the Atlas Corporation Moab Mill; Source Material License No. SUA 917

Dear Mr. Holonich:

Grand County Council, the governing body for Grand County, Utah, in which the Atlas Corporation Moab Mill ("the Atlas Site") is located, provides the following comments with regard to the Draft Technical Evaluation Report ("DTER") issued by the staff of the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards ("NRC staff") on January 30, 1996.

As demonstrated below, the DTER is premature and legally insufficient under NRC's own regulations and applicable statutory requirements. In general, NRC staff has failed to require Atlas Corporation ("Atlas") to comply with the basic technical licensing requirements applicable to the final "reclamation" of uranium mill wastes. (10 C.F.R. Part 40, Appendix A, referred to in these comments as "the Appendix A criteria".) Specifically, Atlas plans to leave 10.5 million tons of radioactive waste on the banks of the Colorado River, within a mile of Moab city limits, and across the highway from Arches National Park. Especially because of the long-term negative environmental consequences of the Atlas plan, as recognized by the NRC in its Draft Environmental Impact Statement ("DEIS"), the technical elements of Atlas' plan should have been strictly scrutinized and conservatively

evaluated by NRC staff. Instead, NRC staff repeatedly has let Atlas off the hook by: (1) relying on Atlas' estimates and promises, 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.

I. 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 embodied 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 ("SRP") for UMTRCA 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.)[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

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1/ Throughout these comments, references to sections of the DTER will be referred to as "DTER, § ____"; references to pages of the DTER will be referred to as "DTER, p. ____".

that, in this case, it has prepared a DTER despite the fact that there are twenty "open issues" and many additional items which still must be confirmed by NRC staff. (DTER, pp. 1-5 to 1-8.) Thus, NRC staff's report is a partial and preliminary DTER, sufficiently evaluating only a limited portion of the licensing criteria.[2/]

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 proceeds to analyze Atlas' compliance with the technical licensing requirement 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, conducted 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

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[2/] As discussed below, in addition to the open issues with respect to the technical disciplines it evaluated in this report, NRC staff has intentionally avoided any evaluation of Atlas' compliance with Criteria 5, 7, and 13. The NRC staff must prepare a new DTER which includes an analysis of water resources protection and make it available for public comment. This analyses must be included in the TER process for all licensing criteria for the Atlas Site.

tailings pile is only 1.5 miles from the Moab city limits. Moreover, the boundaries of the "Atlas Mill Site," as diagramed 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 northwest 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 that "certain geologic and seismologic conditions [such as Criteria 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 Criterior 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 disruptions 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 SRP. (DTER, p. 2-1.)

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. 2-3.) NRC staff has attempted to remedy Atlas' omission in this regard by "compiling" 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.

The DTER cannot be considered complete without an adequate and 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 Diversion 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 6.

B. <u>Structural Setting and Features</u> (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 splay 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 SRP requires to be included before the staff may determine

that Atlas' geologic, bedrock, and seismotectonic stability investigative activities and technical information are "appropriately presented." (DTER, p. 2-6; SRP, 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 waste 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 6. 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. (See, e.g., SRP, 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 discuss structural features in tectonically related groups. 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. (See, e.g., NRC staff's discussion of features possibly related to Quaternary faulting, followed by its discussion of the Paleozoic setting of the Paradox Basin. (DTER, pp. 2-6 to 2-7.)) NRC staff cannot assure Atlas' compliance with the applicable Appendix A Criteria without demonstrating that it has made a competent analysis of the significance of the 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, NRC staff states that syndepositional diapirism controlled the thickness of "late Pennsylvanian to latest Triassic (possibly into the Cretaceous) units." (DTER, p. 2-4.) Subsequently, NRC staff states that diapirism is of the "late Paleozoic through Jurassic" eras. (DTER, p. 2-6.) NRC staff should resolve this inconsistency and state clearly what is the technically correct age/timing of diapirism.

Most importantly, NRC staff's sparse discussion of diapirism does not rule out the possibility that it is occurring today. In fact, NRC staff states later in its discussion that the Moab Fault is related to diapirism and that diapirism may have occurred during the Quaternary era. (DTER, pp. 2-6, 2-7, 2-9.) NRC staff obviously needs to reach, and to convey in the DTER, a clearer understanding of this important geologic feature, particularly as regards to its timing and possible ability to influence the vicinity of the Atlas Site today. Moreover, in DTER § 2.3.3.2, NRC staff notes that Atlas, to date, has failed to consider existing data necessary to fully assess these important geologic stability issues. (DTER, p. 2-7.) Until this analysis is conducted, NRC staff cannot assure compliance with the Appendix A Criteria, particularly 4(e) and 6.

For example, NRC 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, NRC staff also should note that the climate-dissolution 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 an overall 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. NRC 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, NRC staff notes that Atlas observed a borehole beneath the tailings pile, 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 pile." (DTER, p. 2-7.) Similarly, NRC 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's conclusion that "a range of rates of future subsidence is possible in the site vicinity," and NRC staff's own conclusion that the average rate estimates say little about the potential for rapid subsidence-collapse hazards. (DEIS, p. 2-8.) For NRC staff's analysis of geologic stability issues in the DTER to meet applicable standards, NRC staff must not accept Atlas' inconsistent data. Nor can NRC 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, NRC staff's analysis of salt tectonics (DTER, § 2.3.3.2) 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, NRC 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 NRC 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 tectonic 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 diapirism or plate tectonic forces.

In addition, as NRC 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. 2-9.) In this regard, we question NRC staff's conclusion that the "main" Moab Fault may have overlain the site but has since been removed by erosion. (DEIS, p. 2-8.) NRC staff asserts but does not explain its rationale for reaching this latter conclusion. At a minimum, NRC 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.[3]

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 Pennsylvanian)?

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.[4]

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[3] 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.

[4] 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. (See, e.g., SRP § 1.3.2, which states that an investigation of geologic stability is 'appropriately presented' only if it includes the following data: plot plans, stratigraphic profiles and cross sections, and logs of core borings, geophysical investigations and/or test pits. (SRP, pp. 9-10.))

E. Topographical and Geomorphic Features (DTER, § 2.3.4.1.)

In the DTER subsection discussing topography and geomorphic features, NRC staff has inaccurately described the location and nature of several important features. One example of NRC staff's mischaracterization of a significant feature is the statement that Moab Wash "heads at Little Canyon and appears to have captured Little Canyon Wash." (DTER, p. 2-10.) However, review of a USGS topographic map (1:100,000 scale) shows that Little Canyon (and Little Canyon Wash) are distinct tributaries to the Colorado River, and that Little Canyon enters the river over 5 miles downstream from the Site. According to the USGS, the Moab Wash may be eating into the headland area of the Little Canyon Wash, but Moab Wash has not "captured" Little Canyon Wash. In addition, NRC staff refers to several "linear (actually planar) topographic features," which NRC staff asserts -- without further explanation -- are "faults." (DTER, p. 2-10.) NRC staff does not, but should, describe how many such linears/faults it believes occur in this area. Moreover, NRC staff should describe any such features it believes exist in the previous subsection on structural setting. (DTER, § 2.3.3.) Once again, NRC staff fails to make critically important distinctions in its characterizations of the significant geological features in the vicinity of the Atlas Site. Such distinctions must be made before an adequate DTER can be completed.

F. Colorado River and Its Tributaries (DTER, § 2.3.4.2.)

In addition, NRC staff inadequately analyzes whether subsidence caused by dissolution of salt has affected migration of the Colorado River in Moab Valley. (DEIS, p. 2-11.) NRC staff merely states that, "There is no conclusive data available which would indicate that subsidence caused by dissolution of salt affected the migration of the Colorado River in Moab Valley." (Id.) The lack of "conclusive data" could just as easily demonstrate that salt dissolution subsidence could have, as well as could not have, affected the migration of the Colorado River. NRC staff's reliance on inconclusive data, and resulting unsupported conclusion, cannot be a basis for determining Atlas' compliance with the applicable Appendix A standards.

G. Seismicity (DTER, § 2.3.5.)

NRC staff's discussion of seismicity contains several inconsistent, confusing, or inadequate references to important seismic features. (DTER, § 2.3.5.) For example, NRC staff does not discuss surface rupture potential at all.

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. 2-13.) However, NRC staff does not give the location of this area of induced seismicity, nor discuss its possible implications for the Atlas Site. In addition, NRC staff's discussion of potash mining also should include the possibility that active exploration and exploitation for potash mining in the area of the site could produce induced seismicity. (DTER, § 2.4.2.4.) Moreover, NRC staff's statement that earthquakes occur within the upper 20 kilometers of the earth's crust conflicts with its previous statement, on the same page, that the depth of earthquakes varies from shallow to 50 kilometers. (DTER, p. 2-13.) 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 six 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 geomorphic stability, and involve determining: 4) the effects of migrating sand dunes; and 5) the effect of landslides emanating from Poison Spider Mesa. The sixth open issue relates to seismotectonic stability, and involves determining: 6) the seismic design basis for the Atlas Site.

Although these issues currently 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 northeast-trending feature coinciding with the trend of the Colorado River." (DTER, p. 2-12.) However, as NRC staff notes, Atlas' conclusion is not supported by recent observations, which "indicates that a swarm of seismic activity north of the confluence of the Colorado River and the Green River is associated with this trend." (DTER, p. 2-12.) Neither should NRC staff unjustifiably rely on unspecified and unquantified terms in making technical determinations regarding the issues at stake in this case (e.g., potential faults similar to those exposed across Highway 191 are "likely" to be bounding). (DTER, p. 2-15.)

Most importantly, although NRC staff supposedly has left open its ultimate conclusions regarding certain geologic

stability issues, NRC staff impermissibly assumes that the Atlas plan will comply with Appendix A standards. For example, NRC staff conducts an analysis of seismic potential "based on the assumption that the Moab Fault is not a capable fault." (DTER, p. 2-16, emphasis added.) Although NRC staff admits that its "analysis would have to be revised if the Moab Fault was found to be a capable fault" (DTER, p. 2-16), NRC staff's decision to proceed in this manner is not reasoned scientific decision-making. NRC staff first should remedy the numerous deficiencies in the DTER as discussed above and only then, after setting forth an adequate and comprehensive analysis that fully complies with the applicable regulatory requirements, close the remaining open geologic stability issues.

III. NRC Staff's Evaluation of Geotechnical Stability is Deficient.

A. Site and Material Characterization (DTER, § 3.2.)

NRC staff is required to review Atlas' plan to determine if it has presented a "detailed and quantitative discussion" of the sampling procedures used to define "all the critical soil parameters for the site." (SRP, pp. 18-19.) Included in this requirement is NRC staff's obligation to evaluate the borrow materials. NRC staff's discussion of the investigation of borrow areas does not include any reference to the riprap borrow materials. In light of Atlas' recent decision to abandon its use of Round Mountain rock for riprap, there is no Atlas plan which is ready to be evaluated. Until Atlas presents a final riprap borrow plan, the NRC staff cannot evaluate fully geotechnical issues.

Furthermore, as part of its evaluation of Atlas' geotechnical information, NRC staff is required to review historic groundwater fluctuations. NRC staff has failed to require Atlas to conduct any groundwater fluctuation studies as part of its geotechnical investigation. Therefore, because of its failure to review this information, NRC staff's analysis is incomplete.

Finally, although NRC staff finds that Atlas' geotechnical evaluation is deficient because Atlas has not assessed the geotechnical stability of the "tailings and contaminated material" in the Atlas tailings pile, NRC staff refuses to require Atlas to remedy the situation prior to license approval. Instead, on this critical health and safety issue, NRC staff intends to allow Atlas to conduct its testing while Atlas is constructing the pile's cover. Thus, NRC staff is not demanding strict compliance with the regulations requiring that Atlas demonstrate the waste pile's ability to withstand the construction activity. Instead, NRC

staff intends to approve Atlas' plan prematurely, and hope that no problems are encountered during the construction activity. NRC staff's approach inexcusably 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.)

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 5h:1v, 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 5h:1v, 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 10h:3v over most of the pile, except at the southwest corner where the slopes will be 10h: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' side slopes 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.[5/] 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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[5/] 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. (DTER, pp. 3-4, 3-5.) 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' field 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 licensing 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, § 6.2.3 (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^{-7} 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 (K) values" are being imposed. (SRP, p. 23.) Indeed, permeability test results of 10^{-8} to 10^{-10} 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 understates 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 Klondike Flats clay is "near 10^{-7} cm/sec." (DTER, p. 3-7.) NRC staff does not state how "near" to 10^{-7} 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 will impose 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^{-7} 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. 2-25 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 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 Atlas 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. (UMTRA-DOE/AL 050425.0002, Technical Approach Document, Rev. II, Dec. 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 DTER 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 DTER, 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.

A. Hydrologic Description and Site Conceptual Design (DTER, § 4.2.)

In order to analyze the impact of site-specific hydrology on the Atlas Site's ability to withstand erosion, NRC staff must accurately and fully describe the Site's surface water hydrology. NRC staff has failed to perform this fundamental task. NRC staff's mistakes on this issue undermine the conclusions it reaches on the Atlas Site's compliance with the licensing requirements pertaining to erosion protection. Specifically, NRC staff fails to analyze adequately the impact of the Probable Maximum Precipitation and Probable Maximum Flood events on Atlas' proposed design. NRC staff states that "[t]he design basis events for design of erosion protection include the Probable Maximum Precipitation (PMP) and Probable Maximum Flood (PMF) events, both of which are considered to have very low probabilities of occurring during the 1000-year stabilization period." (DTER, p. 4-1, emphasis added.) However, NRC staff's conclusion about the low probabilities of these events are misleading. The very nature of PMP and PMF calculations are that they are low probability events. However, according to NRC policy, it is still necessary to construct designs which protect against these events because, despite the low probability of their occurrence, PMP and PMF events have potentially catastrophic consequences. (SRP, § 3.) Thus, the fact that PMP and PMF have low probabilities of occurrence just restates the obvious and begs the question of whether Atlas' radioactive waste pile's cover will collapse when these events do occur.

Furthermore, despite the low probability of PMP and PMF events, over the past 40 to 50 years, the Southwest has experienced many storms and floods which approach the estimated PMP and PMF events (U.S. Dept. of Interior, Comparison of Estimated Maximum Flood Peaks With Historical Floods, 1986.) Indeed, in the DEIS, the NRC states that the largest flood of record along the Colorado River in Utah occurred in 1984 and "anecdotal evidence indicates that the 1984 flood rose approximately 1.2 m (4 ft) above the toe of the tailings pile." (DEIS, p. 3-18.) Rather than minimizing the likelihood of PMF and PMP events occurring, NRC staff should quantify the impacts of those events and require that Atlas prove that its cover design can withstand them.

B. Flooding Determinations and Water Surface Profiles (§§ 4.3 and 4.4.)

As to flooding and water surface profiles, NRC staff has failed to collect sufficient data to verify or to review independently Atlas' models or conclusions. Although NRC staff is required to review water surface profiles, channel

velocities, and shear stresses associated with flood discharges (SRP, p. 28.), the staff has not collected sufficient data to do so. NRC staff's evaluation in this regard is deficient.

In order to evaluate the stability of the pile, NRC staff must verify that Atlas properly selected the critical design flood event. We question whether Atlas has selected the critical design flood event in light of the analyses of the PMF and frequency-based flood data presented in Table 4-3. (DTER, 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. (DTER, p. 4-12.) To verify Atlas' conclusions, NRC staff performed a sensitivity study for a large flood discharge up to 600,000 cfs. (DTER, p. 4-12.) However, NRC staff also should have completed 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, NRC staff fails to use conservative assumptions and thus casts doubt on its conclusions. For example, NRC staff finds that low flow velocities during the PMF are due to the Portal, a narrow gorge two miles downstream of the Atlas Site. (DTER, 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 give 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, NRC staff underestimates 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, NRC 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, NRC 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, NRC 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. NRC 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, NRC staff used non-conservative assumptions to calculate flood flows past the Atlas Site. NRC staff's improper use of the HEC-2 model underestimates the impact of the PMF on the tailings impoundment. Without more conservative modeling, NRC staff cannot determine whether the proposed design will protect the tailings.

NRC 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; NRC staff has inappropriately accepted Atlas' conclusion to the contrary. (DTER, p. 4-13.) NRC 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." (DTER, p. 4-13.) NRC staff also admits that, "because quantitative proof of bank stability was not provided, it is prudent to design the pile for such an occurrence." (DTER, p. 4-13 to 4-14.) Even in the DEIS, the NRC 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 concern and uncertainty, in the DTER the staff concludes "that it is unlikely that the river will migrate as far as the tailings pile within the next 200-1000 years." (DTER, p. 4-13.) Once again, NRC staff fails to take a conservative approach to evaluating threats to the integrity of the pile.

NRC 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 closer to the Atlas pile.[9] Thus, the Colorado River's westward 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 vegetation on either side of the Colorado River. Since 1950, tamarisk has grown on both sides of the river, but is especially dense on the east bank/Moab slough side of the river. The dense tamarisk stand increases the river's propensity for westward

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[9] Grand County Council's aerial photographs are available for inspection by NRC staff at staff's convenience.

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 aggrading or actively eroding is not relevant to the context of extreme events such as the 500-year flood or the PMF. (See DTER, 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 ½-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 towards the Atlas pile, NRC staff has no basis for not 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, Slick Rock, Naturita, 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. (DTER, p. 4-13.) This rock is proposed to be an average diameter of 11.2 inches. (DTER, 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 deterred 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.

C. Erosion Protection (§ 4.5.)

NRC staff's evaluation of the erosion protection features, or lack thereof, in the Atlas design is deficient in at least three respects.

First, NRC staff provides no support for its acceptance of Atlas' oral 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 experience on 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.

Second, NRC staff apparently does not recognize that rock with a nominal diameter of 1.3 inches is difficult, if not impossible, to construct in a layer of 4 inches. At 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.

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 <65 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 leave in a floodplain. NRC staff improperly accepts Atlas' proposed plan without fully considering the serious threats to long-term stability from the surface water. NRC staff'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. 30.) Thus, the DTER should be withdrawn until these deficiencies can be corrected.

V. NRC Staff Inadequately Addresses Water Resources Protection at the Atlas Site.

A. Introduction (DTER, § 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. 39.) 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. (DTER, 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 have become "impracticable."

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 impacts 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 10h:3v (which violate Criterion 4), channels on the cover surface, and the permeability of certain cover materials such as Mancos 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 (DTER, § 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 the characteristics of the waste, the hydrogeological characteristics of the area, the groundwater flow, the current and future uses of groundwater, as well as the potential risks to human health, wildlife, and vegetation. Similarly, the NRC's Final Standard Review Plan provides that the site characterization must assess "both quantitative and qualitative estimates of the impact to 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 ground-water 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. (DTER, 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."

(SRP, p. 48.) NRC staff should review and discuss maps illustrating monitoring locations, descriptions of monitoring devices, distribution of contaminated materials, historical changes in flow, laboratory data for hazard constituents and indicator parameters, assessments of variations in water quality, identification of off-site sources, and quality assurance of sampling. (SRP, p. 48-49.) In addition, NRC staff has only collected or presented data for selenium, combined radium-226 and -228, uranium, and total dissolved solids, and not for the full panoply of expected contaminants. (DTER, p. 5-10.) Furthermore, any analysis of this data is questionable because the background well AMM-1 may be influenced by contaminants from the former ore storage pad. We agree that this is an open issue and, if this issue is not resolved, NRC staff cannot evaluate the true extent of contamination. Not only has NRC staff has failed to review sufficient data, but the limited data which NRC staff has reviewed clearly establishes that the levels of contaminants exceed water quality standards.

2. Contaminant Characterization

NRC staff has inadequately analyzed the tailings leachate in order to evaluate the presence of all possible contaminants. NRC 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 2.1-3 of the DEIS.[7] NRC 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, NRC staff must verify that the monitoring wells were properly constructed. For example, at one Title I site, in Falls City, Texas, NRC staff rejected several monitoring wells because they were improperly constructed. If these wells are not properly constructed, the sampling data will be skewed.

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[7] The two tables should show identical data, yet they do not. (See DTER, p. 5-13 and DEIS, p. 2-8.) Which table is correct? Which data should be relied on? How have these errors affected NRC's conclusions? NRC staff should answer these basic questions about inconsistencies within NRC's own documents.

3. Extent of Contamination

Another serious deficiency in NRC staff's analysis of water resources is its analysis of the extent of groundwater contamination. In the Title I program, the NRC requires DOE to study the extent of existing groundwater contamination, even when DOE proposes to defer groundwater clean-up. (SRP, p. 48.) The NRC 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, NRC 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 NRC completely ignores these requirements. Although the NRC required Title I sites to meet these expectations, NRC staff fails to apply these standards to its own or Atlas' analyses. NRC staff's analysis is particularly inadequate for several reasons.

First, NRC staff fails to provide data showing which constituents have migrated from the pile and which constituents exceed standards at each monitoring station. In fact, NRC staff only provides data for one constituent, total dissolved solids. (DTER, p. 5-11, Tables 5-3, 5-4.) Table 5-9 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, NRC staff must verify that the data in these tables is valid, including whether the sample sizes are statistically representative.

Second, NRC 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." (DTER, p. 5-15.) However, NRC staff does not provide a sufficient basis to support this statement. Rather NRC staff reaches this conclusion merely by comparing water quality at various depths. (DTER, p. 5-15.) NRC staff does not include any of this data in the DTER, nor does NRC 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.[8] 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 necessitate 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 5 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 program. (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.

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[8] 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.

Grand County Council, in its response to the DEIS, criticized several aspects of NRC's poor analysis of groundwater contamination and the impact of tailings leachate on groundwater and surface water. Those comments should be considered incorporated in this response to the DTER. In summary, NRC staff's conclusions that there are no potential health impacts from Atlas' tailings leachate is not supported by adequate investigation or appropriate analysis.

Despite the inadequate testing program, NRC staff admits that it has accepted Atlas' conclusion that there is only one acceptable plan for dealing with the tailings leachate and resulting groundwater, surface water, and sediment contamination. Not surprisingly, that "corrective" action plan is to allow Atlas to construct its cover and let the pile leak for eternity. (DTER, p. 5-21.)

It also is not surprising to learn that the sole basis for NRC staff's acceptance of Atlas' groundwater contamination plan is that any other plan would cost Atlas too much. (DTER, p. 5-21.) Nowhere in the DTER does NRC staff explain how they conducted the cost-benefit analysis necessary to determine that Atlas' plan was preferable. Indeed, it is hard to imagine that any such analysis was conducted since NRC staff apparently accepted Atlas groundwater contamination plan before NRC's DEIS was performed. The DEIS was NRC's first, albeit flawed, attempt to analyze the environmental costs and or benefits of Atlas' reclamation plan. Thus, NRC staff would not have had information on environmental costs benefits when it supposedly determined that all other groundwater protection plans were "unreasonably costly, when comparing the risks to benefits." (DTER, p. 5-21.)[9/] NRC staff has acted in dereliction of its duty to protect the public health and safety and the environment by its ill-considered acceptance of Atlas' groundwater contamination plan. NRC staff's inappropriate acceptance of Atlas' position underscores the necessity of bringing the evaluation of Atlas' compliance with all groundwater protection standards back into the public TER process.

9/ 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.)

NRC policy provides that "implementation of ground-water 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 severance of water resources protection from the analysis of surface reclamation violates this guideline in two respects. First, NRC staff has severed more than the implementation phase of groundwater remediation. NRC staff has also severed from consideration 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.)

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 UMTRA 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).[10] 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 UMTRA Title I Project designs 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-raffinate 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 UMTRA Project sites such as Ambrosia Lake, New Mexico, and Riverton, Wyoming. NRC staff's failure to address off-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 (19.8 $pCi/m^2/s$), coarse tailings (18.5 $pCi/m^2/s$), and sideslopes (19.15 $pCi/m^2/s$). Each of these values is dangerously close to the 20 $pCi/m^2/s$ 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 $pCi/m^2/s$. Atlas's test methods, and NRC staff's partial approval of those methods, does not constitute a technically defensible approach to radon attenuation cover design.

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[10] 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.)

B. 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. (See Technical Approach Document, UMTRA-DOE/AL 050425.0002, 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 UMTRA Title I Project determines background concentrations by taking at least 5 borings 5 to 6 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 plants, especially invasive and aggressive, deep-rooted plants such as salt cedar (i.e., 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 8 inches of rock armor at Shiprock were insufficient 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 2.4.2.1., it fails to identify the same issue with respect to cover integrity. Experience at Title I sites, such as Tuba City, demonstrate 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 cavalierly states that if the proposed cover fails radon flux tests after it has been completed, "staff could require corrective action such as additional radon barrier material." (DTER, p. 6-12.) This statement rests on two unsupported assumptions. First, that if Atlas's inadequate characterization of the tailings pile leads to a cover failure, it can be easily fixed by slapping on more cover. Second, that Atlas will still be around to perform 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 borrow clays, or the proper background concentrations of Ra-226 in Moab Wash 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 lulls one into a false belief that NRC staff has used conservative analytical techniques to insure 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 evaluated publicly, thoroughly, 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 development at those 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, NRC staff's reference to the distance to Moab by road miles is highly misleading. Similarly, NRC staff overstates the distance between the Atlas 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. NRC staff's deliberate dissemblance on this issue is made apparent by its failure to include Arches National Park on the only location map included in the DTER. (See DTER, p. 1-3.) Furthermore, in its discussion of recreational and tourist uses, NRC staff states, "Adjacent . . . waters are used for a variety of activities." (DTER, 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.

NRC staff's other attempt to mislead the reader on the "remoteness" 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, NRC 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. NRC 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 NRC 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 NRC staff does not have a true appreciation for the serious implications of its actions both for individual citizens and for the environment. NRC 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

NRC 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, NRC staff has severed groundwater protection standards from the overall licensing requirements of the reclamation plan. Although NRC 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 DTER and SRP, 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. (DTER, §§ 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 addressed at the same time that NRC staff considers other technical criteria. (See SRP, p. 3.)

NRC 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 NRC used to evaluate the Atlas Site. Thus, without fulfilling NEPA procedures, NRC staff impermissibly concluded that Atlas' groundwater "reclamation" plan was acceptable because it was the least costly to Atlas. Whatever the reason NRC 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 NRC 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 Section VII of the DTER, NRC staff concludes that Atlas has demonstrated that the cover design will protect against erosion and dispersion by natural forces. However, this conclusion is inconsistent with NRC staff's own prior analysis of Atlas' proposal in the DTER. In the DTER, Section 4.5, NRC staff found that, because Atlas' riprap cover design had not been submitted for NRC's review, Atlas' plan was not acceptable to demonstrate adequate erosion protection. Indeed, because Atlas has no real plan for obtaining adequate rock for its cover, Atlas' plan is not ready for review in this DTER process. Furthermore, NRC 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 NRC staff recognizes, NRC staff's conclusion that Atlas' design protects against erosion and disturbances by other natural forces is without merit or basis in science. NRC staff must be forced to acknowledge that, also on this third ground, the Atlas plan does not meet Criterion 1.

4. No Active Maintenance Required

The NRC staff also concludes that the tailings pile 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 staff's conclusion cannot be supported on this record. As set forth above, the NRC staff has failed to account for bio-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 PMF 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 cannot determine 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 Appeal 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 excusing Atlas from meeting this clear licensing requirement is that a below-grade disposal would be "economically impracticable." (DTER, 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 pile 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 criterion are met" (which itself is but a wild guess, at this point), "the benefits over stabilizing the tailings in place would be negligible." (DTER, 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 Atlas tailings pile 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. 2-26.) The NRC also concludes that the Atlas plan has "significant, long-term impacts" to the environment. (DEIS, p. 2-25.) In addition, the NRC reports that, as compared to the Atlas Site, the below-grade alternative, the Plateau site, better complies with all the Appendix A licensing criteria. (DEIS, p. 2-26.) 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 DTER, not only does NRC staff ignore the conclusions in the DEIS, but NRC staff also then relies upon one further other 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." (DTER, 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 DTER 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 Council's comments in response to Draft Environmental Impact Statement, April 29, 1996, 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 polemical. (DTER, p. 7-3.) This

conclusion, unsupported by fact or anlaysis, serves only to reveal NRC's unwavering 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 water erosion. Thus, because Atlas' plan does not protect against either water or wind protection, 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 how 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/m^2s. 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 1000 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 pile, the background concentrations of Ra-226 in the vicinity of the pile (see also Criterion 6(5)), or the properties of the proposed cover material. 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 with rock covers twice as thick as that proposed at the Atlas Site. (See, UMTRA-DOE/AL 40067.0000, Vegetative Growth Patterns on Six Rock-Covered UMTRA Project Disposal Cells, Feb. 1992; DOE/AL/62350-200, Rev. 1, UMTRA 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 pile. 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 policy issue presented by the Atlas Site. The NRC must decide whether Atlas' plan is the best plan for the permanent disposal of 10.5 million tons of radioactive waste. In issuing the DEIS, the NRC took two steps forward in answering that question. First, it determines 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. xxi.)

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, e.g., DEIS, pp. 2-6, 2-13.) 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 the NRC'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, not whether it is the best plan. However, NRC staff demonstrates that it is doing more than dispassionately 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 weight 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 have 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 UMTRCA).) 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." (Id.) 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 receptive to environmental concerns and consistent with the [NRC's] responsibility . . . for protecting the radiological health and safety of the public." (10 C.F.R. § 51.10.) 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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BY HAND DELIVERY

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Re: Draft Environmental Impact Statement Related to Reclamation of the Uranium Mill Tailings at the Atlas Site, Moab, Utah; Source Material License No. SUA 917

Dear Mr. Holonich:

Grand County Council, the governing body for Grand County, Utah in which the Atlas Site is located, provides the following comments with regard to the Draft Environmental Impact Statement ("DEIS") concerning the Atlas Site issued by the U.S. Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards ("NRC") on January 30, 1996.

As these comments establish, the DEIS is inadequate and legally insufficient under NRC's own regulations and the requirements of the National Environmental Policy Act ("NEPA"). In effect, the NRC has written Atlas an environmental blank check, which will be paid for by the health and safety of the Moab community and its visitors, by the Colorado River ecology, and by the taxpayers.

Because the DEIS fails to comply with the NRC's regulations and NEPA, the DEIS must now be reconsidered and revised, to ensure that full consideration of environmental alternatives, impacts, and effects is undertaken before the reclamation project at the Atlas Site continues. If the NRC instead proceeds with this DEIS, then Grand County Council

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. Marsh, 568 F. Supp. 985, 1000 (D.C. Cir. 1983); 42 U.S.C. § 4332(B).)

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. Hodel, 865 F.2d 288 (D.C. Cir. 1988).) 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. Rather 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' cost 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. xxi.) 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 (1)(B); 10 C.F.R. § 51.10(b); National Wildlife Federation v. Marsh, 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 be used by 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, eleven 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 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

that the unlined tailings pile, even after extensive work to date by Atlas to safeguard the pile, has tailings leachate "diffusing downward into groundwater, some of which moves horizontally and enters the Colorado River." (Id.) The uncovered pile also leaks radioactive radon gas into the air and radioactive dust may be blown into the air from the waste pile. (DEIS, pp. 1-3 and 1-4.)

This huge radioactive waste pile is located on the west bank of the Colorado River, across the street from Arches National Park, across the river from a wetlands preserve, and within the local floodplain. The Atlas pile is located within 1½ miles of residential development and approximately 2 miles from the heart of downtown Moab, Utah. (See map at DEIS, p. 2-2.)

The purpose of the DEIS is to evaluate the "potential environmental impacts and environmental suitability" of Atlas' proposal for permanent "reclamation" of the tailings pile. (DEIS, p. 1-8.) However, Atlas' proposal for "reclamation" is not to reclaim the pile or the environment which it has contaminated. Rather, Atlas is proposing to leave the pile in place, cover it with soil and rock, and wait until some future date, if ever, to address the contamination to groundwater, surface water, and the organisms, both human and otherwise, affected by those waters. Under Atlas' proposal, the long-term maintenance of the pile would be left to an unspecified state or federal government agency, generally, and to the taxpayers, specifically. The long-term risk of failure of the pile's cover would be left to the Moab community, the users of the unique resources in the area, and to their future generations.

B. The DEIS Improperly Analyzes the Atlas Proposal.

In its discussion of the Atlas proposal, the DEIS fails in four principal respects.

First, the NRC simply assumes that the Atlas reclamation plan can be designed and implemented without any adverse environmental consequences. For example, the NRC admits that Atlas' "pile design has not been finalized and details will change . . . ." (DEIS, p. 2-1.) However, without any factual support, the NRC simply states that these "differences are unlikely to affect the analysis of [environmental] impacts . . . ." (Id.) The NRC's conclusion has no logical or analytical basis.

How can NRC claim that a change in the design of the cover of a 10.5 million ton radioactive waste pile will have no effect, if NRC has no idea what the change will be? The

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 fortiori 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 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 riprap cover from the Castle Valley area. (See, Blubaugh, Richard E., 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.

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., sands, slimes), and samples collected from the bottom of the pile. (UMTRA-DOE/AL 050425.0002, Technical Approach Document, Revision II, Dec. 1989, pp. 202, et. seq.) These basic sampling requirements to determine the content and extent of hazard presented by the pile's radioactive leachate also should 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 known 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), not a single sentence describes 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, consider what corrective 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, as 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 fourth 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, Naturita, 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 a 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. 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 6-8 inch thickness. (See, UMTRA-DOE/AL 400677.0000, Vegetative Growth Patterns on Six Rock-Covered UMTRA Project Disposal Cells, Feb. 1992; DOE/AL/62350-200, Rev. 1, UMTRA Project Disposal Cell Cover Biointrusion 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.) 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 proposal . . . , 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 only 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. In reaching this conclusion, 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 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 DEIS' treatment of geological issues is rife 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 columns in Moab Wash 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. 3-7.) 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 in itself sufficient to have a major impact on pile integrity? How much is "some" localized upwelling that "may still" be active? Precisely where 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 that 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 also reports that saturated silt 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 motion 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.

B. Land Use.

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.[1/] The NRC must here describe and must later quantify and fully analyze 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 "[t]he 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.

1/ 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' conclusion that the existing groundwater quality 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 groundwater 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 25 years old, dating from 1971, and should be replaced with more current data. (DEIS, p. 3-17.) 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.[2] 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.[3]

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 river 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.

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[2] 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.

[3] Further information on the history and, therefore, likelihood of severe flood events through Moab Wash and Courthouse Wash are provided in the written comments addressed to the NRC by Saxon 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 adequately to 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 habitats 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, § 3.6.3.) 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 maintain spawning areas near the tailings pile, are obvious failings. 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, at 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 town 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 trucks transporting clay and rock to the site. The transportation route for this activity under the Atlas proposal is through the towns of Moab and Castle Valley at 10 to 12 trucks per hour during daylight hours. (DEIS, p. 4-4.) Since the DEIS was written, Atlas has abandoned its Castle Valley borrow plans. Atlas' new borrow plan must be detailed and analyzed before 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 outstanding geologic, soils, and seismic issues that could affect pile stability and cap integrity. For example, in purporting to analyze the potential effects

on the tailings pile resulting from future possible earthquake movement associated with both strong-motion 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.[4]

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 "cosmetic" 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 "cosmetic"). (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 causing 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 last dramatic image of a portion of the pile suddenly sinking into the aquifer. 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 earthquake damage at the Atlas Site is similarly flawed. The NRC admits that this potential "could be increased by ground motion

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[4] Indeed, no uranium mill tailing reclamation site can be licensed unless the owner can prove that the 1000-year, or at a minimum the 200-year, design standard has been met. NRC's failure to analyze these issues means that its analysis does not meet NEPA or UMTRCA requirements.

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 MCE 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 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; 4) the effects of migrating 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 outstanding 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 <u>any</u> of these significant issues. Public concerns about basic health and safety issues that would 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 geologic, soils, and seismic issues outlined above fails to comply with the NRC's most basic statutory and regulatory requirements.

C. Land Use.

The NRC's discussion of the Atlas plan's impact on land use is based on unsupported conjecture and vague, unspecified 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 -- wherever the riprap ultimately originates -- would actually be removed from other uses by borrow operations.[5] In addition, the NRC provides no analysis whatsoever of the land use impacts of providing access to the borrow sites.

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.

Again without defining or specifying in any way such crucial terms as "unlikely" or "significant," 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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[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.

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 whatsoever 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. First, the NRC's practice of analyzing 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, as its overall assessment of the "tailings contribution" that would be caused by the collapse of almost 2 million tons of radioactive waste into the Colorado River, that this 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 concentration levels, 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 factors that it presumes would reduce the contaminant concentration levels so that, "a few days after pile failure," contaminants 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, water use downstream "might be prohibited." (DEIS, p. 4-9.) Even so, the NRC contends, again without specifying any numerical values, that "no impact" would occur in Arizona, because the concentrations of any tailings contaminants would presumably be "extremely low as a result of dilution" by the time they reach Arizona. (DEIS, p. 4-10.) Again, the NRC resorts to unsubstantiated guesswork, rather than scientific decision-making, and assumes, from this sketchy discussion, that the

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 substances in the water and by deposition of tailings 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 enough 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. (DEIS, 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.) Even so, the NRC concedes, again without quantified analysis, that the tailings could "slightly" contaminate the urban lands downstream in the event of a 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 possible 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."[9]

Throughout its discussion of the environmental land use consequences, the NRC makes inadequate and unsupported

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[9] Furthermore, the NRC must, but does not now, consider the costs of such surveys and clean-ups in its discussion of the costs and benefits associated with reclamation alternatives.

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 constituents are leaching from the tailings pile. 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 constituents designated in § 261, Appendix VIII 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. In Table 4.4-1, the NRC only evaluates nine constituents and fails to disclose any information on the sampling protocol, such as the number of samples or the sampling locations. At a minimum, Table 4.4-1 should include data on arsenic cadmium, chromium, combined Ra-226 and Ra-228, and combined U-234 and U-238. As with the rest of 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 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 -- the rate at which water infiltrating the cover will flow through the pile and exit through the bottom of the pile carrying hazardous constituents -- underestimates the potential impact 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%. Not only is this arbitrarily chosen evaporation rate unsupported, but it overestimates 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 Atlas plan contemplates that leachate will seep through the bottom and sides of the pile, carrying contaminants into the alluvial aquifer and the Colorado River. To accurately analyze the impacts to groundwater, the NRC must use a more conservative and justifiable estimate of the likely evaporation rate.

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 "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 potential for contaminant migration and monitoring of migration "would be matters for consideration by DOE in its long-term surveillance plan and the State of Utah." (DEIS, p. 4-15.) 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 "[t]he 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 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 NRC 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.) First, the water quality data, as presented n 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/Green Rivers 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. 4-23 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 allow far too many other factors to influence the data. The downstream samples should have been collected within no more than a few miles of the Atlas Site. Furthermore, the NRC does not identify what other sources of contaminants are located in between the most upstream and the most downstream sampling locations. On the other hand, the NRC's reference to Grand Junction's contribution to the higher alpha count downstream, as compared to upstream, of the Atlas Site is unwarranted because the Grand Junction site is upstream of all the sampling stations and would be accounted for in the upstream samples. (DEIS, p. 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 analyzed site-specific data in order to determine the Atlas pile's direct impact on

surface water quality. The NRC fails to identify the exact contaminants which the pile contributes to the river and the concentrations of those contaminants. For example, the NRC states that, "[g]iven 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, emphasis added.) Given the NRC's uncertainty, the NRC or Atlas should collect sufficient data to determine whether the pile is in fact contributing a significant fraction of these contaminants or other contaminants. Referring to levels of ammonia toxic to animals, the NRC goes on to state that "no evidence has been found that such concentrations have occurred in the Colorado River in the vicinity or downstream of the Atlas tailings pile." (DEIS, p. 4-27.) However, there is no evidence of ammonia concentrations because neither Atlas nor the NRC has conducted any sampling to determine the level of ammonia coming from the pile. Once again, the NRC 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 NRC admits that "[w]ith respect to river sediments, contamination concentration data is quite sparse." (DEIS, p. 4-27.) Indeed, the NRC 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 NRC embraced Atlas' bad science and reached erroneous conclusions from that non-representative data. Since the sediment sampling is admittedly inaccurate, the NRC 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 NRC should evaluate sediment and soil samples from Moab Wash, the riparian plant communities along the river, and the marsh across the river.

Third, the NRC'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 NRC, 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 NRC 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 NRC 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 NRC 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 NRC has reviewed has been inadequately analyzed to determine the site-specific impacts on the river.

F. Ecology.

The NRC 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 NRC identifies leachate from the tailings pile as a continuing source of groundwater contamination at the site. (DEIS, p. 4-33.) The NRC 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 impacts 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."

(DEIS, p. 4-49.) However, the NRC nowhere provides the public opinion survey data upon which the NRC relied to reach this conclusion. Indeed, the public outrage expressed at the public meeting on the DEIS indicates that scientifically obtained data may indeed prove that public perception of the pile may have a wide variety of consequences which the NRC has ignored. Similarly, the NRC makes completely unsupported statements that Atlas' proposal, once implemented, will have no discernible effects on recreation resources or public services.

The NRC patronizingly concludes that the tax revenue loss due to the Atlas plan is not "significantly adverse." (DEIS, p. 4-56.) In fact, even under the NRC's calculation, the Atlas proposal will cause a loss of between $134,000 to $224,000 of additional revenues per year. Grand County current General Fund Property Tax revenues are $824,000. Thus, Atlas' plan will cause Grand County to lose an additional 16% to 24% of yearly tax revenue. If the NRC or Atlas truly thinks this loss is insignificant, Grand County Council expects one of them to reimburse the community for this loss.

The NRC's unscientific approach to analysis is demonstrated repeatedly in its failure to recognize the true adverse consequences of a pile failure. The NRC blithely asserts that the consequences of a pile failure will be short-term and that no real contamination will occur either downstream or to Lake Powell. As discussed above, Grand County Council questions the NRC's unsupported dismissal of the long-term physical consequences of pile failure. Furthermore, the NRC has no support for its conclusion that a pile failure will have no long-term impact on recreation and public services. While recognizing that a pile failure "could result in substantial economic loss" (DEIS, p. 4-55), NRC still concludes that this economic loss would have no significant long-term effect. (DEIS, p. 4-56.) Again, the NRC's conclusion is based on pure supposition and guess.

Moreover, when the NRC clearly calls for a quantified analysis of the environmental costs, it fails to complete one. For example, the NRC admits that increased truck traffic will cause a loss of local sales revenue, but it does not attempt to quantify that loss. Nor does the NRC quantify the expected costs of truck accidents, whether to property or to the Moab infrastructure. Throughout the NRC's discussion of these resources, the NRC fails to quantify, or even attempt to quantify, the environmental costs of Atlas' proposal. Indeed, the only cost that the NRC quantifies is the cost to Atlas of repairing the roads Atlas is expected to destroy by its trucking activities. The Utah DOT has stated that Atlas should repair those roads. The NRC summarily

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 economic 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 loss 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 reclamation design is technically safe, the pile's stigma 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 stigma effect of the Atlas proposal must be considered in any evaluation of economic environmental consequences.

The only irreparable 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 landscape. The NRC's willingness to allow Atlas to take any action, regardless of its environmental consequences, permeates the entire DEIS. The NRC's bias in Atlas' favor, once exposed, makes suspect the NRC's conclusion that the Atlas proposal is acceptable.[2]

NRC's analysis of the Atlas proposal's impact on socioeconomic resources also discusses historic and cultural resources. (DEIS, pp. 4-62 to 4-63.) The NRC suggests that Grand County Council may wish to erect an "historic marker" at the Atlas Site to denote its historical importance "relative to the Cold War, nuclear power development, and other subjects." (DEIS, p. 4-63.) Grand County Council

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[2] 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. 4-5, 4-42, 4-44, 4-52.) Atlas' deposition of radioactive wash along the banks of the Colorado River, albeit pervasive, is hardly "normal."

agrees that the only remnant of the Atlas Mill that should remain is a plaque describing its historical significance. However, in fact, the NRC is requiring a different historic monument for the site -- a 110-feet 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.

H. Radiological.

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 heterogenous 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 construction 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 brief construction 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 surface 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 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, § 4.9.3) 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."

(DEIS, p. 4-93.) However, the NRC does not analyze adequately even the existing levels of contamination upon existing land uses, much less the contamination that would be added to the river after a tailings pile failure. That the cumulative impacts from such a "hypothetical" event "should be too slight to have any appreciable long term cumulative impact on land uses along the river" is a completely unsupported assertion. (DEIS, p. 4-93.) The NRC should exercise both better science and better judgment in a considered analysis of potential cumulative impacts in the DEIS.

The cumulative impacts of possible differential settlement over varying thicknesses of alluvium is a seismic/salt dissolution issue which the NRC has completely failed to address in the DEIS. For example, how predictable and severe are the results of seismic movement, such as on the West Branch of the Moab Fault down the Colorado River, as interpreted through different geologic structures underlying different parts of the tailings pile? The NRC needs to determine whether the part of the tailings pile underlain by a great thickness of wet alluvium could behave differentially during a seismic event than the part of the pile underlain by drier, thinner alluvium and competent bedrock on top of the Paradox Formation. For example, 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? Without this vital technical data, the NRC does not have sufficient information to confidently assign probabilities to site deformation which could threaten cap integrity. Without this data, the NRC cannot competently assess the cumulative environmental consequences of the outstanding seismic/salt dissolution issues.

Another serious omission in the NRC's discussion of cumulative impacts is the failure to address the full impact of the permanent loss of floodplains as a result of the Atlas proposal. In the arid Southwest, the permanent loss of floodplains and/or wetlands adjacent to a perennial stream is a serious impact. Moreover, the NRC does not disclose the total area of the 100-year floodplain that would be permanently occupied by the tailings pile, debris pits, drainage ditches, and cut-off wall. This total area, and not the mere "3 acres" of floodplain which will have to be added to this permanent loss as a result of further reclamation activity, represents the true cumulative impact. (DEIS, p. 4-97.) By ignoring the total amount of Atlas' occupation of floodplain, the NRC further understates the benefit of the Plateau Site Alternative. Under this alternative, the entire floodplain area, consisting of more than 100 acres, would be restored.

Thus, the NRC's discussion of "cumulative impacts" perpetuates the faulty analysis evident throughout the DEIS. First, the NRC 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 NRC dissects the plan's detrimental effects into small segments and dismisses each one of those segments as unimportant. In fact, the NRC is forced to note many significant, long-term adverse consequences of the Atlas plan. (DEIS, p. 2-25.) However, the NRC never discusses the cumulative effect of these consequences on the public health or environment. Thus, the NRC'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 NRC's flawed analysis is repeated, albeit in summary fashion, in the discussion of unavoidable adverse environmental impacts. Grand County Council will not repeat its comment of the NRC's analysis of those impacts. However, we wish to note that, even given a flawed analysis, the NRC 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 NRC 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 NRC's repeated admission that the Atlas plan would have significant, long-term adverse environmental impacts. In fact, the DEIS demonstrates that the NRC 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 NRC finds that the Atlas plan will cause only limited commitment of resources. Again, the NRC disregards the environmental impact of the Atlas plan. The NRC understates the irretrievable and irreversible commitment of Moab's residents, visitors, and entire natural environment to a permanent radiological threat. The NRC also does not address whether publicity about the pile and the resulting

stigma could irreversibly and irretrievably devastate Moab's economy. Finally, the NRC 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 NRC's Purported Cost-Benefit Analysis.

The NRC's purported cost-benefit analysis suffers from several infirmities. Overall, the NRC's cost-benefit analysis is unacceptable because it analyzes and weighs the wrong factors. NRC 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, NRC 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 NRC 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 NRC's "cost comparison" component of its cost-benefit analysis.

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

Second, the NRC refuses even to consider the costs associated with the hypothetical maximum failure of the tailings pile because those costs are "highly speculative." (Id.) The NRC'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 NRC 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 no reason to avoid discussing its 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, NRC fails to give due consideration to the true costs to the environment of the Atlas proposal.

Third, the NRC's cost comparison is deficient in its analysis of average Title I and Title II UMTRCA sites. NRC 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 fundamental logic, when comparing two sites, NRC should only compare those costs that are fairly comparable based on site characteristics. Then, NRC 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, NRC manipulates this average per-ton data to try to lend credence to Atlas' cost estimates and to the NRC's pre-ordained conclusion that the Plateau Site Alternative would cost significantly more than the Atlas proposal. For example, the NRC 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, ORNL, 12/05/95.) The NRC fails to take into account whether Mr. Ferdinand's cost estimates are objective and verifiable, particularly in light of the fact that Mr. Ferdinand represents the Title II regulated community. Moreover, the NRC fails to consider whether Title I costs may be higher than Title II 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 NRC, 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 NRC 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 NRC 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. NRC also rejects the comparison of Atlas' estimate 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 NRC 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 disposal-in-place reclamations. Indeed, the high cost of reclamation-in-place at Ambrosia Lake and Shiprock demonstrate that these costs should be a floor for what NRC 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 less costly than the costs to be expected at the Atlas Site.

Fifth, in its summary of its cost comparison, the NRC admits that it has conducted a comparison that does not control for site-specific factors. DEIS, p. 5. Thus, despite failing to undertake an analytical approach to testing the accuracy of Atlas' estimate, the NRC, without bases in science or mathematics, improperly concludes that Atlas' cost comparison is valid.

Sixth, the NRC seeks to justify its faulty conclusions by relying on outdated data. The NRC fails to explain why comparison to generic costs developed sixteen years ago provide any support for the acceptance of Atlas' cost estimates. The NRC also fails to explain which actions in the 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 NRC has failed to undertake a true cost comparison, relying instead on outdated and unexplained data.

Finally, the NRC 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 NRC's strict rock durability requirements have forced DOE to haul rock as much as 200 miles at Title I sites (e.g., Falls 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 NRC or any other agency to evaluate the environmental cost of that borrow activity and transport. Similarly, NRC'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 NRC, other government agencies,

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 1½ 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 Misleading 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 insupportable conclusions regarding the environmental effects of the Atlas proposal. For example, NRC concludes that no cost would occur because Atlas' tailings leachate do not affect "groundwater being used." 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 has no effect on the environment 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 vitiate 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(C); 40 C.F.R. §§ 1503.1(a)(1) and 1503.4(a).) Most notably, although the NRC has agreed to use the National Park Service as a consulting agency, it has

not incorporated that agency's comments or directions. Specifically, the NRC unjustifiably refused to require Atlas' compliance with the water and sediment sampling regimen demanded by the National Park Service.

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 analyzing 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 integration 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 I 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. xxi.) 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 reconsiders 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

By: Gabrielle Sigel (by SMC)
One of its attorneys

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cc: The Honorable Albert Gore,
Vice President of the
United States

The Honorable Michael O. Leavitt,
Governor of Utah

The Honorable Orrin G. Hatch,
United States Senator

The Honorable Mike Dmitrich,
Utah State Senator

The Honorable John McCain,
United States Senator

The Honorable Keele Johnson,
Utah State Representative

The Honorable Jon Kyl,
United States Senator

The Honorable Robert F. Bennett,
United States Senator

The Honorable George Miller,
United States Representative

The Honorable James V. Hansen,
United States Representative

The Honorable Bill Orton,
United States Representative

The Honorable Enid Waldholtz,
United States Representative

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C.V.S.R. Box 2310
Moab, Utah 84532
April 28, 1996

Joseph Holonich, Chief
Department of Water Management
Office of Nuclear Materials
Mail Stop TWFN7J-9
Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

As you can see by the letters that I have sent to all the elected representatives in Washington from the State of Utah, I feel very strongly that the health and future prosperity of the residents of Moab, Utah are far better served by moving the enormous uranium tailings pile that is dangerously close to Moab to Klondike Flats, a relatively short distance over existing railroad tracks than by capping the pile in place.

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 Atlas Minerals.

Very truly yours,

John E Powers

9605100043-5pp

Attachment 3

Letters sent to:
President Clinton
Senators Hatch
Bennett
Representatives Green
Hanson
Orton

C.V.S.R. Box 2310
Moab, Utah 84532
April 28, 1996

Subject: Moving the tailings pile presently located on Atlas Minerals' property in Moab, Utah.

SUMMARY

The uranium tailings pile located a bare three miles from the center of the booming vacation town of Moab in southeastern Utah poses a very real threat to the lives of people who live in Moab and to Moab's future prosperity. Disaster will probably not strike tomorrow but probably will strike sometime during the next millenium, 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 Moab and their progony and in violation of a great majority of their own guidelines. The pile can and should be moved.

The purpose of this letter is to call to your attention the manner in which the NRC has flown in the face of their own guidelines. I assume that these guidelines were established by the Congress and/or the Executive Branch acting in behalf of their constituents - or they should have been.

I have a special interest in this matter not only because I am a resident of Grand County but especially because my daughter lives in

the town of Moab. The house that she lives in and owns is located in the flood plain of the Colorado River 1-2 miles from a tremendous pile containing huge amounts of radioactive and toxic materials. It is certainly possible - may probable - that her property could be inundated with this deadly material within the 1,000 years period used by the NRC as one basis for the Draft 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 geological faults. One of these, the Moab Fault, has slipped about half a mile over geological time. No one can convince me that it won't slip another ten feet in the next millenium! If a slip of only ten feet occured, the pile could end up in the Colorado River. Some would end up 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 Arches National Park. Normally the stream that passes through Court House Wash carries very little water even though it drains a very large area. As one who has personally witnessed the devistating 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 maintain that sufficient water could flow through Court House Wash anytime within the next 1,000 years to bury my daughters house in radioactive/toxic slime. Perhaps - God forbid - tomorrow!

The NRC has ignored almost every one of their own guidelines in recommending that the pile be capped in place. This recommendation

has been made in spite of the fact that part of the pile is currently being leached into the Colorado River, the life blood of the southwestern United States and Los Angeles. 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 confirm to several vital NRC standards and will be inherently unstable with respect to 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 vastly superior site. No data has been furnished to substantiate this economic conclusion

It seems to me that if the NRC sanctions Atlas Minerals to cap the pile in place - which flys in the face of most NRC guidelines - ends up being accepted by the U.S. Government, our Government has thus assumed complete responsibility for any and all results of future disasters related to this pile - whatever and whenever such disasters may occur. Located little more than a mile or two from the booming town of Moab, Utah - and much less distance from Arches National Park which attracts tourist from all over the world by the millions - such a disaster could ruin much life and valuable property. The net result is that the U.S. Government would be taking on tremendous liability to save a few dollars for a Corporation, Atlas Minerals. More corporate welfare - in the amount of billions of dollars!

The net result of this and many additional factors dictates that the pile should not be capped in place but, instead, be moved 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 Klondike 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 this pile although noone 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 capping it in place.

Whatever decision is made, the health of the residents of Moab during the entire coming millennium should be of primary concern - not just the financial condition of Atlas Minerals. Maybe my daughter won't be buried in radioactive/toxic slime but what about my grandchildren or future progeny? 1,000 years covers some 50 generations. Unimaginable! Lets not create a situation that constitutes a real danger to future generations.

MOVE THE PILE!

Very truly yours,

John E Powers
Resident of Grand Co., Utah
and father of Judy Powers,
resident of Moab, Grand Co,
Utah

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15 May 96

Joseph J. Holonich, Chief
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Division of Waste Management
Office of Nuclear Material Safety and Safeguards
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U.S. Nuclear Regulatory Commission
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Dear Mr. Holonich:

On Monday, May 13th, I met with NRC attendees at a site visit of the Atlas Moab facility to observe characteristics that relate to several open issues identified in the dTER, NUREG-1532, published in Jan. 96.

The NRC attendees brought with them copies of the photos that I sent in with my comments in April showing the lateral migration of the river over the past 45 years. Since then I have been able to have two photos, 1975 and 1995, scanned into Arc/Info where they could be overlain to compare the changes in migration of the Colorado River that have occurred in the last 20 years. Enclosed is a copy of that analysis to be included in my comments, "if time permits" as stated in the DEIS for submission of comments after the deadline.

Part of the discussion at the site visit centered around the 1950 photo as it portrays the Colorado river possibly further north than any of the other photos. The NRC attendees have apparently concluded that it shows the definitive northern boundary of the migratory habits of the river. Without any analysis other than walking to the bank of the river, they argued this hypothesis. Without acknowledging that the Cooksley Geophysics seismicity study and the Woodward Clyde subsidence test pit clearly indicate that the river was recently much further North than it is today. Without asking how the recently introduced tamarisk might alter the river's migratory habits on both banks, they argued that the 1950 photo was the northern migratory boundary.

Mr. Holonich, why did I send in the 1950 photo with my comments? I didn't have to. It clearly identified something which might hinder the argument that I was making or strengthen it, depending on your perspective. My main point, (as evidenced in my previous comments), in sending the photos was to illustrate the invasion of the Colorado plateau

by tamarisks, something which never existed here before 1950, something which has never been addressed by the NRC. In my opinion, this entire debate with the NRC concerning the Atlas site hinges on only one issue, trust. Should we trust the experts? Will the government scientists look carefully at all the issues? Will the government scientists take care of us? Need I remind you that this is Utah? The statutory requirement of "reasonable assurance" is not adequate here. Utah is where reasonable government experts denied any harmful downwind effects from open air atomic testing for almost 30 years. Utah is where reasonable government experts repeatedly assured they were not involved when thousands of sheep were dead and dying.

NRC Chairwoman Jackson recently stated in Time, 4 Mar 96, "...We (*the NRC*) haven't always been on top of things. The ball got dropped. Here's what I'm saying now: The ball will not get dropped again." How do you define a complex, multi-hinged subsidence dissolution zone with just one sample? How do you define 4-dimensional ground water conductivity by using just one 2-dimensional line? How do you define a river mixing zone with one point? How do you define cumulative biological impacts from one sample? How do you define 1000 years of river migration with 45 years of photos? How do you define 1000 years of frost penetration with 31 years of data? How do you define the effects of something as prolific as tamarisk for the next 1000 years when it didn't exist anywhere in the region in the previous 1000 years? This is the science you are using and then you say, "Trust us." Why shouldn't I think that you are dropping the ball again and again and again?

I appreciate the opportunity to further comment on this process. In closing I would like to say that in Utah it's still, In God We Trust. All others, including the NRC, must play by the laws of physics that we all must live and work in.

Sincerely,

Peter Haney
County Councilman

cc: w/ attachment

Senator Hatch
Senator Bennett
Congressman Orton
Congresswoman Greene
Governor Leavitt

cc: w/o attachment

Phil Justus
Dan Rom
Ted Johnson