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WM-24



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

AUG 22 1980

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

THRU: Hubert J. Miller, Section Leader
New Facilities Section
Uranium Recovery Licensing Branch

FROM: Eugene A. Trager
New Facilities Section
Uranium Recovery Licensing Branch

SUBJECT: MEETING MINUTES - CYPRUS MINES
CORPORATION PROPOSED HANSEN PROJECT

Place and Date

NRC office in Silver Spring, Maryland, on August 15, 1980.

Attendees

NRC

R. A. Scarano
H. J. Miller
E. A. Trager

Cyprus

K. E. Dyas
R. N. McDaniel

Purpose

The meeting was conducted in order to resolve the remaining questions concerning the Hansen Project proposal.

Background

A meeting between the U.S. NRC staff and Cyprus Mines Corporation representatives with their geotechnical consultants, Wahler Associates, was conducted on April 17, 1980, to review unresolved technical questions related to the proposed Hansen Project. At that meeting two major problems were identified which might limit tailings management alternatives

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practicable at the Salt Creek valley site: (1) slump block deposits/ landslides, and (2) artesian groundwater conditions beneath the site. As a result of the meeting Cyprus agreed to provide the information required to complete the NRC technical evaluation for the State of Colorado (See Enclosure 3 of the meeting minutes, dated April 23, 1980). Cyprus provided information concerning the outstanding technical questions in five submittals (dated 4/29/80, 5/12/80, 5/29/80, 5/29/80, and 6/9/80). In a telephone conversation on June 30, 1980, between Cyprus (R. McDaniel) and NRC (E. Trager and NRC geotechnical consultant T. Howard) Cyprus agreed to provide a summary report concerning the Hansen Proposal and alternatives taking into account the newly obtained information and the NRC tailings management performance objectives. The report was to have considered modifications to the proposal and/or alternatives based on the new information. The summary report ("Summary Evaluation of Tailings Disposal Methods, Hansen Project", dated July 1980) was received and was docketed July 29, 1980.

Discussion

Cyprus confirmed plans to propose a multi-cell alternative at the B-2 site. The results of the review by NRC of the most recent Cyprus submittals indicate that Cyprus has obtained the data which was previously requested. However, the data on slump block deposit/landslide potential has not been analyzed to evaluate the practicability of deep excavation at the B-2 site. In addition, some of the specific responses on less significant questions are not considered adequate.

Cyprus was informed that, although NRC recognizes that it would be difficult to perform a mathematical analysis of the landslide potential, at least a parametric study should be performed to determine the optimum cut slopes for various portions of the impoundment. In addition, there is much that could be done in terms of positioning of the dams and cells and in terms of thinking through a possible construction sequence that would help to stabilize the slopes. Construction of the dams would certainly provide a buttressing effect to the slides. Once the dam(s) is/are constructed, the critical areas in each cell could be excavated.

It was agreed as a result of the meeting that NRC will proceed on its tailings management evaluation report based on the assumption that Cyprus will provide by the end of August 1980 a report on the excavated multi-cell alternatives (1 and 2) which confirms that the potential for and consequences of landslide and artesian uplift will not make the alternatives infeasible. The report will include a quantitative parametric slope stability analysis in the areas of potential landslide. It was also agreed that the NRC would provide within a couple of days a list of specific questions on Cyprus responses. (The list of detailed questions is attached; it was forwarded via telecopier on August 20, 1980.)

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Miller stated that, if the NRC received by the end of August 1980 the study on landslide potential along with a statement on the feasibility of the multi-cell alternative(s), the tailings management evaluation will be provided to Colorado no later than mid-October. (This assumes a timely response to the additional specific questions).

NOTE: In a telephone conference call on 8/15/80 between H. Miller, E. Trager, NRC consultant T. Howard, and Cyprus consultant Wahler Associates (F. Gifford, D. Buranek, J. Wulff and E. Solomon), T. Howard explained to Wahler Associates the cut slope stability analysis which is required to show the feasibility of varying multi-cell alternative geometries. In a later telephone conference call 8/18/80 between H. Miller, E. Trager, and R. McDaniel, R. McDaniel confirmed the scope of and anticipated level of effort that will be required to perform the study (approximately 5 man days and 20 computer run;) and stated that the study report should be available in two weeks.

E. A. Trager, Jr.

Eugene A. Trager
New Facilities Section
Uranium Recovery Licensing Branch
Division of Waste Management

Enclosure:
As stated

cc: Mr. Dick Gamewell, State of Colorado
Mr. Keith E. Dyas, Cyprus Mines Corporation
Mr. Ron McDaniel, Cyprus Mines Corporation

ENCLOSURE

In the meeting between NRC and Cyprus on April 17, 1980, Cyprus agreed to provide information concerning the proposed Hansen Project. This information was provided in five submittals dated 4/29/80, 5/12/80, 5/29/80, 5/29/80, and 6/2/80 (with correction dated 6/9/80). "Summary Evaluation of Tailings Disposal Methods, Hansen Project, July 1980," prepared by Wahler Associates was to have provided an updated summary of the tailings management system proposal. The following questions/comments relate to specific item responses (Cyprus item numbering is same as led in the 5/12/80 Cyprus submittal):

1. May 12, 1980, response to Cyprus item numbers 5, 8, 9, 10, 13, 14, 15, and 16.

Item 8 (re: liner system). More detail is needed concerning the use of "backhoe trenches or auger holes (that) will be used to establish that at least 3 feet of impervious material underlies the bottom of the excavation" and regarding the statement that, "(t)he evaluation and determination of areas to be lined will be based on recognized principles of soil mechanics." For example, what will be the spacing on trenches and/or auger holes, what is maximum permissible permeability of the "impervious" spot liner material, and what can be done in areas in which highly pervious zones are covered by thin layers of "impervious" material.

Items 9, 10, and 14 (re: water sheet erosion/flood protection for 3-cell system). In the April 17, 1980 meeting, Cyprus agreed to provide a topographic map of the final reclamation cover which was to have included areas which will be protected by riprap. Of particular concern are areas on the cover which will be subject to the concentrated, higher-velocity flow of runoff from tributary drainage areas. In general discussion at the April meeting, Cyprus stated that flow conditions on the tailings cover would be of a low-velocity, depositional nature. However, from inspection of Figure III-4 (Conceptual Reclamation Plan) it appears as though the transition from erosional to depositional flow may occur on the cover and that some riprap or rock cover protection is called for at these points. The conceptual design for hardening these areas, if required, should be provided.

Item 11 (re: 3-cell water balance). What is the estimated evaporation from the raffinate pond and by what amount could this evaporative capacity be increased? What additional quantity of tailings liquid could be recycled if it were removed from the tailings impoundment?

Item 13 (re: documentation of heaving). The documentation provided shows that heaving can occur, although under conditions which appear to be dissimilar to those at the B-2 site. Is there documentation available of heaving under conditions similar to those at the B-2 site?

2. May 29, 1980, response to Cyprus item numbers 4, 7, and 17.

Item 4 (re: characterization of landslide potential). The study of varying cell geometries to be provided by Cyprus by the end of August 1980 will include a parametric study of slope stability and should resolve questions on this item.

Item 7 (re: dewatering of tailings). It is stated that attempts to dewater using a subdrain system during disposal operations would merely result in recycling of fluid through the tailings. This is misleading because it does not consider that a lower liquid level in the tailings results in a lower driving head and potential for seepage, nor does it consider that removal of liquid during operations should result in earlier settlement and consolidation of tailings and an earlier reclamation. It is also stated that there are a number of possible ways of reducing liquid in the tailings by increasing the recycle of liquid to the mill and by increasing evaporative capacity outside of the impoundment. Please discuss and quantify the following elements which would potentially enable the removal and disposal of liquids in operating tailings cells: (1) recycle of liquid to the mill, (2) increasing the areal extent of the raffinate pond and/or use of an additional evaporation pond, (3) use of tailing liquid in surficial wetting to suppress tailings dusting. Please quantify and account for the disposal of evaporation pond residues in the tailings cell(s). Finally, please estimate the increase in recovery that might be possible with increased recycle of liquids from an underdrain system.

Item 17 (re: optimizing cell geometry to increase below-grade storage volume). The study of varying cell geometries (see item 4 above) should resolve questions on this item.

3. May 29, 1980, response to Cyprus item numbers 2 and 3.

Items 2 and 3 (re: drill and test plan, contour map of saturation zone, etc.) The statement is made that any piezometric map for the site would not be meaningful because this would oversimplify the actual subsurface conditions. Because of the importance of this information in evaluating the potential for blowout and impacts to groundwater please estimate/approximate volumetric extent(s) and capacity of the water bearing zones. Does the term "aquifer" accurately describe these zones? Please comment on the origin of the confined water. If the water is "connate" and there is no recharge, please account for the high pressures observed. Although it would be difficult to precisely quantify the amount of heave and quantity of inflow into the excavations, please bound what would be expected given what is known about the subsurface conditions. What is the "conventional dewatering" plan that would be used during excavation?

4. June 2 and 9, 1980 response to Cyprus item number 1

Item 1 (re: large excavation separated with tailings embankments). In connection with the study of feasible excavation geometries and cut slope stability it is important to note that there was a misunderstanding of what would be involved in the concept of this alternative. The NRC's intent was to examine a large, single excavation in the location of the 3-cell alternatives. The two "ridges" which separate the cells and which support the earthfill embankments in the 3-cell system would be excavated and would be replaced by a series of embankments constructed of tailings sands. The floor of such an excavation would gradually dip from the point nearest the head-of-the-valley and would connect the three deepest points in the 3-cell system design. Tailings sand embankments would be constructed as storage capacity was needed and excavation proceeded. The earthfill embankment at the mouth of the valley might be constructed in stages with excavation material. The overall stability of the embankments in this system would appear to be improved because they would be located largely below grade.