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#### UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION 89 DEC 27 P4:20

ATOMIC SAFETY AND LICENSING BOARD

OFFICE OF SECRETARY DUDKETING & SERVICE BRANCH

IN THE MATTER OF

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KERR-MCGEE CHEMICAL CORPORATION

(West Chicago Rare Earths Facility)

Docket No. 40-2061-ML ASLBP No. 83-495-01-ML

KERR-MCGEE MOTION FOR SUMMARY DISPOSITION OF THE REMAINING CONTENTIONS

> Peter J. Nickles Richard A. Meserve Herbert Estreicher COVINGTON & BURLING 1201 Pennsylvania Avenue, N.W. P.O. Box 7566 Washington, D.C. 20044 (202) 662-6000

Attorneys for Kerr-McGee Chemical Corporation

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### KERR-MCGEE MOTION FOR SUMMARY DISPOSITION OF THE REMAINING CONTENTIONS

On August 22, 1989, Kerr-McGee Chemical Corporation ("Kerr-McGee") sought summary disposition of certain contentions filed by the State of Illinois ("State") in this proceeding. Those contentions either have now been resolved or are pending for resolution. Kerr-McGee now moves for summary disposition of the remaining contentions. $\frac{1}{2}$ 

The contentions that are the subject of this motion were initially advanced by the State in 1983. Since that time, Kerr-McGee has completed and issued its 12-volume Engineering Report<sup>2/</sup> and the NRC staff has completed and

 $\frac{1}{2(m)}$ , 2(0), 2(q), and 2(r).

2/ Kerr-McGee Chemical Corp., West Chicago Project Engineering Report (April 1986) ("Engineering Report"). References to the Engineering Report herein will be in the form "[volume] Eng. Rep. [page, table, figure]." issued the Supplement to the Final Environmental Statement ("SFES").<sup>3/</sup> Many of the matters raised by the remaining State contentions have been thoroughly addressed in those documents. Others either reflect misunderstanding of the Kerr-McGee plan or are otherwise misguided. As will be seen, summary disposition of all these contentions in Kerr-McGee's favor is now appropriate.<sup>4/</sup>

I. Contention 2(a)(i)

This contention provides:

With respect to levels of inorganic containments [sic] in the onsite wastes, the applicant has conceded (Stabilization Plan 3.43) that because the sludge and tailings piles are nonhomogeneous, averaging the results of the samples does not yield numbers which are necessarily representative of the mass of the wastes. The applicant did, however, use averages in calculating the concentrations of inorganic contaminants released from the disposal cell. In order to provide conservative and reliable estimates of dispersion and dilution effects, the applicant should base its calculation on the hot spots in the wastes.

The State's contention is misdirected for several reasons. First, Kerr-McGee has conducted exhaustive random sampling in order to assure the accurate characterization of

 $\frac{4}{100}$  An annex is attached setting forth the material facts as to which there is no genuine issue. See 10 C.F.R. § 2.749(a) (1989).

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<sup>3/</sup> NRC, Supplement to the Final Environmental Statement Related to the Decommissioning of the Rare Earths Facility, West Chicago, Illinois (1989) (NUREG-0904, Supp. No. 1).

the wastes at the West Chicago site. The procedures for the sampling and chemical analysis of the waste are reported in Volume VIII of the Engineering Report.  $\frac{5}{}$  VIII Eng. Rep. 8-5 to 8-12, 8-14 to 8-16, 8-18 to 8-21; <u>id.</u>, Exhibit 1. As discussed in the attached Affidavit of James L. Grant Concerning Contention 2(a)(i) (Exhibit 1), the data do not reveal substantial concentrations of leachable inorganic constituents in the wastes and, in any event, the variability in the concentration of each waste type (<u>e.g.</u>, tailings, sludges, soil) was generally found to be less than the mean values. The State's assertion that there might be significant "hot spots" in the waste is disproved by the exhaustive sampling data. Id., ¶ 4.

Second, the contention is premised on the notion that any adverse impacts to groundwater would result from the postulated hot spots. This premise is noorrect. Any leachate released from a hot spot would be fully mixed in the groundwater system with leachate from both upgradient and

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<sup>5/</sup> The sampling program was performed to conform with EPA procedures for the sampling of wastes. It was designed to ensure that a sufficient number of samples were collected so as to produce a statistically accurate characterization of the materials. To that end, some 330 borenoles were drilled at the site. The pattern of borehole placement and the selection of samples from each borehole were based on statistical techniques that are designed to provide a representative sampling. Chemical screening tests were then performed on over 1800 samples, including some 906 EP Toxicity Leach Tests, 234 infrared analyses, and numerous priority pollutant analyses. VIII Eng. Rep. 8-2, 8-6 to 8-15.

downgradient portions of the cell and with the large flow of groundwater at the site. The geohydrological situation in effect serves to mix the leachate from various parts of the cell with the groundwater and to assure that any impacts on groundwater result from the average properties of the wastes. Id., ¶ 5.

Finally, contrary to the contention, the groundwater modeling did not rely solely on the average properties of the waste. The groundwater analysis used both a "composite" leachate and a "maximum" leachate to estimate groundwater impacts.<sup>6/</sup> Because the layering and placement of the various types of waste might create the possibility that different parts of the cell could yield different leachate quality, Kerr-McGee developed an estimate of the leachate that would be produced in each portion of the cell. As it happened, because the variation of leachate quality across the cell proved not

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<sup>6/</sup> The procedures used by Kerr-McGee in estimating leachate quality are set out in the Engineering Report. II Eng. Rep. 2-77 to 2-81; see also Testimony of Charles W. Fetter, Jr., James L. Grant, and John C. Stauter in Response to the Board's Orders of November 14, 1989, and November 20, 1989, 8-11 (Nov. 28, 1989) ("Fetter Testimony").

The leachate was estimated using data generated from the EP Toxicity tests. VIII Eng. Rep. 8-6 to 8-15. As discussed at the recent hearing, leachate generated under the conditions in the cell is expected to be considerably less concentrated than that yielded by the acidic leaching solution used in the EP Toxicity tests. This is confirmed by certain recent leachate tests. Fetter Testimony, <u>supra</u> note 6, at 11, Tables 2, 3; <u>see also Grant 2(r) Affidavit</u>, ¶ 6 (Exhibit 8).

to be large, Kerr-McGee assumed that a uniform quality leachate would be released from the cell in its subsequent modeling. But Kerr-McGee defined the composite leachate as the largest concentration calculated for any portion of the cell. The composite leachate was seen at the time of the Engineering Report as a reasonably conservative best estimate of the leachate quality. Grant 2(a)(i) Affidavit, ¶ 6; II Eng. Rep. 2-79; Fetter Testimony, <u>supra</u> note 6, at 8-11, 42-43.

In order to provide a worst-case bounding analysis, Kerr-McGee also estimated the "maximum" leachate -- a leachate in which all the wastes are assumed to release constituents at the maximum concentration observed for any of the various types of waste that will be placed in the disposal cell under conservative leachate generation conditions. This maximum leachate is a highly overstated and artificial estimate of the leachate actually likely to be generated in the cell. Nonetheless, even if the leachate from the cell had the properties of the maximum leachate, the predicted concentrations of constituents from the cell in the groundwater at the site boundary are below Illinois water standards. Grant 2(a)(i) Affidavit, ¶ 6; Il Eng. Rep. 2-80 to 2-81, Table 2-40 (Case 2); Fetter Testimony, supra note 6, at 15.

Since the Engineering Report was submitted, Kerr-McGee has conducted additional tests of leachate quality.

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As discussed in the recent testimony before the Board, the additional tests provide perhaps the best current data as to the leachate that might be expected from the cell. The recent tests show that both the prior composite and the maximum leachates serve to exaggerate the possible impacts of the disposal cell on the groundwater system. Fetter Testimony, <u>supra</u> note 6, 10-11, Tables 2, 3; <u>see also</u> Grant 2(r) Affidavit, ¶¶ 5-6 (Exhibit 8).

The State's claim is fundamentally misguided. Summary disposition of this claim against the State is now required.

# II. Contention 2(a)(ii)

This contention provides.

The applicant's dispersion model assumes uniform dispersion of leachate from the disposal cell and does not take into account the possibility of channelized flow. Given the historical experience concerning channelized flow at the Sheffield, Illinois low-level radioactive waste disposal site, and given the inhomogeneous character of the West Chicago Kerr-McGee site subsurface, the possibility and impact of channelized flow must be addressed.

This contention is entirely without merit for several reasons. As is explored in the Engineering Report and was explained at the recent hearing, the groundwater transport model used by Kerr-McGee to predict the concentrations of dissolved solutes in the groundwater adequately accounts for the "inhomogeneous character" of the site. The model applied by Kerr-McGee was a standard groundwater model that allows for variations to transmissivity across the modeled area.<sup>7/</sup> The model was then calibrated so as to assure an accurate representation of the actual potentiometric head at the site. In short, any significant variability in groundwater flow at the site was fully accommodated in the modeling. II Eng. Rep. 2-74 to 2-76; Fetter Testimony, <u>supra</u> note 6, at 11-13.

As explained by the Affidavit of Charles W. Fetter, Jr., Concerning Contention 2(a)(ii) (Exhibit 2), the occurrence of channelized flow at the Sheffield, Illinois disposal site has no bearing on the situation at West Chicago. Groundwater at Sheffield is found in a pebbly-sand unit that is found in a channel in material of much lower hydraulic conductivity. Groundwater drainage is principally defined by the pebbly-sand channel. Fetter Affidavit, 11 4-7. The geology at the West Chicago site, on the other hand, is entirely different. The water table at the West Chicago site is found in a sand-and-gravel layer, termed the E-stratum, which exists under the entire disposal site. No subdrain effects like those seen at Sheffield are observed. Channelized flow simply does not exist at the West Chicago site in the aquifer that would be first and most significantly affected by the disposal cell. Id., ¶¶ 8-9.

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<sup>7/</sup> Transmissivity is the product of saturated thickness and conductivity. Transmissivity was estimated from data collected at the site. II Eng. Rep. 2-74 to 2-76; Fetter Testimony, supra note 6, at 12.

The claim that the State seeks to litigate is unfounded and summary disposition should be granted against the State.

### III. Contention 2(d)

This contention provides:

The applicant's proposed groundwater monitoring system is insufficient to detect the kind and quantity of contaminant migration. Among other things, the stabilization plan does not describe the methods for sample collection, preservation, analysis, and custody; the plan unhelpfully states only that "standard procedures will be followed for sampling and analysis." Plan, 7-3. Similarly, the plan does not describe how groundwater data obtained from the samples will be statistically analyzed; without proper statistical analysis, significant changes in groundwater guality can go undetected. (The plan states only that "Results will be examined for trends by a professional hydrologist." Id.) Nor does the plan specifically indicate the depths, locations, and screen lengths of monitoring wells; without this information the applicant cannot show that screen settings are related to the probable path contaminants would take as they migrated offsite. Nor is the number of wells certain.

Furthermore, the proposed system does not include analysis for organic waste constituents or indicators of organic waste constituents. Such analysis must be undertaken because residuals of organic solvents used in the industrial process may be present in leachate.

The applicant has not shown that it will install a background groundwater monitoring system capable of establishing the quality of groundwater which has not already been contaminated by leachate from the site. Groundwater contamination maps in the FES indicate that pollution originating at the Kerr-McGee site spreads offsite in all directions. Samples from improperly located background wells may yield water that has been contaminated by site pollutants rather than water that is representative of the general area.

The applicant does not propose to monitor groundwater for an adequate length of time following closure. Regulations under the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 et seq. ("RCRA"), require, in this case, post-closure monitoring for around 60 years. However, given the fact that the proposed disposal site is located above, and has already seriously degraded, the major groundwater source in the area, RCRA's monitoring requirements should be treated as a minimum only.

Kerr-McGee's planned groundwater monitoring is described in the Engineering Report. XI Eng. Rep. 3-4, 9-10, 18; <u>id.</u>, Tables 11-1, 11-2. The staff analyzed the Engineering Report and has stated that, in general, the groundwater monitoring program is adequate. SFES, 7-1 to 7-4. A fuller exposition of Kerr-McGee's groundwater plan is attached as Exhibit 3.

As the Board is aware, Kerr-McGee has installed a network of monitoring wells in the uppermost aquifer (the E-stratum) on the disposal site. See II Eng. Rep. 2-46; VIII Eng. Rep. 1-2. Several of these wells will be retained for long-term monitoring purposes, along with certain additional wells that will be installed. Wells to the north of the cell are upgradient and thus will provide background concentrations in the groundwater before any impacts from the cell. The locations of the wells are shown in the attached plan. Groundwater Plan, at 1, 3. Sampling of the wells will be accomplished by procedures similar to those used by Kerr-McGee in conducting its groundwater quality analysis. <u>See</u> II Eng. Rep. 2-48 to 2-51. As described in the plan, sampling and analysis will be performed according to accepted protocols. Samples drawn from each of the monitoring wells will be analyzed for a variety of radiological and chemical parameters. Groundwater Plan, 2, Table 2; <u>see also XI Eng. Rep. Table 11-1</u>. Sampling will be most intense during the first five years following closure, and will be reduced thereafter. Groundwater Plan, 2; XI Eng. Rep. Table 11-2.

The contention asserts that Kerr-McGee should monitor for organic parameters. Kerr-McGee does not propose to monitor organic parameters because there is no indication that organic materials of concern are present in the wastes. VIII Eng. Rep. 8-21, Exhibit 1; Groundwater Plan, 2. Indeed, the State has conceded as much through its withdrawal of contention 2(b).

The State seems to suggest that RCRA monitoring requirements should be considered. In fact, as the extensive Kerr-McGee sampling has shown, there are no wastes regulated under RCRA that will be placed in the disposal cell. VIII Eng. Rep. 8-21; SFES, 2-14 to 2-17. The RCRA regulations are inapplicable and should not be considered.

Summary disposition of this contention against the State is now warranted.

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# IV. Contention 2(h)

This contention provides:

The decommissioning proposal does not include specific and adequate measures for excluding human beings from the site over the long-term. Given the 14-billion-year half-life of thorium, the NRC's acknowledgement that perpetual care of the site will be necessary, and the site's proximity to residences, commercial establishments, and public schools, discussion of such measures is crucial to evaluating the feasibility of onsite disposal.

The State's contention in unfounded. The basic purpose of the disposal cell is to isolate the wastes. The thickness of the cell cover, including the intrusion barrier, will make it unlikely that casual digging would proceed far enough to penetrate the wastes. And the appearance of the cell, as well as the cover's artificial layering, would serve to alert any inadvertent intruder that the cell is not a natural formation. Significant intrusion on the wastes is unlikely. $\frac{8}{}$ 

In any event, the Board has already addressed this contention. In its recent Memorandum and Order, the Board

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<sup>8/</sup> The fact that West Chicago is now a populated region should not be a significant factor in assessing the likelihood of intrusion over the long term. The location of future populated regions is uncertain and thus there is significant uncertainty with regard to all alternatives as to the likelihood of intrusion. SFES, H-661 to 663 (Testimony of Frank L. Parker). Indeed, the presence of a local population might offer benefits as it would serve to assure that any intrusion is observed and corrected.

found that there is no "credible basis for the proposition that the cell will not adequately resist . . . human intrusion." Memorandum and Order, 46 (Nov. 22, 1989). Indeed, the Board has already found in ruling on contentions 4(e) and 4(g) that "the site would [not] constitute an attractive nuisance, so as to make intrusion probable." <u>Id.</u> 24-25. There is no justification for reexamining this conclusion.

The issues that the State seeks to litigate in connection with this contention have been addressed. In light of this fact, summary disposition of this contention against the State is now warranted.

V. Contention 2(1)

This contention provides:

The applicant has not demonstrated that it will adequately control radioactive dust releases from both mobile and stationary sources during stabilization activities, or that the applicant's dust control measures will achieve NRC's ALARA requirement.

Volume IX of the Engineering Report sets forth the dust control program that will be employed during stabilization activities. IX Eng. Rep. 9-3, 9-18, 9-23 to 9-25. The program is more than adequate to meet any concerns with regard to dust releases during the stabilization period.

Kerr-McGee has gained considerable experience in controlling dust emission during the extensive demolition activities already performed at the West Chicago site. Water sprays will be used throughout operations to minimize the generation of dust. Offsite haul trucks will be equipped with tarpaulins to cover loads during transport so as to prevent releases. IX Eng. Rep. 9-3, 9-18. Special attention will be paid to dust control during hauling operations, which might be expected to create the greatest potential for dust emissions. Chemical dust suppressants and liquid asphalt dust-palliative treatments will be considered as supplementary aids to water truck spraying for heavily travelled routes as conditions warrant. IX Eng. Rep. 9-25.

In sum, Kerr-McGee will employ control measures to assure dust emissions are as low as reasonably achievable. Of course, the area (and the workers) will be monitored so that excessive dusting can be detected and corrected. The State's contention is unfounded.

### VI. Contention 2(m)

This contention provides:

The applicant has not demonstrated that radiological air hazards will be adequately monitored after closure. Type and model of instrumentation, location of monitoring points, and frequency of reading or sample collection are not discussed. Because of the demographic setting of the proposed site, adequate post-closure radiological air monitoring for an appropriate time period must be carried out.

Contrary to the contention, the NRC requirements governing radon control establish a <u>design</u> standard. Kerr-McGee is required to design a cover for the West Chicago wastes that will limit radon flux to 20 pCi/m<sup>2</sup>s. 10

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C.F.R. Part 40, Appendix A, Criterion 6 (1989); see 40 C.F.R. \$\$ 192.32(b)(1), 192.41 (1989). As shown by the Engineering Report, the flux from the cell is expected to be 0.35 pCi/m<sup>2</sup>s -- more than 50 times below the regulatory limit. XII Eng. Rep. 12-4; see also SFES, 5-57.

The NRC regulations by their terms explicitly do not require post-closure monitoring.<sup>9/</sup> Nonetheless, as the Engineering Report explains, Kerr-McGee does plan to conduct a post-closure radiological air monitoring. XI Eng. Rep. 4-5; SFES, 5-3 to 5-7. Concentrations of radon-222, the only radiological material that is capable of diffusing through the cell cover,  $\frac{10}{}$  will be monitored by the use of standard and reliable passive radon monitors, such as the Track Etch devices. These devices will be placed at cardinal compass

9/ The NRC criterion includes a footnote that provides

The standard applies to design. Monitoring for radon after installation of an appropriately designed cover is not required.

10 C.F.R. Part 40, Appendix A, Criterion 6, n.1 (1989); see also 40 C.F.R. § 192.32(b)(1) n.1 (1989).

10/ Particulate matter will obviously not be able to escape to the air through the eight-foot thickness of the cell cover. Similarly, radon-220, a gas derived from thorium decay, has a half-life of 55 seconds and will be unable to diffuse through more than a few centimeters of soil. XII Eng. Rep. 12-2. points around the perimeter of the disposal site.<sup>11/</sup> Samples will be analyzed on a quarterly basis for the first five-year period after the completion of stabilization activities. Monitoring thereafter will be governed by performance during the initial five-year period. If elevated samples are detected, "grab" sampling will be conducted to locate the radon source. XI Eng. Rep. 5.

The State's contention has no foundation in law and, in any event, Kerr-McGee has prepared an adequate poststabilization air-monitoring p'an. Summary disposition for Kerr-McGee is now warranted.

VII. Contention 2(0)

This contention provides:

The applicant has not demonstrated that the disposal onsite of 11,000 cubic feet of rare earth compounds will not harm the environment. The applicant must address the toxicity and mobility of these compounds as well as their potential effect on the clay liner.

Kerr-McGee possesses some 1,825 drums of rare earth compounds resulting from facility operations. As discussed in the Affidavit of John C. Stauter Concerning Contention 2(0) (Exhibit 5), Kerr-McGee has sought (and continues to seek) to transfer these materials to an offsite vendor. If no such

<sup>11/</sup> The locations are identified on Exhibit 4. An additional monitor will be placed offsite in the West Chicago area to establish background levels of radon-222.

vendor is found, these materials will be placed in the disposal cell. Stauter Affidavit, 19 4, 6.

The total volume of the rare earth compounds represents a fractional percentage of the total volume of wastes that are to be disposed of in the cell. The rare earth compounds are or will be rendered extremely insoluble in water and, in any event, have a strong tendency to become sorbed onto soil particles. The releases of rare earth compounds from the cell will be negligible. Stauter Affidavit, ¶¶ 5, 7-10.

Moreover, as shown by the Affidavit of Edwin T. Still Concerning Contention 2(0) (Exhibit 6), the rare earth compounds have an exceptionally low order of toxicity. There has never been a report of adverse health effects associated with the use or production of rare earth compounds. Studies of acute or chronic effects in animals show that these materials are biologically inactive. Still Affidavit, ¶¶ 3-7.

The State has no basis in fact or law to support its contention. Summary disposition against the State is now warranted.

### VIII. Contention 2(q)

This contention provides:

Based on the calculations in the FES (Table 5.5), the applicant has not shown that during stabilization activities it will meet applicable radiological exposure and emission standards, because unjustifiable assumptions have been made which effectively minimize the calculated dose. Specifically:

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(i) The FES assumes that the individual at the nearest residence will spend only 10 percent of his time outdoors. However, since the applicant's earth-moving activities are planned for the warm months, it is unlikely that individuals, especially children, will spend 10 percent of their time outdoors. Underestimation of outdoor time results in underestimation of dose received.

(ii) The FES assumes that radon and thoron will be uniformly released over eight weeks of earth-moving operations. To the contrary, releases will most likely occur as puffs of high concentrations when crusted waste materials are breached. The assumption of uniform release serves to minimize the calculation of dose received.

A full examination of the radiological impacts during the stabilization period is included in the SFES. SFES, 5-44 to 5-47. The staff's analysis shows that the construction of the proposed cell will comply with all applicable regulatory requirements.  $\frac{12}{}$  The State has presented no arguments to undercut the staff's assessment.

The contention states that the staff assessed the radiological dose to the maximally exposed individual on the

<sup>12/</sup> Acting under color of authority of the Clean Air Act, EPA recently promulgated certain revised regulations governing releases of radionuclides by NRC licensees. 54 Fed. Reg. 51654 (Dec. 15, 1989) (amending 40 C.F.R. Part 61, Subpart I). These regulations would limit emissions of radionuclides (exluding iodine) so that any member of the public would receive less than 10 mrem/y effective dose equivalent. (Effective dose equivalent is defined by EPA to exclude radon.) The regulations were stayed until March 15, 1990, in order to allow further comment. 54 Fed. Reg. at 51654, 51667-68.

basis that the person would spend only 10 percent of his time outdoors. As shown by the Affidavit of Douglas B. Chambers Concerning Contention 2(q) (Exhibit 7), the State is wrong. The assessment of dose in the SFES was conducted on the assumption that the maximally exposed individual would be exposed outdoors 100 percent of the time. If that person were to be indoors at the location of maximum exposure, the calculated dose would be appreciably less than that estimated by the staff. Chambers Affidavit, ¶ 4, see also id. ¶ 6. Nonetheless, the currently applicable regulatory requirements were shown by the Staff to be fully satisfied.<sup>13/</sup> SFES, 5-57.

Moreover, contrary to the contention, no error resulted from the manner in which doses from radon and thoron were calculated. Radon and thoron contribute only slightly to the dose arising from the assumed release of particulates. Moreover, it is the cumulative exposure, rather than the peak exposure, that is relevant for purposes of assessing radiological impacts. And, in any event, earth handling will occur

<sup>13/</sup> If reasonable assumptions as to indoor occupancy or as to particle-size effects had been applied, the effective dose equivalent for the maximally exposed individual would be well below even the EPA limit that is now under reconsideration. See, supra, note 12; Chambers Affidavit, ¶¶ 4, 6. Indeed, it is the normal practice of the NRC staff to assume a significant percentage of indoor occupancy in conducting such assessments. NRC, Final Environmental Statement Related to the Decommissioning of the Rare Earths Facility, West Chicago, Illinois, 5-26 (May 1983) (NUREG-0904), citing NRC, A Methodology for Calculating Residual Radioactivity Levels Follwing Decommissioning (Oct. 1980) (NUREG-0707).

more or less continuously during the stabilization period and uniform emissions of radon and thoron may reflect the actual nature of releases from the site. Chambers Affidavit, ¶ 5.

In sum, there is no basis for the State's contention, and the contention should now be resolved in Kerr-McGee's favor.

IX. Contention 2(r)

This contention provides:

The applicant did not conduct any tests utilizing representative tailings solutions and representative clay materials to determine whether significant deterioration of permeability or stability properties will occur in the proposed clay liner. Indeed, the applicant has not yet decided what type of clay to use at the site, thus making such tests impossible.

The State's contention is completely misguided. As discussed in the Affidavit of James L. Grant Concerning Contention 2(r) (Exhibit 8), the disposal cell design does not rely on the clay liner for any long-term purpose.  $\frac{14}{}$  See also IV Eng. Rep. 4-2 to 4-4. The principal purpose of the clay liner is to function with the leachate collection and monitoring system during construction of the disposal cell. The liner will provide protection of the groundwater during construction activities by capturing any excess water

<sup>14/</sup> Contrary to the State's claim, Kerr-McGee has specified the clay that will be used for the liner. IV Eng. Rep. 4-1, Table 4-1; Grant 2(r) Affidavit, ¶ 3.

(principally rainwater that falls onto the wastes) before it can infiltrate to the groundwater. If an unexpectedly large volume of leachate develops, the liner will divert the leachate to the leachate collection and monitoring system where it can be detected, and, if necessary, removed from the cell. Grant 2(r) Affidavit, ¶ 4.

Moreover, Kerr-McGee has in fact conducted a test to determine the effect of continued exposure of the clay to leachate derived from the waste materials. The test results confirm that no significant deterioration of the permeability or stability of the clay liner will occur. Id. 11 5-9.

Summary disposition of this contention is now required.

#### CONCLUSION

In light of the foregoing, Kerr-McGee urges that the Board grant summary disposition of the remaining State contentions in Kerr-McGee's favor.

Respectfully submitted,

Peter J. Nickles

Richard A. Meserve Herbert Estreicher COVINGTON & BURLING 1201 Pennsylvania Avenue, N.W. P.O. Box 7566 Washington, D.C. 20044 (202) 662-6000

Attorneys for Kerr-McGee Chemical Corporation

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#### ANNEX

### STATEMENT OF MATERIAL FACTS

# Contention 2(a)(i)

1. Kerr-McGee has conducted an extensive program to characterize the materials that are proposed for disposal in the onsite disposal cell. The sampling and analyses serve to assure that all the wastes have been located and characterized. Gran: 2(a)(i) Affidavit, ¶ 3; VIII Eng. Rep. 8-5 to 8-15.

The sampling and analyses were conducted to 2. determine, with a high level of statistical confidence, whether any of the materials at the West Chicago site have the characteristics of a hazardous waste as defined by federal regulatory standards. Analyses using standard protocols show that the wastes contain constituents below maximum permissible concentration levels. The concentrations of inorganic constituents of each waste type (e.g., tailings, sludges, soils) were found to vary according to expected statistical distributions, and no unusually large concentrations were detected in any of the various waste types. The variability in the concentrations of each waste was generally found to be less than the mean values. The sampling thus shows that the there are no significant "hot spots" in the materials that are to be disposed of in the waste-disposal cell. Grant 2(a)(i) Affidavit, ¶ 4; VIII Eng. Rep. Exhibit 1.

 The placement of the wastes in the cell will result in some homogenization of the materials. Moreover, any adverse impacts might be expected to arise from the average characteristics of the wastes. The leachate released from any portion of the cell would be mixed with leachate released from upstream and downstream portions of the cell and with groundwater. Any groundwater impacts would thus reflect the average properties of the wastes. Grant 2(a)(i) Affidavit, ¶ 5.

4. Kerr-McGee did not use average properties of the wastes in estimating groundwater impacts. The groundwater analyses described in the Engineering Report were performed using both a composite leachate and a maximum leachate. II Eng. Rep. 2-77 to 2-81. The composite leachate was defined as the predicted maximum concentration at any point in the cell based on the expected waste placement. The maximum leachate was determined under the highly conservative assumption that the maximum concentration of a constituent observed for any waste type (<u>e.g.</u>, tailings, sludges, soils) applies to all the wastes. Kerr-McGee's recent leachate tests show that both the composite and the maximum leachate analyses in the Engineering Report provide conservative estimates of leachate quality. Grant 2(a)(i) Affidavit, ¶ 6; II Eng. Rep. 2-79.

5. Any homogeneity in the waste materials does not significantly affect the analyses of the groundwater impacts of the proposed disposal cell. Grant 2(a)(i) Affidavit, ¶ 7.

#### Contention 2(a)(ii)

 Kerr-McGee's groundwater modeling is fully described in the Engineering Report. II Eng. Rep. 2-72 to 2-73, 2-74 to 2-76.

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7. The groundwater model did not assume uniform dispersion of leachate from the disposal cell. Rather, variations in aquifer properties were accommodated in Kerr-McGee's two-dimensional modeling of the West Chicago site. Values for aquifer transmissivity were determined based on data collected throughout the site and then the model was calibrated so as to assure accurate reproduction of the observed potentiometric surface. II Eng. Rep. 2-74 to 2-76; Fetter Affidavit, ¶ 2.

8. The geology and hydrogeology of the West Chicago site is significantly different from that of the Sheffield site. Fetter Affidavit, ¶ 8.

9. The channelized flow phenomena observed at Sheffield arise from the presence of a channel of high permeability pebbly-sand material that is surrounded by clay. The channel serves as an underdrain that significantly affects groundwater flow. Fetter Affidavit, ¶¶ 4-7

10. The geology and hydrogeology of the West Chicago site is described in Volume II of the Engineering Report. II Eng. Rep. 2-7 to 2-16, 2-22 to 2-31.

11. The topmost aquifer is a coarse-grained sand and gravel deposit, termed the E-stratum, that exists under the entire disposal site. There is no evidence of channelized flow like that observed at the Sheffield site. Fetter Affidavit, ¶ 8.

12. The State has provided no evidence to suggest that channelized flow exists in the E-stratum at the West Chicago site.

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#### Contention 2(d)

13. Kerr-McGee's post-closure monitoring of the groundwater at the West Chicago site is outlined in Volume XI of the Engineering Report. XI Eng. Rep. 3-4, 9-10, 18; <u>id</u>. Tables 11-1, 11-2. The Kerr-McGee discussion of groundwater monitoring was found, in general, to be adequate by the NRC staff. SFES, 7-1 to 7-4.

14. Kerr-McGee has submitted a groundwater monitoring plan that fully and adequately describes the postclosure groundwater monitoring of the disposal site. Exhibit 3.

15. The topmost aquifer at the disposal site is the E-stratum. Kerr-McGee will monitor the quality of groundwater in this stratum with a variety of wells that surround the disposal cell. Kerr-McGee will supplement the existing network of wells with additional wells. Groundwater Plan, 1, 3.

16. Kerr-McGee's plan will include the post-closure monitoring of the radiological and chemical parameters that are specifically associated with or are indicators of the encapsulated wastes. Groundwater Plan, 2, Table 2.

17. There is no need to conduct monitoring for organic constituents because Kerr-McGee's exhaustive sampling of the wastes has shown that the wastes contain no organic constituents of concern. VIII Eng. Rep. 8-21, Exhibit 1; SFES, 2-17.

18. The sampling and analysis will performed according to standard protocols. Groundwater Plan, 1.

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19. Monitoring activities will be most intense over the first five years following completion of the cell, and then will be reduced over the next five-year period. Further sampling after the second five-year period will be based on the monitoring results. Groundwater Plan, 2; XI Eng. Rep. Table 11-2.

20. Kerr-McGee's groundwater monitoring program is fully adequate for assessing the performance of the cell and for assuring the protection of groundwater.

### Contention 2(h)

21. The shape and layering of the cell cover will serve to inform anyone excavating into the wastes that the cell is a man-made feature.

22. The wastes will placed under a thick earthen cover that will include a cobble intrusion barrier. The depth and nature of the cover would serve to make intrusion into the wastes unlikely.

### Contention 2(1)

23. Kerr-McGee's program for dust control during stabilization activities is outlined in Volume IX of the Engineering Report. IX Eng. Rep. 9-3, 9-18, and 9-23 to 9-25. The plan is based in part on the extensive experience obtained by Kerr-McGee during prior demolition activities that were performed at the facility under the supervision of the NRC.

24. Water sprays will be used through operations to minimize the generation of dust. Offsite haul trucks will be equipped with tarpaulins to cover loads during transport so as

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to to minimize dusting. XI Eng. Rep. 9-3, 9-18. Special attention will be paid to dust control during hauling operations, which might be expected to create the greatest potential for dust emissions. Chemical dust suppressants and liquid asphalt dust-palliative treatments will be considered as supplementary aids to water truck spraying for heavily travelled routes as conditions warrant. XI Eng. Rep. 9-25. Air monitoring will be conducted so as to assure that any inadvertent excessive releases are promptly detected and corrected.

25. Kerr-McGee's program for construction is fully adequate to assure that excessive dust is not released during the stabilization period.

#### Contention 2(m)

26. The wastes at the Kerr-McGee site contain uranium and thorium and various "daughters" that result from the radioactive decay of those elements. All of the radioactive materials in the waste are solids, and hence will remain isolated in the waste, except for radon-222 ("radon") and radon-220 ("thoron"), which are radioactive gases produced in the decay chains of uranium and thorium, respectively.

27. Thoron has a short half life and thus cannot diffuse through the thick cover. The only air emission of possible concern in the post-stabilization period is the release of radon-222. XII Eng. Rep. 12-2.

28. The predicted flux of radon-222 from the wastes in the completed disposal cell is 0.35 pCi/m<sup>2</sup>s. This is

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more than 50 times less than the regulatory requirement of 20  $pCi/m^2s$ . The releases from the wastes to the air are comparable to the releases of radon from normal soils in the area. XII Eng. Rep. 12-4.

29. There is no legal requirement that Kerr-McGee conduct any post-closure air monitoring to assure performance of the cell cover. 10 C.F.R. Part 40, Appendix A, Criterion 6, n.l.

30. Volume XI of the Engineering Report describes Kerr-McGee's post-closure radiological air monitoring plan. XI Eng. Rep. 4-5; <u>see also</u> SFES, 5-3 to 5-7. Kerr-McGee plans to place four monitoring devices around the periphery of the cell and another device some distance from the cell to monitor background. Exhibit 4. If high concentrations are detected, "grab" sampling will be conducted to find the radon source.

31. Samples will be analyzed on a quarterly basis for the first five-year period. Monitoring thereafter will be governed by performance during the initial five-year period. XI Eng. Rep. 5.

32. Kerr-McGee's air monitoring plan is fully adequate to assure that the cover is performing as designed and that radiological emissions are not higher than expected.

# Contention 2(0)

33. Kerr-McGee has approximately 1,825 drums containing some 874,683 pounds of rare earth compounds at the West Chicago site. The rare earths are in the form of oxides, carbonates, fluorides, nitrates, and oxalaces. These

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compounds are inventory that remains from the period of operations. Stauter Affidavit, ¶ 4.

34. The total volume of rare earths is small compared to the total volume of wastes that are planned for onsite disposal. If Kerr-McGee is unable to transfer ownership to a vendor, the compounds will be blended with other wastes and disposed of in the cell. Stauter Affidavit, 11 5-6.

35. The carbonates, fluorides, oxalates, and hydroxides of the rare earths are among the most water insoluble of metallic salts. Although rare earth nitrates are fairly soluble in water at neutral pH, the nitrates can be easily converted into the insoluble hydroxide form by treatment with lime or caustic. If the nitrates are disposed of in the cell, those compounds will be pretreated with lime and, prior to encapsulation, will be mixed with other materials and lime. This will serve to assure that all the rare earth compounds that are disposed of in the cell will yield negligible concentrations of rare earths in leachate. Stauter Affidavit, ¶¶ 7-9.

36. Any rare earths that are leached from the wastes are expected to sorbed onto clay and soil particles. Stauter Affidavit, ¶ 9.

37. Rare earth compounds have an extremely low order of toxicity. There has never been a report of an adverse human health effect associated with the use or production of rare earth compounds. Animal toxicology studies

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confirm the relatively innocuous nature of the rare earth compounds. Still Affidavit, 11 3-7.

38. There can be no legitimate concern that rare earth compounds disposed of in the cell will be released in significant concentrations to the environment or that the disposal of the compounds in the cell will present any threat to health.

#### Contention 2(q)

39. The radiological impacts that would be associated with the stabilization period have been thoroughly assessed in the SFES. That analysis shows that applicable regulatory standards are readily satisfied. SFES, 5-44 to 5-47.

40. The assessment of radiological impacts in the SFES was performed on the assumption that the maximally exposed individual would be outside 100 percent of the time. This assumption serves to increase the predicted dose above that which would be incurred inside at that location. If more reasonable assumptions as to outside occupancy were applied, the effective dose equivalent to the maximally exposed individual would be well below 7 mrem/y. Chambers Affidavit, ¶ 4.

41. Radon and thoron contribute only slightly to the dose arising from the assumed release of particulates during the stabilization period. An assumption of uniform release of radon and thoron does not serve to minimize dose because it is cumulative exposure, rather than peak exposure,

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that is relevant for assessing radiological impacts. Chambers Affidavit, ¶ 5.

42. Because earth handling will presumably occur more or less continuously during the stabilization period, the uniform release of radon and thoron may reflect the actual nature of releases from the site. Chambers Affidavit, ¶ 5.

#### Contention 2(r)

43. The clay liner of the disposal cell is described in Volume IV of the Engineering Report. IV Eng. Rep. 4-1 to 4-2, 4-10, 4-12, Tables 4-1, 4-3, 4-5.

44. The clays utilized for the liner will be the near surface clays that are available at the West Chicago site. IV Eng. Rep. 4-1, Table 4-1.

45. The disposal cell design does not rely on the clay liner to prevent the migration of leachate into the groundwater. The principal purpose of the clay liner is to function with the leachate collection and monitoring system during construction of the disposal cell. Grant 2(r) Affidavit, ¶ 4; IV Eng. Rep. 4-2 to 4-4.

46. Kerr-McGee has conducted tests to assess the impacts of leachate on the clay liner. The clay liner will not deteriorate as a result of interaction with leachate. Grant 2(r) Affidavit, ¶¶ 5-9.