

RELATED CORRESPONDENCEUNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSIONDOCKETED  
USNRC

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARDOFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCHIn the Matter of )  
)  
)

KERR-McGEE CHEMICAL CORPORATION )

(Kress Creek Decontamination) )  
)  
)Docket No. 40-2061-SC  
ASLBP No. 84-502-01-SCPEOPLE'S MOTION TO COMPEL CERTAIN  
DISCOVERY RESPONSES

On February 15, 1985, the People of the State of Illinois served a discovery request on Kerr-McGee, and on April 1, 1985 Kerr-McGee responded. On April 15, 1985 the People wrote a letter to Kerr-McGee concerning deficiencies in the responses and requesting supplementation thereof (a copy of the letter is attached hereto as Ex. A). On May 28, 1985 Kerr-McGee filed supplemental responses. This motion addresses certain discovery requests the responses to which continue to be inadequate. The People respectfully request that for the reasons set out below Kerr-McGee be required to properly answer Interrogatories 1, 4, 12, 20, and 36.

Interrogatory 1

Interrogatory: Identify all studies, estimates, surveys, and calculations, whether formal or informal, draft or final, made by or for Kerr-McGee or its predecessors concerning

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a) remedial action at Kress Creek or any portions thereof;

b) costs of such action

[Document Request 1 requests production of all such documents.]

Answer: (a) \* \* \*

Kerr-McGee has made, or has had made, informal studies, estimates, surveys and calculations related to what would be involved were remedial action necessary or required. . . . [V]arious informal and preliminary estimates have been made with regard to hypothetical dose and risk calculations, and the locations, volume and distribution of thorium-bearing material that might be involved in a remedial action. These informal and preliminary estimates are found in the following documents, which are being withheld on grounds of attorney-client and/or work product privilege.

1. Evaluation of Techniques for Removal of Thorium Residuals from Lower Kress Creek, letter report from Woodward-Clyde to Kerr-McGee, 1981. (Protected Document No. 2692)
2. Kress Creek Cleanup--Cost Estimate; Kerr-McGee memorandum, W.J. Shelley to E.T. Still, March 22, 1982.
3. Selective Decontamination of Kress Creek Banks, Kerr-McGee memorandum with three attachments, E. Still to G. Rice, April 26, 1982.
4. Kress Creek Comments, E. Still to G. Rice, E. Goltra, B. Shelley, G. Sinke, February 23, 1982.

Kerr-McGee has performed and is performing work with regard to possible remedial action in Kress Creek. Documents relating to such work are subject to attorney-client and work-product privileges, or are being withheld as the ongoing work of litigation experts pursuant to Rule 26(b)(4), F.R.Civ.P., as applicable to this proceeding.

(b) See response to part (a) above. . . .

Supplemental Answer: a) [Claim of privilege has been withdrawn for the first two documents listed above and for the third attachment to the third document].

With response to the remainder of the third listed document and the fourth listed document . . . Kerr-McGee maintains that these documents are protected by the work-product privilege. In addition, Kerr-McGee's further review of its files has located another privileged document relating to possible remedial action at Kress Creek. Thus, the responsive privileged documents as to which Kerr-McGee now asserts a work-product privilege are as follows:

1. Selective Decontamination of Kress Creek Banks; Kerr-McGee Memorandum plus first two attachments; E. Still to G. Rice, 4/26/82.
2. Kress Creek Comments; Kerr-McGee Memorandum, E. Still to G. Rice, E. Goltra, B. Shelley, G. Sinke, 2/23/82.
3. Kress Creek, Kerr-McGee Memorandum, E. Still to G. B. Rice, 2/11/82.

The basis for Kerr-McGee's privilege claim with respect to these documents is set forth in a letter dated May 28, 1985, from R.A. Meserve to A. Rapkin, pp. 3-4. [Actually, the discussion appears at pp. 2-3 of Mr. Meserve's letter. The basis given is the following:

"These documents were all generated shortly after December 18, 1981, when the NRC Staff issued an order concerning possible remedial action at Kress Creek. Each of these documents was prepared by E. Still in consultation with Gerald Charnoff, an attorney who was then advising Kerr-McGee, and in preparation for meetings with the NRC subsequent to the issuance of the December 1981 order. They were prepared during an NRC investigation, and in anticipation of further litigation, and each concerns the development of possible proposals to present to the NRC during the course of these proceedings. The documents contain technical information developed to support

Kerr-McGee's position that Kress Creek poses insignificant risks and should not be disturbed by remedial action, comments on such information that reflect the opinion of the author and Kerr-McGee's counsel, and discussions of strategy for upcoming NRC meetings. All of this information was developed under the supervision of Mr. Charnoff. To the best of Kerr-McGee's knowledge, these documents have been shown only to the limited number of Kerr-McGee personnel involved in the Kress Creek matter and to attorneys advising Kerr-McGee, including Mr. Charnoff, Mr. John Rhineland, and present counsel. Kerr-McGee maintains that these documents are absolutely privileged by the work-product privilege and by 10 CFR Sec. 2.740(b)(2). Kerr-McGee does not know at this time whether anyone who will testify at a hearing in this case will rely on any of these documents or on work done in connection with these documents."

A copy of this letter is attached hereto as Ex. B.]

. . . With respect to [documents generated by expert consultants hired during the course of litigation to perform studies of possible remedial action at Kress Creek], all such documents are governed by the special discovery rules pertaining to experts that have not been identified as trial witnesses. See Fed.R. Civ. P. 26(b)(4)(B). In addition, these documents are [protected by the work-product privilege and by 10 C.F.R. Sec. 2.740(b)(2).

b) Definitive cost estimates have not yet been performed -- and indeed are not yet possible -- because the nature and extent of required remedial action, if any, has not yet been defined. Other than documents recently prepared by experts hired during the course of litigation and documents which have been produced, the only document known to contain a discussion of cost issues is: Selected Decontamination of Kress Creek Banks, Kerr-McGee Memorandum plus first two attachments, E. Still to G. Rice, 4/26/82. That document is privileged for the reasons set forth in (a) above.



With respect to documents prepared by experts hired during the course of litigation to study cost issues, Kerr-McGee maintains that such documents are governed by Fed.R.Civ. P. 26(b)(4)(B) as applicable to this proceeding, and that Kerr-McGee is not required at this time to provide any further information pertaining to these documents. Kerr-McGee further maintains that documents prepared by such experts are protected by the work-product privilege and by 10 C.F.R. Sec. 2.740(b)(2).

Interrogatory 1 deals with the economic and environmental costs of cleaning up Kress Creek and West Branch DuPage River. These are matters which Kerr McGee has raised, over the proponents' objections, as defenses to the Staff's Show Cause Order. There being no apparent statutory basis for these defenses, Kerr-McGee has the burden of going forward on them (Board Orders of February 7, 1985, p. 9, and March 22, 1985, p. 4, 5-6). Thus the company, having raised issues which the Board, like the proponents, believes have no statutory basis, now refuses to disclose information in its possession bearing on those issues.

As justification for this refusal, Kerr-McGee makes two claims of privilege. The first claim is made with respect to two memoranda by employee Edwin T. Still and two attachments to a third memorandum by Mr. Still. The author and nature of the attachments to the third memorandum are not specified. These documents are assertedly protected from disclosure by the work-product privilege. F.R.Civ P. 26(b)(3). The second claim is made with respect to an unspecified number of documents of unspecified nature authored by unspecified persons. These

documents are said to be protected by the rule covering nonwitness experts. F.R.Civ.P. 26(b)(4).<sup>1</sup> Both claims of privilege are unsupportable, for the following reasons.

With respect to both the Still memoranda (R. 26(b)(4)(3)) and the work of outside "experts" (R. 26 (b)(4)), Kerr-McGee has already produced material relating to the environmental and economic costs and problems of cleanup. Not surprisingly, all the documents produced claim for one reason or another that cleanup is not warranted by safety concerns, that health risks are low, and the cleanup costs would be very great. See Ex. C attached hereto, consisting of three studies by outside consultants -- NUS Corporation, ALARA, Inc., and Woodward-Clyde, Inc. -- and perhaps most interesting, a Kerr-McGee "discussion outline" for a March 1982 meeting with NRC. Presumably this latter document is one of the several which employee Edwin L. Still prepared "in preparation for meetings with the NRC subsequent of the issuance of the December 1981 [cleanup] order." Meserve letter, Ex. B., p. 2. The documents which have been withheld contain, according to Kerr-McGee, "technical information developed to support Kerr-McGee's position that Kress Creek poses

<sup>1</sup> Kerr-McGee also claims the general work-product privilege with respect to these documents, but does not suggest that they contain trial strategy or conclusions of counsel, the customary test for protection by the work-product doctrine. Hickman v. Taylor, 329 U.S. 495 (1947). Hence, the People assume Kerr-McGee is resting its case on the nonwitness expert discovery rule, F.R. Civ. P. 26(b)(4).

insignificant risks and should not be disturbed by remedial action". Id. Kerr-McGee goes on to say that the documents contain opinions of counsel and strategy for upcoming meetings with counsel.

The discussion outline contains a wide range of conclusions about the hazards of the Kress Creek contamination and the hazards and economic costs of cleaning it up, all of which conclusions Kerr-McGee apparently presented to NRC at the March 1982 meeting (and quite possibly at other meetings too). These conclusions include the alleged fact that lifetime risk for Kress Creek maximum estimated dose is 0.6% above normal lifetime fatal cancer risk (p.4),<sup>2</sup> that cleanup will cost more than \$3.5 M (p.5),<sup>3</sup> and that "[r]emoval is not justifiable on the basis of public health concerns or cost-benefit considerations" (p.6).

It is clear under the case law that by disclosing the Still discussion outline as well as the reports of the three outside consultants, Kerr-McGee has waived any and all privileges it may have had with respect to other documents in its possession addressing the same subject matter. The discussion outline deals with the identical subject matter with which Kerr-McGee says the

<sup>2</sup> Similarly rosy estimates were presented for Kerr-McGee's Stabilization Plan (see FES Table 5.5). However, as can be seen from the People's last set of interrogatory responses in the Rare Earths proceeding, our consultants estimate cancer risks to be far higher than the FES does (cf. answers to Interrogatories 29, 31, 34, 40, 60).

<sup>3</sup> Of which 17.5% will be legal fees. Id. Small wonder!

insignificant risks and should not be disturbed by remedial action". Id. Kerr-McGee goes on to say that the documents contain opinions of counsel and strategy for upcoming meetings with counsel.

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memoranda deal: the risks posed by Kress Creek and the ramifications of cleanup. The outline would appear to be nothing but a conclusory summary, organized to facilitate oral presentation, of the three withheld memoranda. And insofar as the memoranda may have been written in consultation with counsel and may incorporate counsel's advice and strategy, so does the discussion outline. Finally, the discussion outline as well as the outside reports are all favorable to Kerr-McGee's position; it is especially unfair for Kerr-McGee to withhold the memoranda given that they may contain inconsistent or impeaching information on the same subject matter. See the waiver cases discussed in the Peoples Response to Kerr-McGee's Motion Concerning Discovery, pp. 11-13, filed December 17, 1984, and the People's Motion to Compel Certain Discovery Responses (Rare Earths Proceeding), pp. 3-4, filed June 28, 1985.

With respect to the work-product privilege, the Still memoranda, insofar as they contain facts as distinct from trial strategy or conclusions of counsel, are not protected from disclosure. See Hickman v. Taylor, 329 US 495, 511 (1947), discussed at p. 6 of the People's motion to compel in the Rare Earths proceeding. As we pointed out there, the issue of costs is a factual one -- what is the cost of clean-up given various assumptions as to amounts of contaminants, physical conditions, contractors, availability of company equipment, etc. Similarly, the "location, volume, and distribution of thorium-bearing material that might be involved in a remedial action" -- these



being, according to Kerr-McGee's initial answer, subjects covered in the withheld documents -- are plainly facts, not trial strategy or conclusions of counsel. (For that matter, it is not obvious how "hypothetical dose and risk calculations", subjects also covered in the withheld documents, constitute trial strategy or conclusions of counsel.)

With respect to the nonwitness expert discovery rule, Kerr-McGee declines to provide any information on who these "experts" are, when they conducted their work, and what that work consists of. "Kerr-McGee is not required at this time to provide any further information pertaining to [this work]." Supplemental Response, p.3. The company offers no authority for this assertion, which is not supported by the language of R. 26(b)(4), and the People submit that there is none. Hence, there is no information on which to evaluate Kerr-McGee's privilege claim under R. 26(b)(4) and it should be rejected for that if for no other reason. Beyond that, the People maintain that even if the Board deems this work (whatever it is) to be within the ambit of R. 26(b)(4), there are several reasons to order its disclosure. First, given the posture of this proceeding the question of costs vs. benefits is the ultimate issue to be litigated. Because Kerr-McGee has (incredibly) denied that the Kress Creek contaminants originated at its rare earths site (see Kerr-McGee's amended answer, filed October 10, 1984, Par. 2), the proponents will have to go to the trouble of proving the source of the contamination. But such proof will easily be made, as everyone

recognizes, and the only issue that will take any time will be the one Kerr-McGee has created: what are the comparative costs and benefits of cleaning up the contamination? In other words, as Kerr-McGee has framed the issues the Show Cause Order will stand or fall on the cost-benefit question. Hence, good cause exists to require production of the work performed by Kerr-McGee's outside consultants:

Defendants' second objection is that the interrogatories are improper where they seek to secure work performed by experts or call for experts' opinion. ... Realistically speaking, the resolution of the entire case depends upon medical and expert testimony and opinion. The necessities of such a case transcend the usual limitations which may otherwise be imposed upon discovery proceedings. *E.I. duPont de Nemours & Company v. Phillips Petroleum Company*, D.C.Del. 1959, 24 F.R.D. 416; *Leding v. United States Rubber Company*, D.C.Mont.1959, 23 F.R.D. 220. "The primary concern of courts of justice is to elicit truth essential to correct adjudication." *Sachs v. Aluminum Company of America*, 6 Cir., 1948, 167 F.2d 570, 571. To the extent that information concerning medical and scientific facts is within the knowledge or possession of the defendants, the Court believes such information should be disclosed.

U.S. v. Nysco Laboratories, Inc., 26 F.R.D. 159, 162

(E.D.N.Y. 1960). Second, the issue of costs is one peculiarly within Kerr-McGee's knowledge; see the People's motion to compel in the Rare Earths proceeding, pp. 5-6. And third, Kerr-McGee is far better situated financially than this proponent to undertake studies concerning the subject matter of its affirmative defenses.

If the Board determines, either on the basis of the pleadings or of an in camera inspection, that the consultants' studies Kerr-McGee is withholding are within the ambit of R. 26(b)(4) but should be produced for good cause, the People will pay reasonable costs if the Board considers that approximate (cf. R. 26(b)(4)(C)).

Finally, Kerr-McGee states in its Supplemental Response that it has withdrawn the privilege claim to inter alia, the second item and the third attachment to the third item listed on p. 6 of its initial answer. The People have not received the second listed item (although we have received multiple copies of the first listed item, suggesting an inadvertent clerical error); and we do not know whether or not we have received the third attachment to the third listed item, since the attachments have never been described. We would appreciate receiving these items.

#### Interrogatory 4

Interrogatory: (a) To what level are the offsite "hot spots" being decontaminated?

. . .

\* \* \*

(c) If thorium-contaminated areas at Kress Creek and West Branch DuPage River were to be cleaned up, would the level specified in answer to Interrogatory 4(a) be appropriate for application at Kress Creek and West Branch DuPage River? If not, why not?

Answer: (a) [Kerr-McGee's supplemental answer states that, generally, the hot spots are decontaminated to a level of "gamma radiation at or below 15 uR/hr at

one meter above the surface." The answer to part (c) was not supplemented, and the initial answer is as follows:]

(c) Kerr-McGee does not believe that cleanup of Kress Creek and the West Branch of the DuPage River is required because of the immeasurably small health and environmental risks involved. Consequently, the current gamma rates are acceptable, and development of cleanup criteria is unnecessary. If remedial action is nevertheless required, further study will be necessary to determine what, if any, gamma exposure rates or pCi/g levels would provide appropriate cleanup criteria given the particular characteristics of the thorium-bearing materials involved and the costs and benefits of remedial action.

This answer is a case study in disingenuousness. In response to Interrogatory 1 Kerr-McGee spent pages telling us about the information it has developed concerning the costs and benefits of remedial action. (See also Kerr-McGee's answer to Interrogatory 9.) Insofar as a determination of "appropriate clean-up criteria" depends on such information, surely the need for cost-benefit analysis cannot present problems. Similarly, insofar as such criteria depend on "the particular characteristics of the thorium-bearing materials involved," the information is presently available -- are the contaminants at Kress Creek chemically or physically different than the contaminants being exhumed from the residential hot spots?

Litigation is not a game. It is an extremely serious business which costs the parties tremendous amounts of time and money. Kerr-McGee is defending against the Show Cause Order on the ground that the public health risks at Kress Creek do not warrant

the expenditures for remedial action. How can comparative risks and costs be assessed without positing the levels to which Kerr-McGee would decontaminate? Unless Kerr-McGee is willing to disclose this portion of the basis for its position on costs and benefits, it should withdraw its affirmative defenses. Otherwise, a response to Interrogatory 4(c) should be provided.

Interrogatory 12

Interrogatory: What level, degree, or type of risk constitutes a "significant risk" as that phrase is used in Averment 10 of Kerr-McGee's Amended Answer and Demand For Hearing?

Answer: . . . Kerr-McGee refers the State to Kerr-McGee Chemical Corporations's Memorandum In Response to the Board's Question, in this proceeding, filed January 17, 1985, at 26-30. In addition, Kerr-McGee refers to the Supreme Court's ruling in Industrial Union Dept. v. American Petroleum Institute, 448 U.S. 607, 642 (1980), where the Court stated:

"There are activities that we engage in every day -- such as driving a car or even breathing city air -- that entail some risk of accident or material health impairment; nevertheless, few people would consider these activities 'unsafe'.

"[Before enforcement action is appropriate, the agency must] make a threshold finding that a place . . . is unsafe -- in the sense that significant risks are present . . . " (emphasis added).

The risk comparison chart developed by the NRC Staff, see letter from S.G. Burns, NRC, to N.T. Proto, Esq., September 14, 1984, attachment, demonstrates that the risks posed by Kress Creek are not significant when compared to other risks associated with daily living -- such as driving a car. The significance of a risk must be determined in relation to such other risks.



This interrogatory asks what level, degree, or type of risk constitutes a "significant risk" as Kerr-McGee uses that phrase in one of its affirmative defenses. Incredibly, Kerr-McGee refuses to answer the question despite the fact that Kerr-McGee itself interjected the notion of "significant risk" into this proceeding, and that the Board has found it has no basis, and is therefore undefined, in the governing statute or regulations.

What the company's response comes down to is: the significance of a risk must be determined in relation to other risks. That may be true, but that does not indicate at what point a risk becomes significant in comparison to such other risks. Without such an indication, the parties cannot know what Kerr-McGee means by "significant risk" nor what they need to prove in this proceeding. Hence, Kerr-McGee should be required to explain the term "significant risk" either in numerical or other plainly descriptive terms.

#### Interrogatory 20

Interrogatory: Identify all persons with knowledge of the (a) monetary costs, and (b) environmental and health impacts or risks associated with remedial action at Kress Creek and West Branch DuPage River.

Supplemental Answer: Other than outside experts hired during the course of litigation, whose work-product and identity are being withheld pursuant to Fed.R. Civ.P. 26(b)(4)(B) as applicable to this proceeding, and [employee Edwin T. Still] or in documents recently produced, Kerr-McGee is unaware of persons that have engaged in cost calculations or studies of health impacts associated with remedial action. Kerr-McGee notes that at this time, no person has "knowledge" of the

costs and risks associated with remedial action because the nature, method, and scope of such action, if any, have not yet been defined.

This answer is legally insufficient and self-contradictory. The first sentence implies that there are "outside experts" with knowledge of costs and impacts. If that is the case, Kerr-McGee must disclose their identities, since there is no discovery privilege which permits a party to withhold the identities of persons with knowledge. Then, however, Kerr-McGee tells us, in the last sentence of the answer, that no person has knowledge of costs and impacts. This is rather hard to believe, since Kerr-McGee has alleged in its affirmative defenses -- or at least, it would appear that Kerr-McGee has alleged -- that the costs and adverse environmental impacts of remedial action outweigh the health hazards of the contamination. If Kerr-McGee has no knowledge that such is the case, why are we all being dragged through these time-consuming issues?

In short, Kerr-McGee should provide a straight answer to the interrogatory.

#### Interrogatory 36

Interrogatory: Identify (a) the persons who provided the answers to these interrogatories, designated by interrogatory number ...

Supplemental Answer: Each response to the People's interrogatories was prepared as the result of consultation among a number of people [these eight individuals were identified in the initial answer]. An attempt to allocate the answers to specific

individuals would be unduly burdensome and essentially meaningless.

In response to an identical interrogatory propounded by the People in the Rare Earths proceeding (Interrogatory 75), Kerr-McGee made the same response. In their motion to compel filed in that proceeding on June 28, 1985, pp. 17-19, the People argued that the response is inadequate. The same arguments apply and are incorporated here and Kerr-McGee should be required to answer the present interrogatory.

Respectfully submitted,

PEOPLE OF THE STATE OF ILLINOIS

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EXHIBIT A



**NEIL F. HARTIGAN**

ATTORNEY GENERAL  
STATE OF ILLINOIS  
CHICAGO  
60601

April 15, 1985

Richard A. Meserve  
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P. O. Box 7566  
Washington, D.C. 20044

RE: Kerr-McGee Chemical Corporation (Kress Creek Decontamination),  
40-2061-ML

Dear Dick:

This letter addresses Kerr-McGee's responses to the People's first discovery request. In my opinion, a number of your answers are evasive and a number of the objections are unjustified. If we can resolve our differences informally, an application to the Board for relief will be unnecessary.

Interrogatory 1

Subpart (a) of Interrogatory 1 asks Kerr-McGee to identify all studies, whether formal or informal, about remedial action at Kress Creek and West Branch DuPage River, and costs associated therewith. You identify four responsive documents on p. 6 but state that they are being withheld on grounds of attorney-client "and or" work-product privilege. In order that this claim of privilege can be substantiated, please 1) state which privilege or privileges specifically protect each of the four documents; 2) describe the author's position and how and why he prepared the document; 3) identify all persons to whom the document or its contents, in whole or part, has been disclosed; 4) provide a detailed characterization of the contents of the document, stating whether it contains facts or legal theories, and if it contains both, stating whether they can be separated for discovery purposes; and 5) state whether anyone who will testify for Kerr-McGee will rely in any way, whether expressly or otherwise, on any portion of the withheld document or on work done in connection with the document. Provide any further information you consider pertinent to consideration of the claim of privilege. Finally, please describe why Kerr-McGee considers the document to be privileged.



At pages 6-7 of your response you allude generally to documents but do not identify them. Please identify each document and its author(s), and provide the same information with respect to each such document as is requested above.

Your answer to subpart (b) of this interrogatory implies that responsive information or documents do in fact exist. Therefore, kindly specify what it or they are, and provide the same information requested in connection with Interrogatory 1(a). Please also note that whether or not studies are "definitive" is irrelevant to the claim of privilege.

#### Interrogatory 4

Subpart (a) of this interrogatory asks to what level the off-site "hot spots" are being decontaminated. Kerr-McGee states that areas with an external gamma exposure of 35 uR/hr or greater at one meter above the surface are removed "until background external gamma exposure rates are reached." This answer is evasive. What are the "background external gamma exposure rates" to which you refer?

Kerr-McGee's answer to subpart (b) is also inadequate, largely because the answer to subpart (a) is evasive. The question is, what is Kerr-McGee's rationale for decontaminating the "hot spots" to the specified level? You state that "the gamma level" was set so as to assure satisfaction of 10 CFR Part 20. What gamma level are you referring to?

After you have provided a proper answer to subparts (a) and (b) you may want to amend your tortured response to subpart (c).

#### Interrogatory 10

Interrogatory 9 had asked for a description of adverse environmental impacts which might result from performing remedial work at Kress Creek and West Branch DuPage River. Interrogatory 10 asks whether the impacts described could be minimized or eliminated by engineering or other means. In response you refer to your answer to Interrogatory 9. This is not an answer, since Interrogatory 9 did not concern, and your answer to that interrogatory did not address, means for minimizing or eliminating adverse impacts.

Interrogatory 12

This interrogatory asks what level, degree, or type of risk constitutes a "significant risk" as that phrase is used in Kerr-McGee's Averment 10. Incredibly, you refuse to answer the question, despite the fact that it was Kerr-McGee which dreamed up the notion of "significant risk" and interposed it in this proceeding. You begin by claiming, wrongly, that the interrogatory calls for a legal conclusion. You then waive the objection by responding that "the significance of a risk must be determined in relation to ... other risks [such as driving a car]." That may well be true, but that does not describe at what specific point a risk becomes significant in comparison to such other risk. Therefore, kindly explain, in numerical or other plainly descriptive terms, what you mean by "significant risk".

Interrogatory 13

This interrogatory asks various questions about the "actual risk" to health and safety from cleaning up Kress Creek and West Branch DuPage River. In response you refer to your answer to Interrogatory 1 and allude further to "studies of the matter" which Kerr-McGee has initiated, but claim that they are privileged. Kindly identify all documents and information, and the persons who authored or have knowledge of them, that are responsive to this interrogatory, and with respect to each provide the information requested above in connection with Interrogatory 1. I note again that whether or not studies are "final" is irrelevant to their privileged status.

Interrogatory 14

This interrogatory asks various questions about the "risk of harm to the environment" from cleaning up Kress Creek and West Branch DuPage River. In response you refer to your answers to Interrogatories 1, 9, and 13. Please identify all documents and information, and the persons who authored or have knowledge of them, that are responsive to this interrogatory, and with respect to each provide the information requested above in connection with Interrogatory 1.

Interrogatory 15

Like your response to the immediately preceding interrogatories, your response to this one refers to your answers to Interrogatories 1, 9, and 13. Again, please identify all documents and information, and the persons who authored or have know-

ledge of them, that are responsive to this interrogatory, and with respect to each provide the information requested above in connection with Interrogatory 1.

Interrogatory 20

This interrogatory asks Kerr-McGee to identify all persons with knowledge of the monetary costs and environmental and health risks associated with remedial action at Kress Creek and West Branch DuPage River. You do not answer the question, except to refer to other interrogatory answers. If there are any persons with knowledge of these matters other than the persons identified on p. 6 of your Response, please identify them. I am not aware of any privilege that permits a party to conceal the names of persons with knowledge of relevant matter.

✓ Interrogatory 26 *answered except, see suppl*

In response to subpart (i) of this interrogatory Kerr-McGee states that releases from the holding tanks occurred on several occasions prior to December 1982 and that documents concerning the time periods, frequency, and amounts of such releases will be produced. Can you tell me if these documents will be included among those I will be reviewing in Oklahoma City on May 15 and 16?

Subpart (k) of this interrogatory asks whether the "drainage network" at the West Chicago site provides treatment for "all stormwater at the site". Kerr-McGee replies that the holding tanks provide treatment for "all collected storm water". Since I asked about all storm water, not about all collected storm water, Kerr-McGee has not answered the question.

Interrogatory 29 *answered?*

This interrogatory asks for a description of the methods Kerr-McGee and its predecessors used for collecting and analyzing samples of surface water, storm sewers, floor drains, sumps, and outfalls. You answer by referring to other interrogatory answers and to the West Chicago Health Physics Manual. So far as I can tell, the Health Physics Manual contains procedures for collecting and analyzing samples but does not indicate when such procedures have been in use and what procedures other than those described in the Manual may have been in use at some time. Therefore, the question has not been answered.

Interrogatory 30

This interrogatory asks for the identity of all persons who have collected samples and the time periods during which each collected samples. Your answer is limited, without explanation, to the time period 1979 to the present. Therefore, the question has not been answered.

Interrogatory 31

This interrogatory asks for the identity of all personnel who participated in formulating the sampling methodology. You answer that you cannot identify "all" such personnel. If you can identify any of them, even though not all, please do so. As for the application of "General Objection No. 1", I am not asking you to perform studies or calculations, but to search for the information in Kerr-McGee's possession.

Interrogatory 36 *Wool*

This interrogatory asks Kerr-McGee to identify the persons who answered the interrogatories, designated by interrogatory number. You have declined to do so. Since I will be deposing individuals on the subject matters referred to in these interrogatories, I have a need--and a right--to know who was responsible for answering each, i.e., who has knowledge of the specific subject matter. Moreover, I fail to see how this request is "burdensome", as you claim, and how it is irrelevant, as you suggest.

Document Request General Objection No. 1

I am unclear about the meaning of this objection. If you are implying that in connection with discovery in the Rare Earths proceeding you have produced all documents responsive to this request, please say so plainly. Otherwise, I expect that further documents will be produced.

Document Request General Objection No. 4

Kerr-McGee objects to the People's document request "to the extent" that it calls for production of privileged documents. We are not asking for documents to which we have no legal right either because they are privileged or for any other reason. If there are documents which would be responsive to any of our requests but which you consider privileged, I expect that you will identify such documents; their privileged status can then be explored.

Richard A. Meserve  
Page 6

Document Request 4

This request is for construction drawings of all cutting and filling at the site. You refer to General Objection No. 4. As already stated, you should identify all responsive documents, claims of privilege notwithstanding.

I would appreciate hearing from you on the above points as soon as is convenient. Please amend your discovery responses accordingly, or explain to me why you believe the People are entitled to nothing more than you have already provided.

Sincerely,

Anne Rapkin  
Assistant Attorney General

cc: John C. Berghoff, Jr.  
Mead Hedglon, III

AR:me



EXHIBIT B

COVINGTON & BURLING

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May 28, 1985

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Ms. Anne Rapkin  
Assistant Attorney General  
Environmental Control Division  
100 W. Randolph Street  
13th Floor  
Chicago, Illinois 60601

Re: Kerr-McGee Chemical Corporation (Kress Creek  
Decontamination), Dkt. No. 40-2061-SC,  
ASLBP No. 84-502-01-SC

Dear Anne:

This letter is written in response to your April 15, 1985, letter concerning Kerr-McGee's responses to the People's first discovery request in the Kress Creek proceeding. Your letter requests that Kerr-McGee clarify or amend its responses to certain interrogatories or explain its reasons for responding as it has. The information provided below is intended to satisfy your request. This letter follows the format of your April 15 letter.

Interrogatory 1

Before turning to your comments, we must supplement our response. Kerr-McGee has recently discovered three other responsive documents relating to hypothetical remedial action at Kress Creek. We have decided to withdraw our previous privilege claims for these documents, and they are attached hereto.

a) You have requested that Kerr-McGee provide certain information to substantiate its privilege claims for documents identified on p. 6 of its response. With respect to the first document listed (the "Woodward-Clyde report"), such supplemental information is unnecessary, as Kerr-McGee has

Ms. Anne Rapkin  
May 28, 1985  
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decided to produce the document along with this letter. In addition, our privilege claim for the second listed document is withdrawn; it has already been produced.

With respect to the third listed document, which contains three attachments, Kerr-McGee has decided to produce the third attachment since it was previously made available to the NRC staff.

With respect to the remainder of the third listed document and the fourth listed document, Kerr-McGee maintains that these documents are protected by the work-product privilege. In addition, Kerr-McGee's further review of its files has located another privileged document relating to possible remedial action at Kress Creek. Thus, the responsive privileged documents as to which Kerr-McGee now asserts a work-product privilege are as follows:

1. Selective Decontamination of Kress Creek Banks; Kerr-McGee Memorandum plus first two attachments; E. Still to G. Rice, 4/26/82.
2. Kress Creek Comments; Kerr-McGee Memorandum, E. Still to G. Rice, E. Goltra, B. Shelley, G. Sinke, 2/23/82.
3. Kress Creek, Kerr-McGee Memorandum, E. Still to G.B. Rice, 2/11/82.

These documents were all generated shortly after December 18, 1981, when the NRC Staff issued an order concerning possible remedial action at Kress Creek. Each of these documents was prepared by E. Still in consultation with Gerald Charnoff, an attorney who was then advising Kerr-McGee, and in preparation for meetings with the NRC subsequent to issuance of the December, 1981 order. They were prepared during an NRC investigation and in anticipation of further litigation, and each concern the development of possible proposals to present to the NRC during the course of these proceedings. The documents contain technical information developed to support Kerr-McGee's position that Kress Creek poses insignificant risks and should not be disturbed by remedial action, comments on such information that reflect the opinion of the author and Kerr-McGee's counsel, and discussions of strategy for upcoming NRC meetings. All of this information was developed under the supervision of Mr. Charnoff. To the best of Kerr-McGee's knowledge, these documents have been shown only to the limited number of Kerr-McGee personnel involved in the Kress Creek

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b) The People have requested that Kerr-McGee specify what responsive information or documents exist concerning the costs of remedial action at the Creek. As Kerr-McGee's response indicates, definitive cost estimates have not yet been performed -- and indeed are not yet possible -- because the nature and extent of required remedial action, if any, has not yet been defined. Other than documents recently prepared by experts hired during the course of litigation and documents which have been or are now being produced, the only document known to contain a discussion of cost issues is: Selected Decontamination of Kress Creek Banks, Kerr-McGee Memorandum plus first two attachments, E. Still to G. Rice, 4/26/82. That document is privileged for the reasons discussed above.

With respect to documents prepared by experts hired during the course of litigation to study cost issues, Kerr-McGee maintains that such documents are governed by Fed. R. Civ. P. 26(b)(4)(B) as applicable to this proceeding, and that Kerr-McGee is not required at this time to provide any further

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information pertaining to these documents. Kerr-McGee further maintains that documents prepared by such experts are protected by the work-product privilege and by 10 C.F.R. § 2.740(b)(2).

Interrogatory 4

a) As explained in Kerr-McGee's response, off-site areas with an external gamma exposure rate of 35 uR/hr or greater at one meter above the surface are removed until background external gamma exposure rates are reached. Frigerio et. al., Thorium Residuals in West Chicago, Illinois at 2 (1978), reports that background external gamma exposure rates in the West Chicago area generally range between 14 and 25 uR/hr. At most off-site areas targeted for remedial action, Kerr-McGee removes contaminated material until the targeted portion of the property reveals gamma radiation at or below 15 uR/hr at one meter above the surface. At a few targeted areas located in the immediate vicinity of the site, where background levels are higher than 15 uR/hr, Kerr-McGee removes contaminated material until these higher background levels are reached.

b) The gamma level referred to in Kerr-McGee's response to subpart (b) is 35 uR/hr. Offsite areas with external gamma exposure rates at this level or below easily satisfy the criteria established by 10 C.F.R. Part 20. If a survey of an offsite property reveals gamma radiation above 35 uR/hr at one meter above the surface, remedial action is triggered and contaminated material is voluntarily removed until background gamma levels are reached on that specific portion of the property. As an additional margin of safety, Kerr-McGee routinely initiates remedial action if an offsite area reveals gamma radiation above 30 uR/hr at one meter.

c) Kerr-McGee maintains that its response to subpart (c) is adequate.

Interrogatory 10

In response to the People's interrogatory regarding "engineering or other means" that will minimize or eliminate adverse impacts associated with cleanup of the Creek, Kerr-McGee refers to its response to Interrogatory 9. In the last paragraph of that response, Kerr-McGee expresses its view that remedial action is inappropriate. Obviously, one means of eliminating adverse impacts associated with cleanup is to leave the Creek in its current condition. Further, as Kerr-McGee there states, "the risks associated with cleanup can be reduced by requiring a less extensive cleanup program than one that would be necessary to achieve the radium-in-soil levels stated in the Order



Ms. Anne Rapkin

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Page 5

to Show Cause at all locations along the Creek and river." Beyond this, until the nature, scope and method of required remedial action, if any, are determined, Kerr-McGee is unable to say what specific "engineering or other means" might be used in conjunction with such a program to reduce adverse impacts associated with that program.

Interrogatory 12

Kerr-McGee maintains that its response to Interrogatory 12 is adequate.

Interrogatory 13

Kerr-McGee has produced, or is producing herewith, all documents relating to the "actual risks" to health and safety and to the environment from cleaning up Kress Creek except for one privileged document and documents prepared by outside experts hired during the course of litigation. The privileged document discussing this issue is Selected Decontamination of Kress Creek Banks, Kerr-McGee Memorandum plus first two attachments, E. Still to G. Rice, 4/26/82. The basis for Kerr-McGee's claim of privilege with respect to this document is described in our comments concerning Interrogatory 1(a) above.

The "further studies of this matter" referred to in Kerr-McGee's response are being performed by experts hired during the course of litigation. For the reasons explained in our comments concerning Interrogatory 1(a) above, these documents are being withheld pursuant to Fed. R. Civ. P. 26(b)(4)(B), as applicable to this proceeding, and Kerr-McGee is not required at this time to provide any further information pertaining to these documents. In addition, Kerr-McGee maintains that these documents are protected by the work-product privilege and by 10 C.F.R. § 2.740(b)(2).

Interrogatory 14

Kerr-McGee's response to your questions concerning Interrogatory 14 is identical to our response to your questions concerning Interrogatory 13 above.

Interrogatory 15

Kerr-McGee has produced, or is producing herewith, all documents responsive to this interrogatory except for the three privileged documents listed in our comments concerning Interrogatory 1(a) above and documents prepared by experts hired during the course of litigation. The basis for Kerr-



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McGee's privilege claims is explained in our comments concerning Interrogatory 1(a), as are our reasons for withholding information about documents prepared by experts.

Interrogatory 20

Other than outside experts hired during the course of litigation, whose work product and identity are being withheld pursuant to Fed. R. Civ. P. 26(b)(4)(B) as applicable to this proceeding, and persons identified on p. 6 of our response or in the documents produced herewith, Kerr-McGee is unaware of persons that have engaged in cost calculations or studies of the health impacts or risks associated with remedial action. Kerr-McGee notes that at this time, no person has "knowledge" of the costs and risks associated with remedial action because the nature, method, and scope of such action, if any, have not yet been defined.

Interrogatory 26

i) The documents relating to releases from the holding tanks were mailed to the People along with Kerr-McGee's responses or have been made available for inspection in West Chicago. In addition, one recent document responsive to this interrogatory is produced herewith.

k) Treatment has been provided only for collected stormwater.

Interrogatory 29

The sampling methods described in the Health Physics Manual have been used by Kerr-McGee personnel beginning in October, 1979, up to the present. The Manual was prepared in 1981 at the request of the NRC, and simply sets forth the sampling methods that had been used since October, 1979.

Kerr-McGee's knowledge of the sampling methods used prior to October 1979 is very incomplete. Kerr-McGee has no knowledge of sampling that may have occurred prior to 1945. Attached is a memorandum reflecting one employee's unaided recollection of the sampling methodology that may have been applied for some periods prior to 1973. Kerr-McGee has not been able to verify the accuracy of these recollections concerning sampling by reference to documentation.

For the period between 1973 and October, 1979, Kerr-McGee has no knowledge that routine surface water, storm sewer, floor drain, sump or outfall sampling was conducted. With respect to spot sampling that may have occurred during

Ms. Anne Rapkin  
May 28, 1985  
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this period, if any, Kerr-McGee has no knowledge of the methods that may have been used.

Interrogatory 30

For some portion of the period from 1945 to 1973, Mr. Ed Maryniw recalls having collected samples, although Kerr-McGee has not been able to verify his recollection by reference to documentation. For the period from 1973 to October, 1979, Kerr-McGee is unaware of the identity of individuals, if any, who may have conducted sampling.

Interrogatory 31

According to Mr. Maryniw's recollection, for portions of the period from 1945 to 1973, sampling was performed under the supervision of, in chronological order, Drs. Kremers, Woyski, Healy and Silvernail and Mr. G. Sinke. These individuals may have participated in formulating the sampling methodology used during their tenure, although Kerr-McGee has not been able to verify their involvement by reference to documentation. Kerr-McGee has no knowledge of individuals, if any, who may have supervised and/or defined the methodology for sampling that may have occurred between 1973 and October, 1979.

Interrogatory 36

Each response to the People's interrogatories was prepared as a result of consultation among a number of people, each of whom has been identified. An attempt to allocate the answers to specific individuals would be unduly burdensome and essentially meaningless.

Document Request General Objection No. 1

Without waiving its objection, Kerr-McGee states that all documents responsive to this request were either mailed to the People along with Kerr-McGee's interrogatory responses, produced in connection with the Rare Earths proceeding, made available for the People's inspection in Oklahoma City on May 15 and 16, 1985, produced herewith, or made available for upcoming inspection in West Chicago.

Document Request General Objection No. 4

All responsive privileged documents have either been identified herein or identified with markers placed in files previously inspected or to be inspected in West Chicago.

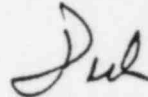
COVINGTON & BURLING

Ms. Anne Rapkin  
May 28, 1985  
Page 8

Document Request No. 4

Without waiving its objection, Kerr-McGee states that all documents responsive to this request were either produced in connection with the Rare Earths proceeding or made available for the People's inspection in Oklahoma City and in West Chicago, with the exception of privileged documents and those protected by Fed. R. Civ. P. 26(b)(4)(B) as applicable to this proceeding. All privileged documents responsive to this request have been identified with markers placed in files either previously inspected or made available for inspection.

Sincerely,



Richard A. Meserve

cc: Stephen H. Lewis, Esq.  
John C. Berghoff, Jr., Esq.  
Thomas J. McDaniel, Esq.

EXHIBIT C

## KRESS CREEK

### DISCUSSION OUTLINE - MARCH 26, 1982 NRC MEETING

#### I. Overview

- A. Radiological Data
- B. Dose Estimates
- C. Risk Estimates
- D. Cleanup Estimates
- E. Position

#### II. Radiological Data

##### A. Surveys and Measurements - specific to site

- 1. NRC - ORAU Nov. 1981
- 2. NRC - ANL Sep. 1978
- 3. EPA - Reg V Aug. 1980
- 4. NRC - Reg III Nov. 1981
- 5. K-M Corp Jan. 1982

##### B. Surveys and Measurements - General Area

- 1. NRC West Chicago
- 2. EG&G Aerial
- 3. Illinois Dept. of Health
- 4. K-M West Chicago

##### C. Data Available

- 1. External gamma exposure rates.
- 2. Radionuclide concentrations - soil, sediment, water.
- 3. Air samples - Airborne radionuclides

##### D. Results

- 1. Banks of Kress Creek
  - a. Gamma rates - backgd to 130 micro R/hr.
  - b. Thorium - backgd to 270 pCi/g
  - c. Radium and Uranium - background mainly
- 2. Sediments of Kress Creek
  - a. Gamma not measurable through water
  - b. Thorium - backgd to 467 pCi/g
  - c. Radium and Uranium - background mainly
- 3. Water
  - a. Radionuclide concentration backgd

E. Evaluation - Appraisal

1. Kress Creek and banks have elevated thorium conc.
2. Thorium is non-uniform in distribution
3. Thorium is from monazite ore finds
4. Thorium has not been processed recently
5. Thorium is insoluble
6. Thorium is not being resuspended
7. Thorium is confined to immediate stream area

F. Basis for Evaluation - Appraisal

1. Multiple independent measurements
2. Radionuclide ratios
3. Gamma readings only at bank areas
4. General air monitoring data and NRC study

III. Dose Estimates

A. Hypothetical Maximum Dose Estimates Possible

1. External gamma - whole body
  - a. Direct exposure or Dose Conversion per pCi/gm
  - b. Highest reading, average of all readings, average of systematic readings
2. Thorium - Internal - organ
  - a. Dose Conversion per pCi/gm - Lung and bone
  - b. Highest concentration, average of all concentrations, average of systematic concentrations

B. Systematically Measured Values Proper Basis

1. Standard procedure, representative
2. Include biased values
3. Only fraction of dose possible from highly localized areas of high concentrations

C. Calculated Maximum Hypothetical Doses

1. Systematically obtained values basis
  - a. Whole-body gamma - DCF - 138 mrem/yr.
  - b. Thorium in Banks (20 pCi/g average conc.)
    - 1) Lung dose - 25 mrem/yr.
    - 2) Bone dose - 75 mrem/yr.
  - c. NRC criteria (10 pCi/g conc.)
    - 1) Whole-body gamma - 73 mrem/yr.
    - 2) Lung dose - 15 mrem/yr.
    - 3) Bone dose - 61 mrem/yr.



D. Estimated Doses Greatly Exaggerated

1. Conservative Assumptions

- a. 60% of food produced in area
- b. Essentially full-time occupancy of area
- c. 50 year dose commitment considered annual dose
- d. Resuspension value high

2. Actual Circumstance

- a. Little, if any, food production actual or possible
- b. Impossible to occupy 100% of time the area
- c. Uptake of thorium by intestinal tract minimal
- d. Difficult to generate thorium-bearing aerosols
- e. Thorium is insoluble, not available in water

IV. Risk Estimates

A. Hypothetical Upper Limit Estimates Possible

1. Cancer Risk for:

- a. Whole body
- b. Lung
- c. Bone
- d. Red Bone Marrow

2. Basis

- a. Estimated Maximum hypothetical doses - systematic values

- 1) Whole-body - 138 mrem/yr.
- 2) Lung - 26 mrem/yr.
- 3) Bone - 75 mrem/yr.

- b. ICRP Risk coefficients

- 1) Whole-body -  $10^{-4}$  per rem per year
- 2) Lung -  $2 \times 10^{-5}$  per rem per year
- 3) Bone -  $5 \times 10^{-6}$  per rem per year
- 4) Red Bone Marrow -  $2 \times 10^{-5}$  per rem per year

D. Estimated Risk - Annual

1. Kress Creek Banks Average Values

- a. Whole-body -  $0.14 \times 10^{-4}$
- b. Lung -  $0.05 \times 10^{-5}$
- c. Bone -  $0.38 \times 10^{-6}$
- d. Red Bone Marrow -  $0.15 \times 10^{-5}$

B. Estimated Risk - Annual - cont'd

2. For NRC proposed criteria

- |                      |                       |
|----------------------|-----------------------|
| a. Whole-body -      | $0.07 \times 10^{-4}$ |
| b. Lung -            | $0.03 \times 10^{-5}$ |
| c. Bone -            | $0.32 \times 10^{-6}$ |
| d. Red bone Marrow - | $0.13 \times 10^{-5}$ |

C. Any increase in risk is slight

1. Normal lifetime fatal cancer risk is .16
2. Lifetime continuous radiation exposure has risk equal to sum of annual risk
3. Lifetime risk for Kress Creek maximum estimated doses is 0.00098
4. This is increase above normal lifetime fatal cancer risk of 0.6% (16 vs 16.6%)
5. Lifetime risk for NRC proposed criteria estimated doses is 0.00049
6. This is increase above normal lifetime fatal cancer risk of 0.3% (16 vs 16.3%)
7. The difference in risk under existing conditions and NRC criteria is insignificant
8. The increase in risk is less than 1%

Revision needed

D. The estimated risk is maximum

1. Dose estimates are conservative
2. Risk coefficients are conservative
3. Actual risk probably much lower and is only statistically determinable

V. Cleanup Estimates

A. Cleanup requires material removal

1. Involves Environmental - Logistical - Administrative factors
2. Involves time and costs

B. Environmental - Logistical Estimates - Requirements

1. Approximately 38,000 cubic yards of material  
- 2 Km length, up to 30 m width, up to 25 cm depth
2. Approximately 13,000 round trips - 3 yard trucks
3. Stream flow diversion
4. Grass, brush, bush, tree removal
5. Access roads
6. Erosion from denuded banks
7. Turbidity and siltration increase
8. Benthic organism removal
9. Aquatic habitat modification
10. Stream bed, bank and other esthetic modifications
11. Terrestrial fauna displacement
12. Storage and disposal of contaminated debris
13. Replacement of soil, vegetation, landscaping
14. Private landowner permission - interaction
15. Governmental approvals, permits.

C. Time - Cost Estimates

1. Formulate and document approach - procedures - approximately 15 months - \$25,000
2. Test and delineate extent of contamination - approximately 4 months - \$200,000
3. Prepare plans, program for removal, storage, and an impact statement - approximately 8 months - \$130,000
4. Secure various approvals, private property agreements, payments to property owners for access, damages, lawyers fees, etc. - approximately 10 months - \$200,000
5. Take bids, select contractor, excavate, haul, store, incinerate debris, landscape and restore - approximately 15 months \$2,800,000
6. Total time - about 52 months  
Total cost - about \$3,505,000

VI.

Conclusions - Position

A. Current levels of thorium at Kress Creek do not pose a risk.

1. Dose estimates are low, comparable to background averages in many parts of the U.S.
2. The probability of any dose is very slight - only route for exposure is inhalation and material is not suspendable.
3. Estimated health risk increase is minimal.
4. The probability of any health effect is negligible.
5. Removal of the contaminant is environmentally and monetarily costly.
6. Removal is not justifiable on the basis of public health concerns or cost - benefit considerations.
7. Cleanup is not required.

EVALUATION OF TECHNIQUES FOR REMOVAL OF THORIUM RESIDUALS FROM LOWER  
KRESS CREEK, WEST CHICAGO, ILLINOIS

Storm water runoff from a thorium ore processing plant in West Chicago, Illinois has carried thorium tailings containing residual radioactivity from the waste dumps at the plant into the lower watershed of Kress Creek. The contaminated area of Kress Creek begins at the outfall from the Kerr-McGee storm sewer adjacent to the Elgin Joliet and Eastern Railroad tracks and extends southward to the confluence of Kress Creek and the West Branch of the Dupage River, a distance of approximately 1-mile.

Kerr-McGee Nuclear Corporation has requested that Woodward-Clyde Consultants evaluate various methods of decontaminating those areas along lower Kress Creek which are above 30  $\mu\text{rem/hr}$ .

The Problem

Figures 1, 2, and 3 show the contaminated areas along the banks of Kress Creek, and provide a brief description of the terrestrial environment in each area. These figures are taken from a report by the Argonne National Laboratory who conducted a radiological survey of the Kress Creek area in 1977 (Frigerio, et al. 1978). It is difficult to interpret the color-coded dose rate map in the ANL report for dose levels of 21 to 27  $\mu\text{rem/hr}$  and 30 to 60  $\mu\text{rem/hr}$ , because virtually the same color code was used for both levels. Therefore, on Figures 1, 2, and 3, solid

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\*The soil along the banks of Kress Creek are classified as a sawmill silty clay loam.

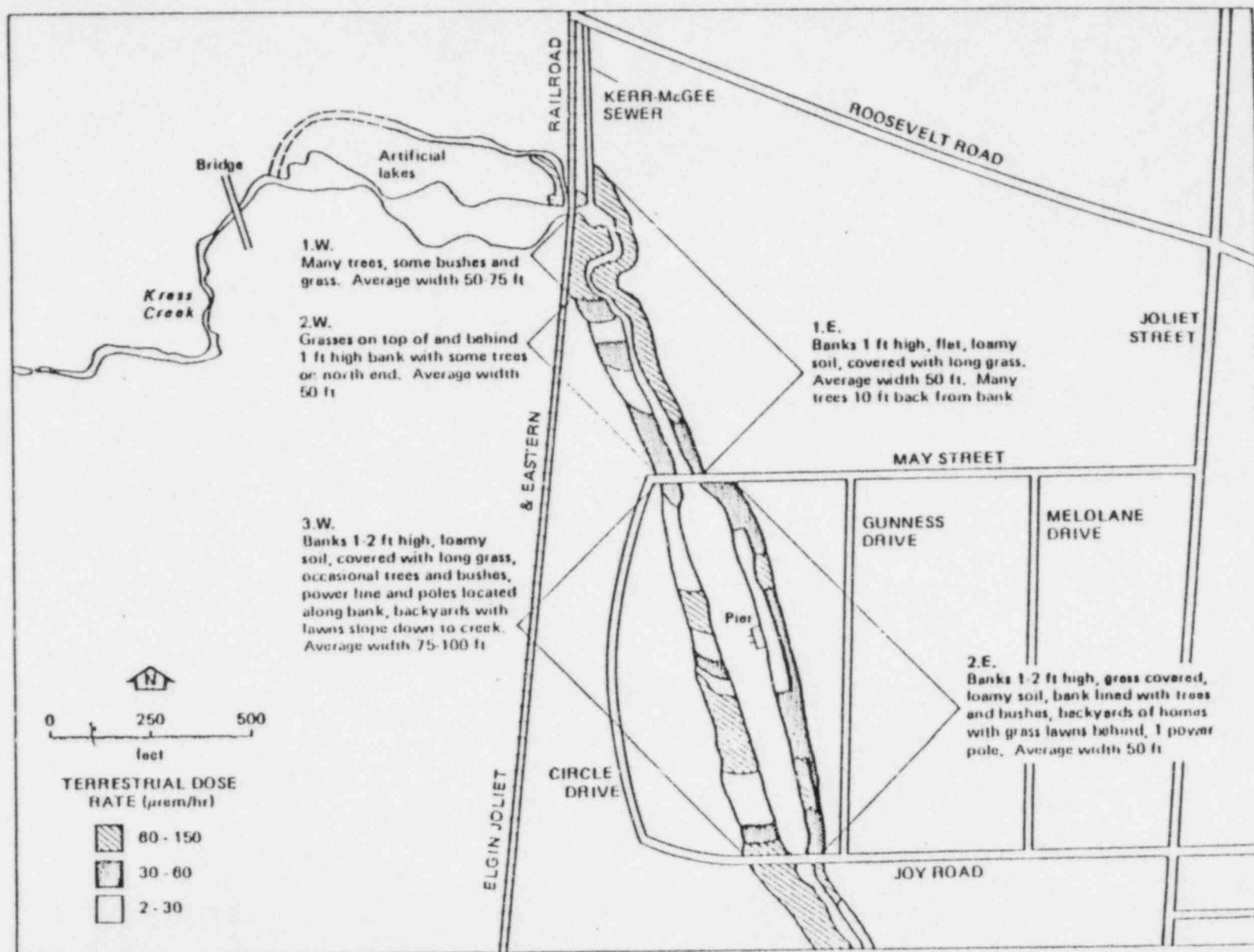


Figure 1. DOSE RATES ALONG THE BANKS OF KRESS CREEK (upper contaminated segment)



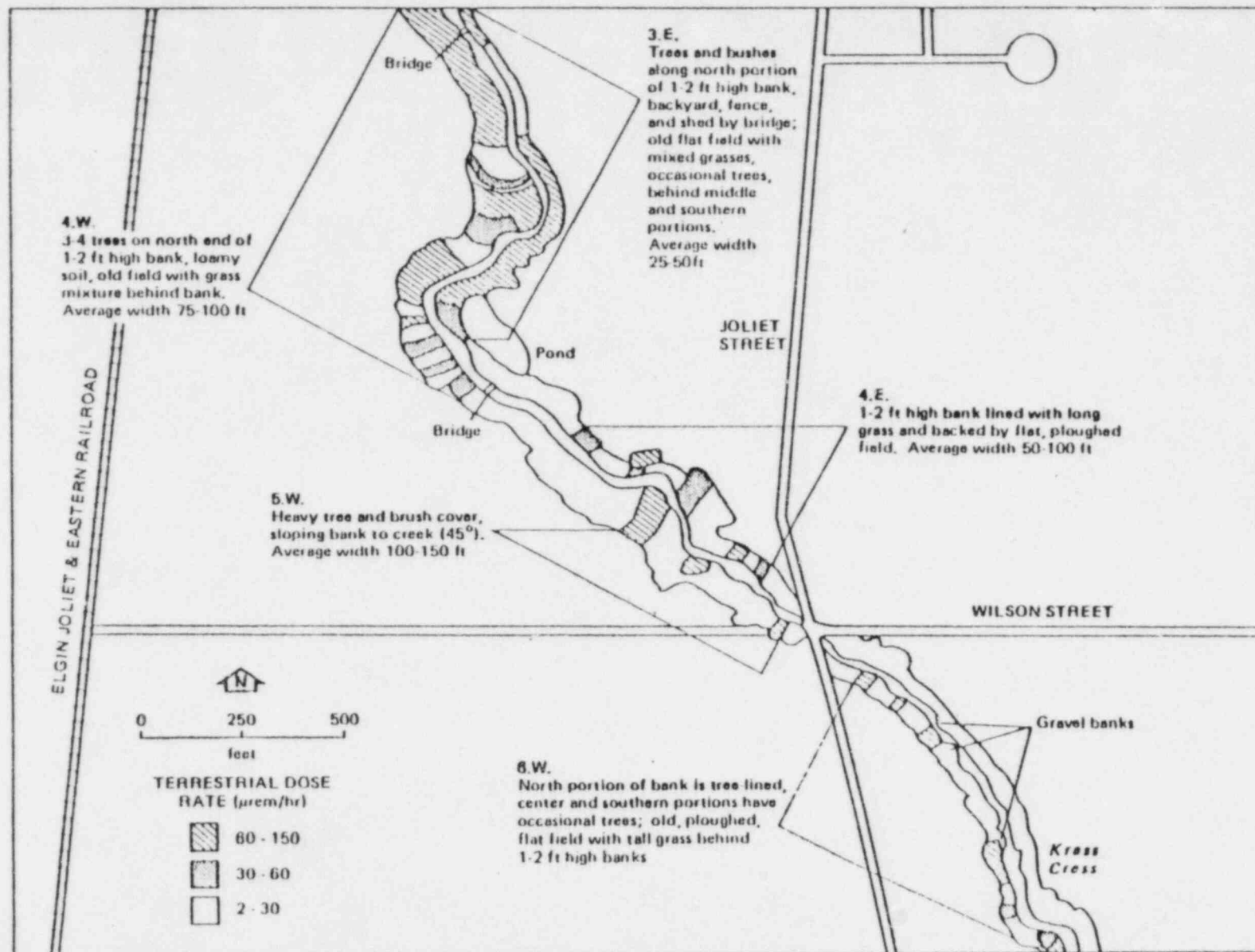


Figure 2. DOSE RATES ALONG THE BANKS OF KRESS CREEK (middle contaminated segment)

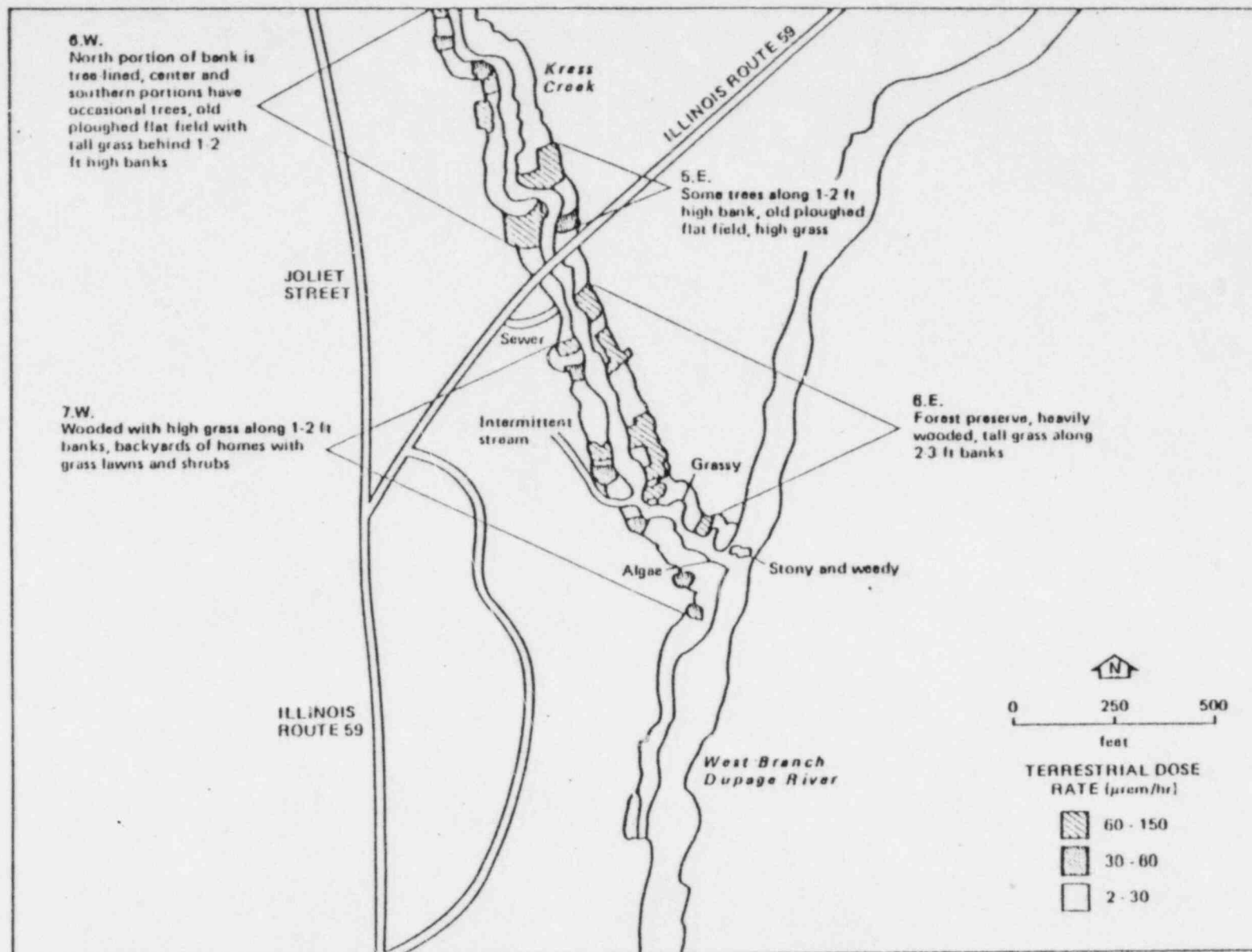


Figure 3. DOSE RATES ALONG THE BANKS OF KRESS CREEK (lower contaminated segment) AND THE WEST BRANCH OF THE DUPAGE RIVER

black areas represent areas with dose levels above 60  $\mu\text{rem/hr}$  and cross hatched areas represent our estimate of where the 30 to 60  $\mu\text{rem/hr}$  levels are. The ANL report does not state at what depth in the soil\* the thorium tailings are found, nor does the report give any dose rate for the Kress Creek stream bed.

#### Decontamination Procedure

Before any decontamination operations are started a detailed radiological survey of the Kress Creek area should be conducted. Core samples of the creek banks and creek bed must be taken in order to determine at what depth the thorium residuals are found. In addition, those areas which have dose rates above 30  $\mu\text{rem/hr}$  must be delineated and the perimeter staked to minimize the removal of excess material. The survey will also establish the distribution of the thorium residuals, i.e., whether the thorium is evenly distributed or is in hot spots.

Decontamination of the banks of Kress Creek would be conducted in two steps. First, all grass, brush, bushes and trees would have to be cut and removed, or in the case of tall meadow grass, a controlled burn could be used to effect removal. This action would minimize the amount of organic material placed in the dump site at the Kerr-McGee plant. The second step would be to remove the layers of contaminated soil using one of several earth moving methods (discussed below) and transport the material to the Kerr-McGee site. Removal of the bank material should begin at the upstream limit of contamination (at the plant storm sewer outfall) and proceed downstream. A silt curtain should be placed across Kress Creek downstream of the daily work area to stop any of the contaminated soil from moving downstream into the west branch of the Du Page River.

If the radiological survey indicates that the stream bed of Kress Creek has radioactive dose levels above 30  $\mu$ rems/hr then the contaminated layers of the stream bed would be removed after the bank of the creek had been decontaminated.

#### Decontamination Methods

Because of the extremely long half life of the thorium residuals, the most effective means of decontaminating the banks of Kress Creek is to remove the contaminated soil layers and transport them to the waste piles at the Kerr-McGee plant site.

If the depth of thorium tailings contamination is limited to the upper 10 to 15 cm of the soil column along the banks of Kress Creek, it would probably be feasible to selectively remove those areas above 30  $\mu$ rem/hr using the techniques described below.

Flat ploughed fields and lawn areas, few trees or bushes. Use a motor grader, starting from the edge of the creek and working parallel to the creek, and cut a layer of soil and cast a windrow of material away from the creek. A front end loader would pick up the windrowed material and place it in a truck for transportation. Two or more passes over the same area by the motor grader may be necessary if the thorium is located below 5 to 10 cm. Alternatively, if the root structure of the soil interferes with the cutting action of the motor grader blade, the soil could be disced first to break up the root structures.

Flat wooded areas and areas with heavy brush. Use a front end loader with a 4 in 1 bucket. The loader would remove tree and brush stumps for separate disposal. Then, using the bucket in the scraper position, the loader would begin at the edge of the creek and, moving backwards perpendicular to the creek, scrape the upper layers of soil into a pile at

the back of the contaminated area for subsequent loading and transportation by truck to the Kerr-McGee plant.

Steep banks. Use a backhoe operating from the top of the bank to reach down and remove the upper layer of soil starting from the creek edge up the bank.

Stream bed removal. To remove thorium tailings residuals from the stream bed, Kress Creek should be dammed at the culvert under the Elgin Joliet and Eastern Railroad tracks and the stream should be diverted by pumps and temporary piping running from the ponds north of the tracks to the west branch of the Du Page River. After the stream bed had dried for several days, front end loaders can be used to cut and remove the contaminated layers of the stream bed and load the material on trucks for disposal at the Kerr-McGee plant.

If the distribution of thorium tailings residuals in the soil is deep (i.e., 15 to 50 cm), then the entire area of stream banks on each side of Kress Creek would probably have to be removed. This could be done with bulldozers and front end loaders that cut and remove the contaminated layers of soil.

Table 1 lists the recommended soil removal procedures for each of the bank areas shown in Figure 1.

#### Decontamination Impacts

A brief qualitative assessment of the environmental impact of removing the banks and stream bed of lower Kress Creek was made and is described below.

Physical Impacts. Table 2 gives an estimate of the volume of soil that might be removed from the banks of Kress Creek (broken down into the areas shown on Figure 1) if selective decontamination was done. A total of 4,000 cu yds of earth would be removed for this case.\* If both banks of Kress Creek had to be removed to an average depth of 25 cm, then approximately 31,000 cu yds of material would be removed. Removal of thorium contaminated layers of the stream bed would entail removing an estimated 1,400 cu yds of material if thorium was in the upper 5 cm, to 7,000 cu yds of material if a layer 25 cm deep had to be removed from the stream bed.

A large increase in erosion from the denuded banks of Kress Creek could be expected with a resultant large increase in turbidity and siltation in the west branch of the Du Page River. The backyards of homes located along the banks of the creek would be adversely affected when lawns, shrubs and trees are removed.

Biological Impacts. Riparian vegetation will be removed and the existing terrestrial habitat along the stream will be altered. Some small and medium-sized mammals will be killed while vegetation and contaminated sediments are removed. The remaining terrestrial fauna will be displaced as the vegetation along the stream is removed.

An immediate effect of the removal of the contaminated materials from the stream will be the loss of benthic organisms (both plant and animal) through direct removal. Additionally, downstream benthic organisms are likely to be lost as a result of the smothering effects of increased siltation and fish species will be displaced due to the increased turbidity. Severe aquatic habitat modification will occur as a result of the removal of the contaminated sediments. The riffle/pool nature of the lower reaches of Kress Creek will likely be lost. This may alter

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\*Assuming an average depth of removal of 9 cm or 0.1-yd.



Table 1. RECOMMENDED SOIL REMOVAL PROCEDURES FOR SELECTIVE DECONTAMINATION

<u>Area</u>	<u>Method</u>
1E	Cut trees and grass, remove soil using front end loader
2E	Cut trees along creek edge and grass, use front end loader to remove soil along bank and motor grader for lawn areas
3E	Cut trees and bushes along bank, remove or burn grass in southern part of area, use front end loader to remove soil around trees, disc field with high grass and use motor grader to windrow soil
4E	Cut or burn grass, use motor grader to cut and windrow soil
5E	Cut trees along bank, cut or burn high grass, use front end loader to remove soil around trees, disc remainder and use motor grader to windrow soil
6E	Cut trees and grass, remove soil with front end loader
1W	Cut trees and grass, remove soil with front end loader
2W	Cut trees and grass, remove soil with front end loader
3W	Cut trees and shrubs, relocate power poles, use motor grader to windrow lawn areas and front end loader to remove soil around trees
4W	Cut or burn grass, disc field, windrow soil with motor grader
5W	Cut trees and brush, remove soil layer with backhoe
6W	Cut trees, brush and grass, remove soil with front end loader
7W	Cut trees, brush and grass, remove soil with front end loader

Table 2. ESTIMATED VOLUME OF MATERIAL TO BE REMOVED FROM BANKS OF KRESS CREEK FOR SELECTIVE DECONTAMINATION

Location Number	Length (feet)	Width (feet)	Area (sq. ft.)	Area (sq. yds.)	Volume (cu yds) if depth removed = 9 cm (0.1 yd.)
1E	775	50	38,750	4,305	430
2E	800	50	40,000	4,444	444
3E	762.5	62.5	47,656	5,295	530
4E	300	75	22,500	2,500	250
5E	150	62.5	9,375	1,042	104
6E	350	50	17,500	1,944	194
1W	225	75	16,875	1,875	187
2W	300	62.5	18,750	2,083	208
3W	375	75	28,125	3,125	312
4W	825	87.5	72,187	8,020	802
5W	162.5	100	16,250	1,805	180
6W	512.5	62.5	32,031	3,559	355
7W	225	37.5	8,437	937	94

Total volume removed = 4,090,  
say 4,000 cu yds.

the species composition of the aquatic community which is ultimately re-established in the stream.

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MORTON I. GOLDMAN, B.S.  
SENIOR VICE PRESIDENT  
ENVIRONMENTAL SYSTEMS GROUP

March 31, 1980  
MIG-242

Mr. William J. Shelley  
Director of Regulation and Control  
Kerr-McGee Nuclear Corporation  
Kerr-McGee Center  
Oklahoma City, Oklahoma 73125

Dear Bill:

I am enclosing a revised version of the Kress Creek writeup forwarded with your letter of March 17. In the rewrite, I tried to incorporate some of the Woodward-Clyde/Kelth Schiager information to provide a little more meat on the bones.

As you will note, I feel there may be a basis for concern about those stretches of the creek which run behind the private homes, if the backyards of those homes contain children's play equipment (sandboxes, swings, slides, etc.) or other lawn furniture which would indicate the potential for occupancy on the order of a few hundred hours per year. I would think it highly desirable to assure that such usage does not exist on or close to those areas designated as above 60  $\mu$ rem/hour as in the W-C locations numbered 2E, 3W, 3E and 7W.

I would not expect that any such usages will be found since the deposited materials define by their presence areas subject to periodic flooding. However, I would feel more comfortable about the conclusions reached if their absence could be confirmed by inspection.

If such equipment is found, more precise definition of the local dose rates would be needed to determine if (and what) corrective steps need be taken.

If there is any further help you would like on this, please let me know.

Very truly yours,



Morton I. Goldman

MIG:rd  
enclosure

*5. I have had one of my people review the draft EPA standards you sent. but am holding these comments until they are officially published.*

*M.*

KRESS CREEK

The report prepared by Argonne National Laboratory entitled "Thorium Residuals in West Chicago, Illinois" describes the work done by that organization to define thorium contamination found along this creek. The material is described as dense and granular with the material characteristics of the tailings pile. Identification of the material required microscopic and radio autographic examination. The report states that, "The material along Kress Creek ... was almost a classic example of placer deposition," and observes that "over some 47 years the great bulk of the material ... has moved less than one mile downstream."

There are two modes of potential radiological exposure from this material: the first is internal exposure to individuals who might consume water contaminated with soluble radionuclides; the second, direct external gamma exposure to individuals in contaminated areas. With respect to the first mode, contaminated water consumption, the Argonne National Laboratory report cited above states:

"The material is so dense, and so insoluble, that it was transported purely as grains of sandlike material, and these grains were found and identified down along the watershed."

"Deposits proved to be almost exclusively the dense, gray, insoluble particles of thorium-ore tailings from the process,..."

"No excess soluble thorium was ever detected in the waters of either the creek or the river. ... Considering the high density and extremely insoluble nature of the material, this was precisely what might have been expected."

On this basis, the thorium residuals in Kress Creek would not appear to produce any measurable or significant soluble concentrations and, hence, no measurable or significant internal exposures from consumption of that water.



The basis for assessing the direct external gamma exposure potential is also presented in the ANL report in which the results of radio-metric analyses one meter above the ground are graphically presented. Measured values of dose rate range from background to a maximum of 150  $\mu$ rem/hour. Thus, a person would need to occupy the space immediately above the area of the maximum dose rate for a period of 167 hours in a year to receive the 25 mrem dose limit specified by the EPA in 40 CFR 190. At a 60  $\mu$ rem/hour dose rate, the occupancy time would have to rise to more than 416 hours per year to reach the 25 mrem EPA limit.

Along the approximately 6,000 feet of Kress Creek to its junction with the West Branch of the DuPage River, it passes through old farm fields, forest preserves and heavily wooded areas, as well as behind backyards of \_\_\_ private homes occupying \_\_\_ feet of bank length. In these areas, the only usage which might provide significant occupancy factors is that of recreational equipment (i.e., children's swings, sandboxes, etc.) at the private homes in near proximity to the deposited materials. An examination of the areas along Kress Creek revealed no such usage, nor would it have been expected since the deposited residuals are in areas subject to periodic flooding.

On this basis, external gamma radiation exposures from the deposited materials would not be expected to exceed a few mrem/year to any individual. Nevertheless, decontamination procedures were evaluated which would involve the excavation and removal of deposited material. The mechanics of decontamination would require a significant alteration of the creek and its banks by heavy grading and excavating equipment (assuming owners' approval and consent for access to privately owned property). Areas with heavy brush and trees would need to be cleared with revegetation requiring an extensive time. Working in this matter would result in substantial contamination of the creek water by erosion of natural soils. It is expected

that such eroded material would contribute measurable contamination in the form of naturally occurring uranium and radium in the soil. Re-establishment of the original grades with fresh soil material would result in continued erosion in the flow of water through the creek bed especially during periods of heavy runoff until revegetation occurred. Alteration may lead to serious scouring of the creek bed and with it generally deeper cutting than is currently evident.

At our request, Dr. Keith Schiager, formerly with the University of Pittsburgh, reviewed the report and stated the following: "It is my conclusion that the thorium residues in Kress Creek do not produce any measurable or significant radiological health impact and that any postulated remedial action might result in an increased radiological impact from naturally occurring radiation sources."

As a result of this review and Dr. Schiager's opinion, it is Kerr-McGee's opinion that evidence of thorium-containing sands in Kress Creek do not constitute a creditable public hazard. Therefore, no plans to reclaim Kress Creek have been included.



2695  
ALARA, Inc.  
P.O. Box 860  
Lyons, Colorado 80540  
303-823-6151

March 3, 1980

William J. Shelley  
Director, Regulation and Control  
Kerr McGee Nuclear Corporation  
Kerr McGee Center  
Oklahoma City, OK 73125

Dear Mr. Shelley:

This letter is in response to your request of January 9, 1980 that I review the potential radiological health impact of thorium tailings residues in Kress Creek downstream from your West Chicago facility. In response to your request, I have reviewed your Decommissioning and Stabilization Plan for the West Chicago facility as well as the Argonne National Laboratory Report- Thorium Residuals in West Chicago, Illinois, (NUREG/CR-0413, ANL/ES-67). The basis for my review has been twofold:

(1) to evaluate whether or not the existing thorium residues in Kress Creek represent any radiological health impact upon the local or surrounding population, and

(2) to determine the advisability of any type of remedial action that might be beneficial if a radiological health impact were present.

This review was limited to the information presented in the aforementioned documents and not upon personal on-site inspections. However, it is my opinion that the available data are sufficient as a basis for my interpretations and conclusions.

Two potential pathways for radiation exposure to members of the general public were considered. First, the external gamma radiation exposure to individuals present over locations of deposited thorium bearing materials and second, the potential internal exposure to individuals who might consume contaminated water. Any other potential routes of exposure to these materials, e.g. inhalation of airborne radioactivity or ingestion of contaminated food products, would be negligible compared with the direct exposure pathways.

The Argonne National Laboratory Report indicates that external exposure rates up to 150  $\mu$ R/hr exist at certain locations along the banks of Kress Creek. Such exposure rates are obviously several times larger than those from naturally occurring radiation sources in the locality. However, the extremely limited locations in which such exposures occur and the low occupancy for such locations would preclude a likely exposure

to any individual of more than a few mR/year. If the thorium residues are gradually dispersed over larger areas, the potential occupancy factor over such areas could increase, but the exposure rates would decrease at least proportionately. Based upon any existing regulations or guidelines for limiting exposures to individual members of the public or upon any recognized method of risk-benefit analysis, remedial action for limiting external exposure rates along Kress Creek could not be justified.

The second exposure pathway considered is that of ingestion of contaminated water. The nature of the materials deposited in Kress Creek apparently preclude any significant or measurable water contamination. This conclusion was derived from the following statements in the Argonne National Laboratory Report:

"... the open nature of the piles of thorium-bearing waste made them particularly subject to runoff, especially during heavy rains. Such material, along with factory waste, found its way into the storm sewer along one edge of the property, across the fields, and down into the Kress Creek watershed. The material is so dense, and so insoluble, that it was transported purely as grains of sandlike material, and these grains were found and identified down along the watershed."

"Deposits proved to be almost exclusively the dense, gray, insoluble particles of thorium-ore tailings from the process, which have been historically stored in two large piles in the site waste area."

"No excess soluble thorium was ever detected in the waters of either the creek or the river." ... "Considering the high density and extremely insoluble nature of the material, this was precisely what might have been expected."

The U.S. Environmental Protection Agency has prepared Proposed Regulations (40 CFR 192) for Remedial Action Standards for Inactive Uranium Processing Sites. However, the EPA has not specifically proposed standards for thorium processing sites. In spite of the lack of specific EPA standards, it is reasonable to evaluate the potential impact of a thorium processing site within the context of the proposed standards for uranium processing sites. In the draft of the Federal Register notice (dated 1-23-80), the EPA proposes the following radioactivity concentration limits for protection of water bodies (primarily groundwater) in the vicinity of inactive uranium sites:

Ra-226 + 228	5 pCi/L
Gross alpha	15 pCi/L
Uranium	10 pCi/L

March 3, 1980

Although these concentration limits are stated to be specifically for groundwater, they appear to be equally applicable to surface waters, since they are adequate for public drinking water supplies as expressed by the EPA:

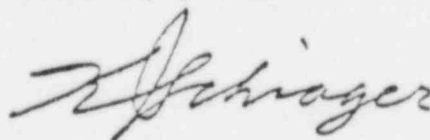
"None of these limits were developed originally as general water quality standards. Since no water quality standards specifically applicable for disposal of uranium tailings are available, we chose standards adequate for public drinking water supplies. We believe they should provide enough protection in a wide variety of circumstances."

The fact that no excess soluble thorium was detected in Kress Creek or the DuPage River by Argonne National Laboratory indicates to me that concentrations did not exceed the gross alpha activity limit promulgated by the EPA for drinking water. I am confident that the analytical techniques used by ANL would have detected any concentrations of thorium above these limits and if so, they would have been reported. On the basis of the ANL investigation, as well as upon the logical deductions that could be made as a result of the nature of the deposited materials, I am convinced that the thorium residues in Kress Creek do not now and will not in the future produce any measurable or significant waterborne concentrations or radiation doses.

In view of the lack of evidence for any radiological health impact from the deposited materials, it is difficult to postulate any justifiable remedial action. Any attempt to remove materials deposited in the small pockets along a stream bed would undoubtedly produce an increase in turbidity and total suspended particulates in the waters downstream. Furthermore, even though the deposited thorium residues are insoluble, the more soluble uranium and radium constituents of the natural soil might be released into the stream as a result of such remedial actions. Consequently, on the basis of information available to me to this date, it is my conclusion that the thorium residues in Kress Creek do not produce any measurable or significant radiological health impact and that any postulated remedial action might result in an increased radiological impact from naturally occurring radiation sources.

If you have any questions relative to my radiological health assessment of thorium residues in Kress Creek, please feel free to contact me.

Sincerely yours,



Keith J. Schiager, Ph.D.  
President

KJS/jes





2695

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March 3, 1980

William J. Shelley  
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March 3, 1980

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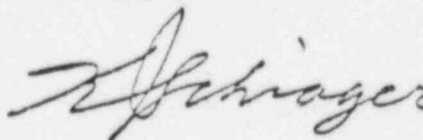
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If you have any questions relative to my radiological health assessment of thorium residues in Kress Creek, please feel free to contact me.

Sincerely yours,



Keith J. Schiager, Ph.D.  
President

KJS/jes

RELATED CORRESPONDENCE

PROOF OF SERVICE

DOCKETED  
USNRC

I, MAUREEN CAWLEY, having been sworn and under oath do  
state that I have this 3rd day of July, 1985, served a copy of  
the foregoing People's Motion To Compel Certain Discovery Respon-  
ses, upon the persons listed on the attached Service List, by  
placing same in envelopes addressed to said persons, by first  
class mail, postage prepaid and depositing same with the United  
States Postal Service located at 160 North LaSalle Street, Chica-  
go, Illinois 60601

Subscribed and Sworn to  
before me this 3rd day of  
July, 1985.

\_\_\_\_\_  
NOTARY PUBLIC

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