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DOCKET NO: 40-2061
LICENSEE: Kerr-McGee Chemical Corporation (KM)
West Chicago, Illinois
SUBJECT: SAFETY EVALUATION REPORT, AUTHORIZATION FOR ONSITE DISPOSAL

Background

In 1931, the Lindsay Light and Chemical Company established a mill in West Chicago, Illinois, for the extraction of thorium and nonradioactive elements from monazite and other ores. With the passage of the Atomic Energy Act of 1954, production of thorium became subject to federal regulations. A license for the production of thorium and thorium compounds was issued to the Lindsay Company by the U.S. Atomic Energy Commission. Ownership of the facility changed from the Lindsay Company to American Potash and Chemical in 1958 and to Kerr-McGee Chemical Corporation in 1967. Operations at the site continued until 1973 when KM closed the plant. The facility continues to be licensed by the NRC under authority granted by the Energy Reorganization Act of 1974.

In July 1977, NRC issued an order requiring KM to submit a plan for decommissioning the inactive West Chicago site and for disposing of the contaminated material at the site. In response to the order, KM submitted a plan dated December 21, 1978, which after preliminary review was rejected by NRC as inadequate. A new decommissioning plan was submitted by KM on August 15, 1979, and was found by NRC to be suitable for review. The plan was later modified by KM and used by NRC in its preparation of a Final Environmental Statement (FES) that was issued in May 1983. In the FES, staff concluded that onsite storage in a disposal cell should be approved and a decision on permanent disposal deferred until several years of monitoring data had been accumulated. Illinois requested a hearing on KM's application and the staff's proposed action. A hearing before the NRC Atomic Safety and Licensing Board (ASLB) was granted.

In Kerr-McGee Chemical Corporation (West Chicago Rare Earths Facility), LBP-84-42, 20 NRC 1296 (1984), the ASLB ruled that the basis on which the staff had refused to consider KM's proposal for permanent onsite disposal had been overtaken by the EPA's promulgation of final rules governing mill tailings disposal. 20 NRC at 1311. Thus, the Board concluded that the staff's treatment of KM's request was a segmentation impermissible under the decisions construing the National Environmental Policy Act of 1969 and that permanent disposal must be considered by the staff. 20 NRC at 1311-1317. In a subsequent decision, the Board further concluded that the failure to have assessed permanent disposal of the Rare Earths Facility wastes in the FES dictated that a supplemental impact statement be prepared and circulated for comment, or that the FES be recirculated with an amendment addressing permanent disposal. Kerr-McGee Chemical Corporation (West Chicago Rare Earths Facility), LBP-85-3, 21 NRC 244, at 256 (1985).

After a request for additional information, KM submitted a twelve-volume Engineering Report that provided information on the West Chicago site and KM's proposed encapsulation cell. The Engineering Report was used in the preparation

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of the Supplement to the Final Environmental Statement (SFES) issued by the staff in April 1989. After issuance of the SFES, the ASLB proceeding was reactivated. The ASLB set a schedule for the proceeding in LSP-89-16, 29 NRC 508 (1989). Illinois moved for summary disposition of some of the contentions and KM moved for summary disposition of most of the contentions. The Board in LBP-89-35, 30 NRC ____ (November 22, 1989) set two contentions down for hearing. The other contentions were resolved on the summary disposition motions. A hearing was held in Chicago, Illinois, on December 14 and 15, 1989, on limited issues relating to the impacts of KM's proposed encapsulation cell on the ground water. On December 22, 1989, KM moved for summary disposition on all remaining contentions. The ASLB issued the Initial Decision on February 13, 1990, LBP-90-9, 31 NRC _____. In this decision, the Board ruled in KM's favor on the summary disposition motion. The issues subject to the December hearing were also resolved in KM's favor. The Licensing Board imposed two license conditions. The staff was directed to issue a license amendment permitting onsite disposal of the West Chicago mill tailings. LBP-90-9, Slip op. at 80. (1990).

Discussion

In accordance with an application dated May 10, 1974, KM's current license was issued on August 22, 1974, for storage and distribution. KM applied for renewal on July 25, 1979. Under the timely renewal provisions of 10 CFR 40.43(b), the license has remained in effect. The license will be revised in its entirety to incorporate the current amendment authorizations and the authorization for onsite disposal. KM has received 17 amendments to their license. Several of the amendments authorized the demolition of various buildings on the site (Amendments 1, 3, 5, 6, 9, 14, and 16). Amendments 10 and 11 concerned the movement of source material from offsite locations to the site. Amendment 12 authorized the use of building rubble for a service road base on the site. Amendment 13 removed the restrictions on the receipt of source material. The actions authorized by these amendments have been completed by KM, and therefore authorization for these activities is no longer needed. These amendments will not be included in the revised license. Amendments 2, 4, and 8 provided authorization for operation of the incinerator. The application dates of these amendment requests will be included in Condition 9 of the revised license and the conditions imposed by these amendments will become Conditions 11 through 17 of the revised license. Amendment 7 incorporated KM's Radiological Health Program Plan and the Health Physics Manual into the license. Amendment 7 was revised by Amendments 15 and 17. The application dates for Amendments 7, 15, and 17 will be included in Condition 9 of the revised license and the conditions from these amendments will become Conditions 18 and 19 of the revised license.

The Engineering Report submitted by KM on April 16, 1986, is a twelve-volume document that contains KM's proposed plan for onsite disposal in an engineered encapsulation cell. The contents of each volume is briefly mentioned below. Volume I provides a summary and overview of Volumes II through Volume XII. Volume II contains an analysis of the geology of the West Chicago site, the location and movement of ground water under the site, the impact of the site on ground water quality, and the projected ground water quality after completion of the disposal cell. Volume III contains an analysis of the foundation soils

underlying the encapsulation cell. The analysis discussed the amount and rate of settlement that would occur at the cell foundation due to the weight of the cell and its contained waste materials. Volume IV contains an analysis of the functions performed by the various layers of the cell and the design criteria for the materials that are to be used in each layer. Volume V contains an evaluation of the subsidence that the waste materials will experience as they are compressed by the weight of the materials on top of them. Volume VI discusses the control of sedimentation during the construction phase and erosion control of the cell cover following completion. Volume VII discusses the neutralization of the wastes and the stabilization of certain of the sludges before placement in the cell. Volume VIII provides a summary of the field investigations and laboratory testing that were undertaken between 1984 and 1986 to characterize the soils and waste materials on the site. Volume IX describes the methods to be used and the sequence to be followed in building the cell. Volume X describes the work to be conducted on the factory site including the method of excavation, the handling of the waste volumes that are to be removed, and the procedures for backfilling and regrading the factory site and other areas surrounding the cell. Volume XI describes the plan for post-closure monitoring, inspection, and maintenance. Volume XII provides an analysis of the post-closure radiological impacts from the release of radon from the cell.

The West Chicago site is a 43-acre parcel located in a residential-industrial area on the southwest side of the city of West Chicago in DuPage County, Illinois. The site is divided into three separate areas: the north end is called the factory site, the middle section is called the intermediate site, and the south end is called the disposal site. Under KM's proposal, remedial activities at the West Chicago site would involve containment of all materials contaminated with uranium and thorium in a new disposal cell to be constructed on the south end of the KM property. The four main components of the cell are the cell bottom, the waste material, the cell sides, and the cell cover. Further information on the site description and cell design can be found in KM's Engineering Report and the SFES and, therefore, will not be repeated here.

KM's radiation protection program has been previously reviewed and approved by the staff (Amendments 7, 15, and 17). The purpose of the program is to ensure that work onsite is done in accordance with rules and regulations applicable to safe handling of radioactive materials and sources of radiation. KM has committed to an ALARA policy with regard to radiation exposure to workers, the public, and the environment. This program will remain a requirement of the license. Further information can be obtained from Amendments 7, 15, and 17.

KM's plan as described in the Engineering Report was analyzed in the SFES. The SFES included an evaluation of the environmental consequences as well as the radiological impacts to the general public and to the workers. The conclusion from the SFES was that KM's proposed action met all applicable regulations to the extent that they applied to the site and that the proposed action was the preferred course of action. Additionally, in LBP-90-9, the Board concluded that "Kerr-McGee's proposed disposal cell satisfies the

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requirements of 10 CFR Part 40, Appendix A, by wide margins and that there is a high degree of assurance that no significant contamination will occur as a result of the disposal of the West Chicago mill tailings in it." At 80. The Board has directed the staff to issue a license amendment permitting onsite disposal of the West Chicago tailings subject to two conditions. LBP-90-9. At 80. Therefore, the following conditions shall be imposed on KM:

Condition 20. During stabilization activities, Kerr-McGee shall implement the mitigative measures against radioactive dust specified in Section 5.9.4.1 of the Supplement to the Final Environmental Statement dated April 1989.

Condition 21. Kerr-McGee shall institute a detection monitoring system pursuant to Criterion 7A of Appendix A to 10 CFR Part 40 when the tailings are placed in the disposal area.

The SFES recommended that during stabilization operations the following subjects be addressed as conditions of the license: (1) KM be required to have a health-physics plan for protection of workers, (2) environmental monitoring of air and water be required, and (3) conditions designed to limit public exposure and environmental impact be imposed. KM has an approved health-physics plan that is part of the license; therefore, the first condition is met. The third condition is met by the imposition of Condition 20 above. The second requirement is met in part by Condition 20. Additionally, in order to show compliance with 10 CFR Part 20, KM must conduct some monitoring. The monitoring program is also described in various parts of the Engineering Report which will become part of the license.

Included in the quantity of waste to be disposed is approximately 81,900 cubic meters of material that has been brought onsite for storage from the Sewage Treatment Plant and residential areas around town. This material has been classified as source material by the Commission. CLI-88-6, 28 NRC 75 (1988). However, the classification of this material is the subject of a proceeding before the U.S. Court of Appeals for the District of Columbia Circuit. If the Court upholds the classification of the material as source material, the State of Illinois has jurisdiction over the material, and KM must consult the State as to the disposition of the contaminated soil. If the Court rules that the material is Section 11(e)(2) byproduct material, then KM may place the soil in the cell with the rest of the onsite wastes.

The revised license shall be for the construction of the encapsulated cell. Upon the completion of stabilization activities, the license will again be revised to cover the post-closure monitoring requirements. Therefore, the following condition should be included in the license:

Condition 22. Prior to completion of the final clay cap of the cell, the licensee shall submit a post-closure monitoring program for NRC review and approval.

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Conclusior/Recommendation

Upon the completion of the review of the licensee's application, the staff has concluded that the activities to be authorized by the issuance of a revised license to Kerr-McGee Chemical Corporation will not constitute an undue risk to the health and safety of the public. Furthermore, the staff has determined that the application fulfills the requirements of 10 CFR Part 40.32.

The staff concludes that Kerr-McGee Chemical Corporation should be granted authorization to construct a disposal cell to encapsulate the § 11(e)(2) byproduct material located on the West Chicago site subject to the following conditions; the first two of which were imposed by the Licensing Board:

Condition 20. During stabilization activities, Kerr-McGee shall implement the mitigative measures against radioactive dust specified in Section 5.9.4.1 of the Supplement to the Final Environmental Statement dated April 1989.

Condition 21. Kerr-McGee shall institute a detection monitoring system pursuant to Criterion 7A of Appendix A to 10 CFR Part 40 when the tailings are placed in the disposal area.

Condition 22. Prior to completion of the final clay cap of the cell, the licensee shall submit a post-closure monitoring program for NRC review and approval.

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