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September 4, 2001

40-8905

Mr. Melvyn Leach
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop T-8A33
Washington, D.C. 20555

Re: Staff Meeting with QMC on August 14, 2001

Dear Mr. Leach:

I want to thank you and your staff for meeting with representatives of Quivira Mining Company ("QMC") on August 13th to address matters raised by Nuclear Regulatory Commission ("NRC") staff regarding QMC's Groundwater Corrective Action Program ("GWCAP") and the Alternative Concentration Limit ("ACL") applications. We believe the discussions at that meeting suggest that a solution can be reached that will satisfy NRC staff's and QMC's concerns. This letter provides a brief recap of those discussions.

As noted, QMC, in response to an NRC directive, filed an application for a license amendment proposing a GWCAP in 1989. Subsequently, in 1990, NRC approved the GWCAP allowing QMC to install a complex water balance system to address potential contamination from uranium recovery activities (i.e., 11e.(2) byproduct material) in deep bedrock aquifers and alluvial materials.

The approved GWCAP is designed to intercept and capture potential seepage from surface impoundments into the deep bedrock aquifers in downgradient underground mine workings. The water collected in the mine sumps includes the seepage and natural drainage into the mine and, until 1999, substantial volumes of water from Old Stope Leaching ("OSL"). This water is then pumped to the ion exchange ("IX") facility for treatment and subsequently discharged into a designated surface watercourse as part of the GWCAP for the alluvial materials. This treated minewater creates a hydraulic head to sweep contaminants from the alluvial material into the interceptor trench at the base of the tailings impoundments. The captured water is then pumped from the trench and disposed of through evaporation in lined evaporation ponds. The 11e.(2) seepage constituent in the treated minewater stream was conservatively estimated to have been under 0.01% of the total flow through the IX during OSL operations.

In early 1992, NRC's Uranium Recovery Field Office ("URFO") raised questions about the propriety of using the treated minewater, which presumably contained 11e.(2) materials from tailings seepage to the deep bedrock aquifers, in the GWCAP for the alluvium. QMC responded by providing data demonstrating that the level of any contaminants from tailings seepage to the bedrock aquifers reaching the mine sumps was insignificant compared to the quality and quantity of the treated minewater discharged into the water-course. After conducting a review of the site conditions and data provided by QMC, URFO released a decision[1] on November 4, 1992 stating that the tailings seepage collected from the bedrock aquifers in the treated minewater

[1] The 1992 URFO decision by Cynthia Miller-Corbett is attached hereto.

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stream was negligible and the facility was in conformance with 10 CFR Part 40. Virtually the same issue was raised again during an inspection in 1998 wherein the NRC inspector questioned if 11e.(2) byproduct material was being discharged into the Arroyo del Puerto in violation of 10 CFR Part 20 effluent limits. In response, QMC contacted headquarters and Region IV and provided data showing that the discharges were treated minewater. The staff again agreed.

QMC believes the program, as it has been operated over the past several years, is an appropriate course of action, as in addition to the multiple staff approvals, the annual CAP reports demonstrate that the GWCAP has been successful. Since 1992, no new threat or hazard has appeared or been identified at the site and most of the original concerns have been minimized or eliminated. The approved groundwater sweep of the alluvial material has performed to its capacity in conformance with the GWCAP. Source terms for contamination of the bedrock aquifers have been eliminated, the aquifers are dry, and thus there is no longer a threat of contamination to the treated minewater.

Given the NRC's approval of the GWCAP; the further staff approvals; the so-called *Eight Old Rec. Plans* decision[2]; and the absence of any significant health, safety or environmental concerns; we believe the GWCAP should be considered final as approved.

Finally, QMC has submitted ACL applications to NRC for its consideration and is awaiting completion of the staff's review and potential requests for additional information ("RAIs"). Per our discussions, QMC understands this process is ongoing and will continue until sometime this fall. Importantly, our discussions with the staff suggest that approval of the ACL applications will make moot any concerns about the GWCAP and avoid the necessity of becoming embroiled in potentially thorny legal issues. Final approval of ACLs renders the classification of treated minewater as 11e.(2) byproduct material moot since the ACLs effectively would authorize that concentration level of 11e.(2) materials, if any, to reach the point of exposure (i.e., the mine sumps and surface drainages). Any issues concerning the classification of treated minewater as 11e.(2) byproduct material would no longer be a matter of concern and the spectre of potentially unsolvable multi-party liability issues disappears.

Another issue raised during our discussions involves the regulatory issues generated by future OSL uranium recovery at the site. These future activities can be and should be addressed in the future as a separate issue when and if necessary.

Once again, we would like to thank you and your staff for meeting with us. We believe that a solution to this matter can be achieved and we look forward to working with you and your staff to reach that end in the coming months. If you have any questions, please feel free to contact me, Paul Goranson, or our local counsel, Tony Thompson. Thank you for your time and consideration in this matter.

Sincerely,

Marvin D. Freeman

cc: Gary Janosko, NRC
Jill S. Caverly, NRC
Michael Layton, NRC

[2] The Commission's opinion in SECY-95-155 is attached hereto.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
URANIUM RECOVERY FIELD OFFICE
BOX 25325
DENVER, COLORADO 80225

NOV 04 1992

URFO:CDMC
Docket No. 40-8905
04008905680E

MEMORANDUM FOR: File No. 40-8905

FROM: Cynthia D. Miller-Corbett, Project Manager

SUBJECT: QUIVIRA MINING COMPANY, AMBROSIA LAKE FACILITY: REVIEW of CORRECTIVE ACTION PLAN FOR CONFORMANCE WITH 10 CFR 40, APPENDIX A

INTRODUCTION

The corrective action plan (CAP) at the Quivira Mining Company mill, McKinley County, New Mexico, comprises recovery and disposal of seepage-bearing mine discharge from three strata. These are the surficial alluvium (Qal), the Tres Hermanos B (THB), and the Dakota Sandstone (Kd). Presently, the licensee disposes of the recovered mine discharge under an NPDES permit to a site channel which is constructed in the Qal. The discharge, that includes some monitored ground-water constituents at levels which exceed ground-water protection standards (GWPs), could act as a source of recharge to the Qal and the underlying THB and Kd, since they are hydraulically connected. The discharge, however, meets all NPDES requirements.

Recognition of the potential negative impact of this discharge method upon the referenced strata has prompted our office to review the CAP at the millsite to determine if the plan meets the objective of 10 CFR Part 40, Appendix A, which is to return ground water to site standards. The following evaluation of the possible impact of seepage-bearing mine discharge on the referenced strata is based on the licensee's response to NRC's requests for information included in letters dated March 5, and July 7, 1992.

RESPONSE TO REQUEST FOR INFORMATION

By letters dated May 20, and August 7, 1992, the licensee submitted (a) a quantitative approach to estimating the contribution of seepage from the THB

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and Kd to the surface discharge volume, (b) a description of prior and current use of these strata as a water supply source, and (c) sufficient ground-water quality data to characterize the extent of impact from discharge of recovered seepage to the Qal, THB, and Kd strata.

Seepage Volume and Ground-Water Quality

The licensee has shown that the seepage-bearing ground-water from the THB and Kd contributes approximately 2.5 percent of the total volume of ground water recovered from the site mines. This is based on the licensee's estimate of ground-water flow which was determined using the maximum calculations for hydraulic conductivity and transmissivity for both strata. A comparison of the maximum and the average values for these properties, as well as the resultant ground-water flow rates is presented in Table 1.

Table 1. Hydrologic Properties of THB and KD Strata

SEEPAGE-BEARING STRATA	HYDRAULIC CONDUCTIVITY: $k_{average}$ (ft/day)	HYDRAULIC CONDUCTIVITY: k_{max} (ft/day)	TRANSMISSIVITY $T_{average}$ (gal/day/ft)	TRANSMISSIVITY T_{max} (gal/day/ft)	FLOWRATE: Minimum: Maximum (gpm)
Dakota Sandstone	0.1	0.84	12	100	3:26
Tres Hermanos B	0.05	0.43	4.1	35	0.7:6

In using the maximum values for hydraulic conductivity and transmissivity to estimate the flow rate of seepage from the THB and KD strata, the licensee has estimated the maximum possible contribution from these strata to the total volume of mine discharge; therefore, the estimated contribution of 2.5 percent may actually be high. If the average flow rate is employed, the contribution from seepage through the THB and Kd is less than 1 percent.

A tabulation of ground-water quality data reflecting the average concentration of hazardous constituents in samples from monitor wells and vent hole seepage is included as Table 2. The quality of NPDES discharge and GWPs are also included.

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Table 2. Water Quality and Ground-Water Protection Standards

DATA SOURCE	Gross Alpha (pCi/l)	Molybdenum (mg/l)	Pb-210 (pCi/l)	Selenium (mg/l)	Th-230 (pCi/l)	Uranium (mg/l)
NPDES	504	0.37	1.7	0.04	0.5	0.02
Qal:GWPS	57	0.06	4.9	0.05	3.1	0.06
Qal: Wells	152	0.06	8.2	0.02	2.2	0.18
THB:GWPS	21	0.08	0.9	0.04	2.2	0.02
THB: Wells	47	0.07	8.27	0.002	1.5	0.03
THB:Venthole	193	0.03	138	0.05	0.78	0.04
Kd:GWPS	56	0.06	1.9	0.04	2.3	0.02
Kd: Wells	17.5*	0.09	3.89	0.012	0.737*	0.015*
Kd:Venthole	118	0.149	8.5	0.01	0.40	0.057

Note: (a) Venthole seepage data is from licensee submittal dated December 21, 1989; (b) Average of water quality from monitor well analyses submitted with 1991 CAP review; (c) "*" for Kd monitor well data reflects omission of apparent outlier data from monitor well 36-06; and (d) NPDES data from licensee submittal dated August 7, 1992.

Aquifer Use and Impact of Seepage Disposal

Alluvium (Qal)

There is no reported domestic use of Qal ground water in the region of the Ambrosia Lake Facility. In the submittals noted above, the licensee references previous hydrologic reports which conclude that before mining, the Qal was essentially dry, or that any ground water residing in Qal comprises seepage from either the Kermac and Phillips mills, or mine water pumped to the surface from strata deeper than the Qal, THB, or Kd. Therefore, premining water quality data does not exist for the 20 wells constructed along the NPDES channel, and it is not possible to compare premining and post mining ground-water quality data to determine the impact of mining or milling activities upon the Qal.

Qal monitor wells MW 32-59 and MW 5-03 are within 320 feet of each other and equidistant from the NPDES channel. The ground water from MW 5-03 is relatively good, but ground-water data from MW 32-59 shows elevated concentrations of hazardous constituents. Monitor well MW 24, located approximately 1 mile further downstream from other Qal monitor wells includes some of the highest concentrations of monitored hazardous constituents; this is converse to what one expects if ground-water quality is a function of NPDES discharge. If the quality is a result of surface discharge, there should be

an attenuation of hazardous constituent concentrations with an increase in distance from the NPDES outfall. The lack of correlation between the position of Qal monitor wells and hazardous constituent concentrations, as well as the observation that concentrations of several hazardous constituents is higher in Qal monitor well samples than in NPDES discharge (Table 2) indicates the quality of Qal ground water is probably due to previous site activities; it appears that Qal ground-water quality is not a consequence of NPDES discharge.

Tres Hermanos B (THB)

The THB is characterized as a tight formation that is unable to produce water at a useable rate, and no domestic or potable water wells have been constructed in the THB prior or subsequent to mining and milling. Water quality monitoring of the THB at the mill site began with commencement of mine and mill activity. Therefore, there is no data base for comparing premining ground-water quality with ground-water quality resulting from site activities.

Monitor well sample data for nine THB wells (see Discharge Plan-169 Annual Report, dated May 11, 1992) were reviewed to determine trends in hazardous constituent concentrations. The following observations indicate the ground-water quality in these wells may be due to previous mining and milling activities, and not the result of recovered seepage discharge:

A. Samples from the three monitor wells in Section 36, located upgradient and furthest from the NPDES channel, show some of the highest values for concentrations of Lead-210. Data from venthole 19-2, located more than a mile north of the channel, show higher Lead-210 concentrations than for several of the wells located proximal to the channel. Furthermore, MW 31-02, located upgradient and further from the channel than MW 31-66, MW 31-67, MW 31-62, and MW 32-64, has the highest Lead-210 concentration of all these wells.

B. The Molybdenum concentration is higher in ground-water samples from two of the three Section 36 monitor wells than it is for samples from monitor wells located proximal to the discharge channel.

C. Concentrations for Gross Alpha and Uranium are higher at MW 31-02, located upgradient and at a greater distance from the discharge channel, than the concentrations at the other four wells located relatively close to the channel.

D. For the five wells proximal to the discharge channel, there is no uniformity in the distribution for high concentrations of monitored constituents; one monitor well sample may show a very high concentration for one ground-water constituent, but then it will have a relatively low concentration for another.

Ground-water quality data from THB monitor well and venthole seepage analyses (Table 2) reveal that ground water from the monitor wells is usually comparable or better than recovered venthole seepage. This suggests that the quality of THB seepage is due to incorporation of minerals (hazardous constituents) during migration of seepage through abandoned mine workings. Although the incorporation of hazardous constituents from mine workings appears to degrade the quality of THB seepage, given the low yield of THB monitor wells (refer to licensee submittal dated March, 30, 1990), collection of venthole seepage is a viable CAP for the THB. Moreover, it may work to improve the THB ground water.

Dakota Sandstone (Kd)

The licensee notes there is little recorded information concerning the water-bearing properties of the Kd, suggesting the Kd is not used as a water supply. In their September, 1987, submittal, the licensee states that the Kd outcrops proximal and to the southwest of the Ambrosia Lake Facility, indicating position of the zero saturation line to the southwest. To the northeast of this zone, there is only a few feet of saturation at the bottom of the Kd, indicating the strata have been dewatered as a result of drainage to mines. In the licensee's September 1986 submittal, the licensee states that monitor wells are difficult to construct because of the small amount of aquifer water. This characterization of the Kd suggests it is unlikely that the Kd would be used as a ground-water supply.

The licensee has compared the Kd monitor well data for two Kd wells (located downdip of the NPDES channel) and NPDES water quality data to demonstrate the quality of Kd ground-water is a not impacted by NPDES discharge. At monitor wells MW 5-02 and MW 32-52, the concentration of Th-230 is 2.4 and 4.2 pCi/l, respectively. This compares with a lower concentration of 1.7 pCi/l for NPDES discharge. If Kd ground-water quality was a function of NPDES discharge, one would expect that the concentration of Th-230 in the surface discharge would be equal to or greater than that of the formation.

Review of Kd monitor well and recovered seepage data (Table 2) reveals that for other hazardous constituents, the concentrations in monitor well samples is commonly less than the concentration of these same constituents in NPDES discharge and venthole seepage. These observations suggest the water quality of recovered seepage is influenced by incorporation of hazardous constituents during migration through abandoned mine workings. This raises the question as to whether collection of venthole seepage is an appropriate CAP alternative; however, considering the low yield at monitor wells (refer to licensee submittal dated March 30, 1990), seepage recovery from ventholes is the best method for collection of contaminated Kd ground-water.

CONCLUSION

Based on an evaluation of (a) the negligible contribution of Kd and THB seepage to the total volume of recovered mine water discharge, (b) the observation that neither the Qal, THB, or Kd provide a ground-water supply, and (c) the lack of data to verify the negative impact of THB- and Kd-bearing mine discharge to ground-water quality, it is concluded that the disposal method for recovered THB and Kd seepage is in conformance with 10 CFR Part 40.

Cynthia D. Miller-Corbett
Project Manager

Case Closed: 04008905680E

POLICY ISSUE
(Notation Vote)

June 14, 1995 SECY-95-155

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: REVIEW OF PREVIOUSLY APPROVED RECLAMATION PLANS

PURPOSE:

To obtain Commission approval of the U.S. Nuclear Regulatory Commission staff plan to review certain previously approved uranium mill tailings reclamation plans for major design deficiencies.

SUMMARY:

The Uranium Mill Tailings Radiation Control Act (UMTRCA) was promulgated by Congress in 1978 to ensure that uranium mill tailings would be stabilized, disposed of, and controlled in a safe and environmentally sound manner. It also added Section 83c to the Atomic Energy Act of 1954, as amended (AEA), which requires the Commission to determine compliance with regulatory requirements at the time of license termination. NRC regulations in 10 CFR Part 40, Appendix A (Appendix A) implement UMTRCA. Appendix A requires that reclamation of uranium mill tailings be conducted in accordance with a plan that provides reasonable assurance of control of radiological hazards to: (i) be effective for 1000 years, to the extent reasonably achievable, but in any case for at least 200 years; and (ii) limit release of radon-222 to 20 pCi

NOTE: TO BE MADE PUBLICLY AVAILABLE WHEN THE FINAL SRM IS MADE AVAILABLE

CONTACT: Joseph J. Holonich, NMSS
415-6643

ENCLOSURE 1

per m^2 per second. Licensees have developed reclamation plans to meet these requirements, addressing among other things, radon attenuation barriers, erosion protection, and slope stability.

However, because of the evolution of guidance and staff practices, and lessons learned from the reevaluation of the Atlas reclamation plan, the staff was uncertain if some approved reclamation plans fully conform to Appendix A requirements. As a result, the staff developed and began to implement a plan to reevaluate previously approved reclamation plans. Industry has expressed opposition to these re-reviews, citing the fact that NRC has approved these plans as meeting the requirements in Appendix A. Some industry criticism of the reviews also cites the small risk that tailings impoundments present.

The staff, therefore, evaluated in a generic manner the risks to public health, safety, and the environment that failure of tailings impoundments would pose. The evaluations considered the three technical areas that the staff identified as potentially not conforming to current guidance for meeting Appendix A requirements. These areas are: 1) erosion protection design; 2) radon barrier design; and 3) seismic design. The staff concluded that there would not be an imminent health, safety, nor environmental risk as a result of potential flaws in those design areas. The staff further concluded that because the government custodian could be required to repair damage to a tailings impoundment, long-term risks could be minimized.

The staff identified three options for addressing previously approved reclamation plans that may not comport with current guidance: 1) accept the plans as originally approved by the staff; 2) complete full detailed reviews of previously approved reclamation plans using current guidance; or 3) perform reviews of the plans only for major design deficiencies based on current information. The staff has put its reviews of previously approved reclamation plans in abeyance pending a Commission decision on this paper. The staff recommends that the Commission approve the third option, to perform an evaluation of the previously approved reclamation plans to determine any major design deficiencies based only on current and/or readily available information. The purpose would be to identify any design features that clearly do not meet the minimum requirements of Appendix A. Only if the staff identifies a design that clearly does not meet the minimum Appendix A requirements, or that has already experienced significant degradation, would the licensee be brought into the review.

BACKGROUND:

Uranium mills are operated under specific licenses issued by NRC (or Agreement States) in conformance with Part 40. The tailings that result from the milling of uranium ore can release significant quantities of radon to the atmosphere for long periods of time. In 1978, Congress passed UMTRCA, which was intended "...to provide for the 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 prevent or minimize other environmental hazards from such tailings." In addition, it added Section 83c

to the AEA which states: "Upon termination on [sic] [of] any license to which this section applies, the Commission shall determine whether or not the licensee has complied with all applicable standards and requirements under such license." The AEA also requires the Commission to retain authority for that determination for mills licensed by Agreement States.

In addition, UMTRCA provides for the perpetual ownership and custodial care of remediated mill tailings sites by a government entity. The government custodian will be responsible, under an NRC general license in 10 CFR 40.28, for site monitoring, maintenance, and emergency measures necessary to protect the public health and safety. The State in which the remediated tailings site is located has the option of becoming the government custodian. If the State chooses not to become the government custodian, site ownership will be transferred to the U.S. Department of Energy (DOE) (unless another Federal agency is so designated by the President). During the March 1995 Workshop and at a subsequent meeting on June 6, 1995, DOE personnel have stated that DOE is prepared to become custodian of a site whenever NRC is ready to terminate the license.

In 1983 the U.S. Environmental Protection Agency (EPA) issued standards for mill tailings in 40 CFR Part 192 in accordance with UMTRCA requirements. The longevity requirement in the EPA standard was that mill tailings disposal areas be designed to provide reasonable assurance of control of radiological hazards for 1000 years, to the extent reasonably achievable, but for at least 200 years. The EPA standards also called for radon emanation to be limited to an average over the entire disposal area of 20 pCi per m^2 per second. These standards are incorporated in Appendix A, which is the basis for NRC's regulatory program for the uranium mill industry. The codified criteria preclude reliance on active maintenance as a design feature for a disposal area.

Licensees developed reclamation plans to comply with the requirements in Appendix A. These plans describe, among other things, how the tailings impoundment features will be constructed to meet the radon emanation and longevity requirements in Appendix A. Typically, radon barriers composed primarily of clay are constructed on top of the tailings. Because of its 3.8-day half-life, the radon gas rapidly decays to solid daughters within the clay barrier, so that less than 20 pCi per m^2 per second escape to the atmosphere. The radon barrier, because of its low permeability, also limits infiltration of rainwater into the impoundment.

One aspect of longevity is consideration of the potential impacts of erosion on the stability of the reclaimed tailings cell. Erosion protection features are designed by licensees to meet the longevity standard in Appendix A. The radon barrier is usually covered with native soil in areas where the slope is shallow (1 percent or less) or with rock riprap on steeper slopes. The size of the riprap can range from less than an inch to several feet, and is dependent on the embankment slopes and the maximum expected flow rate of water.

Another consideration for longevity is the ability of the tailings impoundment slopes to remain stable over the long term. The embankments are designed to remain stable under static and dynamic (seismic) loading. Appendix A requires that the impoundment be designed to withstand a maximum credible earthquake on any nearby capable fault. Typically, the tailings, with cover materials, are contoured to slopes of five horizontal to one vertical or shallower. Seismic conditions are usually analyzed pseudo-statically by applying a horizontal seismic coefficient based on the peak acceleration of the design earthquake for the site. This results in an additional static load being applied to the impoundment.

DISCUSSION:

In the mid-to-late 1980s, the staff gradually realized that reviews of erosion protection were leading to inconsistent designs. The standards require erosion protection designs that are to be effective for 200 to 1000 years, with no maintenance relied on in the designs. Such a design is unique, and methods for achieving it had not been evaluated and reported in the engineering literature. Staff recognized that no appropriate NRC guidance existed, and no guidance was available, outside the Agency, in the general technical literature.

Staff, therefore, proceeded to develop definitive technical guidance on erosion protection. In August 1990, the staff issued a Final Staff Technical Position (FSTP), "Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites." After completion of the FSTP and in view of that document's technical conclusions, the staff became concerned that reclamation plans approved earlier might not meet the longevity requirement in Appendix A. Reinforcing and validating these staff concerns, some older sites with erosion protection designs built to pre-1990 criteria were observed to be experiencing problems, such as erosion and sedimentation. These problems appear to have been caused by either inadequate design or poor construction practice, or both. However, additional review is needed to definitively ascertain the significance and cause of these problems.

Besides the erosion protection concerns at sites reviewed before 1990, the staff had earlier concluded that it was not always clear that the methods used for the design of radon barriers were adequate. Licensees must demonstrate design compliance with the radon emission limit of 20 pCi per m^2 per second, to meet Criterion 6 of Appendix A. The staff, therefore, undertook a program to modify and clarify methods for evaluating radon barrier designs. These methods are presented in Regulatory Guide 3.64, "Calculation of Radon Flux Attenuation by Earthen Uranium Mill Tailings Covers," dated June 1989. The most significant improvements in this guidance relate to a better estimation of values for parameters used to calculate radon flux. Older methodologies used input parameters that may have resulted in underestimation of the radon flux.

In 1993, the staff initiated a detailed reevaluation of the reclamation plan proposed for the Atlas mill in Moab, Utah. This review identified a number of

potential technical concerns, including the erosion protection and radon barrier designs and the seismic stability of the impoundment. Based on the Atlas situation, the staff decided to review all mill sites to determine if seismic issues existed at other sites. For each site, the staff determined, in a simplified manner, if the acceleration used in the geotechnical engineering analysis of the impoundment design would still be considered correct. Preliminary evaluation of the regional seismic acceleration at mill sites identified several cases where regional acceleration substantially exceeds the design accelerations used in reclamation plans. For these impoundments, the next step in the process would be to determine if those piles would remain stable under the new acceleration. The staff would accomplish this step by considering a geotechnical engineering analysis of the impoundment design to determine the capability of coping with the increase in acceleration. The staff has not, however, conducted those geotechnical evaluations.

As a result of the staff's development of guidance on erosion protection and radon barrier design, and its recent experience concerning seismicity in the Atlas review, there is concern that some reclamation plans approved by NRC staff before 1990 may not have had as rigorous a review as those evaluated more recently. Some staff members believed that the designs reviewed without the benefit of guidance may not fully conform to Appendix A, Criterion 6, requirements. Therefore, in 1990 and 1991, the staff requested that licensees with previously approved reclamation plans evaluate their designs, using the current guidance. Licensees were requested to show how their designs compared with the criteria in Appendix A. Although the letters to licensees did not limit the areas for evaluation, the staff was primarily concerned with erosion protection. Responses to these letters have been received from each of the licensees.

In 1994, partly in response to complaints from licensees that staff had not addressed the licensee responses to the 1990 and 1991 letters, staff initiated the reviews of these previously approved reclamation plans. By early 1995, staff had interacted with licensees on five of the eight previously approved reclamation plans. Attachment 1 identifies those reclamation plans and the status of the staff review. It also identifies the reviewing organization and year of approval. These reviews are now being held in abeyance pending confirmation from the Commission of the staff's plans as described in this paper.

Although responses to the 1990 and 1991 requests for licensees to reevaluate erosion protection designs have been varied, there has been industry opposition. The strongest objection came from the Tennessee Valley Authority (TVA). Its senior management challenged the need to reanalyze a previously approved reclamation plan, particularly one that has been implemented and completed. TVA argued that the Edgemont, South Dakota, site was constructed in accordance with a plan that was approved by NRC as consistent with the requirements of Appendix A. TVA is concerned that requiring changes to tailings impoundments to meet current review practices would not be justified, for health and safety reasons.

By letter dated December 15, 1994 (Attachment 2), the Wyoming Mining Association (WMA) wrote to the Chairman raising many of the issues discussed in this paper. The staff's initial response informed the WMA that its concerns were the subject of staff discussion with the Commission, and promised a more detailed response after a final decision is reached. A copy of the proposed, detailed staff response is in Attachment 3. A copy of this paper and its associated Staff Requirements Memorandum (SRM), when released, would also be included in the staff's response to the WMA. In addition, the staff plans to send copies of those documents to the National Mining Association,[1] affected licensees, and Agreement States.

Public Health, Safety, and Environmental Significance

Some of the industry criticism of the staff's review of previously approved reclamation plans focused on the significance, in terms of public health, safety, and the environment, of correcting defects, if they exist, in these plans. The plans are evaluated against technical criteria that do not directly address risk. Although the criteria were derived in part based on risk, the alternatives analyzed compared unregulated tailings impoundments and those reclaimed in accordance with various potential technical standards. Licensees have argued that the reduction in risks to be achieved by redesigning and rebuilding previously approved reclamation plans do not justify the costs involved. The staff therefore evaluated, in a qualitative manner, the public health, safety, and environmental significance of potential design flaws in the three technical areas of concern. However, the Commission has gone on record in Statements of Consideration for rulemakings and in the Generic Environmental Impact Statement on Uranium Milling (NUREG-0706) as concluding that tailings impoundments pose significant risk to public health, safety, and the environment.

Erosion protection

Covers are required to be designed to protect the tailings impoundment from erosion for 1000 years to the extent reasonably achievable, but for at least 200 years. Covers could be eroded in two ways. A severe precipitation event could cause runoff beyond the design capability of the cover, moving rock riprap and soil cover protecting the radon barrier and tailings. Alternately, smaller rainfall events could create rills in sloped soil covers that serve as channels for runoff during succeeding rainfall events, growing deeper and larger with each event. Eventually, gullies could develop that are deep enough to impinge on the radon barrier or the tailings underneath. There are two potential effects of erosional damage to tailings impoundments that are of concern: 1) the radon barrier could be degraded; and 2) tailings could be dispersed to the environment.

If the erosion protection cover on a tailings impoundment were sufficiently eroded, the radon barrier could be exposed and also eroded.

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[1] Previously the American Mining Congress.

The radon barrier is designed to limit radon releases to the air. Although the radon emission averaged over the entire impoundment may still be within the limit, some areas of an impoundment with the radon barrier partially eroded could release more than 20 pCi per m^2 per second. Areas completely denuded of radon barrier could release hundreds of pCi per m^2 per second of radon. However, it is extremely unlikely that more than a small percent of the total surface area of an impoundment would lose the radon barrier, even after many years of erosion, thus limiting the impoundment average radon release rate. For an event where the entire radon barrier was lost, the resultant concentration at the site boundary would likely be above the Part 20 effluent release limit of 0.1 pCi per liter for radon-222. However, most impoundments are in remote locations.

Additionally, the radon barrier serves to limit infiltration of water into the tailings impoundment. If the radon barrier were eroded or entirely removed over areas of the impoundment, more water would be expected to infiltrate into the pile and come into contact with tailings. Over time this water would seep out of the bottom of the impoundment and eventually reach the water table. The effect would be to contaminate the groundwater below and downgradient of the impoundment. The staff has not performed detailed analyses of various scenarios necessary to determine if the additional seepage would likely result in exceedance of groundwater standards. Such an analysis would be highly dependent on site-specific conditions.

The second effect of erosion of the protective cover is the potential dispersal of tailings into the environment. If the erosion cover and radon barrier were removed from a section of the impoundment, the tailings underneath would be exposed and subject to dispersal by wind and water. Tailings could be carried to ephemeral streams during rains and remain in the channels, subject to further dispersal. Tailings could also be carried into permanent streams and dispersed or deposited in stream sediments. In none of these scenarios would there likely be significant doses to individuals who could come into contact with the tailings.

The consequences of potential failure or degradation of erosion protection covers can be mitigated by actions of the long-term government custodian. Since the long-term custodian is required to monitor the site annually, any significant erosion that would occur should be identified. If necessary to protect public health, safety, or the environment, the custodian could be required to repair damage to the impoundment, collect tailings that have been dispersed, and clean up groundwater. Therefore, the staff believes any threat to public health, safety, and the environment, associated with degradation of erosion protection covers, is likely to be minimal.

Radon emanation

Radon barriers are required to be designed to limit radon to an average release of 20 pCi per m^2 per second. This average is taken over the entire surface of the disposal cell. Regulatory Guide 3.64 presents methods to design radon barriers to meet the standard over long periods of time as the barrier dries out and ages. Some previous reviews of radon barriers may not properly account for drying and aging of the barrier materials. Therefore, these designs may release excess radon in later years. However, at least initially, the radon barrier must function properly; licensees are required by Appendix A to confirm, by measurement, that the average radon release rate is below 20 pCi per m^2 per second when the radon barrier is constructed. Because these sites are remotely located, even if excess radon were released in later years it is unlikely that concentrations at the nearest residence would be above Part 20 limits. Therefore, the staff believes the threat to public health, safety, and the environment associated with previously approved radon barriers, is likely to be minimal, if the areas around the sites remain sparsely populated.

Seismicity

Tailings impoundments are required to be designed to remain stable under earthquakes reasonably expected to occur during the design lifetime (1000 years). An earthquake that exceeds the design of a tailings impoundment could cause slope failures and disruptions in the erosion protection and radon barriers. The consequences would be similar to those discussed for erosion protection failures. Also, similar to erosion protection failure, the long-term custodian would be responsible to repair damage from an earthquake if necessary to protect public health, safety, or the environment. Therefore the staff believes any threat to public health, safety, and the environment associated with the seismic design of most impoundments is likely to be minimal. As noted above, several impoundments merit preliminary reconsideration due to much higher acceleration values which were identified in recent reports.

OPTIONS AND RECOMMENDATION:

Given the issues discussed above, the staff has identified three options to address the previously approved reclamation plans. The first option is to discontinue reviews of previously approved reclamation plans; the second is to continue with full detailed reviews of previously approved reclamation plans; and the third is to perform reviews of these plans only for major deficiencies based on currently available information. These options, along with pros and cons of their implementation, are discussed below.

Each option complies with Section 83c. Section 83c is implemented through the Commission's regulations in Appendix A, which also includes the flexibility of regulation permitted by Section 84c of the AEA. Thus, the question of compliance with Section 83c is enveloped within the question of compliance

with Appendix A, and allowed alternatives, as reflected in the individual site licenses. In particular, each license includes reference to Appendix A, and Appendix A provides that alternative requirements are acceptable if they provide equivalent protection "to the extent practicable," taking into account safety and environmental risk and "due consideration" to economic costs.

The policy choices presented in the options will have future consequences (post license termination) in terms of the potential for the occurrence of events of safety significance and related costs to the custodian. Option 2 would tend to reduce such consequences while Option 1 may increase them. The recommendation, Option 3, strikes a middle ground. However, to the extent such consequences can be reasonably foreseen, Appendix A allows the staff to scale up the amount paid over to the custodian for future maintenance.

Option 1 - Accept Most Previous Reviews

Under this option, NRC would decide, as a matter of policy, to grant finality to reclamation plans that have been previously approved by the staff. At license termination, the staff would simply confirm that the reclamation was performed as approved. However, any sites that have degraded before their transfer to the long-term custodian would be required to be repaired, and the licensee would be required to justify that the design meets Appendix A requirements in light of the observed degradation. In addition, the staff would identify to the Commission any previously approved reclamation plans that present significant health, safety, or environmental concerns. The staff would also complete its geotechnical evaluation of the disposal cells which have much higher seismic accelerations and determine if any significant concerns exist. For those disposal cells that were determined to be unstable under the higher seismic accelerations, the licensee would be required to justify that the design meets the requirements in Appendix A.

Pros:

1. Licensees would be assured that NRC approval of a reclamation plan would not be revisited in the future unless unacceptable degradation became apparent.

2. There would be no additional design change impact on most licensees with previously approved reclamation plans (some having completed much or all of construction).

3. Implementation of this option would not result in serious immediate threat to public health and safety or the environment. Any future failure of these reclaimed sites would be unlikely to present an immediate health and safety concern and could be remedied by the long-term government custodian.

4. Staff resources would only be needed for sites with observed degradation or identified significant health and safety concerns.

Cons:

1. Implementation of this option could result in allowing to stand some reclamation plan designs that would not be considered to meet the standards under the current staff guidance and practices. Because these designs may be similar to designs that have already experienced degradation, these previously approved disposal cells may be more likely to degrade or fail in the future than those with more modern designs.

2. Implementation of this option potentially increases the likelihood of the long-term custodian (DOE or the State) having to perform maintenance or repairs on a site after license termination. The requirements in Criterion 6 are in part aimed at minimizing future maintenance and repair, although not guaranteeing it. This maintenance or repair could be expensive and would be a cost to the government that UMTRCA attempted to minimize.

3. Implementation of this option would establish an inconsistency in the application of Part 40 compliance measures to all on-going and future licenses. This option relies on a government maintenance and repair program that assumes that any failure of the radon barrier by erosion or seismic disruption would pose an acceptable radon release until it is detected and fixed. In contrast, licensees with more recent reclamation plan approvals would continue to be held to the more stringent compliance levels of Part 40, which require controlled radon releases up to 200 to 1000 years without reliance on maintenance.

Option 2 - Complete Detailed Reviews of Previously Approved Reclamation Plans

Under this option the staff would remove the current hold on these reviews and complete the reviews using current guidance and staff practice to assess compliance with Appendix A. Evaluations through the normal review and comment process would determine if revisions to previously approved designs would be needed in the three technical areas discussed above to meet Appendix A requirements.

Pros:

1. The review at the time of license termination would be easily accomplished if the updated reviews were to have been recently completed and documented.

2. This option would likely result in more robust designs of disposal cells and less likelihood of future maintenance or repair costs by the long-term Government custodian.

3. The implementation of the applicable standards would be consistently applied to all licensees.

Cons:

1. This option would impose additional design change impacts on licensees with previously approved reclamation plans. The cost to the licensee for

re-analysis, redesign, and additional construction could range up to several million dollars. Western Nuclear, for example, has indicated that in excess of $3 million would be needed to upgrade the existing Day Loma site, to bring it into conformance with the current guidance.

2. The staff estimates an average of 0.7 to 1.0 full-time equivalent (FTE) per site to review previously approved reclamation plans in erosion protection and radon barrier design. These reviews would be billed to the licensee. The billed cost would, therefore, be between $150 thousand to $200 thousand per site. The cost for the preliminary seismic review of 22 sites, already performed by Lawrence Livermore National Laboratory under contract, is $124 thousand and is not being billed to individual licensees (i.e., it is non-fee-recoverable). However, these costs will be recovered from licensees with operating facilities through annual (10 CFR Part 171) fees.

3. The improvement in public health, safety, or the environment (over the no-review option) may not be significant.

4. There would not be finality to NRC approvals of reclamation plans until license termination.

Option 3 - Review Previously Approved Reclamation Plans for Major Design Deficiencies

Under this option the staff would perform a review based on current and/or readily available information to identify sites or reclamation designs that show evidence of failure or degradation. The licensee would be required to repair any design feature that is not functioning as designed or has not been constructed as designed, and to justify how the design could be expected to conform to Appendix A. The staff would also perform an evaluation of the previously approved reclamation plans to determine any major design deficiencies based only on current and/or readily available information. The purpose would be to identify any design features that clearly do not meet the minimum requirements of Appendix A. Only if the staff identifies a design that clearly does not meet the minimum Appendix A requirements would the licensee be brought into the review.

Pros:

1. After the reviews performed under this option are completed, licensees would be assured that NRC approval of a reclamation plan would not be revisited in the future unless unacceptable degradation became apparent or significant new information becomes available that will affect the ability of the design of the facility to adequately protect public health and safety.

2. Implementation of this option would incur less staff and licensee effort and costs than Option 2. The staff expects that because of the manner in which the reviews would be performed, the billed costs to licensees would be considerably less than for Option 2, unless a significant problem is identified. Also, costs to licensees for any design and construction modifications should be significantly less than those for Option 2.

3. This option would eliminate the most significant design problems and should thus reduce the potential maintenance costs that would likely be incurred by the government custodian.

4. The implementation of the applicable standards would be consistently applied (with less impact) to all licensees.

Cons:

1. This option may also be viewed by industry as a backfit, although to a lesser degree. There would be minor design change impact on licensees with previously approved reclamation plans.

2. The staff estimates an average of 0.2 to 0.4 full-time equivalent (FTE) per site would be needed for this option's review of current or readily available information on the previously approved reclamation plans in erosion protection and radon barrier design. These reviews would also be billed to the licensee. The review of the seismic issues would require the same resources as in the other options.

3. The improvement in public health, safety, or the environment (over the no-review option) may not be significant.

Licensee Alternatives during Reviews

Any of the options could result in identification of significant design problems. If the design problem indicates that a reclamation plan is not in compliance with NRC standards, an individual licensee may implement one of several approaches.

1. The licensee can provide additional analysis to show that the plan does meet the standards. For example, the licensee can propose and justify analytical techniques and procedures outside NRC guidance documents.

2. The licensee can revise the reclamation plan (i.e., redesign the impoundment) to meet the standards. Depending on the stage of actual construction at the site, this can result in the licensee having to reconstruct portions of the impoundment that were thought to have been completed.

3. The licensee, under Section 84c. of the AEA and Appendix A, can propose an alternative to specific NRC requirements. Appendix A provides that these alternatives are to be evaluated with reference both to the significance of the safety and environmental risks and the economic costs. A finding must be made that the alternative will achieve, to the extent practicable, the same or greater level of stabilization and containment of the site and protection of public health, safety and the environment. A licensee may be able to demonstrate the impracticability of achieving long-term stability without relying on maintenance. Accordingly, the licensee could propose a design that relied on periodic

maintenance. The licensee would have to identify the maintenance required and show that the site would remain stable if that maintenance were provided. The licensee would also have to provide funds for that maintenance (see Section 161x.(2)(B) of the AEA).

Licensees can also propose combinations of the options described above. Staff expects that for some completed sites, where the cost would be high to reconstruct portions of the impoundment to meet standards, the third approach may be the most palatable recourse for licensees.

RECOMMENDATION:

The staff recommends that the Commission approve Option 3. The basis for this recommendation is that under Option 1, potential problems outweigh the benefits to the Agency or affected licensees, and under Option 2 the potential costs are not warranted by the improvements that would be achieved in health, safety, or the environment. If the Commission approves Option 3, the staff would begin an orderly process to modify and complete its reviews of previously approved reclamation plans. The staff would also send the attached letter (Attachment 3) to the Wyoming Mining Association, along with a copy of this paper and the associated SRM.

The staff would not terminate its detailed review of Atlas because of the significant concerns already identified. Also, some licensees may voluntarily choose to proceed with some or all of their proposed changes to their reclamation plans.

Additionally, many of the concerns identified in this paper may be applicable to reclamation plans in Agreement States. Section 274c.(4) of the AEA states "The Commission shall also retain authority under any such agreement to make a determination that all applicable standards and requirements have been met prior to termination of a license for byproduct material, as defined in section 11e.(2)." Management Directive 9.15 states that the responsibility for making the section 274c(4) determination has been delegated to the Director, Office of State Programs (OSP). These determinations will be made in consultation with the Director, Office of Nuclear Material Safety and Safeguards. The OSP implements section 274c(4) through review of the State's documentation that the applicable standards (the State's regulations and license conditions) have been met. There is no intention of duplicating the Agreement State's review of the licensee's reclamation plan other than that done as part of the staff's routine review of the quality of uranium mill program licensing actions. The Agreement States will be informed of the decision at the next NRC/Industry meeting or through another means following the Commission's decision.

The policy and technical issues have been the subject of extensive discussion among the technical staff. Some staff consider that additional views on background information would be useful for an enhanced understanding of the current situation and the implications of the options presented. This additional view is contained in Attachment 4.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

James M. Taylor
Executive Director
for Operations

Attachments:
1. Previously Approved Reclamation Plans under Review
2. Letter from WMA dated 12/15/94
3. Response to WMA
4. Individual staff views

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Friday, June 30, 1995.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, June 23, 1995, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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PREVIOUSLY APPROVED RECLAMATION PLANS UNDER REVIEW

Licensee	Facility	St	Reclamation Plan Approval		Status of Current Reclamation Plan Review
			Office	Year	
ANC	Gas Hills	WY	URFO	1983	Preliminary review completed, questions sent. Licensee bankrupt; WY will complete reclamation.
Exxon	Highlands	WY	URFO	1988	Not yet reviewed.
Petrotomics	Shirley Basin	WY	URFO	1989	Preliminary review completed, questions sent to licensee.
Sohio	L-Bar	NM	URFO	1989	Not yet reviewed.
TVA	Edgemont	SD	URFO	1986	Preliminary review completed, questions sent to licensee.
Umetco Gas Hills	Above grade	WY	NMSS	1982	Preliminary review completed, questions sent to licensee.
Umetco Gas Hills	A-9 pit	WY	URFO	1988	Preliminary review completed, questions sent to licensee.
Western Nuclear	Day Loma	WY	NMSS	1981	Not yet reviewed.

Attachment 1

WYOMING MINING ASSOCIATION

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AREA CODE 307
HITCHING POST INN
P. O. Box 966
Cheyenne, Wyoming
82003

15 December 1994

The Honorable Ivan Selin
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Chairman Selin:

Subject: Reclamation Plans for Uranium Recovery Sites

The Wyoming Mining Association (WMA) is an industry association of mining companies and associates (suppliers, contractors, service companies, etc.) in the State of Wyoming. The WMA's membership includes uranium recovery operators licensed by the Nuclear Regulatory Commission (NRC). Several WMA uranium recovery licensees have expressed concerns to the association regarding the NRC's handling of their site reclamation plans. The concerns expressed by the licensees regarding their reclamation plans are as follows:

1. **Finality of NRC Approval of Reclamation Plans for Uranium Recovery Sites**

   One licensee, whose reclamation plan was reviewed and conditionally approved in September of 1993 by the staff at the now closed Uranium Recovery Field Office (URFO) formerly in Denver, Colorado, was told in October 1994 during a site visit by members of the NRC's Rockville, Maryland staff that the plan was going to be reopened and reexamined by the Rockville, Maryland staff. This is an NRC approved plan. It appears that the plan is now being subjected to reexamination just because URFO has closed and new NRC personnel in Rockville, Maryland are regulating the project. NRC approval of licensing actions should be just what it says. These actions should not be subject to reevaluation every time new personnel assume responsibility for a project. This particular situation implies that the review and approval given to the reclamation plan by the members of the URFO staff was somehow "substandard" and requires the review and approval of Rockville staff in order to truly be an NRC approved plan.

Another licensee had reclamation plans which were approved by URFO in 1985 and 1988 respectively. The Final Staff Technical Position was released by NRC in August of 1990. This licensee received a letter in 1991 requesting a review of the plan in light of 10 CFR Part 40 Appendix A and the August 1990 Staff Technical Position. The licensee submitted the requested review to the NRC and continued with reclamation. The licensee received a response from NRC in 1994, stating that they must justify their selection of a vegetative cover or use a rock cover. During the three year period between when the licensee submitted its response to the NRC's request for review and when a response from NRC was received, the licensee had discussed the issue with a member of NRC staff. The staff member stated that NRC staff was divided on the question as to whether previously approved reclamation plans should be revisited or not. The licensee was informed that the final outcome would be decided on which side in the dispute within the NRC prevailed.

Another licensee submitted a reclamation plan for their site in the Fall of 1983. The plan was approved in steps by URFO in Denver, Colorado as a series of license amendments. The licensee completed the reclamation work according to the plan approved by URFO in the Fall of 1989. The licensee discussed the completion of the work with the URFO staff and was told that the contractor could be released and the equipment on site could be sold as surplus. The licensee was told to submit a final report and Long Term Surveillance plan to URFO. These documents were submitted to URFO in the Spring of 1990. At this point the licensee believed that reclamation was complete. The licensee received no further direction from NRC. The Final Staff Technical Position on erosion protection was released by NRC in August of 1990. In the Fall of 1990, the licensee received a letter from NRC requesting that they review their reclamation plan in terms of the Final Staff Technical Position and other requirements. The licensee discussed the plan for the review with URFO staff in order to obtain agreement on key assumptions and methodologies. The licensee submitted the review to the NRC in 1992. The licensee received a response from NRC regarding their review in the Summer of 1994. The review stated that the NRC did not agree with the analyses done or the methods used, in spite of the fact that they had been previously coordinated with URFO staff. In this case a licensee was being asked to revisit a reclamation job that they were told was complete by NRC/URFO. In addition review methodologies approved by URFO are now being questioned by the staff in Rockville, Maryland.

On November 19, 1992 you made a speech at a Site Decommissioning Management Plan (SDMP) Workshop in Rockville, Maryland in which you stated, "As described in the action plan, the NRC's decision to terminate a license will relieve the licensee from any further obligation to the NRC to conduct additional cleanup, as long as the licensee decommissioned the site in full accordance with an approved decommissioning plan". The NRC's actions toward uranium recovery licensees appear to violate the regulatory spirit implied in your speech.

This is a very serious issue because the licensees base business decisions and budgets on these plans. Changes in them, once a licensee has been told that the are approved, can be very costly. The long time interval in obtaining a response from NRC, during which no guidance is provided, is in direct conflict with the agency's rules related to decommissioning. The licensee holds a reclamation plan for which final approval has been received and then conducts operations (earthmoving etc.) to implement that plan, only to find out three (3) years later that the NRC decides that the plan is unsatisfactory. During this interval the licensee receives no guidance from NRC and is only told that the NRC's staff is divided on the issue and that the outcome will depend upon which side within the agency ultimately prevails. This is not good regulatory practice. Licensees require timely notification from the agency in order to complete reclamation in a timely and cost effective manner.

The issue involving two (2) of the above mentioned licensees are ones which involve regulatory continuity and the disruption of same. The issue of regulatory continuity and the consequences of the disruption of that continuity with the closure of URFO in Denver, Colorado was raised in a letter from the American Mining Congress (AMC) to you dated May 28, 1993 and in comments sent to you by the WMA in 1993. The issues expressed in these letters are now coming true.

The Final Rule on Timeliness in Decommissioning of Materials Facilities imposes a stringent decommissioning timetable on licensees. A decommissioning timetable would be difficult if not impossible to meet given the delays experienced by uranium recovery licensees in obtaining reviews of their submittals. The NRC's Final Conforming Rule on Mill Tailings incorporates reclamation milestones. The Final Conforming Rule does allow for "Delays beyond the time reasonably required in obtaining necessary government permits, licenses, approvals or consent for activities described in the reclamation plan..." Delays of the magnitude described above (three years) make a mockery of any attempt by a licensee to meet any sort of milestone.

Licensees cannot plan or budget if their is no finality to NRC approval and if "approved" reclamation plans are always going to be subject to arbitrary reexamination, revisitation and modification by the NRC at any time after "final approval". This situation makes a regulatory compliance an attempt to "hit a moving target" which is nearly impossible. The industry needs finality of approval and assurance that the NRC will not revisit previously approved reclamation plans if it is to achieve reclamation of uranium recovery sites in a timely and efficient manner.

2. **Delays in Reviewing Submittals**

A least one licensee has experienced a long delay in obtaining a response from NRC on a reclamation plan submittal (a response to an NRC request for review) similar to the delay experienced by the above mentioned licensee. This licensee had a reclamation plan which was approved in 1989. In August 1990 the Final Staff Technical Position on the Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites was issued by NRC. In a letter dated August 2, 1991, the licensee was requested by NRC/URFO to review its reclamation in terms of the thirteen criterion in 10 CFR 40 Appendix A and the Final Staff Technical Position. The licensee submitted the requested review in the Fall of 1991. The licensee then received a response to its review in the Fall of 1994 in which NRC listed numerous comments related to erosion protection, the radon barrier and other geotechnical issues. How can licensees be expected to complete reclamation in a timely manner as expected by the NRC and EPA and as required in 10 CRT 40 Appendix A Criterion 6A (1) given the regulatory delays that are currently being experienced? Licensees require timely responses to their submittals in order for them to properly plan and budget for their reclamation activities

3. **Leakage of Title I Requirements into the Regulation of Title II Sites**

There is growing evidence that requirements for the reclamation of Title I (DOE) sites have been creeping into the regulation of Title II sites especially following the closure of URFO and the transfer of the licensing function to Rockville, Maryland. This issue has been raised by uranium recovery licensees at the Transition Oversight Team meetings and at other occasions. For example, the subject of biointrusion of the tailings impoundment cover appeared in an NRC review of a conceptual tailings management study submitted by one licensee, even though there is no mention of biointrusion in the STP on the design of erosion protection covers for tailings impoundments. The issue of biointrusion, however, is one that is addressed in the regulation of Title I sites. Uranium recovery licensees need clear regulatory guidance to plan their

reclamation and should not be expected to have to address issues that are not explicitly required in the regulations but rather are raised by individuals in the agency who are driven by Title I requirements.

The Wyoming Mining Association appreciates the opportunity of addressing these issues with you. The WMA requests a response from you on these issues and also requests that these issues be placed on the agenda for discussion at the planned NRC/Uranium Recovery Licensee meeting planned for March in Denver, Colorado. If you have any questions please do not hesitate to contact me.

Sincerely yours,
WYOMING MINING ASSOCIATION

Marion Loomis

Marion Loomis
Executive Director

OP:m
6 DEC

cc: Anthony J. Thompson - Pittman, Potts, Shaw and Trowbridge
James Gilchrist-American Mining Congress
Glenn Catchpole-Uranium Producers of America

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Mr. Marion Loomis, Executive Director
Wyoming Mining Association
Post Office Box 866
Cheyenne, Wyoming 82003

Dear Mr. Loomis:

SUBJECT: FOLLOWUP RESPONSE TO LETTER CONCERNING STAFF REVIEW OF RECLAMATION PLANS FOR URANIUM RECOVERY SITES

On January 10, 1995, Robert M. Bernero responded to your letter of December 15, 1994, to Chairman Selin, in which you raised concerns regarding the finality of U.S. Nuclear Regulatory Commission staff's review of reclamation plans for uranium mill tailings sites. In that letter Mr. Bernero stated that it would be inappropriate to respond to the issues you raised because the staff was in consultation with the Commission on some of the areas identified in your letter. He promised you that once those consultations were complete, the staff would provide you with a more detailed response to your concerns. The staff has recently completed its consultations with the Commission. Attached are copies of the Commission Paper (SECY-xx-yy) discussing review of previously approved reclamation plans and the associated Staff Requirements Memorandum. These documents address in detail your concern about backfit reviews of previously approved reclamation plans. As you can see, the Commission has approved the staff recommendation to review previously approved reclamation plans for major design deficiencies. The staff plans to modify its reviews in an orderly manner and will be in contact with individual licensees in regard to this.

Your letter also identified concerns related to the "leakage" of Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I requirements into Title II reviews, and delays in conducting reviews. With regard to your concern of leakage of UMTRCA Title I requirements into the regulation of Title II sites, you should be aware that the staff is using a common set of guidance documents in implementing these programs. This is because the basic standards are the same in both programs. The major difference is that the U.S. Environmental Protection Agency (EPA) standards have been incorporated into 10 CFR Part 40 regulations only for Title II. Title I reviews simply deal directly with the EPA standards. The staff has indicated to uranium recovery licensees (e.g., at the March 1994 and 1995 workshops with the uranium industry) that the Standard Review Plan that it had developed and implemented in the Title I program is also being applied to Title II reviews. Lessons learned in any particular action will be applied across the two programs.

The long delay in some reclamation plan reviews also concerned you. As indicated at the March 1994 and 1995 workshops, the staff has focused on, during the past few years, and continues to focus on reviews necessary to meet 40 CFR Part 61, Subpart T (Clean Air Act) obligations for final covers. In

response to concerns raised at the March 1994 workshop, the staff began the reviews of the previously approved plans, and, to date, has transmitted comments on five of the eight sites. Earlier this year, the staff put those reviews in abeyance, pending consultation with the Commission. As a result of the recent decision, individual project managers will be in contact with licensees, to expedite the process of modifying the reviews to focus on major design deficiencies. In addition, as we indicated in the October 1994 meeting with industry representatives, the Division of Waste Management reallocated significant resources to support reviews of routine submittals by licensees.

I trust that we have responded to your concerns. If you have any questions, please feel free to contact either me or Mr. Joseph Holonich, Chief, High-Level Waste and Uranium Recovery Projects Branch. I can be reached at (301) 415-7800, and Mr. Holonich can be reached at (301) 415-7238.

Sincerely,

Carl J. Paperiello, Director
Office of Nuclear Material Safety
and Safeguards

cc: Anthony J. Thompson, Shaw, Pittman, Potts, and Trowbridge
Kathlene Sweeney, National Mining Association
Glenn Catchpole, Uranium Producers of America
UR licensees
State representatives

Individual Staff Views

Attachment 4

June 14, 1995

COMMENTS BY MYRON FLIEGEL ON SECY PAPER:
REVIEW OF PREVIOUSLY APPROVED RECLAMATION PLANS

Although I do not disagree with the recommended option in the subject Commission Paper, I have concerns with the manner in which the paper is developed and the options presented. The choice facing the staff, and the Commission, is neither an easy nor a good choice. There are serious repercussions that would result from adopting each of the options identified, but especially from Option 1, that are not adequately described in the paper. Additionally, there is some background and historical information which may be useful to better understand how and why we now face this situation.

The Commission Paper is written primarily from the perspective of risk rather than NRC's responsibility to adhere to its codified standards. I, like many staff involved in the uranium recovery program, have questioned whether the standards are warranted by the risks posed by mill tailings. However, both EPA and NRC have defended the standards as appropriate, after consideration of the risks. If NRC now wants to revisit whether those standards are too restrictive it should do so in a more direct manner. If Option 1 (and to some extent, Option 3) were adopted, it can be viewed as the Commission indirectly repudiating some of the agency's past conclusions that have appeared in Statements of Consideration for rulemakings and in the Generic Environmental Impact Statement on Uranium Milling (NUREG-0706).

Historical perspective - erosion protection

The Commission Paper portrays the concerns related to erosion protection as resulting from the development and revision of guidance leading the staff to question previously approved reclamation plans. The concerns are couched in terms of robustness of design and whether designs meet current guidance. However, I think it is important to understand that the preparation of guidance on erosion protection was actually initiated because some technical staff had major concerns that NRC was approving designs that did not meet the standards in Appendix A.

In the mid to late 1980's, staff in the (old) Division of Waste Management (DWM) were beginning to address erosion protection designs at DOE Title I sites. There was some material in the technical literature on rock riprap design that DWM staff and DOE tried to adopt to the requirement for 1000 year, no maintenance designs. DWM staff also became aware that staff at the Uranium Recovery Field Office (URFO) were looking favorably on licensee designs employing only soil covers. DWM staff were unaware of any technical basis to support a conclusion that a soil cover would last 1000 years with no maintenance. DWM staff concluded, based on experience, that any sloped soil cover would develop a network of small channels to carry away water when it rained. These small channels coalesce and deepen with each succeeding rainfall-runoff event, eventually forming gullies. Given enough time, and 1000 years appeared to be more than enough time, the gullies would erode into the radon barrier and then tailings. It therefore appeared to DWM staff that designs relying on soil covers for erosion protection would not meet EPA and NRC longevity standards.

In discussions, URFO appeared to rely on both Criterion 4, which presented maximum allowed slopes, and engineering judgement to conclude that designs employing soil covers would meet the longevity standard. A great deal of effort went into trying to resolve the technical disagreements between DWM and URFO. Eventually it was decided to prepare a technical document to resolve the issue. The document would present technically defensible methods that could be used to provide reasonable assurance that a proposed cover design would perform as required by the standards. The document, which became the FSTP referred to in the Commission Paper, was a joint effort by the erosion protection experts in DWM and URFO. The FSTP essentially confirmed the earlier conclusion that soil covers could not be relied on for long term erosion protection.

As a result, it became apparent to staff that designs approved (by URFO) before the FSTP, probably did not meet the longevity requirement. That was the reason that staff wrote to licensees in 1990 and 1991, requesting that they show that their (approved) designs meet the criteria in Appendix A.

In summary, it was DWM staff's concern that designs which did not meet Appendix A had already been approved that directly led to the development of the guidance, not the other way around as the Commission Paper implies.

AEA Section 83c interpretation

The legal interpretation of AEA Section 83c described in the paper has some interesting implications under Option 1 and to some extent, under Option 3. As I understand it, Option 1 would result in previously approved reclamation plans that are not revisited (i.e., those not having seismic concerns or showing evidence of degradation) being deemed to have met Appendix A by the following logic: 1) the original review and approval concluded that the appropriate criteria in Appendix A were met, 2) if the original approval was in error with respect to any of the specific requirements in Appendix A (e.g., because of inappropriate technical evaluation), Appendix A allows NRC to accept alternative requirements, and 3) the Commission would conclude, if it approved Option 1, that the reclamation plan met Appendix A because it met an alternative requirement that provides equivalent protection "to the extent practicable," taking into account safety and environmental risk and "due consideration" to economic costs. The Commission Paper would be basis of the Commission's conclusion, even though it does not consider specific reclamation plans, specific costs and specific alternative requirements.

I believe that there are some practical considerations in implementing this approach.

At the time of license termination, an NRC official, probably a Branch Chief, will have to certify that all applicable standards and requirements have been met. What options will that official have, if informed by one or more technical staff, either orally or in writing, that the reclamation does not meet the specific requirements in Appendix A? The official could either sign the certification, relying on the Commission Paper and its associated Staff Requirements Memorandum, or, based on staff concerns, initiate a technical review. If he or she signed the license termination and a hearing or other

legal action ensued, that official could find him or herself in the position of defending the certification that all applicable standards have been met, even though that official had knowledge that the specific requirements in Appendix A were probably not met and alternative requirements had not been specifically evaluated for the reclamation plan. The official may be reluctant to sign such a certification because of legal concerns or simply out of a sense of professional responsibility.

On the other hand, if the certifying official decides to initiate a technical review, the net result will have been to postpone that review from now to some time in the future. However, the result of initiating such a review at the time of imminent license termination could lead to worse consequences if it were determined that the old reclamation plan did not meet Appendix A. The costs to licensees to redesign and rebuild tailings impoundments could be considerably higher years from now. Additionally, there is the possibility that the licensee may not have sufficient resources to redesign and rebuild, (or fund ongoing maintenance by the long-term government custodian) after NRC has approved construction (as conforming to the originally approved design) and released the surety requirement.

The interpretation of 83c or a specific license termination could be challenged, either as a result of the Commission Paper or in a specific licensing case. If challenged, NRC could be in the unusual position of being unable to rely on its technical experts, since its technical experts may not be able to confirm that the specific requirements in Appendix A were met. While there may be little opportunity for challenge by traditional intervening parties, there is a likelihood of objection from DOE.

DOE interactions

DOE has the responsibility under 10 CFR 40.28, as the government long-term custodian, to prepare a Long-Term Surveillance Plan (LTSP) for each site in advance of its license termination. In order to prepare the LTSP, DOE must conduct a detailed study of the site and the reclamation. DOE has begun this process, which will rely primarily on licensee and NRC documents.

DOE has two strong reasons to challenge any instance it identifies of reclamations that do not fully meet the specific requirements in Appendix A:

1. As stated in the paper, reclamation designs that do not meet the specific requirements are more likely to degrade or fail in the future. DOE would be responsible for repairing the damage. The repairs, which could be expensive, would have to be paid for by DOE. DOE, therefore, has good reason to try to prevent sites whose reclamation designs do not meet the specific requirements, from passing through to its custodial care.

2. DOE has been accused, primarily by uranium mill licensees, of wasting money in its program of reclaiming old uranium mill sites under Title I of UMTRCA. NRC, in its concurrence role in the Title I program, has compelled DOE to meet the applicable EPA standards, which are essentially the same standards required, in Appendix A, of NRC

licensees. DOE has done a good job in remediating its sites but at considerably higher cost than NRC licensees typically spend. NRC licensees have tried to avoid some of the design features that DOE has determined are necessary to meet the standards, calling DOE's approach "gold plating." By not challenging designs that do not include those features that DOE concluded were necessary to meet the EPA standards, DOE could be viewed as agreeing with licensees that it did more than necessary and thus wasted money in the Title I program. DOE, therefore has an interest in holding NRC licensees to the same standards that it met.

As reported in the Commission Paper, DOE has stated that it is prepared to become site custodian whenever NRC is ready to terminate a license. However, DOE has also indicated that it will discuss and try to resolve with NRC, any instance in which it, during preparation of the LTSP, determines that a site doesn't meet the standards. DOE also indicated that problems it finds at sites could be remedied by requiring licensees to provide funding for ongoing maintenance. However, the timing may be such that issues may not be raised by DOE until shortly before license termination, resulting in the types of problems discussed above.

EPA interactions

There may be consequences with respect to NRC's interactions with EPA, in proceeding with Option 1 (or to a lesser extent Option 3). At least some of the differences between the two agencies may stem from some EPA staff doubts that NRC is fully committed to implementing standards that originated in EPA. This appeared to be the case with mill tailings groundwater standards, where EPA tried to insert itself in the site-specific approval process of alternate concentration limits. EPA also inserted itself into the Kerr-McGee West Chicago hearing, when it concluded that NRC was not properly implementing its standards. Proceeding with Option 1 (or Option 3) might be viewed by EPA staff as NRC backing away from implementing its standards, thus confirming their opinion of NRC.

Conclusion

All three options have adverse consequences. I think the decision as to which option to choose should not be decided primarily on risk but rather on policy implications with respect to implementing codified standards. The implications of Option 2, which are primarily related to staff resources and costs to licensees, are well laid out in the Commission Paper. Implications of Options 1 and 3 may need to be more completely considered.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 29, 1995

MEMORANDUM TO: James M. Taylor
Executive Director for Operations

FROM: John C. Hoyle, Secretary /s/

SUBJECT: SECY-95-155 - REVIEW OF PREVIOUSLY APPROVED RECLAMATION PLANS

The Commission (with all Commissioners agreeing) has disapproved the staff's recommendation to proceed with Option 3 and approved Option 1 with the understanding that the staff has estimated the resources required to implement Option 1 to be about 1 FTE.

Commissioner de Planque noted that the staff is already planning a review of Criterion 4 (site and design criteria) and Criterion 12 (long-term site surveillance) as part of the National Performance Review process. She recommended that the staff re-examine all of Appendix A, in particular Criterion 5 (groundwater) and Criterion 6 (radon barrier and release limits) in terms of risk, benefit and cost. If the reviews of the various criteria in Appendix A result in less stringent requirements for the licensees, they should be allowed to modify their reclamation plans.

cc: The Chairman
Commissioner Rogers
Commissioner de Planque
Commissioner Jackson
OGC
OCA
OIG
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)

SECY NOTE: THIS SRM, SECY-95-155, AND THE VOTE SHEETS OF ALL COMMISSIONERS WILL BE MADE PUBLICLY AVAILABLE 5 WORKING DAYS FROM THE DATE OF THIS SRM.