

ENVIRONMENTAL REPORT
South Powder River Basin Mill
Kerr-McGee Nuclear Corporation
July 1977

Supplement No. 1
Answers to NRC Questions Dated
December 19, 1979

Question 1: Describe the final covering over the surface disposal pit mines; e.g., the amount, shape and thickness of the cover materials, and the final contour.

Response: The amount of final covering over the surface disposal pit mines will be at least 3 m (10 feet) composed of overburden and topsoil removed and stockpiled prior to surface mining. Based upon topsoil mapping studies, approximately 2.5 feet of topsoil is available for final coverage in this area. Final contour in the surface disposal pits will provide for surface runoff diversion away from the disposal area.

Question 2: Provide a description of the upstream drainage for the surface mines area.

Response: Information on drainage basins located in the area of the surface mines is provided on page 2-73 and 74, Table 2.6-2 (Station number 6, 10 and 11) and Figure 2.6-5 page 2-75 of the Environmental Report.

Question 3: Provide description of the groundwater flow characteristics and compositions at the surface mines area, and potential contaminant movement.

Response: The groundwater flow characteristics in the surface mine area are provided in Figure 2.6-7, page 2-88 of the Environmental Report. Groundwater that may potentially be impacted by surface mining operations occurs as an unconfined aquifer system and flows in a northeasterly direction under a hydraulic gradient of 40 feet per mile. These characteristics are expected to prevail following reclamation activities.

Potential contaminant movement will largely be controlled by the natural groundwater flow path and rate. The rate - or average velocity - of groundwater flow in the shallow water table system may be calculated using Darcy's Law. Assuming an order of magnitude range in the permeability of the water bearing units of 5 to 50 gpd/ft², a porosity range of 0.15 to 0.30, and utilizing the aforementioned hydraulic gradient, then the average groundwater velocity is estimated to range between a minimum of 0.017 feet per day to a maximum of 0.34 feet per day. These velocities translate to a travel time requirement of 850 years per mile and 43 years per mile, respectively.

During operation and dewatering activities, groundwater movement will be directed toward the surface mine.

Question 4: Describe the procedures for disposal of the tailings liquids drained from the surface pits during operations; i.e., will they be discharged to an evaporation pond?

Response: Mill tailings placed in the surface mines will be drained prior to placement, and during mining operation any small quantity of liquids drained from the tailings will be routed through the mine treatment ponds.

Question 5: Provide a description of the surface hydrological flow pattern at the site and the upstream drainage for the tailings retention pond.

Response: Page 2-68 of the Environmental Report provides description of the surface hydrological flow patterns on the site. Possible surface runoff flow from the drainage basin located below the tailings pond is characterized at Station I, Table 2.6-2, page 2-73 of the Environmental Report. Additional information on surface hydrological flow patterns are presented in the Addendum.

Question 6: Describe the local stratigraphy, and provide a stratigraphy map.

Response: The hydrologic and engineering properties taken from a core hole at the tailings dam site are provided on page 2-95 of the Environmental Report. Exploratory Borings ranging in depth from 24 to 99 feet are presented in Appendix G with the log sheets for each test hole provided previously in answer to NRC questions dated April 28, 1978.

Question 7: Provide an estimate of the excavation depth necessary at the retention pond to maintain tailings slimes storage below grade.

Response: Detailed design of the excavation depth of the retention pond (see addendum) to maintain tailings slime storage below grade is calculated to be 25 feet.

Question 8: Describe the procedures for storing the excavated rock from the retention pond area and how the clay lining will be prepared in the pond.

Response: Excavated material from the retention pond area will be stockpiled at the mill site (see addendum). Preparation of the pond clay liner is described on page 3-22 of the Environmental Report.

Question 9: Provide a map showing the general boundaries of the three sections for staged tailings discharge in the retention pond. Describe the techniques for controlling the points of discharge of tailings, and how separation between each section will be maintained.

Response: The boundaries of the three sections for staged tailings discharge into the retention pond are shown on the revised site drawing given in the addendum. The separation wedges shown will be constructed of clay and earth and are of sufficient length to contain most of the estimated annual tailings production.

Material proceeding beyond the tail of the wedges shown is not thought to be of substantial importance in these calculations. In the event there is some overlapping of the tailings from one section into the other, it is the applicants' belief that operational procedures will permit differentiation between those tailings that are well-drained and those deposited in more recent times. It should be understood that an exact separation is probably not necessary since the majority of the sandy tailings will drain relatively promptly.

Question 10: Estimate the quantities and compositions of sands that will be used for underground backfill, if still planned.

Response: The quantities of sands which will be used for backfill will be dependent upon underground mine location and amount of material required for roof support. Composition of sands have been previously described in the September 27, 1978 submission to USNRC.

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Addendum No. 1

February, 1980

ADDENDUM #1
Design of Water and Slimes Retention Pond
at SPRB Mill Site

Question 7 and 9 posed by the NRC in its letter of December 19, 1979, prompted Kerr-McGee to reassess the design and operation of the proposed retention pond in the light of the new criteria that have evolved since the initial submission in 1978. Results of this reassessment are described in this addendum.

The tailings disposal, drainage area, and the pond concept have been completely redesigned as shown in SK691, SK692 and SK693 which are attached. The essential differences between the new concept and the one presented in the September 28, 1978 submittal as pond "M" (see SK685, ER, pg 3-23) are as follows:

1. The beach for the initial deposition of the sand portion of the tailings has been widened and subdivided into three sections. The slope of the artificial beach has been changed to $2\frac{1}{2}\%$ with the expectation that the tailings will form an angle of repose of approximately 6% on this area. Tailings deposition will begin in Cell #1 during the first year of mill operation and subsequently, proceed to Cell #2 (year 2) and Cell #3 (year 3). During the third year of mill operation, drained tailings sands in Cell #1 will be removed and transported by truck to the surface mine disposal site. This operational sequence will be continued throughout the life of the mill and allows concurrent deposition of wet tailings sands and removal of drained tailings sands to the surface mine disposal site.
2. The shape of the liquid and slimes retention pond as shown on SK691 has been changed and deepened to provide for placement of the mixture of overburden and slimes below grade.

3. The main natural water course called Blizzard Draw on maps of the area has been avoided by the reshaping of the retention system, thus avoiding the need for a diversion channel leading to the south of the pre-existing ranch road. A slight natural drainage course will be altered by the provision of diversion channels during operation; and, following termination or operations, an artificial channel will be re-established avoiding the main tailings disposal area.
4. The tailings liquid and slimes catchment area is a pond approximately 25 feet in depth with a clay liner approximately 4 feet in depth. The overburden-topsoil will be deposited as shown in the northeast corner of the site. Upon termination of the operation, the overburden will gradually be returned to the pond effectively neutralizing any remaining liquid and the mixture of overburden and slimes will be covered with two feet of clay and subsequently an additional 8 feet of overburden and topsoil.

The site layout is shown in SK691. Cross sections of the tailing system and pond in the diversion channel are shown on SK692. The final reclamation of the pond is shown on SK693.

The applicant believes that the system described above and in the subject drawings provides adherence to the latest NRC guidance and proposed regulations.