



ATLAS CORPORATION



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Denver, CO 80202
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RICHARD E. BLUBAUGH
Vice President Environmental
and Governmental Affairs

November 8, 1996

VIA FACSIMILE: (301) 415-5397

Mr. Joseph J. Holonich, Chief
High-Level Waste and Uranium Recovery Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Re: License SUA-917
Docket No. 40-3453
Open Issue on Slope Stability

Dear Mr. Holonich:

Transmitted herewith are letters from Woodward-Clyde Federal Services (WCFS) and Smith Environmental Technologies Corporation (SETC) which were prepared in response to your October 30, 1996 letter and the October 22, 1996 letter from Grand County Councilman Peter Haney. As indicated in your letter, the capability of the slopes to withstand potential offsets at depth is important in assessing the proposed tailings pile cap design. We believe that this issue and other related issues have been satisfactorily addressed by WCFS in its July 8, 1996 report, "Evaluation of Potential Surface Deformation Related to Salt-Dissolution Subsidence at the Atlas Tailings Site, Moab, Utah." Further, we thought this was confirmed by your letter dated October 2, 1996, wherein you indicated that the technical staff, after conducting independent investigations and analysis, had concluded that 11 of the 20 open issues had been adequately resolved.

It is our understanding that the NRC process for reviewing and approving proposed license amendments submitted by a licensee is generally designed to be reasonable in terms of the amount of time involved to reach a decision. We were advised in March

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1994 that this process, even though now requiring an Environmental Impact Statement (EIS), was scheduled to be complete in 12 months. That would have been April 1995. As we have repeatedly emphasized, the NRC decision on this project is vital to this company's continued viability. In our opinion it is inappropriate for NRC to continue to accept comments and request yet additional information from Atlas, thus prolonging the process and increasing the cost, when the technical staff has conducted its own independent analysis.

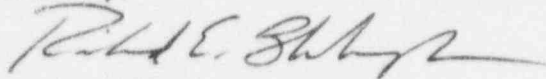
Further to this matter, we are concerned that anyone, regardless of their professional qualifications and competence, may simply send their comments at anytime, even at the very last moment, and create yet further delay in this process. When does it stop?

Nevertheless, Atlas has asked its consultants to respond to this letter from Mr. Haney because NRC has asked us to do so. We do not believe the questions warranted this additional effort. In fact, we believe these questions were adequately addressed in the WCFS report submitted in July 1996 and in the follow-up responses prepared by WCFS and SETC in September 1996.

In addition to the November 6, 1996 letters prepared by WCFS and SETC which address each point raised by Mr. Haney, I am enclosing for your information a couple of documents recently published in the Moab media which mention Mr. Haney, who, we understand, was not re-elected to the Grand County Council.

We trust the enclosed information satisfies your needs and that this process will move expeditiously to its conclusion. Please contact me at your convenience should you have any questions with respect to the contents of this letter and enclosures.

Sincerely,



Richard E. Blubaugh

Enclosures

cc: Distribution (Attached)

Atlas Corporation

Distribution for Letter Dated November 8, 1996

Senator Hatch
Senator Bennett
Congressman Orton
Congresswoman Greene
Governor Leavitt
William Sinclair, UDEQ
Peter Haney, Grand County Council
Bill Hedden, Grand County Council
John Cook, NPS
Walt Dabney, NPS
Dan Kimball, NPS
Kerry Moss, NPS
Christine Turk, NPS
Lillian Stone, DOI
William Lamb, BLM
Marcia Moore, BLM
Milton Lammering, EPA
Wes Wilson, EPA
Kenneth Havran, ERO
Robert Williams, FWS
Gabrielle Sigel, Esq., J&B
Robert Reed, ORNL
Dale Edwards, Atlas
Bruce Hassinger, SETC
Susan Olig, WCFS
Anthony Thompson, Esq., SPPT
Patrick Thomas, WSA
Robert Pattison

November 6, 1997
Project No. SK9407

Mr. Richard Blubaugh
Republic Plaza
Environmental & Govt. Affairs
Atlas Corporation
370 17th Street, Suite 3050
Denver, CO 80202

**Subject: Response to Comments on Evaluation of Potential Surface Deformation
Related to Salt-Dissolution Subsidence at the Atlas Tailings Site, Moab, Utah**

Dear Mr. Blubaugh:

As you requested, we are responding to comments in a letter, dated 22 October 1996, sent to the U.S. Nuclear Regulatory Commission by Mr. Peter Haney of the Council for Grand County, Utah. This letter addresses concerns that Mr. Haney raised regarding the analyses presented in our report entitled "Evaluation of Potential Surface Deformation Related to Salt-Dissolution Subsidence at the Atlas Tailings Site, Moab, Utah" dated 8 July 1996. For your convenience, we have generally keyed our responses to his number/letter designations.

1. We agree with Mr. Haney that the analyses performed by Dr. Bray were research studies and that the earthquake rupture propagation is complex and contains considerable uncertainty. However, we used Bray's procedures to model a loading condition (salt-dissolution subsidence) that is much less severe than the fault rupture process for which it was developed. The salt dissolution process is a much slower and more diffuse process than fault rupture, so there are no inertial forces and the offset is generally expected over a broader zone than for fault rupture. We have consulted with Dr. Bray and he agrees with our judgment on this point.

2a. The Bray analysis was developed for modeling fault rupture propagation through clays. However, Dr. Bray has stated to us that the procedure is also applicable for granular soils since the procedure is based on the failure strain. The failure strain is the most important parameter in evaluating the rupture propagation. Professor Bray also told us that he has made

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some comparisons with results for granular soils, which were consistent with the curves he developed for clay soils.

2b. The nonlinear stress-strain behavior was not fully modeled in the simplified evaluation performed in our study because it is not needed to estimate the rupture propagation in the model. In attempting to estimate the likely amount of rupture propagation, we used average values for the failure strain. The values used to calculate the average are shown in our report. We used an average because the soils, particularly the native sediments, vary considerably both laterally and with depth. To select a few isolated values as representative of the soils is not reasonable in our judgment. The triaxial test results are appropriate at the confining pressures of the tests. The 3.3:1 slopes of the tailings pile will result in slightly lower mean confining pressures than soils at the same depth under level ground, but the resulting differences in confining pressure are too small to have a significant effect on the strain at failure and the overall results or conclusions.

2c. Again, we were attempting to calculate a best estimate of the potential rupture propagation given the already conservative values selected for the bedrock offsets (see further discussion later) and the conservative application of this procedure (discussed above). Compounding conservatism in the selection of strain at failure and relationship between failure strain and rupture propagation would result in an **overly** conservative estimate of the rupture propagation.

2d. The buried escarpment shown on Figure 2 of our report does not extend beneath the proposed tailing pile cap shown on Figure 3. As shown on Figure 3, the extent of the tailings pile cap along Section B-B' is between boreholes B-10 and B-2. As shown in Section B-B' on Figure 4, the escarpment does not begin until southeast of borehole B-2. This was clearly stated in our report (Section 5.0, p. 9, third bullet statement): "Although the crest of the buried escarpment may extend partially under the toe of the embankment, the area of potential maximum subsidence which is the alluvial basin, most likely does not extend beneath the area of the tailings pile clay cap, even though in our evaluation we have assumed that it does."

2e. Based on the seismic profiles (Cooksley Geophysics, 1995) and our observations of dissolution-related deformation elsewhere, the zone of subsidence-related deformation is expected to occur at a very high angle. However, the angle of dip, particularly a change in dip, is important in normal faulting because the fault movement puts the overlying soils in tension. In the case of salt dissolution subsidence there is not a tectonic fault undergoing extension and thus, we do not believe the dependence of deformation area to dip of the deformation zone would necessarily be the same as for tectonic faults.



Woodward-Clyde

Mr. Richard Blubaugh

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2f. The inclusion of the alluvium in the total thickness of the overburden is appropriate because there is **no** evidence of surface rupture in the existing alluvium and because of the recent deposition of the alluvium.

We agree that the use of Bray's model for estimating the propagation of potential offsets through overburden soils has limitations, but believe that the procedure is conservative for this case, especially given the conservative estimates of subsidence. As discussed in our report, the estimated long-term subsidence rate is between 0.08 and 0.2 mm/year, and our estimated short-term rate is between 0.4 and 1 mm/year. The upper bound 1 mm/year value was combined with a 1,000-year time period, as opposed to the minimum period of 200 years specified in the regulations, to arrive at the 1 meter of offset. The 2-meter offset was used in a sensitivity evaluation. We have already responded with comments (see our letter dated 30 September 1996) on the large uncertainties inherent in the Northwest pipeline data that Grand County used to estimate a subsidence rate of 1.33 mm/yr. To these comments we add that Dr. J.C. Savage of the U.S. Geological Survey (22 October 1996 issue of EOS) recently discussed the large errors inherent in geodetic surveys due to monument instability (for example, 3.3 mm over 5 years for well-constructed monuments). Shut-off valves on pipelines buried in loosely-compacted, backfilled excavations, as were surveyed for the Northwest pipeline, do not qualify as well-constructed monuments. Therefore, errors could even be much larger for the Northwest pipeline data and the "signal" could likely be well below the level of "noise" in the data.

Mr. Haney also pointed out that the three samples tested from borehole B-14 had lower strains at failure than the average material tested, so using these values alone will allow rupture to propagate further than using the average strain values for all of the samples. Borehole B-14 was 21.3 m (70 feet) deep but did not extend to bedrock, so actual soil thickness is unknown. However, even if one assumes a strain value of 5.7%, then the expected rupture propagation distance of 17 m (for a 1-m-offset) is still less than the absolute minimum soil thickness of 21.3 m. This does not even take into account the proposed cover over the embankment of at least 2.2 m (7 feet) of sediments (silty sandy alluvium excavated from Moab Wash). The expected rupture propagation distance is 34 m for a bedrock offset of 2 m, which may or may not be greater than the soil thickness at borehole B-14. However, given the many compounded conservatism's in this case and the likelihood that soil thickness at B-14 is much greater than 23.5 m, this unlikely possibility does not change our original conclusion that the potential for differential offsets reaching the surface at the tailings pile over the next 1,000 years is negligible.

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Mr. Richard Blubaugh

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We are not sure of the point being made regarding borehole B-13, as Mr. Haney agrees that the rupture may not propagate to the surface in 1,000 years. We clarify that we did not propose or recommend any active maintenance in our report.

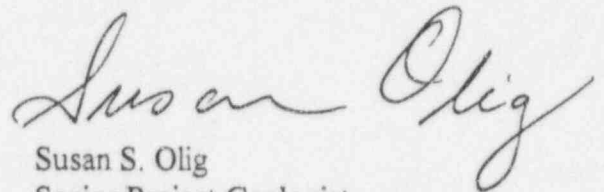
In regard to Mr. Haney's questions on very long-term effects, obviously, subsidence will not continue for "eternity", but will only continue as long as there is salt to dissolve and enough fresh water flowing through the rocks to dissolve it. Again, we point out that we have conservatively used rates estimated from the area of maximum subsidence, in the alluvial basin along the Colorado River. However, all of the cap and most if not all of the entire pile is west of the alluvial basin where subsidence rates are expected to be much less. Furthermore, the regulations do not require consideration of 10,000 to 20,000 year periods.

Finally, in regard to Mr. Haney's concern about possible indirect effects of subsidence on erosion, we point out that subsidence in the area will also lower the Colorado River. Therefore, subsidence will not raise the river level relative to the pile, unless the river aggrades (that is, there is net deposition, not erosion as alluded to by Mr. Haney). Furthermore, all of the geologic and hydrologic evidence (such as the thick alluvial basin, very young [latest Holocene] deposits at the surface, and the tendency of the river channel to migrate toward the east, away from the pile) indicate that aggradation has recently occurred and continues to occur on the west side of the river. We hope our response satisfactorily addresses any concerns that Mr. Haney raised about our report. If you or your staff have any further questions, please do not hesitate to call us.

Sincerely,



Robert K. Green, PE
Senior Project Engineer



Susan S. Olig
Senior Project Geologist

cc: Bruce Hassinger



November 6, 1996

88-067-20-029

Mr. Richard E. Blubaugh
Vice President of Environmental
and Governmental Affairs
Atlas Corporation
Republic Plaza
370 Seventeenth Street, Suite 3050
Denver, CO 80202

Response to Comment
Rock Apron
Reclamation Design
Atlas Corporation Tailings Pile
Moab, Utah

Dear Richard:

This letter concerns the comment by Mr. Peter Haney of the Grand County, Utah, Council concerning the rock apron design, in a letter to the Nuclear Regulatory Commission (NRC) dated 22 October 1996. In this letter, Mr. Haney expresses doubt that the rock apron designed to protect the tailings pile from erosion by the Colorado River will work as designed, should the river migrate toward the pile.

First of all, Smith Technology Corporation (Smith Technology) does not believe that the Colorado River will migrate toward the tailings pile. Smith Technology contracted with Mussetter Engineering, Inc. (Mussetter Engineering) of Fort Collins, Colorado, to evaluate the potential for lateral migration of the Colorado River toward the Atlas Corporation (Atlas) tailings pile. Mussetter Engineering is highly respected for its work in water resources and civil engineering. The work was performed by the principals of the firm, Mr. Robert A. Mussetter, Ph.D., P.E., and Michael D. Harvey, Ph.D., Geomorphologist. Their work included a review of historical river data, surveying river cross sections, field reconnaissance, geomorphic analysis, hydraulic modeling and an analysis of the vertical and lateral stability of the river in the area of the tailings pile. The results of their evaluation indicated that there is no reason to believe that a tendency for lateral migration of the river toward the tailings pile will occur in the future. The Mussetter Engineering report, "Geomorphic, Hydraulic and Lateral Migration Characteristics of the Colorado River, Moab, Utah", dated May 1994, is provided as Appendix N in the Final Reclamation Plan (Smith Technology, October 1996).



Mr. Richard E. Blubaugh

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To provide an additional measure of safety and comfort for the Moab citizenry, Smith Technology and Atlas implemented into the tailings pile design a rock apron to protect the tailings pile should the river migrate toward the pile. The design is based on a U.S. Army Corps of Engineers engineering and design guidance document (EM 1110-2-1601, 1 July 1991), "Hydraulic Design of Flood Control Channels". Appendix O of the Final Reclamation Plan provides the rock apron design details, references and calculations, including the volume and the size of riprap. The river hydraulics used in the design are from the hydraulic modeling performed by Mussetter Engineering. This design is based on standard engineering references and practice for the design of hydraulic structures.

If you have any questions concerning this response or have received additional comments concerning our design, please call me at (303) 790-1747.

Very truly yours,

A handwritten signature in cursive script, reading "Bruce W. Hassinger".

Bruce W. Hassinger, P.G.
Project Manager

BWH/sjp

Grand County Taxpayers Have More to Worry About Than the Atlas Tailings Pile!

Expert consulting engineers, and the Nuclear Regulatory Commission and Oak Ridge National Laboratory scientists agree that the Atlas tailings pile in-place reclamation plan is a stable design that will last maintenance-free for at least 1,000 years (an EPA, not NRC, standard, by the way). The most learned, concerned and competent people in the nuclear business also agree.

Yet, Peter Haney continues to use scare tactics in his campaign to waste more of our hard-earned tax dollars: At least **\$100 million more**, to move that pile. (Note: Mr. Haney had his chance on March 19, 1996, to have his "simple questions" answered by the above experts, but he chose not to attend the meeting! **Ask him why?**)

From the health and environmental standpoints, it makes no sense at all to move the tailings pile to a new location.

Be aware that Mr. Haney's call for litigation over the pile will be a tremendously expensive undertaking for Grand County, whose taxpayers will ultimately foot the bill for this frivolous waste of money.

We need practical, reasonable people in our Grand County government. We need people with common sense, who will be wise with the taxpayer's money, regardless of its source: local, state, or federal.

There are literally thousands of better ways to spend our taxes than continuing to satisfy Peter Haney's rants about "what if, might happen, or just in case" scenarios thousands of years from now. No one, not even Peter Haney, knows what will happen that far in the future. And even if the government had surplus money to waste, moving the pile would not be a good way to spend it.

If you are concerned about the enormity of the local, state and federal governments' taxes and voracious spending habits, now is the time to act. **Get to the polls and vote for candidates who care about your money.**

Robert S. Pattison, Taxpayer and Reclamation Specialist

Mr. Sam Taylor, Editor-in-Chief
The Times-Independent
Moab, Utah

October 29, 1996

Dear Sam:

I am an internationally known expert in radiological health and radiation protection and, since I live in Moab, I felt compelled to respond to Peter Haney's advertisement in last week's paper.

Mr. Haney apparently believes the Atlas tailings are high level radioactive waste and are extremely dangerous. This is not true. The tailings are less radioactive than the naturally occurring ore from which they were derived and they should not be treated as a source of imminent hazard, which they are not.

Substantial human populations live without any ill effects in areas of the world where the natural levels of radiation are as high as those directly over the Atlas pile.

Mr. Haney implies the NRC did not analyze the consequences of the tailings pile being eroded into the Colorado River. His implication is untrue as the consequences of the pile being released to the river is analyzed on page 4-27ff of the Draft Environmental Impact Statement (NUREG 1531).

The natural radioactivity in the suspended sediments flowing down the Colorado River in a thousand years, containing the same radioactive elements found in the Atlas tailings pile, exceeds that which is in the Atlas tailings pile. The mass of suspended sediments flowing by the pile in a year exceeds the total mass of the pile.

I have measured the radioactivity over several tailings piles, including Atlas', and there is nothing unusually high about the Atlas tailings.

I have no financial connection with Atlas Corporation, although I have been frequently called upon to do consulting work for a variety of clients including the U. S. Department of Justice, the Canadian Atomic Energy Control Board and the International Atomic Energy Agency. However, I do have a financial stake in Moab as the owner of the Sunset Motel and I support Bob Pattison's position that the unnecessary expense of \$100 million for moving

the pile would not have health or environmental benefits commensurate with the cost.

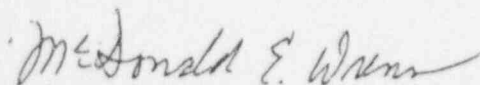
I have read the relevant NRC documents in our public library and conclude that the current pile location will produce no significant exposure to any single person in Moab relative to internationally accepted radiation protection standards or the natural background radiation levels here, either now or in the future.

Mr. Haney's last paragraph is devoid of any quantitative judgment or reasoning. He only wants the pile removed, without reasonable justification. As the owner of a local business I, and some of my employees, are more afraid of Mr. Haney's influence than that of the Atlas tailings pile!

Concerning his educational background, what special training does Mr. Haney have to disapprove of the ability of the NRC scientists and engineers to make valid and complex technical judgments? When he says: "...what will happen in 500 years..." he hypothesizes a farm over the former Lake Powell. I point out the fact that a farming town in Brazil is built over a naturally occurring uranium deposit where the local population shows no ill effects from eating the food grown upon it; food that is fit for human consumption. A similar situation exists over an even larger area in India, where 100,000 people are exposed to 2 roentgen per year of external radiation from naturally occurring thorium and its daughter products in the underlying soil, without any apparent ill effects.

When Peter Haney says that the pile will end up in the river, I ask "what will be the consequences?" as it will be buried under tons of sediment where it can not expose anyone significantly. The river can only dilute the tailings, not concentrate them, whether they flush by slow erosion or by flash floods.

Respectfully submitted,



McDonald E. Wrenn, Ph. D.
Professor of Pharmacology, University of Utah and Adjunct
Professor of Physics and Biology, Mesa State College, Grand
Junction, Colorado

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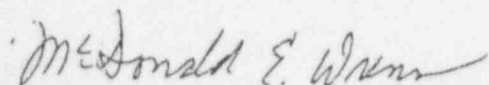
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