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	<i>[initials]</i>		HDT
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	EJM		VAC
	DAC		File

Files

December 22, 1966

Merle R. Miller, Investigation Specialist, Original Signed  
Region II, Division of Compliance, Atlanta by M. R. Miller

COMPLIANCE INQUIRY MEMORANDUM -  
HUMPHREY MINING COMPANY, FOLKSTON, GEORGIA  
(NO LICENSE) - MISCELLANEOUS

CO:II:MRM

On December 22, 1966, David L. Foster, Radiation Specialist, CO:III, telephoned Jack Sutherland, Senior Radiation Specialist, CO:II, and reported the following:

During an inspection at the American Potash and Chemical Company, West Chicago, Illinois, on December 15, 1966, Foster saw a small unopened package. The package had been mailed on December 9, 1966, from the Humphrey Mining Company, Folkston, Georgia. The labeling on the package indicated that the content of the package was monozite sand.

Foster surveyed the package and the radiation level at contact was 1 mr/hr. This exceeds the 10 mr/24-hr limit as prescribed by Part 125.24 Postal Guide, U. S. Post Office Department.

On December 22, 1966, M. R. Miller, CO:II, telephoned Eugene V. Whittle, Engineer, Humphrey Mining Company, Folkston, Georgia, and told him about the above shipment. Whittle said that the Humphrey Mining Company mailed a package of monozite sand to the American Potash and Chemical Company as a sample on or about December 9, 1966. He said he did not realize that the shipment violated postal regulations. He said that the Humphrey Mining Company will make all future shipments of samples of monozite sand by common carrier.

On December 22, 1966, Miller telephoned W. S. Turner, Information Center, U. S. Post Office Department, Atlanta, Georgia, and told him about the above shipment and the telephone conversation with Mr. Whittle. Turner said that the Post Office Department would take no action on this matter.

No further action is necessary.

cc: CO:III  
Leo Dubinski, CO:Hqs  
R. G. Page, DSLR, Hqs

DEC 27 1966

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PDR FOIA  
RAPKIN85-30 PDR

MEMO ROUTE SLIP Form AEC-93 (Rev. May 14, 1947)		See me about this. Note and return.	For concurren. For signature.	For action. For information.
TO (Name and unit) Enforcement Branch Div. of State & Licensee Relations HQ	INITIALS  DATE	REMARKS SUBJECT: AMERICAN POTASH & CHEMICAL CORP. WEST CHICAGO, ILLINOIS LICENSE NO. STA-583		
TO (Name and unit) Div. of Compliance HQ (w/o field notes)	INITIALS  DATE	REMARKS		
TO (Name and unit)	INITIALS  DATE	REMARKS		
FROM (Name and unit) Region III, Div. of Compliance Chicago	DATE 2-20-67	REMARKS Attached are copies of field notes, Form AEC-592 and letter to licensee covering an inspection of subject licensee.		
PHONE NO.	63			

USE OTHER SIDE FOR ADDITIONAL REMARKS

U. S. GOVERNMENT PRINTING OFFICE: 1947-O-421307

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by the staff on this date.

Facility Kerr-McGee Nuclear Corporation  
 License No. STA 583  
West Chicago, IL 60185

Licensee Emergency Classification:  
 \_\_\_\_\_ Notification of Unusual Event  
 \_\_\_\_\_ Alert  
 \_\_\_\_\_ Site Area Emergency  
 \_\_\_\_\_ General Emergency  
xx \_\_\_\_\_ Not Applicable

Subject: STEPS TAKEN TO MEASURE AND CONTROL RELEASES OF LEAD-212 FROM SITE

Region III (Chicago) issued a Confirmatory Action Letter to the Kerr-McGee Chemical Corporation on March 17, 1983, confirming Kerr-McGee's agreement to install a system to suppress lead-212 releases from the thorium tailings pile at its West Chicago, Illinois, facility and add a number of airborne sampling stations in the unrestricted area near the tailings pile.

This action resulted from a special inspection by Region III of the airborne lead-212 levels on and off the Kerr-McGee site. The special inspection was conducted after the licensee provided on-site air sampling data to the Office of Nuclear Material Safety and Safeguards (NMSS). During this inspection it was found that one on-site sampling station 20 feet from the site boundary had airborne lead-212 levels of 1700 picocuries per cubic meter when averaged over the past 8 months. While this level is well within the restricted area limit in 10 CFR 20, it is likely, from considerations of site topography, that similar levels existed in the unrestricted area outside the boundary. The relevant 10 CFR 20 limit for an unrestricted area is 600 picocuries per cubic meter.

The unrestricted area involved is a narrow strip along a railway embankment with a very low occupancy factor. No significant exposures actually occurred.

The licensee has submitted a decommissioning plan for the site which is currently under review by NMSS.

Region III (Chicago) is issuing a news announcement on the licensee's agreement.

The State of Illinois and the City of West Chicago will be notified.

The Confirmatory Action Letter was issued on March 17, 1983. This information is current as of 1 p.m. (EST), March 17, 1983.

Contact: C. Paperiello  
FTS 384-2517

J. Hind  
384-2510

## DISTRIBUTION:

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Regions I 346, II 347, IV 348, V 349 Licensee (Corporate Office) ✓

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MAR 16 1983

Kerr-McGee Chemical Corporation  
ATTN: Mr. W. J. Shelley  
Vice President  
Kerr-McGee Center  
Oklahoma City, Oklahoma 73215

License No. STA-583

Gentlemen:

This refers to the meeting held with you, Mr. Ivan Denny and Mr. Scott Munson of your staff and Mr. A. B. Davis and others of my staff on March 15, 1983, in the NRC Region III Office. At this meeting, held at your request, we discussed your on-site measurements of airborne lead-212 (Pb-212) concentrations.

Based on the above discussions, it is our understanding that you will:

1. Install as soon as possible but within 30 days a system to suppress the Pb-212 source term on the site.
2. Install as soon as possible but within 14 days additional sampling stations and sample for Pb-212 in the following locations:
  - a. In the unrestricted area at the fenceline west of the existing station 6,
  - b. In the unrestricted area west of station 6 and the Chicago, Joliet and Elgin railroad track,
  - c. In the unrestricted area at the fenceline west of the tailings pile, and
  - d. In the unrestricted area west of the tailing pile and the Chicago, Joliet and Elgin railroad track.

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MAR 16 1983

Please inform us immediately if your understanding differs from that set forth above.

Sincerely,

James C. Keppler  
Regional Administrator

cc: Ivan Denny, Manager  
Special Projects  
W. Harris, Project Manager  
W. T. Crow, Uranium Fuel  
Licensing Branch (UFLB)  
W. A. Nixon, UFLB  
P. G. Bollwerk, Office of  
General Counsel  
DMB/Document Control Desk (RIDS)  
J. Axelrad, ELD  
J. Taylor, DRP  
L. Cobb, DRP  
E. Rennels, City of West Chicago  
~~Dr. P. Gustafson~~, Illinois  
Department of Nuclear Safety

RIII

Paperfello/jp  
3/16/83

RIII

Schuracher  
3/16/83

RIII

Hind

RIII

Schultz  
3-16

RIII

Lewis

3/16

RIII

Davis

3/16

RIII

Keppler

3/16/83

December 7, 1973

James Engel, Chairman  
City Hall  
City of West Chicago  
West Chicago, Illinois 60185

Dear Mr. Engel:

This will confirm the telephone conversation held with C. E. Norelius of this office on November 26, 1973, regarding your inquiry as to the AEC's control over use of radioactive material by Kerr-McGee Corporation in West Chicago, Illinois.

Thorium, a naturally occurring radioactive material, is possessed and used by Kerr-McGee under License No. STA-583 issued by the Atomic Energy Commission. The current license is effective through June 30, 1974. Periodic inspections of this program are conducted by this office to assure that AEC licensed materials are handled safely, and in accordance with Commission requirements. A copy of 10 CFR 20, "Standards for Protection Against Radiation," is enclosed for your information.

During our last inspection, we learned, as you have, that Kerr-McGee plans to curtail operations at this facility. As Mr. Norelius advised you, curtailment of operations does not relieve the company of its responsibility under their AEC license. If thorium production stops but an inventory of radioactive material is maintained, a system of physical security will be required. If the company plans to sell the facility, it must be decontaminated to de minimus levels or the recipient of the facility must obtain an appropriate AEC license.

If you have further questions, we would be glad to discuss them with you.

Sincerely yours,

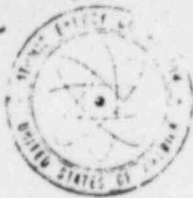
James C. Kappler  
Regional Director

Enclosure:  
As stated

OFFICE ▶	RO:III	RO:III	RO:III			
SURNAME ▶	<i>EN</i> Norelius/mm	<i>EN</i> Allan	<i>JK</i> Kappler			
DATE ▶	12-7-73	12-7-73	12-7-73			

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UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

OCT 24 1974

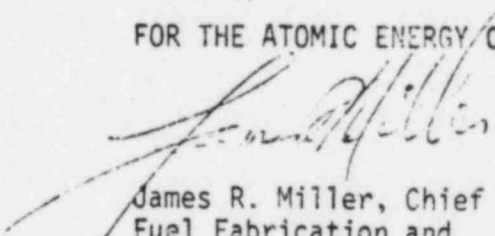
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40-2061  
STA-583

Kerr McGee Chemical Corporation  
ATTN: Mr. L. E. Craig  
Vice President Chemicals Manufacturing  
Kerr McGee Center  
Oklahoma City, Oklahoma 73102

Gentlemen:

Pursuant to your June 13, 1974 letter and based on the results of independent radiation survey measurements made by USAEC Directorate of Regulatory Operations Region III on August 27, 1974 and September 18, 1974, you are hereby authorized to dispose of your W-1 sales office and laboratory building located at 185 West Washington Street, West Chicago, Illinois.

FOR THE ATOMIC ENERGY COMMISSION

  
James R. Miller, Chief  
Fuel Fabrication and  
Reprocessing Branch No. 2  
Directorate of Licensing



NOV 8 1974

~~8001110305~~

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III

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PRELIMINARY NOTIFICATION

No. PN-III-76-46  
Date: July 12, 1976

Facility: Kerr-McGee Chemical Corporation, West Chicago, Illinois  
License No. STA-583

Subject: DISPOSAL OF THORIUM PROCESSING RESIDUES IN PUBLIC AREA

On July 9, 1976, a reporter for a Wheaton, Illinois, newspaper advised Region III that an anonymous caller had alleged that thorium ore processing residues, in the early days of this plant's operation, had been hauled off-site and disposed of in a park in the City of West Chicago. The plant, originally owned and operated by Lindsey Light and Chemical Company began processing thorium ore at the West Chicago Plant during World War I. Under the provisions of the Atomic Energy Act of 1954, the plant came under license in 1956. Periodic inspections since 1956 have not indicated that any residues have been disposed of in an unauthorized manner.

On July 9, 1976, an IE:III inspector performed isolated gamma surveys in the park and located an area estimated to be 25 feet by 25 feet that yielded readings up to 4 mR/hr at approximately 3 feet above the ground surface. A more detailed survey of the park is in progress.

The Kerr-McGee Corporation purchased American Potash and Chemical Corporation (Parent firm of Lindsey Light and Chemical Company) in 1967 and is presently dismantling equipment and cleaning up the facilities at West Chicago for future sale. The plant was shut down approximately 3 years ago because of economic reasons.

The Region III PAO was informed of this matter by telephone by a Wheaton, Illinois newspaper writer at 4:00 p.m. on July 9, 1976. This PN reflects information as of 7:00 p.m., July 9.

*Wheaton, Illinois newspaper writer*  
Contact: J. A. Pagliaro, T. Lonergan, J. M. Allan  
*for* Prepared by Section Chief Branch Chief *for*

8204750181

IP.

July 22, 1976

J. A. Pagliaro, Chief  
Environmental and Special Projects Section

ASSAY OF SAMPLES FROM WEST CHICAGO AS ORE

Specific activity is a function of half-life and atomic weight as follows:

$$\text{curies/g} = \frac{1.308 \times 10^8}{A T} \quad \text{where} \quad \begin{array}{l} A = \text{atomic weight} \\ T = \text{half-life in days} \end{array}$$

Thus, specific activity for the Th-232 chain is  $1.11 \times 10^{-7}$  Ci/g or 111 nCi/g.

Specific activity for the Ra-226 chain is, of course, 1 Ci/g.

To determine the percent thorium or radium we simply divide the analyzed activity by the specific activity as follows:

TABLE I

Sample	nCi/g Th-232 Chain <sup>1/</sup>	% Th-232 purity	nCi/g Ra-226 Chain	% Ra-226 Purity
Site Tailings Pile #2	11 nCi/g	9.9%	4.4	$4.4 \times 10^{-7}$
Site Tailings Pile #3	2.6 nCi/g	2.3%	0.59	$5.9 \times 10^{-8}$
Site Sludge Pit	4.9 nCi/g	4.4%	0.50	$5.0 \times 10^{-8}$
Reed Park #1 (2" surface)	47 nCi/g	42.3%	4.7	$4.7 \times 10^{-7}$
Reed Park #1a (2"-6")	40 nCi/g	36.0%	3.8	$3.8 \times 10^{-7}$
Reed Park #2 (2" surface)	14 nCi/g	12.5%	1.7	$1.7 \times 10^{-7}$

Monazite consists of a mixture of rare earth sulfates with thorium present predominantly as  $\text{Th Si O}_4$ , in which the weight percent of thorium is about

<sup>1/</sup> As analyzed by ANL-Memo, Oestmann to Pagliaro, dtd July 15, 1976

IE:III  
Jorgensen/mp  
7/22/76

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2pp

July 22, 1976

72%. It is uncommon for the thorium content to exceed 10% in unprocessed monazite sands.

As can be seen from the table, the Ra-226 chain represents a fraction of the activity present ranging from about 10% to 40%, but the weight percent is very small.

While I was unable to obtain information concerning expected area dose rate readings for thorium materials, I was informed in a conversation with Mr. A. Hazel of the State of Colorado, Bureau of Occupational Radiological Health, that when dealing with large area quantities of uranium mill tailings, area readings of 1 mR/hr correspond roughly to 0.5 to 1.0 nCi/gm Ra-226. In this event, our Reed-Keppler Park area readings of 3-5 mR/hr may be due in significant part to the Ra-226 chain analyzed to be present, though it should be recalled that the samples thus far analyzed may well not be representative of the bulk of material present.

The following characteristic gamma rays may be used for analysis of the Th-232 (4N) chain:

Isotope	Gamma Energy (Mev)	Equilibrium	$T_{1/2}$
		Gammas/Th-232 alpha	
Ac-228	0.908	0.25	6.13 hr.
	0.963	0.19	
Bi-212	0.72	0.126	60.6 min.
	0.80	0.109	
Tl-208	2.62	0.347	3.1 min.
Pb-212	0.239	0.80	10.6 hr.

While other characteristic gammas exist in the chain, they all have an abundance of less than 10% compared to the alpha disintegration rate of Th-232.

If monazite sands are processed for removal of Ac and Ra, the Th-228 to Th-232 activity ratio will cease to be in unity, i.e., equilibrium. This ratio, which must be known for determining Th-232 concentration by gamma spectrometry since all the important gamma-emitters are daughters of Th-228, descends to 0.56 in 4.8 years after processing and has returned to 0.97 in 35 years. In about 60 years, total equilibrium may be considered to be re-established.

B. L. Jorgensen  
Radiation Specialist



72  
July 30, 1976

The Honorable Richard J. Truitt, Mayor  
City of West Chicago  
City Hall  
West Chicago, Illinois 60185

Dear Mayor Truitt:

This is in response to recent telephone calls from Ralph Jacob, a City of West Chicago employee, to Mr. Jan Strasma of the Regional Office concerning the movement of soil at the Kerr-McGee Chemical Company facility in West Chicago.

As a result of an inspection by this office on July 8, 1976, Kerr-McGee agreed to retrieve soil containing thorium ore residues which had apparently washed into a ditch between the west boundary fence and the railroad tracks at a point adjacent to a large pile of ore residues.

The company has begun the removal of this soil and ore residue from the ditch. The material is being placed within the boundary fence in the area of the existing residue piles.

The agreement of Kerr-McGee to retrieve the material from the ditch is documented in the enclosed letter (Enclosure 1). The NRC Regional Office staff considers Kerr-McGee's actions to be acceptable and responsive. The company is using the same procedures as those utilized in removing the soil adjacent to the tennis courts at Reed-Keppler Park. There have been several inspection visits to the Kerr-McGee plant in the past weeks and further visits are planned to assure that the site is maintained in a manner that complies with NRC regulations and provides adequate protection for the plant's West Chicago neighbors.

As you may have known, Kerr-McGee has been removing processing equipment and decontaminating facilities at the plant for possible turnover to another firm. The facilities cannot be released for unrestricted use without the permission of the NRC, and no such release has yet been authorized. Such NRC authorization would be based on an independent survey by the NRC of radiation levels in the buildings and grounds.

OFFICE	IE:III	IE:III	IE:III	IE:III		
SURNAME	Strasma/ms	Fisher	Loneragan	Keppler		
DATE	7/30/76	7/30/76	7/30/76	7/30/76		

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2pp

Mayor Richard J. Truitt

- 2 -

During a recent inspection of the decontamination operations, NRC inspectors found certain inadequacies in the monitoring programs for working conditions for employees inside the plant. Kerr-McGee has suspended all decontamination activities and retained a consulting firm to develop an acceptable program for monitoring the working conditions. The company's agreement is documented in a second enclosure.

I hope this letter is responsive to the questions raised by Mr. Jacob. If I can be of further assistance, please do not hesitate to call on me or my staff.

Sincerely yours,

James G. Keppler  
Regional Director

Enclosures:  
As stated.

bcc: John G. Davis, Deputy Director  
Dudley Thompson, Acting Director, DFO  
G. Roy, IE:HQ  
J. Fouchard, PAO:HQ  
R. Cunningham, NMSS  
PDR  
Local PDR  
Reg Central Files

OFFICE	IE:III	IE:III	IE:III	IE:III		
SURNAME	Strasma/ms	Fisher	Lonergan	Keppler		
DATE	7/30/76	7/30/76	7/30/76	7/30/76		

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

August 6, 1976

Region III Files

*W.L. Fisher*

THRU: W. L. Fisher, Acting Chief, Fuel Facility and Materials  
Safety Branch

KERR-MC GEE CHEMICAL CORPORATION, WEST CHICAGO, ILLINOIS  
LICENSE NO. STA-583  
MANAGEMENT MEETING OF JULY 22, 1976

Representatives of Kerr-McGee Chemical Corporation and their consultant, Eberline Instrument Company, met with IE:III representatives at IE:III offices on July 22, 1976. Those attending were: Ralph Vreeland, Project Manager, West Chicago Plant; Roy MacLean, Kerr-McGee representative, West Chicago and Acting Radiation Safety Officer; Milt Trautman, Manager Eberline Instrument Corporation Midwest Facility, (Consultant to Kerr-McGee Chemical Corporation); J. M. Allan, Chief, Fuel Facility and Materials Safety Branch; G. T. Lonergan, W. H. Schultz, and C. T. Oberg, all of the Materials Radiological Protection Section of Region III.

The meeting was opened by Mr. Allan, who explained the purpose of the meeting as being a discussion of the steps necessary to strengthen the health physics program at the Kerr-McGee, West Chicago site. G. T. Lonergan pointed out that based on the results of samples and independent measurements and observations by IE:III Inspectors, there is an apparent need for the immediate strengthening of the health physics coverage of the decontamination of the West Chicago site. A description of several conditions observed by the inspectors during the making of comparative measurements was described, i. e. air samples indicating concentrations greater than four times MPCa, personnel exposure greater than quarterly exposure limits, an apparent lack of knowledge of airborne maximum permissible concentrations by individuals providing health physics coverage, the use of improper respiratory protective equipment, records indicating shipment of equipment offsite without survey to other Kerr-McGee facilities by common carrier, and lack of training of individuals participating in decontamination operations. Specifics of certain of these individual items were discussed in detail during the meeting. Lonergan pointed out that at this time IE:III was concerned about what steps the licensee had planned to take



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August 6, 1976

with regard to the overall problem of the need for strengthening the health physics program.

Mr. Vreeland indicated that Mr. Trautman of Eberline Corporation had been engaged to review the operations and develop an acceptable health physics program for the decontamination operation. He also indicated that no further decontamination operations will be conducted until such a program is developed and implemented. At that point, Lonergan pointed out that it is IE:III's understanding that Kerr-McGee plans to cease all decontamination operations at their West Chicago facility until a health physics program designed to control decontamination operations is developed by the licensee's consultant, Eberline Instrument Corporation, and that plan will be made available and reviewed by IE:III prior to the initiation of decontamination operations at the West Chicago facility. It was also pointed out that IE:III would confirm this understanding in a letter to the licensee.

Mr. Vreeland requested information with regard to results obtained during confirmatory survey of the building at the West Chicago facility by IE:III. Mr. Allan, at this point, advised the licensee personnel that any decision with regard to the release of the building to unrestricted use will be made by licensing and not by Inspection and Enforcement. IE's position at this time in this matter is to conduct confirmatory surveys of the facilities at the request of NMSS. Oberg and Schultz provided a detailed discussion of the results they obtained during confirmatory measurements made at the site on July 16 and 19, 1976. In general, it was pointed out that direct reading both alpha and beta gamma in the areas surveyed were significantly higher than those listed in the de minimus levels as well as the readings obtained by the licensee. Results of smear samples collected indicate agreement, except in a number of locations which were identified by Schultz and Oberg. Possible causes for variations in the readings were discussed, however licensee did not contest the readings. At this time, Lonergan again pointed out that IE:III would forward their confirmatory measurements to Licensing, who would be responsible for the ultimate decision with regard to the release of the areas requested.

Mr. Allan questioned the licensee regarding the possibility of any material being taken offsite at the present time. In response to this query, Mr. Vreeland indicated that the criteria for the removal of material from the site was as follows:

1. Anything removed must be worthwhile being removed.

August 6, 1976

2. That they don't attempt to move anything that has had any contact with thorium.
3. They only move items which had contact with rare earth operations.

It was pointed out that comparative measurements may indicate that this criteria might have resulted in possible removal of material from the site which contained contamination, for example large vats were indicated to be free from contamination were found to contain significant alpha activity.

Mr. Vreeland also indicated that no barrels were being removed from the site and that all items removed from the factory area were taken directly to the waste storage area and deposited there. No items or equipment or material was being removed to any dumps in the vicinity. Water resulting from decontamination is collected in a holding basin and is later pumped to one of the leaching ponds on the 12 acre site.

At this point, the area just south of the garage was brought to the attention of the licensee as being one where radiation levels as high as 5 to 6 mR/hr at surface contact with the GM meter were detected. These readings were brought to the licensee's attention in order to demonstrate the difficulty of containing contamination within an area at one time thought to be free from contamination.

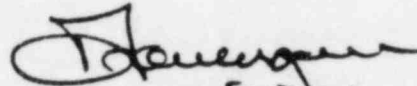
Mr. Vreeland then indicated that he would like to discuss the cleanup of the material outside the fence with respect to the North side. He pointed out that he had reached an agreement with a Mr. Hennessey, who owns the land, and upon Kerr-McGee's initiation of retrieval operations, they were contacted by Mr. Hennessey's lawyer who indicated that Hennessey desires a written statement from the NRC and from Kerr-McGee that the property has been cleaned to acceptable levels. Mr. Allan pointed out that IE:III will not provide Mr. Hennessey directly with such a statement, however, upon the decontamination and recovery of material from the area offsite IE:III will provide Kerr-McGee with a letter indicating the reduction of contamination to acceptable levels. With regard to the contaminated area west of the storage area, between the waste pile and the railroad, there was a discussion with regard to what levels would be considered as acceptable on the surface of the ground. IE:III stated that .2 of an mR/hr measured at 1 centimeter with a probe of less than .7 of a milligram per square centimeter was the criteria being applied in this area.



Region III Files  
Kerr-McGee Chemical Corporation 4

August 6, 1976

The meeting was closed with a reiteration of the commitments on the part of the licensee and IE:III's pointing out that the commitments would be confirmed in a letter from this office.

A handwritten signature in dark ink, appearing to read "G. T. Lonergan", with a stylized flourish at the end.

G. T. Lonergan, Chief  
Fuel Facility and Materials Safety  
Branch



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

SEP 1 1976

The Honorable Richard J. Truitt,  
Mayor  
City of West Chicago  
City Hall  
West Chicago, Illinois 60185

Non-licensee

Dear Mayor Truitt:

During the past several weeks, members of this office together with representatives of the State of Illinois, have been conducting an investigation regarding thorium residues in West Chicago. In this effort we have received important assistance and support from members of your staff and the West Chicago municipal government. I wish to thank you and members of your administration for their willing involvement during this investigation.

The present situation has been assessed as follows:

1. The major portion of Reed-Keppler Park has been surveyed and released as of July 13 and 14, 1976, as having no indication of thorium ore residue.
2. The tennis court area, which was found to contain thorium ore residues, was cleared of the residues on July 15, 1976. The residues were removed to the undeveloped area of the park. As of July 15, 1976, the tennis court area was suitable from a radiological viewpoint for release for public use.
3. The remaining areas in the undeveloped portion of the park were secured and posted as of July 16, 1976, due to the apparent presence of thorium ore residues.
4. The Waste Treatment Plant near Route 59 and Roosevelt Road was surveyed and found to have two thorium residue areas (about 10 yards x 20 yards and about 10 yards x 10 yards). These areas were roped off and posted with the assistance of your staff on July 15, 1976.



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The Honorable Richard J. Truitt, - 2 -  
Mayor

SEP 1 1976

5. Other areas surveyed which did not indicate presence of thorium ore residues are as follows: Powis Street location, Industrial Park area, cemetery north of the Reed-Keppler Park, and general areas in and around West Chicago.
6. Water samples taken from West Chicago Municipal Wells 3, 4, and 5 were analyzed and did not indicate the presence of any thorium in the city water supply.

A copy of the report covering our activities to date is enclosed for your information. Final disposition of this matter is pending resolution of questions concerning jurisdiction by the State of Illinois, NRC, and ERDA.

We appreciate your assistance and concern regarding this situation. We will keep you apprised of future developments in this matter. If you have any questions, please feel free to call us.

Sincerely yours,

James G. Keppler  
Regional Director

Enclosure:  
IE Investigation Report  
No 76-01

bcc. Central Files  
Reproduction Unit NRC 20b  
PDR  
NSIC

UNITED STATES NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

IE Investigation Report No. 76-01

Subject: Reed-Keppler Park  
City of West Chicago  
West Chicago, Illinois  
(Non-licensee)

Thorium Residue found in uncontrolled locations,  
West Chicago, Illinois

Period of Investigation: July 9, 12-16, 22 and 30, 1976

Prepared By: B. L. Jorgensen 8/20/76  
(Date)

A. G. Januska 8/20/76  
A. G. Januska (Date)

G. A. Phillip 8/20/76  
(Date)

Approved By: J. A. Pagliaro 8/20/76  
J. A. Pagliaro, Chief (Date)  
Environmental Protection and  
Special Projects Section

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## SUMMARY OF FINDINGS

### Evaluation Summary

Special investigative efforts conducted July 9, July 12 through 16, July 22 and 30, 1976, by members of the Nuclear Regulatory Commission, Office of Inspection and Enforcement, Region III: Completed numerous cursory and detailed radiological surveys of selected locations in West Chicago, Illinois on the basis of information volunteered by or solicited from members of the general public; identified the location and extent of areas surveyed in which radiation levels significantly above background were noted; collected environmental samples from target areas and other locations; performed screening analyses and made arrangements for detailed analyses of environmental samples; provided continuing consultative services, including recommendations for protective or remedial actions, to officials of the City of West Chicago; and coordinated with officials of the City of West Chicago in the handling of public relations and providing information to the news media.

### Significant Findings

#### A. Radiological Surveys

During surveys conducted on July 12 through 14, a total of four areas were identified in West Chicago, Illinois in which radiation levels significantly exceeded background, indicating the presence of buried radioactive material. Two of these areas are located within the fenced enclosure of the City of West Chicago Sewage Treatment Plant. A third area is located in an undeveloped portion of the Reed-Keppler Park in the City of West Chicago. The fourth area was an area adjacent to the tennis courts in the Reed-Keppler Park. Radiation levels over the identified areas ranged from less than one millirad per hour to approximately 50 millirads per hour beta-gamma at ground contact.

#### B. Analysis of Environmental Samples

While all analyses have not yet been completed, analytical results to date indicate the following:

1. The material found at the four identified locations is probably of a common origin.
2. Some of the materials contained concentrations of thorium-232 and its daughter products greater than those ordinarily encountered in unprocessed thorium ores, indicating that the material had been subjected to processing which increased the weight percent of thorium in the process waste.

3. The material found in the undeveloped portion of the Reed-Keppler Park has not been subjected to processing which would separate radium and actinium from the thorium for a period of time on the order of 30 years.
4. The material has a low pH, generally yields positive indications on analysis for sulfates, is relatively insoluble and therefore not readily available to the city water supplies.

C. Protective and Remedial Actions

The management of the IE:III staff, in consultation with representatives of the government of the City of West Chicago, recommended in a meeting on July 12, 1976, that the Reed-Keppler Park be closed to public access until completion of surveys to identify the size and location of any areas containing thorium ore residues. On identification of areas of apparent thorium residues dumping, IE:III recommended that access by the public be limited by use of fencing. In order to return the tennis courts in Reed-Keppler Park to public use, IE:III recommended the removal of contaminated soils located adjacent to the tennis courts and transport of these soils to the undeveloped portion of Reed-Keppler Park, also identified as a contaminated area. At the present time, the tennis courts as well as the developed portion of the park have been returned to public use, the areas at the Sewage Treatment Plant have been demarcated and are restricted from public access, and the area in the undeveloped portion of Reed-Keppler Park has been fenced to restrict public access. Final disposition of this matter is pending resolution of questions concerning jurisdiction by the State of Illinois, NRC, and ERDA.

## REPORT DETAILS

### 1. Background

Lindsay and Company was founded in 1902 and was incorporated in Illinois in 1904. Lindsay originally occupied a building at 161 East Grand Avenue, Chicago, Illinois and manufactured incandescent mantles which required thorium nitrate as one of the raw materials. Thorium nitrate was imported from Germany in a refined state. When World War I eliminated that source of supply, Lindsay began its own processing of monazite sand to extract thorium. With the development of electricity, the demand for mantles declined and with it the need for thorium. As the demand for thorium declined, Lindsay developed refining processes for rare earth chemicals as new uses for these elements were discovered.

In about 1931, Lindsay moved its operations from Chicago to facilities located at 258 Ann Street, West Chicago, Illinois, and in 1935 the corporate name was changed to Lindsay Light and Chemical Company to reflect the nature of its business.

During World War II, Lindsay furnished thorium and rare earth products to the Manhattan Project and for several years afterward, continued to supply them to the Government. The mantle business was sold by Lindsay on December 31, 1953.

Activities at the Lindsay West Chicago Plant involving thorium were licensed by the Atomic Energy Commission on May 1, 1956, when Source Material License No. R-106 was issued. These activities became subject to 10 CFR Part 20, Standards for Protection Against Radiation, when that regulation subsequently became effective 30 days after its publication in the Federal Register on January 29, 1957.

In May 1958, the Lindsay plant was acquired by American Potash and Chemical Corporation and became known as the Lindsay Chemical Division of that firm. In 1968, the West Chicago facilities were acquired by Kerr-McGee Corporation when American Potash and Chemical Corporation became a subsidiary of Kerr-McGee. The operation of this plant was terminated prior to the end of 1973. With the exception of a small caretaker crew, all personnel were terminated or transferred. The only activities carried on at the plant since the beginning of 1974 have related to decontamination of the premises.



Following confirmation that radioactive materials were present in Reed-Keppler Park, efforts were made to determine the circumstances surrounding its being placed there and whether similar materials had been deposited elsewhere. It was ascertained that several of the key people in the Lindsay organization who would have been able to provide definite information in this regard are now deceased. Through interviews with 16 individuals the following information, however, was obtained.

During the 1930's and 1940's, Lindsay dumped process wastes in the area in Reed-Keppler Park where the radioactivity was detected. At that time this was an undeveloped area adjacent to Reed-Keppler Park and was a general dumping area used by the townspeople as well as businesses. The area had earlier been a gravel pit and was about 50 feet deep.

Most of the material dumped by Lindsay was a white sludge, calcium sulfate, which was generated from processing fluorspar to produce hydrofluoric acid. This material had essentially no thorium or other radioactive material component. Some undetermined amount of blue and/or gray mud, thorium residue and barium sulfate, which would have contained some radioactive material was also dumped in the same general area.

One individual who was interviewed stated that as a Lindsay employee he had dumped an average of one truckload of dark mud per week in the area during the period June to October 1947. He indicated that a truckload consisted of eight or nine barrels of material and estimated each load would have weighed about 1800 pounds. He did not know whether or for how long that kind of material had been dumped before he began taking this material to the dump. He later pointed out the specific location where the material had been dumped and it coincided with the location where the radiation levels were detected. He indicated that the practice was discontinued in October 1947. No other individuals contacted were aware of any such dumping after that time.

It was indicated that after the material was dumped near the edge of the road, employees of a Lindsay contractor would level the area off by pushing the material in a generally westerly direction with a bulldozer.

Through interviews, it was also learned that prior to the period when the material was dumped in the Reed-Keppler Park area, some processing waste from the Lindsay Plant had been dumped in a city dump on the south side of West Chicago and that this dump was now the site of the West Chicago Sewage Treatment Plant.

Individuals who had occupied supervisory and management positions at Lindsay in the 1940's who were still available were interviewed. All of them denied any knowledge of the dumping of any thorium bearing materials in either of the above-mentioned locations. It was indicated that thorium residue as a result of rare earth processes were stockpiled on the plant premises and later processed to obtain the thorium. It was indicated, however, that some of the material intended to be kept may have been inadvertently dumped off site. It was indicated that activities in the plant were not as carefully controlled and supervised in those days as they are in today's manufacturing plants.

## 2. Introduction

On Friday afternoon, July 9, 1976, information was received at IE:III through a newspaper reporter relaying allegations from an anonymous source that thorium residues had been dumped in a public area known as Reed-Keppler Park in West Chicago, Illinois. A cursory survey of the general area of the Reed-Keppler Park was conducted on the evening of July 9, 1976, utilizing a scintillation device. At that time, some indications of radiation levels above background were obtained. The surveyor advised IE:III management, and in a meeting on Sunday, July 11, it was determined that IE:III would: initiate a more detailed survey of the park; conduct a more comprehensive general survey of the City of West Chicago; advise the City of West Chicago and the State of Illinois of the identification of any problem areas; consider recommending the restriction of any problem areas identified; and collect appropriate samples of any identified contaminated areas for laboratory analysis. This plan was implemented with the assembly of a monitoring team at the IE:III office at 6:30 a.m., on Monday, July 12.

## 3. Inspection Efforts

Friday, July 9, 1976: One inspector performed cursory surveys utilizing a scintillation instrument through various areas of the Reed-Keppler Park. One area in the park was identified as a potential location of abnormally high radiation readings. On this date, pursuant to investigation of other information received earlier by

IE:III related to the Kerr-McGee Corporation thorium facility, a total of nine water samples were collected by IE:III personnel from locations routinely monitored by the Kerr-McGee Corporation and from city wells.

Monday, July 12, 1976: A team of four inspectors completed a more detailed survey in two areas of the park. One location, henceforward designated the Undeveloped Area in Reed-Keppler Park, was positively identified as a source of elevated radiation levels both by scintillation devices and by portable Geiger-Mueller (GM) instruments. The survey team performed some quantification of radiation levels and completed preliminary perimeter surveying to establish a rough estimate of the size of the contaminated portion of the Undeveloped Area. A number of soil samples from the identified area were collected for laboratory analysis.

Mobile surveys, again utilizing scintillation-type instruments, were performed covering a significant portion of the town of West Chicago by cross transects from the streets.

The survey team advised IE:III management that one area (Undeveloped Area) had been identified in which radiation levels at one meter above the surface were in the range of 3 to 5 millirads per hour. At this time, the area was estimated to have an extent of approximately 150 x 200 feet. IE:III management was also advised that surface level readings above 10 millirads per hour, and a few spots reading up to approximately 50 millirads per hour had been identified in the contaminated area. The State of Illinois and the City of West Chicago were notified the evening of July 12, 1976. Arrangements were made for a meeting in West Chicago on the evening of July 12, to discuss the problems identified and recommendations for protective action. This meeting, which commenced at approximately 11:00 p.m. and was attended by representatives of IE:III, the City of West Chicago, the State of Illinois, the DuPage County Health Department, and the Kerr-McGee Chemical Corporation, resulted in agreement with IE:III recommendations that the City of West Chicago Park District close Reed-Keppler Park at 6:00 a.m., July 13, and that a press release concerning closing of the park be made by the Mayor of West Chicago at 10:00 a.m., July 13.

Tuesday, July 13, 1976: In the early morning, IE:III personnel performed detailed surveys of all structures in Reed-Keppler Park, utilizing instrumentation sensitive to alpha, beta, and gamma radiations. These surveys included the maintenance garage of the West Chicago Park District, the swimming pool and associated dressing rooms, a teen center, and assorted washrooms and shelters. No

indications above background radiation levels were noted. Commencing at approximately 11:00 a.m., personnel from IE:III, the Radiological Assistance Team of the Argonne National Laboratory Office of ERDA, and the Illinois Department of Public Health commenced grid surveys of the developed portions of Reed-Keppler Park utilizing transects with an approximate four foot spacing. Surveys of approximately 60% of the total area of the park were completed.

As the result of the transect surveys, all of surveyed portions of the park were released for public use with the exception of the park tennis courts. The surveys indicated the existence of an area of contaminated soils adjacent to the east side of the tennis courts, between the courts and Yale Street. IE:III recommended removal of the contaminated soils to the Undeveloped Area so that the tennis courts could be returned to public use.

Wednesday, July 14, 1976: Transect surveys of the remainder of Reed-Keppler Park, including the trap shooting range, were completed. Surveys of additional city owned properties adjacent to the park were also made. A careful demarcation of the physical extent of contaminated soils in the undeveloped area was made, and a border isodose line representing 0.2 millirads per hour\* was indicated by red paint. In pursuit of leads identified in discussions with local residents, surveys were also conducted at the City Sewage Treatment Plant and at an Industrial Park. In addition, particulate air samples were collected in and adjacent to the Undeveloped Area in Reed-Keppler Park. Surveys at the West Chicago Sewage Treatment Plant showed some elevated radiation levels.

Thursday, July 15, 1976: Radiological monitoring coverage was provided for an evaluation of the effectiveness of removal of contaminated soils adjacent to the tennis court. Following removal of the soils to the Undeveloped Area, approximately 100 yards west, and replacement of the removed soils with clean fill, the tennis courts were released to public use. Additional surveys were performed at the West Chicago Sewage Treatment Plant for the purpose of delineating the exact size and location of areas showing elevated radiation levels. Two areas, one approximately ten yards by ten yards and the other approximately ten yards by twenty yards, were delineated and subsequently roped off by employees of the City of West Chicago.

\*"Guidelines For Decontamination Of Facilities And Equipment Prior To Release For Unrestricted Use Or Termination Of Licenses For Byproduct, Source, Or Special Nuclear Material", U.S. Atomic Energy Commission, December, 1973.



Friday, July 16, 1976: An additional number of air, soil, and vegetation samples were collected for laboratory radioanalysis.

Thursday, July 22, 1976: A second set of samples of water from city wells in West Chicago was collected for radioanalysis.

Friday, July 30, 1976: Raw and finished (chlorinated) water samples were collected from one city well for radioanalysis.

#### 4. Evaluation Results

##### a. Surveys

With the exception of the four locations discussed below, no areas showing radiation levels above background were identified in the numerous surveys.

##### (1) Reed-Keppler Park - Undeveloped Area

This area has an extent of approximately 200 x 200 feet. Surveys throughout the area indicate radiation levels at one meter above ground level of from 3 to 5 millirads per hour. Radiation levels at ground contact are generally on the order of 4 to 5 millirads per hour. However, a few spots were identified where surface radiation levels exceeded 10 millirads per hour. The maximum exposure level noted at surface contact was 50 millirads per hour. Vertical profiles were taken above selected spots. These surveys indicate a rapid decrease in radiation levels to approximately 5 millirads per hour at one meter. In addition, a bore hole dug by the State of Illinois was logged for examination of the reduction of radiation level as a function of depth. This examination indicated that the primary activity concentrations are in the uppermost two to three feet of soil. For the purpose of this report, a small area located in the landfill to the west of the major contaminated soils in the Undeveloped Area is considered a part of the Undeveloped Area. This smaller area (having a surface of approximately ten square yards) showed radiation levels on the order of about 5 millirads per hour at ground contact.

##### (2) Reed-Keppler Park - Tennis Courts

An area having an extent of approximately 8 yards by 15 yards and located to the east of the tennis courts between the courts and Yale Street was identified as having general area radiation levels at grass top level of from

2 to 3 millirads per hour. Some isolated sections showed greater levels, but none exceeded 10 millirads per hour. These materials were dug out and removed to the Undeveloped Area in Reed-Keppler Park on July 15, 1976. Soils were removed by City of West Chicago personnel up to a point immediately adjacent to the paved surface of the tennis courts. Surveys at the time of removal (from inside the excavation) indicated that some contaminated soils extend below the paved surface of the court. The possible quantity of materials located beneath this paved surface is not known. Radiation levels above the paved surface itself are less than 0.1 millirad per hour. Following replacement of removed contaminated soils by clean fill, and extension of the paved surface of the tennis courts a distance of approximately four feet east to the existing fence line, the tennis courts were released for public use.

(3) Sewage Treatment Plant - West Chicago

These two areas, as noted above, have dimensions of approximately 10 by 10 yards and 10 by 20 yards. The larger area is not located adjacent to any of the buildings or machinery of the Sewage Treatment Plant. A small storage shed is located in the smaller area. Surveys of these two areas indicate no radiation levels in excess of 0.6 millirads per hour.

b. Sample Analyses

IE:III representatives collected a total of twelve soil samples, three vegetation samples, five particulate air samples, and ten water samples during the course of this evaluation effort, as described in Table 1. Sample analyses are incomplete as of August 20, 1976. However, results are available for selected analyses of some samples. IE:III personnel performed screening radiological analyses and selected chemical analyses on various samples. In addition, arrangements were made for further analyses by ERDA's Argonne National Laboratory (ANL), Argonne, Illinois and by Health Services Laboratory (HSL), Idaho Falls, Idaho. Results of analyses completed as of August 20, 1976 are presented in Tables 2, 3 and 4.

Table 2 presents the results of selected chemical analyses performed on soil samples at Argonne National Laboratory by IE:III personnel. These results indicate that some samples



have a low pH (highly acid), that the soils are relatively insoluble, and that sulfates are present in most soil samples. Analytical results are presented for samples from the dumping area in Reed-Keppler Park as well as for samples from process tailings owned by the Kerr-McGee Chemical Corporation in West Chicago. These analyses show some degree of similarity between the two types of process waste material.

Table 3 provides the results of gamma scans of selected soil samples performed at Argonne National Laboratory by ANL personnel. Identification of thorium-232 concentrations by gamma scanning requires that the ratio of thorium-228 to thorium-232 be known. In this instance, this ratio was presumed to be unity; i.e., the samples were considered to be in equilibrium. The results indicate concentrations of thorium in certain samples in excess of that found in any naturally occurring ores. Thus, these waste products must be the result of a process which in effect enriched the waste material in thorium concentration. The radium-226 decay chain was also identified in this analysis as indicated in Table 3, but at concentrations less than those identified for the thorium-232 chain.

Table 4 presents results of analyses performed by the Health Services Laboratory in Idaho Falls, Idaho. The Health Services Laboratory performed alpha spectroscopic examinations in addition to gamma scanning. It should be noted that the thorium-228 to thorium-232 ratio is effectively unity for the three samples collected in Reed-Keppler Park. This establishes that the materials located in the park have not been subjected to a process which would separate radium and actinium from thorium for at least 30 years. This is not the case for the two samples collected at the Kerr-McGee site in West Chicago. The thorium-228 to thorium-232 ratio for these samples indicates that they were probably processed within the past four to eight years.

The results of analyses of splits of the same samples by ANL and by HSL show excellent agreement, particularly in view of the inhomogeneity of the samples. This inhomogeneity is demonstrated by the differences between samples S-4 and S-5 in Table 4. These samples were taken from contiguous different depths at a single location.

In addition to the analyses presented in Tables 2, 3 and 4, the Health Services Laboratory has completed analyses of three additional soil samples (S-7, S-8 and S-9), all five air particulate samples, and one vegetation sample (V-3). Concentrations of thorium in these soil samples were all lower, ranging from background (0.001-0.003 nCi/g) to about 1.8 nCi/g. No indications of presence of thorium or its daughter products were found on analysis of the air particulate filters or the vegetation sample. Similarly no thorium was detected in well water samples analyzed by Argonne National Laboratory.

#### 5. Protection Measures

Two protective measures have been implemented to minimize or to eliminate unnecessary exposures which might otherwise be caused by the existence of thorium process waste materials in uncontrolled areas. These measures are restriction of access and removal of material. In the case of the Reed-Keppler Park tennis courts, in which it was desired that the facility be made available for public use, materials adjacent to the tennis courts were excavated, removed to the nearby major dumping area, and replaced with clean fill. This action has resulted in reduction of area exposure levels to less than 0.1 millirad per hour. The protective measure taken for the other three identified dumping locations was to restrict public access. In the case of the two locations at the West Chicago Sewage Treatment Plant, these locations are inside the cyclone fenced enclosure at the Treatment Plant boundary. This area is not an uncontrolled public use area. Normal occupancy at the sewage treatment plant consists of two or three employees working regular daytime hours. The two areas which showed slightly elevated radiation levels have been demarcated and posted such that their location is known by the employees and extensive occupancy may be avoided.

The Undeveloped Area in Reed-Keppler Park has been restricted by installation of a snow fence. This snow fence was installed by employees of the State of Illinois Department of Public Roads at the request of the Illinois Department of Public Health, Bureau of Radiological Health, and the Nuclear Regulatory Commission Inspector and Enforcement Representative.

Final disposition of this matter is pending resolution of questions concerning jurisdiction by the State of Illinois, NRC, and ERDA.

Table 1

## ENVIRONMENTAL SAMPLES COLLECTED IN WEST CHICAGO BY IE:III

<u>Sample</u>	<u>Indent. No.</u>	<u>Date Sampled</u>	<u>Analyses By *</u>
<u>Soils</u>			
Kerr-McGee Sludge Pit	S-1	7-8-76	IE:III, ANL, HSL
Kerr-McGee Slag Pile No. 2	S-2	7-8-76	IE:III, ANL, HSL
Kerr-McGee Slag Pile No. 3	S-3	7-8-76	IE:III, ANL, HSL
Reed Park No. 1 (2" surface)	S-4	7-12-76	IE:III, ANL, HSL
Reed Park No. 1.a (2" - 6")	S-5	7-12-76	IE:III, ANL, HSL
Reed Park No. 2 (2" surface)	S-6	7-12-76	IE:III, ANL, HSL
Reed Park, E. of tennis court	S-7	7-12-76	ANL, HSL
Gravel Road, Reed Park	S-8	7-12-76	ANL, HSL
Quadrant NW of K-M	S-9	7-16-76	ANL, HSL
Quadrant SW of K-M	S-10	7-16-76	ANL, HSL
SW Fenceline, K-M	S-11	7-16-76	ANL, HSL
Quadrant NE of K-M	S-12	7-16-76	HSL
<u>Vegetation</u>			
Quadrant NW of K-M	V-1	7-16-76	HSL
Quadrant SW of K-M	V-2	7-16-76	HSL
Quadrant NE of K-M	V-3	7-16-76	HSL
<u>Air</u>			
Weyrauch Street (330 ft3)	AS-1	7-9-76	HSL
School SW of K-M (375 ft3)	AS-2	7-16-76	HSL
Park Undeveloped Area (100 ft3)	AS-3	7-14-76	HSL
Upwind of AS-3	AS-4	7-14-76	HSL
Downwind of AS-3	AS-5	7-14-76	HSL
<u>Water</u>			
Garys Mill Road	W-1	7-9-76	HSL
Mack Road	W-2	7-9-76	HSL
Roosevelt Road and DuPage River	W-3	7-9-76	HSL
Beecher and Summit	W-4	7-9-76	HSL
168 ft Well, Weigand Lumber Co.	W-5	7-9-76	HSL
Private Lake	W-6	7-14-76	HSL
N at Sewage Plant Discharge	W-7	7-9-76	HSL
City Well No. 3	W-8	7-9 & 22-76	ANL, HSL
City Well No. 4	W-9	7-9, 22 & 30-76	ANL, HSL
City Well No. 5	W-10	7-9 & 22-76	ANL, HSL

\* IE:III; Nuclear Regulatory Commission, Office of Inspection and Enforcement, Region III.

ANL; Argonne National Laboratory.

HSL; Health Services Laboratory.

Table 2

## CHEMICAL ANALYSES OF WEST CHICAGO SOIL SAMPLES

<u>Sample</u>	<u>Solubility (g/100 ml)</u>	<u>pH</u>	<u>SO<sub>4</sub> Present</u>
Kerr-McGee Slag Pile No. 2	0.318	2.0	Yes
Kerr-McGee Slag Pile No. 3	0.427	4.0	Yes
Kerr-McGee Sludge Pit	0.530	5.0	Yes
Reed Park No. 1 (2" surface)	0.202	5.5	No
Reed Park No. 1.a (2" - 6")	0.218	5.5	Yes
Reed Park No. 2 (2" surface)	0.270	2.0	Yes

Table 3

GAMMA-SCAN ANALYSES OF WEST CHICAGO  
SOIL SAMPLES BY ARGONNE NATIONAL LABORATORY

<u>Sample</u>	<u>nCi/g</u>	<u>%</u>	<u>nCi/g</u>	<u>%</u>
	<u>Th-232 Chain</u>	<u>Th-232 Purity</u>	<u>Ra-226 Chain</u>	<u>Ra-226 Purity</u>
Kerr-McGee Slag Pile No. 2	11	9.9	4.4	$4.4 \times 10^{-7}$
Kerr-McGee Slag Pile No. 3	2.6	2.3	0.59	$5.9 \times 10^{-8}$
Kerr-McGee Sludge Pit	4.9	4.4	0.50	$5.0 \times 10^{-8}$
Reed Park No. 1 (2" surface)	47	42.3	4.7	$4.7 \times 10^{-7}$
Reed Park No. 1.a (2" - 6")	40	36.0	3.8	$3.8 \times 10^{-7}$
Reed Park No. 2 (2" surface)	14	12.6	1.7	$1.7 \times 10^{-7}$

The % purity presented in this table were calculated by IE:III from the known specific activities of Th-232 and Ra-226 of 111 nCi/g and 1 Ci/g, respectively. The reported concentrations are based on the assumption that the decay chains are in equilibrium.

Table 4

## RADIOLOGICAL ANALYSES OF WEST CHICAGO SOIL SAMPLES BY HEALTH

Ident. No.	gamma scan (uCi/g)			alpha spectroscopy	
	Pb-212	Pb-214	Ac-228	Th-232	Th-230
S-1	$1.69 \pm .04 \text{ E-3}$	$2.4 \pm .1 \text{ E-4}$	$1.89 \pm .05 \text{ E-3}$	$4.11 \pm .08 \text{ E-3}$	$2.60 \pm$
S-2	$1.09 \pm .02 \text{ E-2}$	$4.7 \pm .1 \text{ E-3}$	$8.6 \pm .2 \text{ E-3}$	$1.40 \pm .05 \text{ E-3}$	$7.6 \pm$
S-4	$3.33 \pm .07 \text{ E-2}$	$4.8 \pm .1 \text{ E-3}$	$4.02 \pm .08 \text{ E-2}$	$4.0 \pm .3 \text{ E-2}$	$4.0 \pm$
S-5	$2.80 \pm .06 \text{ E-2}$	$3.57 \pm .09 \text{ E-3}$	$3.16 \pm .07 \text{ E-2}$	$3.0 \pm .2 \text{ E-2}$	$2.9 \pm$
S-6	$1.00 \pm .02 \text{ E-2}$	$1.83 \pm .05 \text{ E-3}$	$1.32 \pm .03 \text{ E-2}$	$9.5 \pm .2 \text{ E-3}$	$9.7 \pm$

## Notes:

1. Pb-212 and Ac-228 are gamma-emitting daughters in the Th-232 chain, which include Th-232, Ra-228, Ac-228, Th-228, and Pb-212.
2. Pb-214 is a daughter in the Th-230/Ra-226 chain.
3. Pb-212, Ac-228, Th-232 and Th-228 should be approximately equal in an equilibrium.

N.B. These are the only completed results at the time of the writing of this report.



961  
SAC & I 233

Kerr-McGee Chemical Corporation  
ATTN: Mr. F. D. Lyons  
Vice President  
Chemical Manufacturing  
Division  
Kerr-McGee Center  
Oklahoma City, Oklahoma 73125

License No. STA-583-76-01

040-02061

Gentlemen:

This refers to the inspection conducted by Messrs. G. T. Lonergan, W. H. Schultz and C. T. Oberg of this office on July 8, 9, 16 and 19, 1976, of activities at your Rare Earth Plant facilities, West Chicago, Illinois authorized by NRC Source Material License No. STA-583 and to the discussion of our findings with Messrs. R. J. Vreeland and R. P. MacLean at IE Region III offices on July 22, 1976, after the conclusion of the inspection.

The inspection was an examination of activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and with the conditions of your license. The inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

During this inspection, certain of your activities appeared to be in noncompliance with NRC requirements, as described in the enclosure to this letter.

In addition, we understand that all decontamination and cleanup work has been discontinued until a Health Physics program can be developed. Also, that the USNRC, Region III, will be given an opportunity to review the program prior to the resumption of the decontamination and cleanup work.

This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you

OFFICE ➡	IE:III WHS	IE:III CLO	IE:III LON	IE:III FIS		
SURNAME ➡	Schultz/jw	Oberg	Lonergan	Fisher		
DATE ➡	8/30/76	8/30/76	8/30/76	8/30/76		

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Kerr-McGee Chemical  
Corporation

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to submit to this office within twenty days of your receipt of this notice a written statement or explanation in reply, including for each item of noncompliance: (1) corrective action taken and the results achieved; (2) corrective action to be taken to avoid further noncompliance; and (3) the date when full compliance will be achieved.

We will gladly discuss any questions you have concerning this inspection.

Sincerely yours,

William L. Fisher, Acting Chief  
Fuel Facility and  
Materials Safety Branch

Enclosure:  
Description of Items  
of Noncompliance

bcc w/encl:  
Central Files  
Reproduction Unit NRC 20b  
PDR  
NSIC

OFFICE ➤						
SURNAME ➤						
DATE ➤						

ENCLOSURE

Kerr-McGee Chemical Corporation  
License No. STA-583

The following items of non-compliance were noted during the inspections.

Infractions

1. Contrary to 10 CFR 20.101, an individual received an overexposure to the whole body of 1.40 Rem during the second quarter of 1975.
2. Contrary to 10 CFR 20.405(a), thirty day reports were not submitted to the USNRC on personnel overexposure and excessive levels of airborne radioactive contamination.
3. Contrary to 10 CFR 20.201(b), an adequate evaluation of airborne concentrations was not made.

Deficiencies

1. Contrary to 10 CFR 20.203(d)(2), airborne radioactivity area warning signs were not posted.
2. Contrary to 10 CFR 20.409(b), an individual was not notified in writing of an exposure to radiation.

OFFICE ➤						
SURNAME ➤						
DATE ➤						

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

January 19, 1983 *Paperiello*

PRINCIPAL STAFF			
RA		ENF	
D/RA		SCS	
A/RA		PAO	
DRPP		SLO	
DRMA		RC	
DRMSP			
DEP			
ML			
OL		FILE	

MEMORANDUM FOR: R. G. Page, Chief, Uranium Fuel Licensing Branch (UFLB)

FROM: C. J. Paperiello, Chief, Emergency Preparedness and  
Program Support Branch, Region III

SUBJECT: DEMOLITION OF THE KERR MC GEE FACTORY SITE, WEST CHICAGO,  
ILLINOIS - NRC LICENSE STA-583

This is in response to a UFLB information request from W. Nixon, of your staff, regarding the above licensee relevant to the informal hearings being conducted by Mr. D. B. Mausshardt. The following summary of demolition activities is based on inspection notes, reports, and onsite/near site observations. Should further or more detailed information be required, please refer to the inspection reports forwarded to your office or call me.

In general, building demolition has been conducted neatly and with minimal offsite impact. Region III inspectors have been onsite and/or near site during significant demolition with the greatest offsite potential, including demolition of certain exterior wall segments of Buildings 1 and 3, the thorium oxide room, the barnsite room, and the removal and cleaning with a vacuum cleaner the barnsite and Building 4A baghouses. During demolition, exterior walls are shored to prevent rubble from breaking the perimeter fence and spilling into the street. The walls are surveyed, washed to remove any loose contamination, and spray painted in the case of fixed contamination (thorium oxide room). The walls are either misted with water as they are knocked down or collapsed into a layer of fire fighting foam. Rubble is segregated into piles onsite, i.e. combustibles, bricks, metals; some of the metal is surveyed for compliance with "Draft Guidelines for Unrestricted Release" and shipped offsite for scrap reclamation. Contaminated material is boxed for ultimate disposal. An abutment or retainer wall is maintained around demolished sections to minimize offsite runoff.

Baghouses are vacuummed to remove any loose particulate activity. Filters are removed and boxed as contaminated material prior to dismantling of the baghouse. A tent-like structure maintained under negative pressure to promote inflow air leakage was built around the Building 4A baghouse during cleanup operations. Workers wore full face respirators inside the baghouse and half face respirators inside the tent. Two air samples collected by NRC inspectors from each baghouse demolition indicated no detectable long lived concentrations above ambient background levels when analyzed for gross alpha and beta activities. Licensee values for grab air samples collected offsite downwind during baghouse operations were

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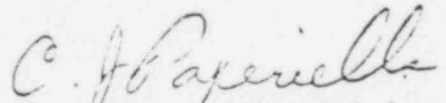
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less than 20% MPC unrestricted concentrations; the average concentrations for the continuous environmental air sample stations in this case were approximately 2% or less MPC unrestricted values. Reported offsite air sampling values during factory demolition are approximately one to two orders of magnitude less than MPC unrestricted levels.

Releases to the storm sewer - water runoff collection from misting procedures and rainwater runoff - are less than 10% MPC unrestricted for 1982. Laundry releases to the sanitary sewer are less than unrestricted MPC values when monthly averaging and dilution factors are applied.

Direct whole body exposures to the workers average 10-20 millirem per month according to film badge records. The highest reported exposure to a worker was 80 millirem per month during packaging of rare earth material in Building 19 on the disposal site. The highest confirmed worker airborne exposure was 32.5 MPC hours for the second quarter, 1982 during Building 4A baghouse cleaning and dismantling.

A twenty-four hour guard service makes hourly patrols after normal working hours. The perimeter fence integrity is intact.

  
C. J. Paperiello, Chief  
Emergency Preparedness and  
Program Support Branch

cc: W. Nixon, UFLB, NMSS  
D. B. Mausshardt,  
Deputy Director, NMSS

Marty

DISTRIBUTION  
RA's Office  
Director, DPRP  
Docket File  
C. Paperiello  
~~J. Miller~~

*J. Struter*  
F. Maura  
K. Naidu  
Inspector  
Inspector's Division  
Director

INSPECTION EVALUATION

SECTION I

1. Facility Kerr-McCree, West Chicago IL

Dates of Inspection Jan. 4-6 & 25-28, 1983

Report No. CH 002041/83-01

Type (X) Routine \_\_\_\_\_

Reactive \_\_\_\_\_

Special ✓

Inspectors A. A. Nicholson \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Scope of Inspection

The inspector reviewed personnel dosimetry; airborne monitoring including personal air monitors, work area grab samples, and ~~the~~ environmental monitoring; the operational <sup>water</sup> retention system; liquid effluent and surface water runoff; survey instrument calibration; and offsite shipments.

3. Evaluation of Licensee Performance

(Include such things as 1) major concerns not represented by the items of noncompliance; 2) positive observations not reflected in the report, or 3) perspective on the significance of the findings.)

1. The offsite shipment survey record sheets need more careful review by the health physics supervisor. Some survey readings were not recorded on sheets reviewed and signed by this individual.

(over)

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2. Re. site liquid effluents & releases. Only the soluble fraction of the liquid effluent grab samples are analyzed by the Peck Center, the filtered residue is not analyzed for radiometric or gross  $\alpha/\beta$  concentrations. Onsite, both fractions are counted for gross  $\alpha$  and  $\beta$  activities of grab samples collected. The licensee (at the vice president level for nuclear programs) agreed to analyze both fractions ~~for~~ at the Peck Center. A review of <sup>insoluble</sup> gross alpha concentrations (analyzed onsite) indicates the most restrictive MPC <sup>for effluent release</sup> of an isotope attributable to the  $^{232}\text{Th}$  chain has not been exceeded; the actual value is approximately 30-40% of the MPC ~~value~~ limit.

4. Overall Inspector Assessment

Since the last inspection of this type, I believe the licensee's regulatory performance in this area has:

Improved ✓  
Stayed the Same \_\_\_\_\_

Regressed \_\_\_\_\_  
Indeterminate \_\_\_\_\_

Additional Inspector Comments

Inspector(s) \_\_\_\_\_

(Signature)

(Date)

*The licensee appears to be in a position now to better control effluent - with his new retention system. Also the routine analysis of the insoluble (filtered) fraction is a good idea.*

5. Supervisor's Comments

Supervisor \_\_\_\_\_

(Signature)

(Date)

# INSPECTION EVALUATION

## SECTION I

DFM Director  
Operational Sup. Sec.  
Docket File  
C. J. Paperiello  
J. Miller  
K. Naidu  
F. Maura  
Inspector  
Inspector's Div. Dir.

*Schunacker*

1. Facility Kerr McGraw ~~Corp~~ Corp  
Dates of Inspection 8/10-17/82  
Report No. 82-03  
Type (x) Routine ☒  
Reactive \_\_\_\_\_  
Special \_\_\_\_\_

Inspectors RM Nicholas \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### 2. Scope of Inspection

Review of onsite employee & exposure (dosimetry); personal, perimeter & environmental air sampling; effluent release concentrations to the sanitary and storm sewers; radon concentrations at the disposal site; ~~and~~ site security and analytical procedures; personnel training.

### 3. Evaluation of Licensee Performance

(Include such things as: 1) major concerns not represented by the items of noncompliance; 2) positive observations not reflected in the report, or 3) perspective on the significance of the findings.)

The licensee has added new environmental sampling stations to collect more offsite data, both activity in air and water. The licensee has also added a new NCI system for sample analysis and ~~the~~ <sup>that</sup> add'l health physics technicians.

### 4. Overall Inspector Assessment

Since the last inspection of this type, I believe the licensee's regulatory performance in this area has:

Improved ☒ Regressed \_\_\_\_\_  
Stayed the Same \_\_\_\_\_ Indeterminate \_\_\_\_\_

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Additional Inspector Comments

The health physics manual needs to be updated to reflect the current work conducted onsite. ~~Some of the~~ In some instances, the manual is difficult to interpret (i.e. many interpretations can be inferred), although it is not clear that the new manual submitted to NMSS for approval, would be a more definitive. The current manual, written primarily by a contractor for the reactor health physics, refers to ~~reactor~~ health physics practices in reactors quite extensively; the same practices can be applied to this site in some cases, however considerations of <sup>the</sup> thermum and maximum chains should be addressed in more detail.

5. Supervisor's Comments

I agree. The new manual should be an improvement as it is written more specifically for the site and is not a retread of a reactor oriented document. I will contact the NMSS project manager next week (August 30) when he is due to return from vacation to determine the status of the new HP manual.

9/2/82 Talked with Bill Dixon. Believes based on Commission reaction to amendment requested (by K-M) because amendment, that a license amendment approving the new HP plan will require a hearing. He has not prepared for such an amendment and does not regard it as a high priority item. Informed NAW 9/4/82.

Inspector(s) L. A. Nicholson

Supervisor's M. Schumacher  
(Signature)

8/25/82  
(Date)

SECTION 11

40-2061/82-03

6. With respect to Identified Concerns, you believe they are:

	Yes	No
(a) Being dealt with effectively by licensee	<input checked="" type="checkbox"/>	<input type="checkbox"/>
(b) Being dealt with effectively by NRC	<input checked="" type="checkbox"/>	<input type="checkbox"/>

7. If either answer to 4. is "No," provide your recommendations and rationale.

8. Supervisor's Comments

*I agree.*

*Kara Nicholson* 8/26/82  
Inspector(s)

*M. Schuman*  
Supervisor

DEC 20 1983

Docket No. 04002061

Ref 2061/F3-02

Kerr-McGee Chemical Corporation  
ATTN: Mr. J. L. Rainey, President  
Kerr-McGee Center  
Oklahoma City, OK 73125

Gentlemen:

This is in further response to Kerr-McGee's letter of September 30, 1983. Our letter of October 26, 1983 indicated that the staff was reviewing Kerr-McGee's response to the Notice of Violation transmitted by our letter of August 31, 1983, including your request for withdrawal of the citations. We have completed our review and have concluded that the citations were valid and that there is no basis for their withdrawal. Detailed comments are in the attachment to this letter.

You have also advanced the argument that the second violation should be withdrawn because it is inconsistent with the Enforcement Policy's encouragement of licensee self-identification and correction of problems as described in 10 CFR Part 2, Appendix C, Section IV.A. All five of the tests enumerated there must be met in order to provide a basis for an NRC staff decision not to issue a Notice of Violation. Kerr-McGee fails to meet at least two of the tests: 1) the NRC staff, rather than Kerr-McGee, identified the violation of 10 CFR 20.106(a), although the data on which that initial determination was based had been gathered by the licensee and 2) corrective action was not undertaken on Kerr-McGee's initiative, but only after the March 15, 1983 management meeting between Region III and Kerr-McGee. The NRC staff does not agree, therefore, with your position that the staff failed to follow its Enforcement Policy in proposing the second violation.

As noted in our October 26, 1983 letter, we will continue to review airborne levels along the site boundary in order to determine the efficacy of suppression measures thus far taken. You should be aware, however, that the principal

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responsibility for such evaluations and for ensuring compliance with regulatory requirements rests with the licensee.

Sincerely,

Original signed by  
James G. Keppler

James G. Keppler  
Regional Administrator

Attachment: As stated

cc w/encl:

I. Denny, Manager

Special Projects

W. Harris, Project Manager

W. T. Crow, UFLB

W. A. Nixon, UFLB

P. G. Bollwerk, Office of  
General Counsel

DMB/Document Control Desk (RIDS)

Anne Rapkin, Office of the  
Illinois Attorney General

RIII

Schumather/db  
12/15/83

RIII

Paperiello  
12/16/83

RIII

Hind  
12/16/83

RIII

Lewis  
12/16/83

RIII

Schultz  
12-19-83

RIII

Davis  
12/19

RIII

Keppler  
12/20/83

## ATTACHMENT

### Violation No. 1: 10 CFR 20.201 (b)

This citation was issued for failure to make evaluations (i.e. surveys), pursuant to 10 CFR 20.201 (b), needed to ensure compliance with the 10 CFR 20.106 limit ( $6E-10$  u Ci/cc annual average) for Lead-212 releases to the unrestricted area west of the disposal site. Kerr-McGee noted in its November 1982 letter to the Office of Nuclear Material Safety and Safeguards that the average concentrations at a monitoring station (EMS-6) in the restricted area near the boundary fence was averaging above this value between mid June and mid September 1982. However, this letter included no evaluation of the state of compliance with the limit at the unrestricted area boundary.

Kerr-McGee was also in receipt of a letter from Region V EPA dated September 29, 1982, that suggested the possibility of boundary concentrations exceeding the limits and of a subsequent letter from the EPA, dated February 8, 1983, noting that concentrations at EMS-6 had averaged almost four times the limit for 60 sampling days during the period.

Given this information, it was incumbent on Kerr-McGee to evaluate the state of compliance at the site boundary, approximately 19 feet from EMS-6, and to take remedial action, if necessary. It was not until Region III presented a detailed evaluation of Kerr-McGee data at the management meeting in the NRC Region III Office on March 15, 1983, that Kerr-McGee undertook an adequate evaluation and began measures to suppress Lead-212 releases.

In previous inspections, Region III inspectors correctly noted that data from monitoring stations at or beyond the site boundary were within unrestricted area limits. The fact that recently accumulated Lead-212 data at EMS-6 was overlooked during the Region III inspection of January 1983, does not alter Kerr-McGee's responsibility for properly evaluating its own data and for making evaluations pursuant to 10 CFR 20. The NRC inspection program normally involves a sampling review of a licensee's data rather than a detailed review. Moreover, in this instance, Region III was not in possession until early March 1983 of the information contained in the above referenced correspondence that indicated possible problems at EMS-6.

We do not agree with your position that you meet 10 CFR 20.201 (b) because your monitoring program is consistent with Regulatory Guide 4.14. Regulatory Guide 4.14 provides guidance for environmental monitoring at uranium mills in order to ascertain compliance with regulatory requirements, including 40 CFR 190, "Environmental Radiation Protection Standards for Nuclear Power Operations." As such, it is not specifically applicable to the West Chicago site where the problems arise from thorium, and its daughters, not uranium. In any event, the citation was not issued against the established monitoring program but for failure to adequately followup on information obtained from that program. The fact that Kerr-McGee has more sampling stations than the minimum described in the regulatory guide is not grounds for revoking the citation.

While it is true that the NRC's predecessor, the Atomic Energy Commission, in License Condition No. 9 granted an exemption to 10 CFR 20.105 that would permit radiation levels up to 2.5 millirems per hour in the unrestricted area at the southwest boundary, no corresponding exemption to exceed the limits of 10 CFR 20.106 was granted. The fact that actual human exposures in that area would be very low was considered in categorizing the violation as Severity Level IV, rather than Severity Level III.

Violation No. 2: 10 CFR 20.106 (a)

This citation was issued for permitting release of licensed material to an unrestricted area in excess of the limits of 10 CFR 20.106 (a). It was based on data at Kerr-McGee's designated monitoring station (EMS-6) for the west boundary of the disposal site between June 11, 1982 and June 11, 1983. This data, which was unevaluated by Kerr-McGee, indicated accumulation of 365 MPC-days (equivalent to one year's permitted release) had been reached about four months into the period and that a value almost twice the limit was reached by the March 15, 1983, management meeting.

Although EMS-6 was actually 19 feet inside the site boundary, the areal extent of the source and local topography made it unlikely that conditions would be much different at the boundary. Data from new sampling stations (EMS 10 and 11) established on the boundary after the March 15, 1983, management meeting confirmed this expectation. Concentrations at EMS-11 averaged about 98% of those at EMS-6 during the 86 day period from March 18 to June 11, 1983. Even when corrected for possible overestimating, owing to diurnal variation, the extrapolated annual average airborne concentration at EMS-11 exceeded the 10 CFR 20.106 (a) limits by about forty percent.

Since the issuance of the inspection report, the comparison period has been extended to 197 days (through September 30, 1983), with little change (1.1 vs 0.98) in average concentration ratio between EMS-11 and EMS-6. Our original conclusion that average boundary concentrations exceeded regulatory limits between June 11, 1982 and June 11, 1983, has therefore, not changed.

*Start  
File  
Kerr-McGee*

SEP 13 1983

Office of the Illinois  
Attorney General  
ATTN: Anne Rapkin  
188 W. Randolph St.  
Suite 2315  
Chicago, IL 60601

Dear Ms. Rapkin:

Enclosed is a report addressing inspection activities regarding elevated airborne lead-212 concentrations at the Kerr McGee West Chicago Project. Should you have any questions concerning this report, please contact me at 790-5500.

Sincerely,

*C. J. Paperiello*

C. J. Paperiello, Chief  
Emergency Preparedness and  
Radiological Safety Branch

Enclosures: As stated

*Inspection Report 46-2061/83-02  
transmitted*

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RIII  
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Nicholson/jp  
09/02/83  
*9/13/83*

RLII  
*sh*  
Schumacher

RIII  
*CJP*  
Paperiello  
*9/13/83*

Schumacher

OCT 26 1983

206/83-02

Kerr-McGee Chemical Corporation  
ATTN: J. L. Rainey, President  
Kerr-McGee Center  
Oklahoma City, OK 73125

Gentlemen:

This is in response to the letter of September 30, 1983, from I. L. Denny of Kerr-McGee sent in response to the Notice of Violation transmitted by our letter of August 31, 1983. Mr. Denny's letter requests that the two citations contained in the Notice of Violation be rescinded as inappropriate and contrary to the NRC enforcement policy. This request is currently under review by the staff and the results of the review will be transmitted to you in a subsequent letter.

We have reviewed the description of measures being taken to suppress lead-212 emissions from the disposal site. These measures appear reasonable, but it is too early to draw firm conclusions. The most recent data (August and September) shows lead-212 concentrations still elevated at the disposal site boundary. However, the weather was generally warm and dry and conducive to thorium exhalations, moreover, the data, where comparable, indicates generally lower levels than in the corresponding period of 1982. We will continue to review the pertinent air sampling data to determine if the measures thus far taken are adequate.

*R. L. Spenser*  
James G. Keppler *for*  
Regional Administrator

cc: W. J. Shelley, Vice President  
Nuclear Licensing and Regulation  
I. Denny, Manager  
Special Projects  
W. Harris, Project Manager  
W. T. Crow, UFLB  
W. A. Nixon, UFLB  
P. G. Bollwek, Office of General Counsel  
RMB/Document Control Desk (RIDS)

cc: w/ltr. dtd. 9/30/83  
J. A. Axelrad, IE  
J. Lieberman, ELD

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OFFICE	RIII/DRMSP	RIII	RIII	RIII	RIII	RIII
SURNAME	Schumacher	Paperiello	Hind	Lewis	Davis	Keppler
DATE	10/25/83	10/25/83	10/25/83	10/25/83	10/25	10/25



**KERR-McGEE CHEMICAL CORPORATION**

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

September 30, 1983

J. G. Keppler  
Regional Administrator  
Region III, USNRC  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Re: Docket No. 04002061

Dear Mr. Keppler:

This responds to the Notice of Violation for Kerr-McGee Chemical Corporation's West Chicago Facility, which is operated pursuant to NRC License No. STA-583. The Notice was received under cover letter dated August 31, 1983 and alleges violations of two NRC regulations. Kerr-McGee objects to each of the citations of violation contained in the Notice. On the basis of the discussion below and NRC enforcement policy evidenced in 10 CFR Part 2, Appendix C, Kerr-McGee urges that the Notice be rescinded.

10 CFR 20.201(b)

The first alleged violation involves 10 CFR 20.201(b). That regulation requires that each licensee make or cause to be made such surveys as may be reasonable under the circumstances to evaluate the extent of radiation hazards that may be present and necessary to comply with NRC regulations. The Notice asserts that Kerr-McGee Chemical violated these requirements in that surveys for lead-212 were not made in an unrestricted area outside the facility fenceline although surveys in an adjacent restricted area some nineteen feet inside the fenceline showed lead-212 levels in excess of the limit for unrestricted areas. In this regard, it should be noted that the survey data on which the Notice is based were furnished to Region III by Kerr-McGee.

Kerr-McGee has been in reasonable compliance with 10 CFR 20.201(b). It has operated, and continues to operate, sufficient environmental monitoring stations for evaluating the extent of any potential radiation hazards associated with the West Chicago facility and for complying with NRC regulations. The citation of violation is accordingly inappropriate and should be rescinded. A number of factors support these conclusions.

First, the Company could reasonably conclude that monitoring of the specific location to which the Notice pertains was irrelevant for the purpose of evaluating radiation hazards or for assuring compliance with NRC regulations. The area in

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question is a small parcel of land lying immediately between the restricted area and a 10 to 15 foot high railroad embankment. There is no occupancy of this area and any radiation exposure to casual traffic -- whether pedestrian or on a passing train -- would be negligible. This aspect was detailed previously and agreed to by the Atomic Energy Commission when, in response to the Company's request, License No. STA-583 was amended by AEC in accordance with 10 CFR 20.105(a). That amendment authorized the licensee "...to produce a radiation level in the unrestricted area at the southwest boundary of the licensee's plant of not more than 2.5 millirems per hour."\* The unrestricted area for which this authorization was granted, and which has been continued by NRC, includes that small parcel of land between the facility fenceline and the railroad embankment -- the same area in question regarding this citation. Moreover, NRC's own assessment, as contained in USNRC Region III Report No. 04002061/83-02 (DRMSP) of August 4, 1983, estimates actual exposures to lead-212 concentrations for the area in question would range from 1.0% to 2.4% of unrestricted MPC limits.

Second, the Company's monitoring program for airborne particulates has complied with 10 CFR 20.201(b) requirements as construed by NRC for milling operations. NRC has published in the form of Reg. Guide 4.14 (Rev. 1, 1980) an extensive interpretation of the §20.201(b) provision as applied to raw materials processing. This Regulatory Guide nominally applies to uranium mills but may reasonably be relied upon by licensees of other raw materials operations, such as thorium mills, which are comparable to uranium mills. Reg. Guide 4.14 calls for a minimum of three stations for monitoring air particulates (including the lead decay product of radon) at or near the site boundary. Kerr-McGee maintained at least four such stations at its West Chicago facility.\*\* Moreover, the four stations were reasonably located at points near areas where exposure might potentially occur. (All these stations indicate ready compliance with unrestricted area limits.) The Company thus conformed to the requirements for air particulate monitoring specified in the pertinent regulatory guide. It is arbitrary and unreasonable to cite Kerr-McGee for a violation of §20.201(b) when the Company has complied with NRC's own interpretation of the regulation as applied to raw materials processing activities.

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\* The level of 2.5 mrems per hour implicitly applies to external gamma dose rate for the area in question. However, the 2.5 mrem/hr is equivalent to a level some 44 times the nominal level that would result in the dose limit for a member of the public under 10 CFR Part 20. By analogy, the maximum permissible concentration (MPC) of lead-212 in air would thus be 44 times the nominal unrestricted MPC. The authorization was granted because it was clear the potential was very slight for an individual to be exposed and any potential dose would therefore be well below the nominally permitted limit.

\*\* EMS 1,2,3 and 4 monitored for air particulates, including lead-212, the decay product of radon-220, at or near the site boundary.

Third, although the facility has been under license since May 1, 1956 and has been inspected for compliance with applicable regulations on numerous occasions, NRC and NRC Region III have never questioned the completeness or adequacy of the Company's survey procedures nor the location of the survey stations. To the contrary, NRC Region III inspection reports have indicated the Company's monitoring program to be in compliance with requirements. This confirms Kerr-McGee's position that it has complied with §20.201(b), particularly in view of the fact that conditions pertaining to the portion of the facility site of interest have remained virtually unchanged for the past ten years. Put another way, the Region III staff's current interpretation of §20.201(b), the basis for the citation of violation, is inconsistent with previous interpretations and with repeated previous evaluations of Kerr-McGee's monitoring program.

In short, Kerr-McGee strongly believes a reasonable evaluation confirms that monitoring the small area between the fenceline and the railroad embankment serves no health or safety purpose and was not required by §20.201(b) as construed in Reg. Guide 4.14. The Company believes the citation of violation is therefore without basis and should be rescinded.

Without wavier of the views expressed above, the Company has undertaken additional monitoring at the request of NRC Region III staff, as described in the August 31, 1983 cover letter and the attached Report of Inspection. This additional monitoring should correct any concerns of Region III with respect to the Company's survey program.

#### 10 CFR 20.106(a)

The second alleged violation involves 10 CFR 20.106(a). That regulation provides that a licensee shall not possess licensed materials so as to cause a release to an unrestricted area radionuclides in concentrations that exceed limits specified in 10 CFR 20 Appendix B, Table II. The Notice asserts that Kerr-McGee Chemical violated this requirement because Region III staff estimate lead-212 concentrations in excess of the Table II limit were released to the unrestricted area west of the boundary fence in the proximity of the thorium waste tailings pile. In particular, Region III staff estimate the concentration between the site boundary and the railroad embankment may be 1.4 MPC on an annual average basis.

Kerr-McGee strongly objects to this citation. Even if the lead-212 concentration in the small area between the facility fence and the railroad embankment is as Region III staff projects it to be, there is no cause for public health or safety concern. As discussed above, there is no occupancy of this small parcel of land, nor could any significant occupancy of the area be reasonably expected. In confirmation, NRC expressly recognized that "...the actual human exposure (in the area in question) appears to be low based on low occupancy..." Inspection Report 04002061/83-02 at page 7. Also as pointed out above, NRC has granted the Company a license condition authorizing along the southwest boundary of the facility radiation levels equivalent to about 44 times the nominal level that would result in the allowable dose limit to the public.

Furthermore, the Company believes the extrapolation and projection procedure used by Region III staff fails to take into account a number of important aspects and therefore does not constitute a valid basis for presuming lead-212 levels have exceeded the unrestricted area limit. The determination by Region III that lead-212 levels exceed the allowable limit has effectively been projected on the basis of 86 days of sampling results, over a consecutive 3-month period. The Company believes this is an insufficient basis for arriving at such a determination in this instance. Lead-212 is a short-lived decay product of the very short-lived gas, radon-220. Radon-220 is comparable to radon-222 in regard to factors that influence its concentration in ambient air. Many authorities have observed that the concentration of radon-222 and its decay products vary widely within very short distances as well as diurnally and seasonally. Further, the concentration is markedly influenced by local meteorological conditions. See, e.g., Gesell, Background Atmospheric Radon-222 Concentrations Outdoors and Indoors: A Review, 45 Health Physics 289 (1983); United Nations Scientific Committee on the Effects of Atomic Radiation, Ionizing Radiation: Sources and Effects, Annex D 141 (1982). A similar conclusion may reasonably be expected to apply with respect to radon-220 and its decay products -- concentrations at any point vary widely from concentrations at a nearby point and are highly dependent upon many factors.

Although NRC has attempted to correct its calculations for diurnal variations, there has not been sufficient time to evaluate accurately possible seasonal effects. The only valid method for determining radon and radon decay product concentrations with a precision in the range of 1/2 MPC (the amount which NRC alleges Kerr-McGee exceeded the standard) is through measurement over a sufficient period of time. For example, the Surgeon General's guidelines for Grand Junction call for multiple measurements throughout a period of a year (10 CFR 10.20.3(g)). While extrapolations such as presented in the citation do not rule out the possibility that lead-212 concentrations in the area in question could be in excess of the Appendix B, Table II limit, such extrapolations do not constitute a demonstration of non-compliance.

The Company has been in reasonable compliance with the pertinent regulation. The Citation of Violation is inappropriate and should be rescinded.

#### Enforcement Policy

Finally, Kerr-McGee notes that the Citation of Violation is contrary to NRC's General Policy and Procedure for NRC Enforcement Actions, 10 CFR Part 2, Appendix C IV. The statement of policy explains that "—NRC will not generally issue a Notice of Violation for a violation that meets all of the following tests: (1) It was identified by the licensee; (2) It fits in Severity Level IV or V; (3) It was reported, if required; (4) It was or will be corrected... within a reasonable time; (5) It was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation."

All these conditions are satisfied in the situation presented here.

- 1) The alleged violations were identified by the licensee. The pertinent inspection report indicates that this matter arose due to data which Kerr-McGee reported to NRC for EMS #6.
- 2) The violations were both classified in Severity Level IV by NRC.
- 3) There was no reporting requirement applicable. See 10 CFR 20.405(a)(5).
- 4) The problem which NRC staff perceived has been promptly addressed and corrected within a reasonable period of time.
- 5) There was no previous violation relating to the alleged violations at issue here.

In sum, under NRC's own enforcement policy, a Notice of Violation should not have been issued even if a violation or violations occurred as alleged in the Notice issued Kerr-McGee.

#### Measures Taken by Kerr-McGee

Kerr-McGee has implemented a program designed to reduce further the lead-212 levels in the area in question. The facets of the program and data showing its effectiveness are presented in the attached appendix and respond to the specific requirement in the Notice to submit a written explanation within thirty days of corrective action taken and results achieved. In addition, it is noted that monitoring data have been reviewed by Region III staff and that discussions have been held between Region III and Kerr-McGee staff regarding the data.

The measures taken to reduce lead-212 in the area in question prior to decommissioning the facility are necessarily temporary in nature and must be removed for construction activities during decommissioning. Moreover, measures to reduce lead-212 in the area between the facility fenceline and the railroad embankment are unnecessary to protect public health and pose costs disproportionate to any benefit gained. Kerr-McGee believes that it would therefore be appropriate to establish, pursuant to 10 CFR 20.106(b) and 20.501, an exception to the Table II MPC limit for airborne lead-212 in the area between the railroad embankment and Kerr-McGee's restricted area. The exception would be for the duration of activities related to final tailings stabilization.

All criteria specified in §20.106(b) for establishing such a limit have been satisfied. More specifically, Kerr-McGee has made a reasonable effort (see Appendix A) to minimize lead-212 levels in the area in question ( §20.106(b) (1)); and NRC staff admits that the lead-212 concentration in the area in question will not result in an exposure of an individual in excess of the limits specified in Part 20, App. B, Table II (20.106(b)(2)). Amendment of the license to establish such a limit specifically for lead-212 would be consistent with the previous amendment authorizing levels of 2.5 millirem per hour in that

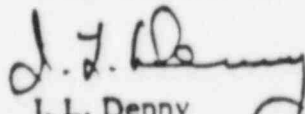
J. G. Keppler  
September 30, 1983  
Page 6

area. Kerr-McGee notes, however, that the best method to obtain further reductions of lead-212 levels would be the expeditious stabilization on site of the thorium residues that result in the lead-212.

Kerr-McGee has demonstrated that it is committed to taking all measures reasonable and necessary to protect the public health and safety and the environment related to emissions from the inactive thorium processing facility at West Chicago. However, Kerr-McGee believes that, under the circumstances which have occurred as outlined in the Notice of Violation and herein, a Notice of Violation should not have been issued because such a Notice is unwarranted. The Notice should be rescinded by NRC Region III.

Should the Region III staff require supplemental documentation supporting this summary of our position or for purposes of rescision of the Notice, Kerr-McGee will provide such documentation immediately.

Very truly yours,

  
I. L. Denny  
Manager, Special Projects

ILD/lh

Attachment - As



## APPENDIX

The Notice of Violation from NRC, dated August 31, 1983, requested the following information from Kerr-McGee Chemical Corporation within 30 days:

1. Corrective action taken and the results achieved.
2. Corrective action to be taken to avoid further non-compliance.
3. The date when full compliance will be achieved.

Although Kerr-McGee does not admit to a violation, the Company has undertaken the following actions to reduce lead-212 concentrations in the small unoccupied area between the railroad embankment and the southwest boundary of the property:

1. A water spray system controlled by an automatic timer was installed in April 1983 on the top and sides of the thorium waste tailings pile. Spraying began April 18, 1983.
2. The water spray system was extended to the east of the tailings pile in May 1983; operation began on May 26, 1983.
3. It became apparent during May 1983 that other sources of thorium residues were contributing to the lead-212 concentration. Additional detailed surveys were conducted on a grid system basis to delineate the sources more precisely. These surveys identified the area between the pond sediment pile and the tailings pile, as well as several localized areas to the west of Building 19, as containing elevated thorium residuals.
4. As a result of additional survey work and the apparent inefficiency of the water spray system in substantially suppressing thoron emanation, application of an asphalt suppression system began July 13, 1983. This system consists of a light coat of cationic asphalt emulsion followed by a non-woven geotechnical fabric (Mirafi) and then a relatively thick top coat of asphalt emulsion. Asphalt emulsion is applied at a rate of 0.22 to 0.26 gallons per square foot.

Application of asphalt emulsion has been an ongoing program and was begun in areas identified as having the higher thorium residuals.

Asphalt emulsion has been applied in the following sequence:

- a. July 18, 1983 - Area between tailings and sediment pile covered.
- b. July 29, 1983 - Sides of tailings pile covered.
- c. August 10, 1983 - Localized areas west of Building 19 covered.
- d. August 19, 1983 - Remainder of tailings pile covered.
- e. September 6, 1983 - Sediment pile covered.
- f. September 28, 1983 - Strip of soil adjacent to the west toe of the tailings pile covered.



5. Building 19 has been identified as a source of thoron, and major openings in this building were closed on September 21, 1983.

Through September 6, 1983, a total area of approximately 150,000 square feet or about 3.5 acres has been covered with asphalt emulsion. The total cost has exceeded \$80,000, not including engineering or salaries of supervisory personnel. The resulting cost is approximately \$0.53 per square foot or \$23,000 per acre.

We believe the actions taken will assure annual average lead-212 concentrations at off-site monitoring locations EMS 10 and 11 will be in compliance with 10 CFR 20 App. B, Table II, as interpreted by NRC Region III in the Notice of Violation issued to Kerr-McGee on August 31, 1983. The monitoring data collected during the period since the asphalt emulsion was applied (September 6, 1983 through September 23, 1983) show lead-212 concentrations at EMS 10 and 11, located between the fenceline and the railroad embankment, are well below Table II MPC limits. The respective MPC fractions for the period are 0.42 and 0.69. Extrapolated for one full year, these data indicate ready compliance with unrestricted area limits and represent a substantial reduction from prior calculations of MPC fractions.

We will continue the extensive on-and-off-site monitoring and timely evaluation of the data obtained. If it appears levels do not remain sufficiently low, additional actions will be taken. These actions may include asphalt applications over areas not currently covered. However, for the reasons stated in the main body of this response, no health risk is posed by the lead-212 levels in the area in question. We continue to believe that additional control measures are neither necessary nor justified.



## KERR-McGEE CHEMICAL CORPORATION

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

September 30, 1983

J. G. Keppler  
Regional Administrator  
Region III, USNRC  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Re: Docket No. 04002061

Dear Mr. Keppler:

This responds to the Notice of Violation for Kerr-McGee Chemical Corporation's West Chicago Facility, which is operated pursuant to NRC License No. STA-583. The Notice was received under cover letter dated August 31, 1983 and alleges violations of two NRC regulations. Kerr-McGee objects to each of the citations of violation contained in the Notice. On the basis of the discussion below and NRC enforcement policy evidenced in 10 CFR Part 2, Appendix C, Kerr-McGee urges that the Notice be rescinded.

### 10 CFR 20.201(b)

The first alleged violation involves 10 CFR 20.201(b). That regulation requires that each licensee make or cause to be made such surveys as may be reasonable under the circumstances to evaluate the extent of radiation hazards that may be present and necessary to comply with NRC regulations. The Notice asserts that Kerr-McGee Chemical violated these requirements in that surveys for lead-212 were not made in an unrestricted area outside the facility fenceline although surveys in an adjacent restricted area some nineteen feet inside the fenceline showed lead-212 levels in excess of the limit for unrestricted areas. In this regard, it should be noted that the survey data on which the Notice is based were furnished to Region III by Kerr-McGee.

Kerr-McGee has been in reasonable compliance with 10 CFR 20.201(b). It has operated, and continues to operate, sufficient environmental monitoring stations for evaluating the extent of any potential radiation hazards associated with the West Chicago facility and for complying with NRC regulations. The citation of violation is accordingly inappropriate and should be rescinded. A number of factors support these conclusions.

First, the Company could reasonably conclude that monitoring of the specific location to which the Notice pertains was irrelevant for the purpose of evaluating radiation hazards or for assuring compliance with NRC regulations. The area in

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question is a small parcel of land lying immediately between the restricted area and a 10 to 15 foot high railroad embankment. There is no occupancy of this area and any radiation exposure to casual traffic — whether pedestrian or on a passing train — would be negligible. This aspect was detailed previously and agreed to by the Atomic Energy Commission when, in response to the Company's request, License No. STA-583 was amended by AEC in accordance with 10 CFR 20.105(a). That amendment authorized the licensee "...to produce a radiation level in the unrestricted area at the southwest boundary of the licensee's plant of not more than 2.5 millirems per hour."\* The unrestricted area for which this authorization was granted, and which has been continued by NRC, includes that small parcel of land between the facility fenceline and the railroad embankment — the same area in question regarding this citation. Moreover, NRC's own assessment, as contained in USNRC Region III Report No. 04002061/83-02 (DRMSP) of August 4, 1983, estimates actual exposures to lead-212 concentrations for the area in question would range from 1.0% to 2.4% of unrestricted MPC limits.

Second, the Company's monitoring program for airborne particulates has complied with 10 CFR 20.201(b) requirements as construed by NRC for milling operations. NRC has published in the form of Reg. Guide 4.14 (Rev. 1, 1980) an extensive interpretation of the §20.201(b) provision as applied to raw materials processing. This Regulatory Guide nominally applies to uranium mills but may reasonably be relied upon by licensees of other raw materials operations, such as thorium mills, which are comparable to uranium mills. Reg. Guide 4.14 calls for a minimum of three stations for monitoring air particulates (including the lead decay product of radon) at or near the site boundary. Kerr-McGee maintained at least four such stations at its West Chicago facility.\*\* Moreover, the four stations were reasonably located at points near areas where exposure might potentially occur. (All these stations indicate ready compliance with unrestricted area limits.) The Company thus conformed to the requirements for air particulate monitoring specified in the pertinent regulatory guide. It is arbitrary and unreasonable to cite Kerr-McGee for a violation of §20.201(b) when the Company has complied with NRC's own interpretation of the regulation as applied to raw materials processing activities.

\* The level of 2.5 mrems per hour implicitly applies to external gamma dose rate for the area in question. However, the 2.5 mrem/hr is equivalent to a level some 44 times the nominal level that would result in the dose limit for a member of the public under 10 CFR Part 20. By analogy, the maximum permissible concentration (MPC) of lead-212 in air would thus be 44 times the nominal unrestricted MPC. The authorization was granted because it was clear the potential was very slight for an individual to be exposed and any potential dose would therefore be well below the nominally permitted limit.

\*\* EMS 1,2,3 and 4 monitored for air particulates, including lead-212, the decay product of radon-220, at or near the site boundary.

Third, although the facility has been under license since May 1, 1936 and has been inspected for compliance with applicable regulations on numerous occasions, NRC and NRC Region III have never questioned the completeness or adequacy of the Company's survey procedures nor the location of the survey stations. To the contrary, NRC Region III inspection reports have indicated the Company's monitoring program to be in compliance with requirements. This confirms Kerr-McGee's position that it has complied with § 20.201(b), particularly in view of the fact that conditions pertaining to the portion of the facility site of interest have remained virtually unchanged for the past ten years. Put another way, the Region III staff's current interpretation of § 20.201(b), the basis for the citation of violation, is inconsistent with previous interpretations and with repeated previous evaluations of Kerr-McGee's monitoring program.

In short, Kerr-McGee strongly believes a reasonable evaluation confirms that monitoring the small area between the fenceline and the railroad embankment serves no health or safety purpose and was not required by § 20.201(b) as construed in Reg. Guide 4.14. The Company believes the citation of violation is therefore without basis and should be rescinded.

Without wavier of the views expressed above, the Company has undertaken additional monitoring at the request of NRC Region III staff, as described in the August 31, 1983 cover letter and the attached Report of Inspection. This additional monitoring should correct any concerns of Region III with respect to the Company's survey program.

#### 10 CFR 20.106(a)

The second alleged violation involves 10 CFR 20.106(a). That regulation provides that a licensee shall not possess licensed materials so as to cause a release to an unrestricted area radionuclides in concentrations that exceed limits specified in 10 CFR 20 Appendix B, Table II. The Notice asserts that Kerr-McGee Chemical violated this requirement because Region III staff estimate lead-212 concentrations in excess of the Table II limit were released to the unrestricted area west of the boundary fence in the proximity of the thorium waste tailings pile. In particular, Region III staff estimate the concentration between the site boundary and the railroad embankment may be 1.4 MPC on an annual average basis.

Kerr-McGee strongly objects to this citation. Even if the lead-212 concentration in the small area between the facility fence and the railroad embankment is as Region III staff projects it to be, there is no cause for public health or safety concern. As discussed above, there is no occupancy of this small parcel of land, nor could any significant occupancy of the area be reasonably expected. In confirmation, NRC expressly recognized that "...the actual human exposure (in the area in question) appears to be low based on low occupancy..." Inspection Report 04002061/83-02 at page 7. Also as pointed out above, NRC has granted the Company a license condition authorizing along the southwest boundary of the facility radiation levels equivalent to about 44 times the nominal level that would result in the allowable dose limit to the public.



Furthermore, the Company believes the extrapolation and projection procedure used by Region III staff fails to take into account a number of important aspects and therefore does not constitute a valid basis for presuming lead-212 levels have exceeded the unrestricted area limit. The determination by Region III that lead-212 levels exceed the allowable limit has effectively been projected on the basis of 86 days of sampling results, over a consecutive 3-month period. The Company believes this is an insufficient basis for arriving at such a determination in this instance. Lead-212 is a short-lived decay product of the very short-lived gas, radon-220. Radon-220 is comparable to radon-222 in regard to factors that influence its concentration in ambient air. Many authorities have observed that the concentration of radon-222 and its decay products vary widely within very short distances as well as diurnally and seasonally. Further, the concentration is markedly influenced by local meteorological conditions. See, e.g., Gesell, Background Atmospheric Radon-222 Concentrations Outdoors and Indoors: A Review, 45 Health Physics 289 (1983); United Nations Scientific Committee on the Effects of Atomic Radiation, Ionizing Radiation: Sources and Effects, Annex D 141 (1982). A similar conclusion may reasonably be expected to apply with respect to radon-220 and its decay products — concentrations at any point vary widely from concentrations at a nearby point and are highly dependent upon many factors.

Although NRC has attempted to correct its calculations for diurnal variations, there has not been sufficient time to evaluate accurately possible seasonal effects. The only valid method for determining radon and radon decay product concentrations with a precision in the range of 1/2 MPC (the amount which NRC alleges Kerr-McGee exceeded the standard) is through measurement over a sufficient period of time. For example, the Surgeon General's guidelines for Grand Junction call for multiple measurements throughout a period of a year (10 CFR 10.20.3(g)). While extrapolations such as presented in the citation do not rule out the possibility that lead-212 concentrations in the area in question could be in excess of the Appendix B, Table II limit, such extrapolations do not constitute a demonstration of non-compliance.

The Company has been in reasonable compliance with the pertinent regulation. The Citation of Violation is inappropriate and should be rescinded.

#### Enforcement Policy

Finally, Kerr-McGee notes that the Citation of Violation is contrary to NRC's General Policy and Procedure for NRC Enforcement Actions, 10 CFR Part 2, Appendix C IV. The statement of policy explains that "—NRC will not generally issue a Notice of Violation for a violation that meets all of the following tests: (1) It was identified by the licensee; (2) It fits in Severity Level IV or V; (3) It was reported, if required; (4) It was or will be corrected... within a reasonable time; (5) It was not a violation that could reasonably be expected to have been prevented by the licensee's corrective action for a previous violation."

All these conditions are satisfied in the situation presented here.

- 1) The alleged violations were identified by the licensee. The pertinent inspection report indicates that this matter arose due to data which Kerr-McGee reported to NRC for EMS #6.
- 2) The violations were both classified in Severity Level IV by NRC.
- 3) There was no reporting requirement applicable. See 10 CFR 20.405(a)(5).
- 4) The problem which NRC staff perceived has been promptly addressed and corrected within a reasonable period of time.
- 5) There was no previous violation relating to the alleged violations at issue here.

In sum, under NRC's own enforcement policy, a Notice of Violation should not have been issued even if a violation or violations occurred as alleged in the Notice issued Kerr-McGee.

#### Measures Taken by Kerr-McGee

Kerr-McGee has implemented a program designed to reduce further the lead-212 levels in the area in question. The facets of the program and data showing its effectiveness are presented in the attached appendix and respond to the specific requirement in the Notice to submit a written explanation within thirty days of corrective action taken and results achieved. In addition, it is noted that monitoring data have been reviewed by Region III staff and that discussions have been held between Region III and Kerr-McGee staff regarding the data.

The measures taken to reduce lead-212 in the area in question prior to decommissioning the facility are necessarily temporary in nature and must be removed for construction activities during decommissioning. Moreover, measures to reduce lead-212 in the area between the facility fenceline and the railroad embankment are unnecessary to protect public health and pose costs disproportionate to any benefit gained. Kerr-McGee believes that it would therefore be appropriate to establish, pursuant to 10 CFR 20.106(b) and 20.501, an exception to the Table II MPC limit for airborne lead-212 in the area between the railroad embankment and Kerr-McGee's restricted area. The exception would be for the duration of activities related to final tailings stabilization.

All criteria specified in §20.106(b) for establishing such a limit have been satisfied. More specifically, Kerr-McGee has made a reasonable effort (see Appendix A) to minimize lead-212 levels in the area in question ( §20.106(b) (1)); and NRC staff admits that the lead-212 concentration in the area in question will not result in an exposure of an individual in excess of the limits specified in Part 20, App. B, Table II (20.106(b)(2)). Amendment of the license to establish such a limit specifically for lead-212 would be consistent with the previous amendment authorizing levels of 2.5 millirem per hour in that



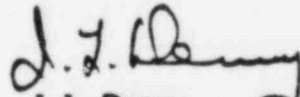
J. G. Keppler  
September 30, 1983  
Page 6

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Should the Region III staff require supplemental documentation supporting this summary of our position or for purposes of rescission of the Notice, Kerr-McGee will provide such documentation immediately.

Very truly yours,

A handwritten signature in dark ink, appearing to read "I. L. Denny", is written over the typed name.

I. L. Denny  
Manager, Special Projects

ILD/lh

Attachment - As

## APPENDIX

The Notice of Violation from NRC, dated August 31, 1983, requested the following information from Kerr-McGee Chemical Corporation within 30 days:

1. Corrective action taken and the results achieved.
2. Corrective action to be taken to avoid further non-compliance.
3. The date when full compliance will be achieved.

Although Kerr-McGee does not admit to a violation, the Company has undertaken the following actions to reduce lead-212 concentrations in the small unoccupied area between the railroad embankment and the southwest boundary of the property:

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2. The water spray system was extended to the east of the tailings pile in May 1983; operation began on May 26, 1983.
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We believe the actions taken will assure annual average lead-212 concentrations at off-site monitoring locations EMS 10 and 11 will be in compliance with 10 CFR 20 App. B, Table II, as interpreted by NRC Region III in the Notice of Violation issued to Kerr-McGee on August 31, 1983. The monitoring data collected during the period since the asphalt emulsion was applied (September 6, 1983 through September 23, 1983) show lead-212 concentrations at EMS 10 and 11, located between the fenceline and the railroad embankment, are well below Table II MPC limits. The respective MPC fractions for the period are 0.42 and 0.69. Extrapolated for one full year, these data indicate ready compliance with unrestricted area limits and represent a substantial reduction from prior calculations of MPC fractions.

We will continue the extensive on-and-off-site monitoring and timely evaluation of the data obtained. If it appears levels do not remain sufficiently low, additional actions will be taken. These actions may include asphalt applications over areas not currently covered. However, for the reasons stated in the main body of this response, no health risk is posed by the lead-212 levels in the area in question. We continue to believe that additional control measures are neither necessary nor justified.

May 19, 1983

Kerr McGee Chemical Corporation  
ATTN: James C. Rainey, President  
Kerr McGee Center  
Oklahoma City, Oklahoma 73215

Gentlemen:

This refers to the telephone conversation between Mr. W. J. Shelley of Kerr McGee and Dr. C. J. Paperiello of this office on May 19, 1983, regarding arrangements for a meeting between members of our organizations. This meeting is scheduled for 9:00 AM, Tuesday, May 24, 1983, in our office at 799 Roosevelt Road, Glen Ellyn, Illinois.

The purpose of this meeting is to discuss the item of noncompliance identified during a recent inspection, your corrective actions, and the enforcement options available to the NRC.

If you have any questions related to this meeting, please contact Martin Schumacher at 312/932-2514.

Sincerely,

Original signed by  
James G. Keppler

James G. Keppler  
Regional Administrator

cc: W. J. Shelley,  
Vice President  
Kerr McGee Chemical Corp.  
Ivan Danny, Manager  
Special Projects  
W. Harris, Project Manager  
W. T. Crow, Uranium Fuel  
Licensing Branch (UFLB)  
W. A. Nixon, UFLB  
P. G. Bollwerk, Office of  
General Counsel  
DMB/Document Control Desk (RIDS)  
J. Axelrad, ELD  
J. Taylor, DRP  
L. Cobb, DRP  
E. Rennels, City of West Chicago  
Gary Wright, Illinois  
Department of Nuclear Safety  
Anne Rapkin, Illinois Attorney  
General

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OFFICE	General	RIII <i>JS</i>	RIII <i>UP</i>	RIII <i>JS</i>	RIII <i>JS</i>	RIII <i>JS</i>
SURNAME		Schumacher/rw	Paperiello	Hind	Davis	Keppler
DATE		5/19/83	5/19/83	5/19/83	5/ /83	5/17/83

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

MAY 20 1983

NOTICE OF SIGNIFICANT LICENSEE MEETING

Name of Licensee: Kerr McGee Chemical Corporation

Name of Facility: West Chicago Rare Earth Facility

License No: STA-583

Date and Time of Meeting: Tuesday, May 24, 1983, 9:00 AM

Location of Meeting: NRC Region III Office  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Purpose of Meeting: To discuss NRC findings during a recent inspection, enforcement options available, and licensee's corrective actions.

Region III Attendees:

J. G. Keppler, Regional Administrator

J. A. Hind, Director, Division of Radiological and Materials Safety Programs

C. J. Paperiello, Chief, Emergency Preparedness and Radiological Safety Branch

✓ M. C. Schumacher, Chief, Independent Measurements and Environmental Protection Section

W. H. Schultz, Enforcement Coordinator, Region III

N. A. Nicholson, Radiation Specialist, Region III

Licensee Attendees:

J. C. Rainey, President, Kerr McGee Chemical Corporation

W. J. Shelley, Vice President, Kerr McGee Chemical Corporation

I. L. Denny, Manager, Special Projects, Kerr McGee Chemical Corporation

S. Munson, Health Physicist, Kerr McGee, West Chicago

NOTE: Attendance by NRC personnel at this Region III/Licensee Meeting should be made known by 4:00 PM (CDT), May 23, 1983, via telephone call to M. C. Schumacher, Region III, FTS 384-2514.

Distribution:

J. M. Taylor, Director, Division of Quality Assurance, Safeguards and Inspection Programs, IE

L. I. Cobb, Chief, Fuel Facilities, Materials, and Safeguards Branch, IE

J. A. Axelrad, Acting Director, Enforcement Staff, IE

James Lieberman, ELD

R. G. Page, Chief, Uranium Fuel Licensing Branch, NMSS

Paul Bollwerk, OGC

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JAN 07 1985

Kerr-McGee Chemical Corporation  
ATTN: Dr. John C. Stauter  
Director of Nuclear  
Licensing and Regulation  
Kerr-McGee Center  
Oklahoma City, OK 73125

License No. STA-583

Gentlemen:

This refers to the routine safety inspection conducted by Mr. A. G. Januska of this office on December 10-13, 1984, of activities at the Kerr-McGee West Chicago Project authorized by NRC License No. STA-583, and to the discussion of our findings with Messrs. W. Harris and M. Krippel at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

No items of noncompliance with NRC requirements were identified during the course of this inspection.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractors) believe to be exempt from disclosure under 10 CFR 9.5(a)(4), it is necessary that you (a) notify this office by telephone within ten (10) days from the date of this letter of your intention to file a request for withholding; and (b) submit within twenty-five (25) days from the date of this letter a written application to this office to withhold such information. If your receipt of this letter has been delayed such that less than seven (7) days are available for your review, please notify this office promptly so that a new due date may be established. Consistent with Section 2.790(b)(1), any such application must be accompanied by an affidavit executed by the owner of the information which identifies the document or part sought to be withheld, and which contains a full statement of the reasons which are the bases for the claim that the information should be withheld from public disclosure. This section further requires the statement to address with specificity the considerations listed in 10 CFR 2.790(b)(4). The information sought to be withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified periods noted above, a copy of this letter and the enclosed inspection report will be placed in the Public Document Room.

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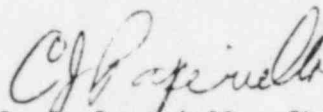
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We will gladly discuss any questions you have concerning this inspection.

Sincerely,




C. D. Paperiello, Chief  
Emergency Preparedness and  
Radiological Protection Branch

Enclosure: Inspection Report  
No. 40-2061/84-04(DRSS)

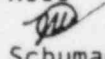
cc w/encl:

I. Denny, Manager  
Special Projects  
W. Harris, Project Manager  
W. T. Crow, UFLB  
W. A. Nixon, UFLB  
P. G. Bollwerk, Office of  
General Counsel  
DMB/Document Control Desk (RIDS)  
Anne Rapkin, Office of the  
Illinois Attorney General  
Illinois Department of  
Nuclear Safety

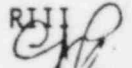
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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 40-2061/84-04(DRSS)

Docket No. 40-2061

License No. STA-583

Licensee: Kerr-McGee Corporation  
Kerr-McGee Center  
Oklahoma City, OK 73125

Facility Name: Kerr-McGee West Chicago Project

Inspection At: Kerr-McGee West Chicago Project, West Chicago, IL

Inspector: *A. G. Januska*  
A. G. Januska

*1/7/85*  
Date

Approved By: *M. C. Schumacher*  
M. C. Schumacher, Chief  
Independent Measurements and  
Environmental Protection Section

*1/7/85*  
Date

Inspection Summary

Inspection on December 10-13, 1984 (Report No. 40-2061/84-04(DRSS))

Areas Inspected: Routine unannounced inspection of onsite Health Physics and the environmental monitoring programs including personnel monitoring; training; site security; liquid waste disposal; incineration of contaminated combustibles; demolition of Building 9; and routine independent collection of an air sample at EMS-11 to verify the licensee's reported values. The inspection involved 21.4 inspector-hours onsite by one NRC inspector.

Results: No apparent items of noncompliance were noted.

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SPP

## DETAILS

### 1. Persons Contacted

\*W. Harris, Project Manager  
\*M. Krippel, Health Physicist  
K. Lambert, Health Physics Supervisor

### 2. Personnel Monitoring

#### a. Dosimetry

The licensee's film badge program remains as described in a previous report<sup>1</sup>. Reports from the licensee's contractor for the period June 15 through November 14, 1984 were examined. The highest third quarter exposure was 50 mrem while the highest monthly exposure was 40 mrem. More individuals are receiving exposures due to the demolition of Building 9 and materials sampling in Building 19.

#### b. Airborne Exposures

The licensee determines personal exposure to airborne radioactivity by the use of personal (lapel) air samplers augmented when necessary with area air samplers.

Exposure to both thorium and lead-212 are summarized by the quarter. Exposures from June 1, 1984 through November 30, 1984 were examined for both nuclides. The highest complete quarterly exposure for thorium was 62 MPC-hours - 12% of the allowable limit; 11% for the fourth quarter through November 30, 1984 and 140 MPC-hours for the highest CY 1984 running total.

The highest quarterly exposure for lead-212 was 4 MPC-hours - <1% of the allowable limit and 6.25 MPC-hours for the highest CY 1984 running total. NRC regulations (10 CFR 20.103) limit intakes to 520 MPC-hours per 13 week period.

### 3. Incineration

Forty burns of contaminated combustibles were conducted during the period of August 16 through December 10, 1984. August 16 was the first burn after the installation of new sealed primary burners<sup>2</sup>. Valid instantaneous pressure spikes exceeding a negative 0.1 inch of H<sub>2</sub>O continue to occur but usually during the ignition of the charge. Uneven ignition and random ignition in the nature of minor explosions appear to be the cause.

<sup>1</sup>Inspection Report No. 40-2061/83-03

<sup>2</sup>Inspection Report No. 40-2061/84-03

Burn parameters are recorded in a ledger by operators on each shift. Spikes exceeding  $-0.1'' \text{ H}_2\text{O}$  are categorized as real or false, the cause determined if possible, and appropriate changes in operating parameters made. The ongoing evaluation and corrections made during a burn cycle satisfy License Condition 2 of Amendment No. 8. The inspector noted that licensee management normally reviews the logged evaluations, comments as appropriate, and signs the ledger. The inspector did note one instance of an inadequate review and one instance of failure to review the burn ledger when abnormal conditions prevailed. The burn on October 1 which emitted smoke was inadequately reviewed and the second burn which emitted smoke was not reviewed. The inspector stressed the importance of reviewing and documenting this review.

On three occasions smoke was noted escaping from around the incinerator door. An exhaust plenum around the door aids in preventing dispersion into the room. Personal air sample, area air sample, and the stack air sample data was reviewed. No personnel exposures to concentrations greater than 3% of restricted area MPCs for either lead-212 or thorium were noted. Stack samples were  $<1\%$  of the unrestricted limits.

For the period examined, no stack sample exceeded  $1.3 \text{ E-}10 \text{ } \mu\text{Ci/cc}$  lead-212 or  $9.3 \text{ E-}13 \text{ } \mu\text{Ci/cc}$  thorium and no area air sample exceeded  $3.4 \text{ E-}10 \text{ } \mu\text{Ci/cc}$  and  $9.0 \text{ E-}13 \text{ } \mu\text{Ci/cc}$ . The licensee's daily smear survey results for the incinerator restricted area were selectively examined. Fifteen locations are smeared daily with a  $20 \text{ d/m/}100\text{cm}^2$  level set for followup evaluation. One result of  $126 \text{ d/m/}100\text{cm}^2$  noted was properly investigated.

#### 4. Water Monitoring

##### a. Laundry Water

For the period July 18 through December 3, 1984, twenty-eight tanks of laundry waste were sampled, analysis performed for gross alpha and beta onsite and the contents, 49840 gallons, released to the sanitary sewer system. On one occasion, an additional tank volume of dilution water was required to get to below the release limit.

Radiometric results for twelve tanks were reviewed. No anomalous results were noted. The results of these analyses performed in the Oklahoma Technical Center continue to lag by approximately two months. A licensee representative stated that this is due to a work backlog.

##### b. Surface Water

The licensee continues to monitor surface water (storm sewers, outfalls, Kress Creek, and the south branch of the DuPage River) as previously reported<sup>3</sup>. Available results for 1984 were examined. The program was properly implemented and no unusual trends were noted.

<sup>3</sup>Inspection Report No. 40-2061/84-02

5. Training

No annual training was due for regular site employees during the period since the last inspection. However, four sessions were conducted for forty-four Kerr-McGee, Radiation Management Corporation and West Chicago employees who were assigned to the West Chicago Offsite Thorium Removal Project. The training included the Basic Radiation Protection Training outlined in Appendix A of the Health Physics Manual, Safety Procedures, and procedures addressing the removal project. Attendance was documented and tests were administered. Some retraining was necessary based on test results.

6. Site Security

The guard services and functions remain as previously reported<sup>4</sup> except for the following:

- ° two guards are on duty during all non-normal shifts
- ° Building 12 is never unattended
- ° Buildings 12 and 20 door checks are performed hourly
- ° additional daylight visual checks are made of the disposal site from the north-south road on the west of the site and from the south side of the disposal site using binoculars
- ° spot checks are made of guard performance by the security contractor management

7. Environmental Air Sampling

The inspector examined results from the licensee's lead-212 and radon monitoring programs. For lead-212 the period of review was June 9 through December 6, 1984, and for radon July 4 through December 7, 1984.

For the calendar period of October 1, 1983, when coverage of the tailings pile was completed, through September 29, 1984, lead-212 at EMS-11 averaged 50% of MPC and EMS-6 34% of MPC. For the running calendar year ending December 6, 1984, EMS-11 was at 47% and EMS-6 at 36%. The highest monthly total for June through November was 105% MPC for EMS-11 and 63% for EMS-6.

The radon program, initiated April 17, 1984, estimates radon concentration to date at about 65% of MPC. Since July 5, 1984, the highest single day exposure was 3.26 MPC-days.

As of December 6, 1984 the average total exposure at EMS-11 for lead-212 plus radon was about 1.12 MPC-days. The licensee stated that the release would be closely followed and if by mid-January the concentration is not dropping at a rate that would result in less than 1 MPC-day by April 16, 1985, remedial action would be decided upon and implemented.

<sup>4</sup>Inspection Report No. 40-2061/84-03

The licensee commenced the demolition of Building 9 on about September 1, 1984. High volume air samples were collected downwind of the building and offsite when possible. Results through October 31, 1984 indicated the maximum concentration for lead-212 and thorium to be  $4.9 \text{ E-11 } \mu\text{Ci/cc}$  (0.08% MPC) and  $7.7 \text{ E-14 } \mu\text{Ci/cc}$  (0.04% MPC), respectively.

8. Offsite Shipments

No scrap or rubbish shipments were released from the site since June 1984.

9. Laboratory and Portable Monitoring Equipment

The licensee continues to implement a program for Quality Control of both laboratory and portable monitoring equipment as previously described. Backgrounds and efficiencies are determined and recorded daily. The status of equipment and accuracy of standards used was selectively verified indirectly during the inspection. An air sample was collected and independently analyzed for lead-212 by the NRC inspector using Region III equipment and the results compared to the daily routine sample collected by the licensee at EMS-11 for the same period. The licensee reported  $2 \text{ E-11 } \mu\text{Ci/cc}$  and the NRC reported  $1.8 \text{ E-11 } \mu\text{Ci/cc}$ .

10. Exit Interview

The inspector met with individuals noted in Section 1 at the end of the inspection. The scope and inspection findings were discussed with and acknowledged by the licensee representatives.





**KERR-MCGEE CHEMICAL CORP.**

KERR-MCGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

October 8, 1976

Mr. Donald F. Knuth, Director  
Directorate of Regulatory Operation  
United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Re: License No. STA-583

Dear Mr. Knuth:

During the second quarter of 1975, one individual in our employ at our West Chicago, Illinois facility received an overexposure to the whole body of 1.42 rem. We regret that we failed to notify your office of this fact promptly, under provisions of 10CFR 20.101.

The subject employee was informed verbally of this exposure immediately on receipt of the report. The employee has been notified in writing by a copy of this letter. The employee is identified on the attached Appendix.

The exposure of the employee was controlled in subsequent periods to assure that the accumulated limit will not be exceeded. The employee's accumulated exposure is well below the allowable limit.

Effective October 1, 1976, copies of reports of exposure are being sent to the Corporate headquarters for review to prevent recurrence of such an omission.

Very truly yours,

*Roy MacLean*

Roy MacLean  
West Chicago Plant  
258 Ann Street  
West Chicago, Illinois 60185

RM/so

cc: W. L. Fisher, Region III ✓

~~820-1020590~~

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APPENDIX

<u>Name</u>	<u>Social Security No.</u>	<u>Age</u>	<u>Whole Body Exposure*</u>
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\*For period 2nd qtr., 1975.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

April 26, 1979

MEMORANDUM FOR: Region III Files

THRU: *CB* A. B. Davis, Chief, Fuel Facility and Materials  
Safety Branch

FROM: W. L. Axelson, Radiation Specialist

SUBJECT: REPLY TO AIT NO. F31924F3 - THORIUM SURVEY OF  
RESIDENTIAL PROPERTY BELONGING TO

On April 25, 1979, W. Grant and I performed a direct radiation survey of                      property located at West Chicago, IL. Survey results indicated that radiation levels were at natural background levels. To the best of our knowledge, no thorium residuals were located on this property.

After completing the survey, I called                      and explained the survey results to her. She was very pleased with our response.

*W. L. Axelson*  
W. L. Axelson  
Radiation Specialist

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*American Standard  
Steel Chicago, Ill.*

September 23, 1963

Director, Div. of Licensing & Regulation  
U. S. Atomic Energy Commission  
Washington 25, D. C.

RE: LR:RH  
40-2061

Dear Sir:

In order to conform with 10CFR20.405, we hereby report that one of our operators was over-exposed (Maximum 1410 mrem) to whole body radiation during our second quarter in 1963, April 15 - June 15.

During the final month of the period our operator received 410 mrem. His over-exposure was due to badge contamination.

To insure against badge contamination we have inserted the badge into a plastic envelope to avoid over-exposure in the future.

Very truly yours,

GJS:jl

Enc.:

cc: Manager, Atomic Energy Oprn. Off.  
9800 S. Cass Ave.  
Argonne, Ill.

G. J. Sinke  
Safety Engineer

LICENSE FILE ROUTING	
JMA	ma

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COPY

September 5, 1963

Name

Social Security No.

Period

Whole Body Exp.  
(urem)

*Sanitized*

4/15/63 - 6/15/63

1410  
(1 Contaminated  
Badge).



LINDSAY RARE EARTH CHEMICALS  
*American Potash & Chemical Corporation*



258 ANN STREET • WEST CHICAGO, ILLINOIS

February 19, 1964

Director, Division of Licensing and Regulation  
U. S. Atomic Energy Commission  
9800 South Cass Avenue  
Argonne, Illinois

Dear Sir:

In order to conform with 10CFR20.405 we hereby report that one of our operators was over exposed (max. 1290 mrem) to whole body radiation during our fourth quarter in 1963, October 15 to January 15, 1964.

During the final month of the period the man received 360 mrem. His whole body radiation exposure from January 15, 1963 to January 15, 1964 was 2930 mrem. It is believed that steps which have been taken, including job rotation, will insure that this man will not be over exposed in the future.

Name and exposure are attached. Report is being furnished to the man who was over-exposed as per 10CFR20.405.

Very truly yours,

AMERICAN POTASH & CHEMICAL CORPORATION  
West Chicago Plant

*Gerald J. Sinke*

G. Sinke  
Safety Engineer

GS:mt

Attached: (1)

cc: Manager, Atomic Energy Operation Officer, Argonne, Ill.  
B. J. Bennett  
R. MacLean

~~8204020577~~  
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FEB 26 1964

February 19, 1964

<u>Name</u>	<u>Social Security No.</u>	<u>Period</u>	<u>Whole Body Exposure (mrem)</u>
<i>Saintez</i>		10/15/63-1/15/64	1290

5.50  
3.50  
3.50  
12.50

TH  
TH  
TH

LICENSEE TELEPHONE NOTIFICATION OF INSPECTION  
(GENERAL)

Licensee: American Potash & Chem. Corp.  
Licenses No: R-134

Date: December 8, 1964

Individual Contacted:

(Name & Title)

Mr. B. J. Bennett, Plant Manager

Type Inspection: Investigative #4

Contacted by: J. H. Ashley

The following information was given to the licensee:

- A. Informed of inspection of above listed licenses to be performed on Tues. Dec 15<sup>th</sup> @ 10:00 AM — possibly ~~the~~ remainder of week
- ✓ B. AEC representative may be accompanied by a representative of the state or local Health Agency.
- ✓ C. Inspection of the program will include: (envisie)
  - 1. Observation of operations
  - 2. Inspection of facilities and equipment
  - 3. Review of following records:
    - a. Receipts, transfers, and/or disposals
    - b. Surveys to show an evaluation of use and storage of licensed material
    - c. Personnel monitoring (film badges, pocket dosimeters, etc.)
    - d. Leak tests (if applicable)
    - e. Reports of incidents, loss or theft, or overexposures
  - Additional Records for 10CFR70 Licenses
    - f. Inventory
    - g. Form AEC-578, Material Status Report
    - h. Form AEC-388, Material Transfer Report
- D. Remarks: Will have HPC consultant, Theo. Fuller, present.

Form CO:III-2

LINDSAY RARE EARTH CHEMICALS

*American Potash & Chemical Corporation*



258 ANN STREET • WEST CHICAGO, ILLINOIS

February 19, 1964

Director, Division of Licensing and Regulation  
U. S. Atomic Energy Commission  
9800 South Cass Avenue  
Argonne, Illinois

Dear Sir:

In order to conform with 10CFR20.405 we hereby report that one of our operators was over exposed (max. 1290 mrem) to whole body radiation during our fourth quarter in 1963, October 15 to January 15, 1964.

During the final month of the period the man received 360 mrem. His whole body radiation exposure from January 15, 1963 to January 15, 1964 was 2930 mrem. It is believed that steps which have been taken, including job rotation, will insure that this man will not be over exposed in the future.

Name and exposure are attached. Report is being furnished to the man who was over-exposed as per 10CFR20.405.

Very truly yours,

AMERICAN POTASH & CHEMICAL CORPORATION  
West Chicago Plant

*Gerald J. Sinke*  
G. Sinke  
Safety Engineer

GS:mt

Attached: (1)

cc: Manager, Atomic Energy Operation Officer, Argonne, Ill.  
B. J. Bennett  
R. MacLean

EXHIBIT D  
American Potash  
& Chemical Corp.

126 1964

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UNITED STATES GOVERNMENT

## Memorandum

	RCH		GAF
	JMA		HDT
	HVC		WAC
	EJM		VAC
	DAO		File

TO : Region III Files

DATE: June 22, 1967

FROM : James M. Allan  
Senior Radiation Specialist

SUBJECT: COMPLIANCE INQUIRY MEMORANDUM

MRS. [REDACTED], WEST CHICAGO, ILLINOIS (NON-LICENSEE)  
ALLEGED DUST PROBLEM CAUSING DISEASE TO PLANT LIFE  
RE: AMERICAN POTASH AND CHEMICAL CO., WEST CHICAGO, ILLINOIS  
LICENSE NO. R-234

At 8:45 a.m. on June 19, I received a telephone call from a Mrs. [REDACTED] who identified herself as a resident of West Chicago, Illinois. Mrs. [REDACTED] stated that over the course of the last couple of years, she has noticed an increase in the amount of dust which accumulates on the porch and around the windows of her home. Mrs. [REDACTED] stated the DuPage County, Illinois Health Officer, one Mr. Emil Oelberg, had advised her as a result of a visit to her residence that the dust was thorium. Mrs. [REDACTED] requested a visit to Region III office in order to discuss the problem and also to bring some samples of the dust in for analysis.

Mrs. [REDACTED] arrived at Region III office at about 10:00 a.m. on June 19, and met with the writer.

Mrs. [REDACTED] explained that she lives with [REDACTED] at [REDACTED], West Chicago, Illinois. Mrs. [REDACTED] related that the neighborhood is somewhat run down and is located about one block north of the American Potash and Chemical Company plant.

Mrs. [REDACTED] related that for the last couple of years she has noticed an increase in the amount of dust that accumulates on her front porch and in the window wells of her house. In addition, Mrs. [REDACTED] stated that some of her trees and shrubs, and those of her neighbors, have been turning brown and dying.

She went on that in October 1966, following a strong south wind, she became so perturbed at the dust problem that she called the DuPage County, Illinois Health Officer, Mr. Emil Oelberg, because she feared that inhaling the dust would be deleterious to her and her family's health. Mr. Oelberg reportedly came to the [REDACTED] residence, took some soil and vegetation samples for some type of analysis, and then visited American Potash and Chemical regarding the problem of a possible airborne acid release evidenced by the browned out shrubbery. Mrs. [REDACTED] stated that as she recalled, Mr. Oelberg had stated that the dust she was getting was "thorium." She stated that she was very unhappy because she had never received anything in writing from Mr. Oelberg regarding the results of his tests.

Reviewed by E.J. Barrett 6-22-67

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June 22, 1967

Mrs. [REDACTED] furnished the writer two samples of dust which she stated had come from her house and that Oelberg had indicated was "thorium." The writer checked both samples with an Eberline PAC 1 alpha counter and an Eberline E-500 B beta-gamma survey meter equipped with a 3.5 mg/cm<sup>2</sup> end window probe. No detectable radioactivity was found from either sample. These measurements were made in the presence of Mrs. [REDACTED] who observed the results.

Mrs. [REDACTED] related that about 26 years ago her parents were among several people who had sued American Potash and Chemical Co. (at that time Lindsey Light and Chemical Company) for damage done to trees and shrubbery as the result of acid vapor releases. Mrs. [REDACTED] added that each complainant was awarded a dollar as the result.

The writer related to Mrs. [REDACTED] that Region III has inspected American Potash and Chemical Company over the course of several years, and that during each inspection we have looked very closely at their environmental air sampling program and it does not appear that she should have any great concern over exposure to airborne thorium.

Mrs. [REDACTED] stated her greatest concern was that she had not received any satisfaction from Mr. Oelberg, and she had some doubt about his competency. Mrs. [REDACTED] added that when people like her lose faith in public officials such as Mr. Oelberg that the tendency is to drift toward communism.

The writer attempted to reassure Mrs. [REDACTED] that she was not being exposed to any concentrations of thorium that would be deleterious to her health, and that if she was concerned about the status of her health, she should contact her family physician. Further, that since it appeared that the problem she was experiencing with her shrubbery was not due to any radioactivity but possibly of an acid origin as she had alluded to earlier, that she should contact the State of Illinois Department of Health, Water and Air Pollution Section. Mrs. [REDACTED] expressed her gratitude for the suggestion.

Following Mrs. [REDACTED] visit to Region III, the writer telephonically contacted Mr. Oelberg to determine if in fact he had told Mrs. [REDACTED] that the dust problem she was having was from thorium. Mr. Oelberg denied having told this to Mrs. [REDACTED]. He added that of all the residents in the vicinity of American Potash and Chemical, that Mrs. [REDACTED] is the only one who constantly complains to his office about dust, odors, and burned shrubbery. Oelberg did admit that it appears that there is an acid vapor problem coming from American Potash and Chemical Company as evidenced by many "dead trees" along George Street in West Chicago. Mr. Oelberg stated that as a matter of fact, he had had two representatives of the Air and Water Pollution Section of the Illinois Health Department at West Chicago on June 12, 1967, in order to attempt to find the cause of the tree problem.

June 22, 1967

Since there was no evidence of licensed material contributing to Mrs. ~~Wendell~~ problem, Region III plans no further action in this matter. Inquiry closed.

cc: R. Handler, Enforcement Branch, CO:HQ (For info)  
J. Roeder, CO:HQ (For info)  
D. Nussbaumer, DML (For info)