



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

NOV 16 1979

MEMORANDUM FOR: Ross A. Scarano, Chief  
Uranium Recovery Licensing Branch

FROM: John J. Linehan, Section Leader  
Uranium Recovery Licensing Branch

SUBJECT: REPORT ON SITE VISITS TO SOHIO, ANACONDA, KERR-MCGEE  
AND UNC HOMESTAKE PARTNERS URANIUM MILLS IN NEW  
MEXICO

Dates: September 20 and 21, 1979

Participants: M. Mustain, I & E, Region IV  
J. Linehan, WMUR

Purpose:

To familiarize NRC staff with the conditions of tailings areas at operating uranium mills in New Mexico and to determine if, under the NRC's concurrent jurisdiction over tailings in New Mexico, any immediate remedial actions should be taken at operating tailings disposal areas. During a September 6, 1979 telephone conversation with J. Linehan, T. Wolff, New Mexico Environmental Improvement Division (EID), declined NRC's invitation for EID personnel to accompany NRC on these site visits.

Discussion:

Discussions of the site visits to each of the four mills are attached.

Recommendations and Conclusions:

Based on the attached discussions, it is recommended that we take the actions, listed below, at all four sites. Since the problem areas and areas of concern identified at the four sites are similar in type, although they differ greatly in severity or extent as evidenced by a comparison of the discussion of the Anaconda visit with the discussion of the Kerr-McGee visit, it is felt the following actions are needed across the board:

- 1) Require all four licensees to develop and implement a program for interim stabilization or interim reclamation of all tailings not covered by standing water. The program should include written operating procedures and weekly documented inspections to determine the effectiveness of the program.

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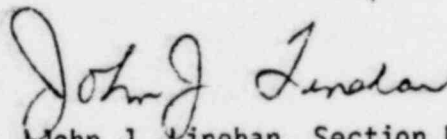
- 2) Require geotechnical engineering studies to be performed and submitted by all four licensees regarding the stability of the existing dams.  
  
Site inspections of all four dams by a geotechnical engineer from the NRC or an NRC consultant, should also be conducted.
- 3) Require performance and submittal of a detailed alternative study on future tailings disposal at each of the mills as well as a study of alternative methods of reclaiming existing and future tailings.
- 4) Require submission of all environmental data for our review and implementation of an environmental monitoring program that is comparable to that specified in our Branch Position-Operational Radiological Environmental Monitoring Programs for Uranium Mills.

The above actions should be taken in the immediate future and not delayed until time of license renewal review.

The main concern I have after visiting these sites is that there was, in general, no indication from licensees that there are design studies or data to assure that these operating tailings dams meet our Regulatory Guide 3.11 criteria. In addition, it is clear that the advances we have made over the past several years in the design of tailings dams and development of systematic planned tailings management, including interim stabilization, and reclamation programs are not being implemented in New Mexico. As evidenced by a statement from Kerr-McGee, that the State had made no modifications to their old AEC license since New Mexico became an Agreement State, it seems that there is no sense of urgency being expressed by New Mexico to their licensees to improve or upgrade tailings management at operating facilities.

It should be noted that the above findings are based on approximately 2 to 3 hour site visits and only on information provided by the licensees during these visits. While additional and more detailed information may modify our findings somewhat, it is felt that these findings reflect the actual situations at these tailings disposal sites.

M. Mustain, Region IV concurred in this report on November 16, 1979.



John J. Linehan, Section Leader  
Uranium Recovery Licensing Branch  
Division of Waste Management

Enclosures:  
As stated

2178 164

MILL: Sohio  
DATE OF VISIT: September 21, 1979  
CONTACT: J. Bazemore

DISCUSSION:

The Sohio facility is a 500 ton per day acid leach mill. The tailings impoundment is an above-ground impoundment built on natural materials with an engineered earthen starter dam to the west that keys into the natural topography on the north and south. In addition, there is also a small saddle dam to the east. The dam has been lifted by the upstream method by spigotting of tailings. These upstream lifts were not engineered and there appeared to have been no specific engineering controls or license conditions on these lifts. The only piezometers in the dam are located in a drainage blanket. Additional piezometers are scheduled to be installed in the near future.

The dry tailings beaches, as well as the upstream dam lifts (spigotted tailings), appeared to be crusted and there was no visible evidence of blowing tailings. However, there was no monitoring data (air and soil) readily available to verify that blowing was not a problem. There appeared to be some water erosion on the downstream face of the dam.

The licensee has no firm interim stabilization or reclamation plan.

The licensee did not have environmental monitoring data readily available, but promised to send this data (air and water) in the immediate future. This environmental data, depending on its comprehensiveness, may allow a determination of whether or not there is a problem with blowing tailings or seepage to groundwater.

While Sohio staff indicated that there was supposed to be 150 feet of beach and 5 feet of freeboard, it appeared in some areas that this beach requirement was not being met.

2178 165

MILL: Anaconda  
DATE OF VISIT: September 20, 1979  
CONTACT: E. Leany

DISCUSSION:

The Anaconda facility is a 6000 ton per day acid leach mill with an above-grade tailings disposal impoundment. The tailings impoundment consists of an earthen embankment on all sides. The downstream face of the embankments appeared to have approximately a 2:1 slope and were covered in some areas with vegetation. In addition, there appeared to be no erosion of the earthen downstream face of the embankment. The upstream slope is rip-rapped in areas where necessary. Anaconda presently has a private consultant performing a stability study on the impoundment.

Liquid from the tailings impoundment is transferred to four above-grade evaporation ponds with PVC on the bottom and sides and a three foot freeboard is maintained.

During the visit it was quite windy, yet there was no evidence of blowing of tailings from tailings areas within the impoundment not covered by water. These areas appeared to be heavily crusted over. (However, from the embankment we observed a large plume of dust rising from the UNC Homestake tailings area in the distance.)

In addition, there is an old carbonate tailings area at the site that has been covered with soil and naturally revegetated.

A review of monitoring data for the first six months of 1979, which appeared to be very well organized and documented, showed the following:

- a) Groundwater - U-nat, Ra-226, and Th-230 are well below applicable MPCs and Ra-226 is also well below the drinking water standard of 3 pCi/l. Some data showed unusually high levels of Cl and SO<sub>4</sub>, but values were high both up and down gradient of the tailings and evaporation areas.
- b) Air - both within the restricted area and off-site U-nat, Th-230, Ra-226, and Pb-210 are all well below the applicable MPCs based on high volume particulate samples (1 wk/month). Rn data (1 wk/month) showed levels of approximately .3 pCi/l which is well within the applicable MPC.

There is no firm detailed reclamation plan for the site at the present time.

MILL: Kerr-McGee  
DATE OF VISIT: September 20, 1979  
CONTACT: J. Cleveland

#### DISCUSSION

The Kerr-McGee facility is a 6000 ton per day acid leach mill. The tailings impoundment is made of tailings and raised by downstream spigotting (no cycloning). There was very little ponded water in the impoundment. Water is decanted to approximately three foot deep evaporation ponds (16 total) some of which are unlined, others of which have hypalon liners.

There was considerable evidence of seepage at the toe of the dam. Kerr-McGee has dug a ditch down to the Manco Shale, which is approximately 100 feet thick, to intercept this seepage which is then pumped back to the tailings impoundment. There are no piezometers in the dam.

Kerr-McGee has no program for interim stabilization to control blowing of tails and relies solely on crusting. There was considerable visible evidence of blown tailings and erosion of the dam (constructed of tailings) noted during the visit. Kerr-McGee indicated that measurements show that the tails used for dam construction contain 50 to 60 pCi of Ra-226 per gram of tailings.

Environmental monitoring data was reviewed during the visit. While there were reams of data, the data seemed to be poorly organized. Air particulate data was analyzed for gross alpha and there was no break down of radionuclides. Perimeter radon daughter measurements for two samples in 1979 showed values less than 0.01 WL. Groundwater data indicated a seepage problem out to approximately one-half mile. The licensee has approximately 100 wells, but most data was kept in corporate offices in Oklahoma and was therefore unavailable. Available data showed Ra-226 levels at the toe of the dam and at the site boundary of up to 16 pCi/l (drinking water standard 3 pCi/l), U levels of 1.7 mg/l, and Chloride levels of up to several thousand mg/l (drinking water standard 250 mg/l and livestock water standard 1500 mg/l). It should be emphasized that, although the data reviewed was only spotty, it is evident that there is a major groundwater contamination problem. Kerr-McGee indicated that they may install pump down wells to control the groundwater contamination problem.

Available gamma survey data showed gamma levels of 0.02 - 0.03 mr/hr within the site boundary and less than 0.02 mr/hr outside.

Kerr-McGee has no firm detailed reclamation plan but is studying alternatives at the present time. Future plans for tailings disposal are to raise the existing impoundment as necessary.

2178 167

POOR ORIGINAL

MILL: UNC Homestake Partners  
DATE OF VISIT: September 20, 1979  
CONTACT: J. Parker

This mill is a 3,000 ton per day alkaline leach process. Tailings are discharged to an above-grade impoundment made of tailings that appeared to be approximately 100 feet high. The dam is raised four to five feet per year with cycloned tailings. Tailings liquid from the impoundment (pH 9.5-10) is recycled back to the mill. UNC maintains five feet of freeboard (measured monthly) and 50 feet of beach. There are piezometers in the dam that are read every two weeks. There are two operators stationed at the tailings impoundment 24 hours per day.

During the site visit there was no visible evidence of blowing and tailings seemed to be crusted. However, later in the day while at Anaconda we observed a plume rising from UNC Homestake's tailings pile. UNC - Homestake relies essentially on crusting to control blowing tailings. They have used chemical sprays on certain susceptible areas in the past, but have no formal interim stabilization program.

In addition to the operating pile there is an old abandoned pile which has been partially revegetated. UNC owns all the land that both tailings areas are on.

A review of random environmental monitoring data showed the following:

Water: Data shows Ra-226 approximately 1 pCi/l (drinking water standard 3 pCi/l), As less than 0.01 mg/l (drinking water standard 0.05 mg/l), sulfate both on- and off-site and at background locations up to 1800 mg/l (drinking water standard 250 mg/l), nitrate up to 46 mg/l (drinking water standard 10 mg/l), and Se up to 1.0 mg/l (drinking water standard 0.01 mg/l).

Air: Particulate data from perimeter locations and locations outside the site perimeter showed concentrations of Ra-226, Th-230, and U-nat to be well below the applicable MPCs.

The licensee has done two sets of vegetation surveys to date but analysis has not yet been completed. Gamma surveys at 250 foot contours are scheduled to be done in the future every six months.

2178 168

The licensee has a seepage intercept and collection well system to control movement of seepage and has reached an agreement with the state for groundwater cleanup. The licensee estimates that it will take five to eight years after the end of the life of the tailings pile to complete groundwater cleanup. In addition, the licensee is delivering water to two nearby subdivisions. However, the licensee feels that contamination of the subdivision's groundwater is not being caused by them, as evidenced by the lack of contamination between the tailings pile and subdivision.

A study is presently being performed by a private consultant on alternative reclamation plans. UNC - Homestake's future plans are to raise the sides of the impoundment as necessary to contain future tailings.

2178 169