

TWX INCOMING

DOCKET NO. 40-8027

1969 NOV 21 AM 10 00

THIS IS KERR MCGEE CORP OKLAHOMA CITY OKLA NOV 21 1969

MR DONALD A NUSSBAUMER

U.S. ATOMIC ENERGY COMM.

TWX UNIT

SOURCE & SPECIAL NUCLEAR MATERIALS BRANCH

DIVISION OF MATERIAL LICENSING

U S ATOMIC ENERGY COMMISSION

WASHINGTON D C

REFER DOCKET 40-8027. PLEASE AMEND SOURCE MATERIAL LICENSE SUB-1010 TO INCLUDE AUTHORIZATION FOR UNLIMITED STORAGE OF DEPLETED UF6 AT THE SEQUOYAH FACILITY PER KERR-MCGEE APPLICATION OF SEPTEMBER 23, 1969. STORAGE OF UF6 WILL BE IN STANDARD CYLINDERS USED FOR TRANSPORT OF UF6. LICENSE APPROVAL IS URGENTLY NEEDED BY EARLY DECEMBER TO ASSURE TIMELY REMOVAL OF TOLL ENRICHMENT TAILINGS FROM AEC FACILITIES UNDER CONTRACT CONDITIONS. APPRECIATE YOUR COOPERATION IN EXPEDITING LICENSE AMENDMENT.

G E WULLER

END000

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TWV INCOMING



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PDR ADOCK 04008027 PDR
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HQ-9401
(9-66)

INTERMEDIATE ACTION FORM

Source & SNM Licenses

REFERENCE NUMBERS

01. PROG. CODE 62	03. DOCKET NO. 40-8027	09. TASK NO. 3066	42. PURPOSE OF TASK new license	12. CONTROL NO. 3066	15. LICENSE NUMBER
18. APPLICANT Kerr-McGee Corporation				54. AM NO. RESULTING FROM TASK	
21. STREET & BUILDING Kerr-McGee Building			45. CLASSIFICATION U		63. ASG. TO:
24. CITY Oklahoma City	27. STATE OKLA	30. ZIP 73102	33. RECEIVED YR. MO. DAY 69 09 29		35. ISSUED YR. MO. DAY
57. APPLICANT'S COMMUNICATION DATED YR. MO. DAY 69 09 23			39. EXPIRED YR. MO. DAY		
58. DESCRIPTION (MUST BE UNCLASSIFIED) Ltr.....trans:			59. ENCLOSURES (4 cys. rec'd.) AEC-2 w/suppl. for lic. to cover unlimited depleted & natural uranium.....		
			60. DISTRIBUTION DWG. NOS: 201-M-641; 110-C-152; 110-C-151; 201-M-640 & 600-M-101 & Highway Map Sequoyah		
			60. DISTRIBUTION 1-PDR cy. County		
			1-compliance cy.		
INTERMEDIATE ACTIONS				OTHER REFERRALS	
TYPE	ON		ACTIV.	RETURNED	
	YR.	MO. DAY	92	YR.	MO. DAY
ACDL. INFO. REQUESTED FROM APPLICANT	91		1	93	
REFERRED TO:	94		2	96	
REFERRED TO:					
				DATE YR. MO. DAY 69 09 29	
				Missbauer w/file cy. & file 1-extra cy.	
				DJQ	

THIS LETTER AND ENCLOSURES FILED IN REPORTS FOLDER.



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON, D.C. 20242

DOCKET NO. 40-8027
Regulatory File Cy.

July 13, 1970

Mr. Donald A. Nussbaumer, Chief
Source & Special Nuclear Materials Branch
Division of Materials Licensing
U.S. Atomic Energy Commission
Washington, D. C. 20545



Dear Mr. Nussbaumer:

Reference is made to your letters of April 21 and June 2, 1970, requesting assistance from the Geological Survey in reviewing the additional data submitted to your office by the Kerr-McGee Corporation in connection with their Sequoyah Uranium Facility in Oklahoma (Source Material License SUB-1010, Docket 40-8027), and to my letter to you dated December 19, 1969, in which we reviewed parts of Kerr-McGee's application for Source Material License.

Our review efforts with respect to the additional data were concentrated mainly on the geology and hydrology as they might affect the movement of radioactive wastes from the proposed waste-injection well, and the hydrologic effects of the proposed injection scheme. In general, the additional information given by the applicant does not provide a sufficient amount of geologic and hydrologic data to provide a basis for judgment as to whether the wastes to be injected, including thorium-230 (half life, 80,000 years) and radium-226 (half life, 1,622 years), will be contained by the Arbuckle Formation.

The applicant states on page IV-5 that after five years the injected fluid is estimated to move only 460 feet from the disposal well. This estimate is based on a calculation using the equation given on page 18 (Appendix B) which assumes that the formation porosity and permeability are homogeneous and isotropic and that flow from the injection well is uniformly radial. Carbonate rock aquifers are notably heterogeneous and the core analysis data in exhibit K demonstrate this. For example, the data show that permeabilities determined from cores taken in the Arbuckle range from less than 0.1 to 768 millidarcies, and that vuggy porosities range from 0.9 to 13.4 percent. From these data, it can be expected that the rate of movement from the well bore will be extremely variable, from low rates of movement in beds of low permeability to high rates of movement in beds of high permeability. It is believed therefore that the estimate of the amount of movement of the injected fluid is not based on valid assumptions.

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The applicant states on page 8 (Appendix B) that the depth to saltwater in the Arbuckle in the proposed disposal well is 50 feet below land surface, or 513 feet above sea level. On page 6, it is stated that the saltwater potentiometric surface is about 550 to 600 feet above sea level. This surface is above much of the land surface in the area and considerably above the elevations of the Illinois and Arkansas Rivers. On page 5 (Exhibit M) the consultant to Kerr-McGee states and geologic cross sections H and I show that this surface appears to be common not only to the Arbuckle, but also to the overlying Simpson, Hunton, and Spiro Formations. In addition, the consultant suggests that the chemical quality of the brine in the Arbuckle and overlying formations is essentially the same. The uniform head and chemical quality of the formations suggest a hydraulic connection between them. Because of the impermeable nature of the uppermost part of the Arbuckle and of several horizons in the overlying formations, the only apparent feature that could provide such a hydraulic connection is a fault or fracture zone cutting across the beds. Several faults of this type are shown on the map of Exhibit B, the State Geologic Map, and on geologic cross sections Exhibits H and I. In addition, along one of the faults about 8 miles west of the proposed site, highly mineralized water (containing about 110,000-115,000 parts per million total dissolved solids) is discharging at the surface (Marcher, 1969¹; Exhibit M, p. 6). Therefore, any type of fluid injected in the proposed well will cause a pressure buildup in the injection zone and will eventually force brine (containing about 140,000 parts per million total dissolved solids) upward along faults or fracture zones to the surface. The available data are not adequate to determine when brine may be forced to the surface by the waste injection; however, because the potentiometric surface is about 550 to 600 feet above sea level, it is possible that this may occur shortly after continuous injection has begun.

The applicant's consultant has stated on page 6 (Appendix B) that a pollution hazard could be created if sufficiently large volumes of waste were injected at high pressure causing the waste fluid front to reach the nearest fault zone. It is apparent from the description of the planned monitoring program (p. 16-17, Appendix B) that the applicant considers the most probable path for the upward movement of radioactive wastes to be along the Carlile School fault, about 1 mile east-southeast of the disposal well. The statement is made (p. 17) that the site of the monitoring well on this fault was selected to detect a change in either the water quality or the static water level. The available hydrologic and geologic data are inadequate to predict the precise paths along which brines or radioactive waste solutions might rise and discharge at or near the surface or the time when this might occur.

Although several faults have been mapped, the possibility exists that there may be other faults or fracture zones closer to the disposal well site. Of most concern is the possibility that the waste solutions or brines will emerge in the Arkansas River Valley. The alluvium in the Arkansas River Valley downstream from the site is a source for domestic water supplies and, in Arkansas, the alluvium is considered to be the most consistently productive aquifer in that state.

¹Marcher, M. V., 1969, The Water Resources of the Ft. Smith Quadrangle: Oklahoma Geol. Survey Hydrologic Atlas 1.

Regarding the proposed monitoring program, it should be mentioned that such a program would be desirable, but it is important to note that in view of the complexity of the pattern of ground-water flow, a pollutant in ground water could bypass an array of monitoring wells and escape detection. Therefore, negative monitoring information on the movement of waste radioactive liquids would not demonstrate containment of the waste, as stated on page 17 (Appendix B). Also, if radioactivity were detected in a monitoring well along the fault line, or anyplace else, it would be impracticable or impossible to take corrective action as indicated on page 17.

On page 17 (Appendix B), the applicant states that two retention basins of 5.5 million gallons capacity are provided for temporary impoundment of the waste liquids in the event of malfunction of the disposal well. Details concerning the construction of embankments for the retention basins are given in Drawing no. SK-C-53; however, the details for construction of the floors of the basins are not given. The floor of the basin should be made as impermeable as possible in order to prevent the downward percolation of waste fluids, which conceivably could migrate offsite and enter the alluvium of the Illinois or Arkansas Rivers. In addition, shallow core holes should be drilled beneath each basin. From the cores, permeabilities should be determined in order to properly evaluate the possibility of downward percolation through the bottoms of the basins. On page IV-6.8, the applicant states that a massive leakage through stop logs in Basin no. 1 drainage structure is believed unlikely since the basin will not be used continuously, and that Basin no. 2 has no built-in drainage system. If the basins are to be used continuously, it may be necessary to construct the drainage structure of Basin no. 2 in a manner similar to that of no. 1, or to redesign both basins.

On page IV-5 the applicant refers to experimental data on a disposal well in which 99 percent of the thorium was precipitated at the interface of the waste water and the formation water. Although this may be desirable in preventing the movement of thorium, the precipitation of thorium would tend to reduce the porosity and permeability and restrict both the amount and rate of movement of fluid into the formation.

In summary, the injection of waste fluid of any type would build up the pressure head in the Arbuckle Formation and result in brine moving upward along faults and fracture zones and discharging at or near the land surface. The available geologic and hydrologic data are inadequate to predict the flowpaths or the time when radioactive waste solutions might reach the surface. However, it is possible that these wastes eventually will discharge in the Arkansas River Valley where, in addition to entering the river, they could enter the alluvial aquifers which are sources for domestic water supplies.

If you should have any questions regarding these comments, please let us know.

Sincerely yours,

Robert Schneider

Robert Schneider
Chief, Office of Radiohydrology

cc: W. G. Belter, AEC, Germantown
Assistant Chief, Research and Tech. Coord.
Chief, Ground Water Branch
District Chief, Oklahoma City
D. G. Metzger

COLLECT
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JUL 9 1970

LYALL JOHNSON
ACTING DIRECTOR
DIVISION OF MATERIALS LICENSING
U. S. ATOMIC ENERGY COMMISSION
WASHINGTON, D. C. 20545

KERR-McGEE CORPORATION
KERR-McGEE BUILDING
OKLAHOMA CITY, OKLAHOMA 73102

ATTENTION: MR. GEORGE PARKS
EXECUTIVE VICE PRESIDENT

THE PROPOSED WASTE HANDLING AND TREATMENT CONCEPT DESCRIBED IN YOUR TWX
DATED JULY 7, 1970 APPEARS SATISFACTORY SUBJECT TO OUR REVIEW OF THE DETAILS
OF DESIGN AND OPERATION YOU PLAN TO SUBMIT IN THE NEAR FUTURE. THE CONCEPT
SHOULD HAVE THE OBJECTIVE OF REDUCING THE CONCENTRATION OF URANIUM IN THE
EFFLUENT TO THE LOWEST PRACTICABLE LEVEL. IN VIEW OF YOUR REFERENCES TO
YOUR PENDING DEEP WELL PROPOSAL, WE FEEL YOU SHOULD CLEARLY UNDERSTAND THAT
WE ARE IN NO POSITION TO PROVIDE YOU ANY DEGREE OF ASSURANCE THAT AEC ACTION
ON YOUR DEEP WELL PROPOSAL WILL BE TAKEN WITHIN THE NEXT TWELVE MONTHS OR
THAT, ^{WHEN} ~~WHEN~~ ACTION IS TAKEN, IT WILL NECESSARILY BE AFFIRMATIVE.

REFERENCE: DML:DAN; 40-8027

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C. Buchanan, DML
L. Johnson, DML

8507310325 lp

OFFICE ▶	DML	DML			
SURNAME ▶	Nussbaumer/mad	L. Johnson			
DATE ▶	7/9/70	7/9/70			

U.S. ATOMIC ENERGY COMMISSION

USE WHERE REQUIRED

OUTGOING TELECOMMUNICATION MESSAGE

(See reverse side for instructions)

THIS DOCUMENT CONSISTS OF _____ PAGES
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Average transmission time exclusive of messenger services is shown.)

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INFO: ☐ (4 Hrs.) ☐ (2 Hrs.) ☐ (1 Hr.) ☐ (ASAP)

TYPE OF MESSAGE
(Check one)

☒ SINGLE ADDRESS
☐ MULTIPLE ADDRESS
☐ BOOK MESSAGE

FOR COMMUNICATION CENTER USE

MESSAGE IDENTIFICATION

NR: DTG: Z

FROM: **LYALL JOHNSON**
ACTING DIRECTOR
DIVISION OF MATERIALS LICENSING
U. S. ATOMIC ENERGY COMMISSION
WASHINGTON, D. C. 20545

OFFICIAL BUSINESS

A.M.

P.M.

(Signature of certifying official)

(Time)

DATE:

July 9, 1970

COMMUNICATION CENTER ROUTING

TO

KERR-McGEE CORPORATION
KERR-McGEE BUILDING
OKLAHOMA CITY, OKLAHOMA 73102

ATTENTION: MR. GEORGE PARKS
EXECUTIVE VICE PRESIDENT

THE PROPOSED WASTE HANDLING AND TREATMENT CONCEPT DESCRIBED IN YOUR TWX
DATED JULY 7, 1970 APPEARS SATISFACTORY SUBJECT TO OUR REVIEW OF THE DETAILS
OF DESIGN AND OPERATION YOU PLAN TO SUBMIT IN THE NEAR FUTURE. THE CONCEPT
SHOULD HAVE THE OBJECTIVE OF REDUCING THE CONCENTRATION OF URANIUM IN THE
EFFLUENT TO THE LOWEST PRACTICABLE LEVEL. IN VIEW OF YOUR REFERENCES TO
YOUR PENDING DEEP WELL PROPOSAL, WE FEEL YOU SHOULD CLEARLY UNDERSTAND THAT
WE ARE IN NO POSITION TO PROVIDE YOU ANY DEGREE OF ASSURANCE THAT AEC ACTION
ON YOUR DEEP WELL PROPOSAL WILL BE TAKEN WITHIN THE NEXT TWELVE MONTHS OR
THAT, ^{WHEN} ~~WHEN~~ ACTION IS TAKEN, IT WILL NECESSARILY BE AFFIRMATIVE.

REFERENCE: DML:DAN; 40-8027

BE BRIEF-ELIMINATE UNNECESSARY WORDS

ORIGINATOR:

INSERT CLASSIFICATION (If Classified)

RESTRICTED DATA OR ESPIONAGE STAMP, IF REQUIRED

INSTRUCTIONS

(Note: The AEC Correspondence Handbook, AEC Appendix 0240, contains procedures and illustrations for preparing this form. More detailed requirements are contained in the AEC Manual, Volume 2000, "Security," and chapter 0270, "Telecommunications.")

Classification: Stamp the classification in the designated areas at top and bottom of the form when the message is classified. Place the downgrading-declassification marking at the bottom, adjacent to the classification, and the appropriate wording referring to it at the end of the message, as required by AEC chapter 2102.

Documentation: Complete the documentation in ink, as required.

Precedence: Check the appropriate precedence designation according to the urgency of the message. If no designation is checked, the message will be sent, "Routine."

Type of message: Check the appropriate space.

From: Type "USAEC" on the first line, the name and organization of the sender on the second line, and city and state as given in the Address Guide (AEC Appendix 0240), on the third line.

Official Business: Signature of official authorized to certify message as "official business." The time may be added to the signature on messages designated "Priority" or higher, as a means of establishing the sequence of transmission. The hour of signature may be added to "Routine" messages when the originator considers it a matter of importance.

Date: Insert the date the message is released for dispatch.

To: Use the Address Guide for AEC addresses. The address should be placed on one line whenever possible; see the Correspondence Handbook for proper style. Do not list information addressees in the address portion of the message unless wire transmission is required. Send information copies by mail whenever possible.

Message Text: Be brief. To reduce message length, use coined words; commonly understood abbreviations; ordinary punctuation; and numerals as needed. Omit the articles, "a," "an," and "the" unless needed for clarity. Use block style. Start the body of the message three spaces below the address. Double space between lines.

Continuation Page: Use plain paper for continuation pages.

Originator: Type name of originator, initials of typist, and the telephone and room number of the originating office.

03

FROM:

Kerr-McGee Corp.
Oklahoma City, Okla.
(G. B. Parks)

DATE OF DOCUMENT

7-7-70

DATE RECEIVED

7-8-70

NO.:

2113

LTR.

MEMO:

REPORT:

OTHER:

TX

TO:

L. Johnson

ORIG.:

1

CC:

OTHER:

ACTION NECESSARY ☐CONCURRENCE ☐

DATE ANSWERED

NO ACTION NECESSARY ☐COMMENT ☐

BY:

CLASSIF:

U

POST OFFICE

REG. NO:

FILE CODE:

DOCKET: 40-8027

DESCRIPTION: (Must Be Unclassified)

TX ref. our 6-30-70 letter and
advising with regard to their plans
for handling liquid effluents.....

REFERRED TO

DATE

RECEIVED BY

DATE

Harmon: 7-8

w/ file 47.

ENCLOSURES:

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1-L. Johnson

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U.S. ATOMIC ENERGY COMMISSION

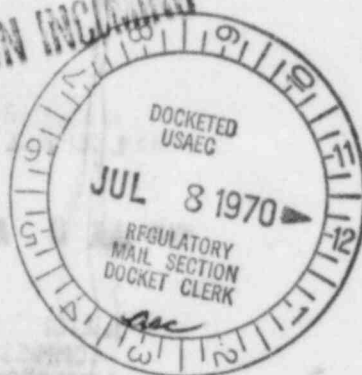
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1970 JUL 7 PM 6 49

U.S. ATOMIC ENERGY COMM.
TWX UNIT

THIS IS KERR MCGEE CORP OKLAHOMA CITY, OKLA 7/7/70 516PM

LYALL JOHNSON, ACTING DIR.

DIV. MATERIALS LICENSING

U.S. ATOMIC ENERGY COMM.

WASH., D.C.

DOCKET NO. 40-8027

☒ Regulatory

☐ File Cy.

REFERENCE IS MADE TO YOUR LETTER OF JUNE 30, 1970. IT WAS OUR UNDERSTANDING AT THE MAY 26, 1970 MEETING IN YOUR OFFICE THAT, SINCE YOU COULD NOT AT THIS TIME RESOLVE THE QUESTION OF DEEP WELL DISPOSAL OF OUR SEQUOYAH WASTES, WE COULD CONTINUE TO OPERATE WITH THE TEMPORARY PONDING SYSTEM WITHIN THE SCOPE OF OUR LICENSE. WE POINTED OUT THEN THAT IT WOULD BE NECESSARY FOR US TO EXPAND OUR PONDS IN ORDER TO COVER US PENDING YOUR EVENTUAL DECISION ON THE DEEP WELL.

SINCE THAT TIME WE HAVE DEVELOPED PLANS AND ARE PROCEEDING WITH A \$300,000 PROGRAM TO HANDLE OUR LIQUID EFFLUENTS SAFELY WITHIN THE SCOPE OF OUR PRESENT LICENSE FOR THE NEXT YEAR. WE ARE STILL

C

2113

CONVINCED THAT DEEP WELL DISPOSAL WILL BE THE ULTIMATE SOLUTION TO THE SEQUOYAH DISPOSAL PROBLEM AND ARE PROCEEDING ON THE BASIS OF AN INTERIM PONDING SYSTEM PENDING RESOLUTION OF THE DEEP WELL APPROACH.

4501310319

ESSENTIALLY THE SYSTEM WE ARE NOW DEVELOPING CALLS FOR SEGREGATION OF OUR LIQUID PLANT EFFLUENTS INTO TWO STREAMS - SOLVENT EXTRACTION RAFFINATE AND HF SCRUBBER. EACH STREAM WILL BE TREATED WITH LIME AND OTHER CHEMICALS AND THE RESULTING SLURRIES WILL FLOW TO PONDS. ALL RAFFINATE SLURRIES WILL BE RETAINED IN AN ON SITE POND. THE OTHER SLURRIES WILL BE FED TO SETTLING BASINS FROM WHICH THE CLEAR FLUORIDE FREE SOLUTION OF THE PROPER ACIDITY WILL FLOW TO THE RIVER WITH CONCENTRATIONS OF RADIOACTIVE MATERIAL WELL BELOW MPC LEVELS. PONDS WILL MEET AEC STANDARDS. THEY WILL BE PROPERLY POSTED AND FENCED. MONITOR WELLS WILL BE STRATEGICALLY PLACED TO ASSURE NO POND LEAKAGE.

WE ARE NOW IN THE FINAL STAGES OF TAKING BIDS ON THE WORK AND WE EXPECT THAT WITHIN A MONTH THE RAFFINATE TREATMENT AND RETENTION SYSTEM WILL BE IN OPERATION AND THAT THE ENTIRE SYSTEM WILL BE IN OPERATION WITHIN 3 MONTHS.

WE WILL SUPPLY YOU WITH DETAILS OF DESIGN AND OPERATION IN THE NEAR FUTURE.

G. B. PARKS

EXECUTIVE VICE PRESIDENT

WESTERN UNION INCOMING

2113

TKS END

40-8027

JUN 30 1970

L
USGS

Mr. George Parks
Executive Vice President
Kerr-McGee Corporation
Kerr-McGee Building
Oklahoma City, Oklahoma 73102

Distribution:

Subject File ✓
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Division Reading File
DR Reading File
Document Room
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H. Shapar, OGC
M. M. Mann, DR
H. L. Price, DR
L. Johnson, DML

Dear Mr. Parks:

This letter will confirm our May 26, 1970 discussion with you and other Kerr-McGee representatives concerning Kerr-McGee's request to dispose of liquid waste from the Sequoyah Plant by deep-well injection.

After careful consideration of your application, it has become clear that questions related to public health and safety raised by deep-well disposal will not be resolved in the near future. We cannot, therefore, act on your request at this time.

During the discussion you indicated that several alternative waste handling and treatment methods for the Sequoyah Plant liquid waste were under study. As we pointed out, an objective of the study should be to identify methods which will reduce to the lowest practicable level the radiological constituents of any waste released to unrestricted areas. Also, we understand the study will consider methods of dealing with the raffinate waste other than storing it in ponds. Please provide us with a proposal describing the scope and schedule for actions to be taken in this regard.

This letter will also acknowledge the telegram of May 13, 1970, from your Mr. George Waller advising of the status of liquid effluent plans for start-up of UF₆ production operations. We view the information in the telegram as representing interim measures for dealing with liquid waste pending outcome of the study mentioned above.

Because of the importance of this matter we would appreciate your reply within 30 days from the date of this letter.

Sincerely,

Original Signed by
Lyall Johnson

Lyall Johnson, Acting Director

Division of Materials Licensing

OFFICE ▶	DML	OGC	DR	DR	DML
SURNAME ▶	Nussbaumer/vjh	HShapar	MMann	HLPrice	LJohnson
DATE ▶	6/25/70	6/25/70		6/30/70	6/30/70

40-8027

Mr. George Parks
Executive Vice President
Kerr-McGee Corporation
Kerr-McGee Building
Oklahoma City, Oklahoma 73102

DISTRIBUTION:

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M. M. Mann, DR
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deleted
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Sincerely,

Lyall Johnson, Acting Director
Division of Materials Licensing

OFFICE ▶	DML	OGC	DR	DR	DML
SURNAME ▶	Nussbaumer/mad	HShapar	MMann	HLPrice	LJohnson
DATE ▶	6/11/70	6/23/70			

SIGNATURE MAIL ROUTING SLIP

(Director's Office)

Mr. Price 6/2/6 concurrence 6/13/70
 Dr. Beck : concurrence 6/2/6
 Dr. Mann : concurrence 6/2/6
 Mr. Henderson : concurrence 6/2/6

Is notification to the
 JCAE recommended? _____

Concurrences received from:

Compliance _____ ()
 Materials Licensing _____ (6/11/70)
 Nuclear Materials Safeguards _____ ()
 Radiation Protection Standards _____ ()
 Reactor Licensing _____ ()
 Reactor Standards _____ ()
 State & Licensee Relations _____ ()
 Office of General Counsel _____ (6/23/70)
 Others _____ ()

Remarks: Ltr to George Parks, Kerr-McGee Corp. fm LJohnson confirming
 discussion of 5/26/70 concerning disposal of liquid waste from
 the Sequoyah plant by deep-well injection and ack. tel of 5/13/70

Date 6/23/70

Originator Nussbaumer