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United States Nuclear Regulatory Commission  
Before the NRC Staff

In the Matter of  
KERR-McGEE CORPORATION  
(West Chicago Rare Earths  
Facility)

Docket No. 40-2061  
Amendment Nos. 5 and 6

Decision of the Presiding Officer

The City of West Chicago petitioned the Commission for a hearing regarding the dismantling of selected buildings covered by the NRC license granted to the Kerr-McGee Corporation. The specific Amendment was No. 5 to NRC Docket Number 40-2061. Kerr-McGee Corporation also submitted an additional Amendment No. 6 to remove additional buildings at their West Chicago facility. By Order dated August 6, 1982 (CLI-82-21), the Commission ordered the Staff to conduct an informal hearing. By Order dated October 6, 1982, the Director, Office of Nuclear Material Safety and Safeguards, designated Donald B. Mausshardt to conduct the informal hearing covering both amendments. As a part of this informal hearing, each party was requested to provide factual information concerning the demolition of buildings covered under Amendment Nos. 5 and 6. An informal meeting was held at the site to observe the facility and see firsthand those buildings slated for demolition. As a result of this process, the City raised seven issues which will be addressed in two sections. The first section covers legal questions concerning the proceedings and the segmentation of the process. Those are answered in the first section. The

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second section focuses upon technical issues which are covered in Issues 2, 3, and 4 of the City of West Chicago submission of January 7, 1983.

Background

By letters dated February 19, and May 6, 1982, the Kerr-McGee Corporation requested NRC approval to proceed with the demolition of Buildings 14 and 16. This requested action was identified as Amendment No. 5. Later in August 1982, Kerr-McGee again requested a further amendment which would be identified as Amendment No. 6. This amendment covered Buildings 2, 10, 11, and 21. The demolition of these buildings is the principle fact considered in this proceeding.

First Section

There are four issues in this proceeding that do not need to be decided because they have already been decided by the Commission with respect to an earlier amendment to demolish other buildings (Amendment No. 3). As stated in the City's various filings, these issues are: (1) the legality of the informal-type hearing, (2) the "piecemeal" approach to decommissioning the site, (3) the failure of Kerr-McGee to use a water fog spray and special lagoon catchment area for water used for dust abatement, and (4) the need for City of West Chicago demolition permits. These issues are identical to issues decided by the Commission in Kerr-McGee Corporation (West Chicago Rare Earths Facility), CLI-82-2, 15 NRC 232 (1982). In that proceeding, involving the same parties, the Commission decided that neither the Atomic Energy Act of 1954, as amended, nor the Constitution require a trial-type hearing (Id. pp 247-262). The Commission also decided that "piecemeal" decommissioning was appropriate in the circumstances of this case (Id. pp. 262-265), that a water fog and special lagoon catchment area were not required for building demolition (Id. pp. 266-268), and finally, that it is not incumbent upon the NRC to enforce the City's assertions of regulatory authority for issuing demolition permits (Id. p. 269). It should be noted that on these issues, the safety and environmental consequences of building demolition under Amendment Nos. 5 and 6 do not differ in any respect from those considered by the Commission under Amendment No. 3.

The doctrine of res judicata applies in NRC licensing proceedings, of which this is one, albeit informal. Houston Lighting and Power Company (South Texas Project, Units 1 and 2), LBP 79-27, 10 NRC 563 (1979). All of the tests established in that case are present here for the four referenced issues: (i) the issues are the same as in the earlier action, (ii) the issues were actually litigated, (iii) the issues were determined by a valid and final order, and (iv) the determination of the issues was essential to the prior decision. Further, neither of the two conditions that negate application of res judicata in NRC proceedings, namely, significant supervening developments or an unusual factor of special public interest, are present. On the four enumerated issues, the parties are bound by the prior Commission adjudication which has been affirmed in all respects by the Court of Appeals for the Seventh Circuit. See City of West Chicago v. United States Nuclear Regulatory Commission, Docket Nos. 82-1575 and 82-1684, decided March 1, 1983.

In conjunction with demolition permits, the City has noted that they have not received detailed engineering procedures for demolition. In its reply statement of January 19, 1983, Kerr-McGee states that it intends to apply for necessary demolition permits following Commission issuance of Amendment Nos. 5 and 6. Presumably, the Kerr-McGee application for demolition permits will be accompanied by whatever detailed engineering procedures are necessary to secure the permits. In any event, the NRC does not require such detailed engineering procedures for its purposes, and the matter is not one necessary to resolve in this informal hearing. It is a matter between Kerr-McGee and the City acting in its own regulatory capacity.

Second Section

In the City of West Chicago's response (January 4, 1983) to the Hearing Officer's request for a factual statement of the issues, there were three technical issues that warranted responses. These issues as identified in the January 4, 1983 filing were:

Number 2: Monitoring of airborne emissions from the site must be adequate to ensure fair and thorough readings during the demolition activities proposed.

Number 3: Prevention of overflow and water contamination from the site.

Number 4: Protection of cement blocks containing the sump sediments and of the metal container housing the blocks.

This decision will address each of the issues separately and will identify technical points that are outstanding, if any. It is noted that the City raised allegations but did not provide supporting data and did not challenge Kerr-McGee data.

Issue 2: Monitoring of airborne emissions from the site.

The City's contention, as stated above, was that monitoring of airborne emissions must be adequate to ensure fair and thorough readings during the proposed demolition activities.

This contention was raised in both the November 29, 1982 and January 4, 1983 submissions from the City. In response to the City's contention, Kerr-McGee

submitted information on the air-monitoring program on December 1, 1982, and also on February 4, 1983. This information included monitoring results, not only from permanent environmental air samplers; but also from lapel air samplers, work area samplers, and portable samplers located downwind of the work areas. Specific dates for certain dismantling operations were given so that air-monitoring results could be keyed to dismantling activities. In addition to the Kerr-McGee supplied information, the record contains a summary of inspection findings from the Region III Office of the Nuclear Regulatory Commission. (See Item 37 Appendix.)

The monitoring programs can be summarized as follows. Prior to the start of dismantling operations, Kerr-McGee committed to an air-monitoring program that included both fixed and portable air samplers. This commitment was included as a license requirement in Amendment No. 1 to the Kerr-McGee license by reference to correspondence between Region III and Kerr-McGee. The air sampling program remains a license requirement.

Kerr-McGee has installed nine air sampling stations around the West Chicago site. Of these, six are on or adjacent to the factory site. In addition, Kerr-McGee uses portable air samplers which are located downwind during dismantling operations. Air-monitoring data for about 10 months (November 1981 to September 1982) was submitted by Kerr-McGee in November 1982. Additional information which extended the period for which monitoring results were given and which also included the results of downwind samples taken during dismantling operations was submitted by Kerr-McGee in February 1983. An

examination of this data shows that the thorium content in air at all fixed monitoring sites on or adjacent to the factory site and from all downwind samples was in the  $10^{-13}$  to  $10^{-14}$  uCi/ml range. In 10 CFR Part 20, the annual average limit is  $2 \times 10^{-12}$  uCi/ml, about 10-100 times higher than the average measured values.

The second part of the issue focuses on worker exposure at the site. In their February 1983 submittal, Kerr-McGee provided the sampling data from lapel air samplers and workplace air samplers. This information indicates that the concentration of natural thorium in the workspace air is well below the 10 CFR 20 limit for workers. The 10 CFR 20 limit is  $6 \times 10^{-11}$  uCi/ml for a worker exposed to the concentration for 40 hours per week for 13 weeks. Measured work area concentrations were in the  $10^{-12}$  to  $10^{-13}$  uCi/ml range. Calculated MPC hours of exposure of workers were also summarized in the February 1983 Kerr-McGee submittal and are well below the 520 MPC hours allowed per quarter. Direct radiation exposure was also reported in the February submittal and appeared quite low.

Additional information on the effectiveness of the Kerr-McGee dust control measures is available from NRC inspection experience at the site. In Tab E, Kerr-McGee provided a summary of NRC inspections, dates and names of officials involved. The NRC Regional III inspection staff summarized their findings which were submitted for the record on January 19, 1983. Based upon the staff's monitoring and analysis of Kerr-McGee data, it appears

that Kerr-McGee has been in compliance with NRC rules and regulations during demolition of Buildings 1 and 3. It would also appear that both worker and public exposure were kept to a minimum during the dismantling operations.

In a letter dated February 22, 1983, the City requested that a February 8, 1983 letter from the Region V Office of the United States Environmental Protection Agency to Kerr-McGee be made a part of the record of this hearing. This letter contains information on lead-212 (a daughter of radon-220) concentrations around the Kerr-McGee site. The source of lead-212 at the Kerr-McGee site, for all practical purposes, is the waste piles in the 27 acre portion of the site to the south of the factory site. None of the dismantling operations herein considered will have any impact on the waste piles and therefore, no impact on lead-212 releases or air concentrations. The February 8, 1983 letter, therefore, is not considered to be germane to this issue of air monitoring for the purposes of Amendments 5 and 6.

Based upon the foregoing, it appears that the practices employed by Kerr-McGee, and independently checked by NRC, represent a fair and thorough monitoring program and that during the dismantling of the buildings there have been no significant impacts on either work or public health and safety or on environmental values. There is no reason to change the current practice nor vary the program.



Issue 3: Control of water.

The City of West Chicago raised two issues pertaining to the prevention of overflow and water contamination from the site. (See Item 33, Appendix.)

Prior to dismantling of buildings onsite, most rainfall flowed from building roofs to the ground surface without sampling or control. Some rainwater did flow to the Building 14 sump where it was sampled prior to discharge to the storm sewer to demonstrate compliance with 10 CFR Part 20. As building dismantling occurred, more of the rainwater was directed to the Building 14 sump. The capacity of the Building 14 sump is limited and there were times, during heavy precipitation, when the sump overflowed into the storm sewer. However, the overflow was sampled and analyzed and no NRC limits were reported to be exceeded. To help prevent such uncontrolled releases, Kerr-McGee revised the rainwater collection system. Rainwater from the areas where buildings have been dismantled is not directed to a larger sump in Building 9 where it is collected, transferred to tanks for batch sampling, and treatment if necessary, prior to discharge to the storm sewer. The sump in Building 14 has been cleaned out and isolated from the storm sewer. The Building 14 sump can be used, if necessary, for additional storage capacity for rainwater, but any rainwater collected in the sump would be pumped back into the Building 9 sump for batch sampling prior to discharge. Analytical data submitted by Kerr-McGee indicates that water directed to the storm sewer has contained only a small fraction of the concentration of radioactive substances permitted under 10 CFR Part 20.

In the Kerr-McGee submission of December 21, 1982, Tabs 28, 37, and 45. Kerr-McGee noted that they have conducted a water sampling program at 13 stations on or near the Kerr-McGee plant site. In Kerr-McGee's February 4, 1983 submission, it was noted that their storm water releases were well below the maximum allowable level authorized in 10 CFR Part 20, Appendix B, and notes analysis data was given in Exhibits 3 and 4 attached to the letter. In the Kerr-McGee submission, it was also noted during the actual demolition of Buildings 1 and 3 and Building 4A dust collectors, that there was no significant increase in the activity levels in discharge water as compared to periods when there was no active demolition work. While the data showed no significant increase in levels of radioactivity, due to the release of water from the site, it was noted that releases had occurred. Actions taken by Kerr-McGee to first clean out the Building 14 sump was a significant move to eliminate a possible source of contamination. The storage of the removed material will be handled under a separate issue. It was also noted by Kerr-McGee that monitoring was conducted during the overflow to the storm drains during 1982. Exhibit 4 in the February 4 report, discusses the levels and shows that the results were in the range of 1 to 7 percent of the MPC. The runoff of liquids were monitored and shown to be below the MPC allowed by NRC. Kerr-McGee has also developed onsite capacity to contain waters used in conjunction with their demolition activities. The capacity is approximately 298,000 gallons and should capture the bulk of most rainstorms. It is also noted that the Kerr-McGee Company has applied to the appropriate state agency for a NPDES discharge permit under Section 301 and 402 of the Clean Water Act.

The evidence demonstrates that Kerr-McGee is taking reasonable and correct steps to insure that contaminants are controlled onsite and that any releases of radioactive materials in effluents is well within regulatory limits in 10 CFR Part 20.

Issue 4: Protection of material removed from the sump.

The City questioned the plans for removal and storage of material from the sump of Building 14. On January 19, 1983, Kerr-McGee submitted a detailed description of steps taken to protect and monitor material removed from the sump. Using the authority under the existing license, Kerr-McGee removed the sump residues, solidified the residues with concrete in metal boxes covered with plastic, and is storing the boxes of material on the factory site. The residues are in a nondispersible form and currently present no hazard to public health and safety. Any deterioration of the boxes or plastic covers can be promptly detected and easily corrected. The procedure followed by Kerr-McGee is adequate to protect the public health and safety.

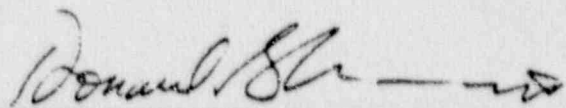
Conclusion

The City of West Chicago has raised several issues vis-a-vis environmental monitoring actions taken by Kerr-McGee as operating under NRC License No. STA-583, Docket No. ~~49~~-2061.

The record in this informal proceeding clearly establishes that Kerr-McGee has the capability of demolishing buildings under Amendment Nos. 5 and 6 in a

manner that will adequately protect the public health and safety and without significant impact on environmental values. The City of West Chicago has not brought forward any facts to the contrary. Further, the record establishes that the air and water monitoring systems in use are adequate to detect significant releases of effluents and to demonstrate compliance with regulatory limits.

Under the Commission's Order of August 6, 1982 (CLI-82-21), the Presiding Officer's decision in this proceeding shall become final 30 days after the date of issuance unless the Commission, on its own motion, undertakes a review of the decision. Accordingly, the staff may issue Amendment Nos. 5 and 6 30 days after the date of issuance of this decision unless the Commission notifies the staff that it is undertaking a review.

  
Donald B. Mausshardt, Deputy Director  
Office of Nuclear Material Safety  
and Safeguards  
Presiding Officer

Dated at Silver Spring, MD  
this 5 day of March, 1983.

KERR-MCGEE CORRESPONDENCE FILE

AMENDMENTS 5 & 6

40-2061

TABLE OF CONTENTS

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- 1) Undated Response of City of West Chicago, Illinois to Kerr-McGee Request for Consolidation of License Amendment Number 6 for Hearing with License Amendment Number 5.
- 2) February 19, 1982 Amendment request from Kerr-McGee, Buildings 14 and 15 demolition.
- 3) May 6, 1982 Revision to February 19, 1982 amendment request.
- 4) August 6, 1982 Amendment request from Kerr-McGee for dismantling Buildings 2, 10, 11, and 21.
- 5) August 6, 1982 NRC Order (CLI-82-21).
- 6) September 17, 1982 Amendment to NRC Order (CLI-82-21).
- 7) September 23, 1982 Request of Kerr-McGee Chemical Corporation to Consolidate License Amendment No. 6 for Hearing Requested by City of West Chicago.
- 8) October 6, 1982 Order designating Donald B. Mausshardt as Presiding Officer to conduct hearing.
- 9) October 15, 1982 Ltr fr Harold J. Spelman to Director, IE, seeking clarification from the NRC on the propriety of Kerr-McGee's installation of an incinerator at West Chicago site.
- 10) October 1982 Ltr DBMausshardt to HJSpelman responding to Spelman's October 12, 1982 letter to Mr. Hoyle.
- 11) November 1982 Order directing the Secretary to refer the City of West Chicago's hearing request on Amendment No. 6 to the NRC staff for consolidation with the pending proceeding of proposed Amendment No. 5.
- 12) November 2, 1982 Memo for Record, subject: Phone Call to Harold J. Spelman and Associates, November 2, 1982, s/Mausshardt.
- 13) November 3, 1982 Memo for Record: Phone Call to Gerald Charnoff, 822-1032 or John Rhinelander, 822-1048, Nov. 3, 1982, s/Mausshardt.

- 14) November 8, 1982 Ltr to Harold J. Spelman, Esq., fr DAMausshardt confirming visit to West Chicago 11/17/82.
- 15) November 8, 1982 Ltr to Gerald Charnoff, Esq., fr DAMausshardt confirming visit to West Chicago 11/17/82.
- 16) November 8, 1982 Memo for Files, subject: Phone Calls to Mr. William Shelley, November 2, 1982 and November 5, 1982 s/Nixon.
- 17) November 12, 1982 Memo for the Record, subject: Phone Call fr Harold J. Spelman, November 12, 1982, s/Mausshardt.
- 18) November 16, 1982 Memo for Files, subject: Phone Call to Walt Harris and Ivan Denny, Kerr-McGee Chemical Co., November 15, 1982, s/Nixon.
- 19) November 16, 1982 Memo for File, subject: Meeting with Kerr-McGee, s/Nixon.
- 20) November 24, 1982 Memo for File, subject: Visit to Kerr-McGee Site, s/Nixon.
- 21) November 29, 1982 West Chicago's Response to Kerr-McGee's Application for License Amendments 5 and 6 for West Chicago Facility.
- 22) November 29, 1982 Ltr to WANixon fr WJShelley in response to three questions re amendment application nos. 5 and 6.
- 23) November 30, 1982 Memo for File, subject: Site Visit to Kerr-McGee Corp., West Chicago, IL., November 17, 1982.
- 24) December 1, 1982 Ltr fr Rhinelander re NRC Hearing No. 2 w/encl files.
- 25) December 1, 1982 Ltr to RECunningham fr HJSpelman re Kerr-McGee request for 25 year license.
- 26) December 2, 1982 Ltr to Rhinelander acknowledging receipt of 12/1/82 ltr.
- 27) December 15, 1982 Ltr to DBMausshardt fr HJSpelman in which City requests 30-day extension.
- 28) December 21, 1982 Ltr to DBMausshardt fr Rhinelander re City's request for 30-day extension.
- 29) December 21, 1982 Ltr to DBMausshardt fr Rhinelander transmitting supplemental documents for record.

- 30) December 22, 1982 Ltr to Spelman fr Mausshardt granting City of West Chicago until 1/7/83 to submit statement on issues pertaining to Amendments 5 and 6.
- 31) Decmeber 23, 1982 Ltr to Charnoff fr Mausshardt confirming 1/7/83 as filing date for Kerr-McGee submittal.
- 32) December 23, 1982 Ltr to Mausshardt fr REZahler transmitting 7 replacement pages for record.
- 33) January 4, 1983 Response of City of West Chicago on issues relevant to License Amendment Nos. 5 & 6.
- 34) January 7, 1983 Ltr REZahler to DBMausshardt transmitting Kerr-McGee's Statement of Issues Relevant to License Amendment Nos. 5 & 6.
- 35) January 14, 1983 Ltr DBMausshardt to JBRhinelande requesting additional information pertaining to License Amend Nos. 5 & 6.
- 36) January 19, 1983 Ltr to DBMausshardt fr REZahler transmitting Reply Statement of Issues Relevant to License Amend Nos. 5 & 6.
- 37) January 19, 1983 Memo CJPaperiello, Region III to RGPAGE, regarding Demolition of the Kerr-McGee Factory Site.
- 38) February 4, 1983 Ltr REZahler to DBMausshardt responding to 1/14/83 request for additional information.
- 39) February 14, 1983 Memo to Files, Subject: Telephone Call to Ivan Denny, Kerr-McGee on January 28, 1983, s/Nixon.
- 40) February 22, 1983 Ltr to Mausshardt fr HJSpelman, transmitting copy of ltr from Mr. Adamkus, EPA, to Mr. Denny, KM discussing EPA's air monitoring data.
- 41) March 4, 1983 Memo to Files fr Nixon, subj: telephone calls to Kerr-McGee on March 2, 3, and 4, 1983.

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Docket File 40-2061 (396-SS)  
NMSS R/F  
FCUF R/F  
IE:HQ

one non-compliance (see page 4) <sup>12/10/64</sup>

Kress Creek - Staff Affirmative Case

Contamination occurred during period of licensed activities: May 1, 1956 to present

1. Operations history
  - a. Process
  - b. Site characteristics
  - c. Onsite activities
2. Thorium pathways
  - a. City storm sewer
  - b. Overland run-off: tailings pile
  - c. Disposal of solids
  - d. Filtration from sumps, ponds

deoxy exemption #5  
in entirety

C/8

1. Operations history

a. Process

1. IR 4/2/56 - Description of Lindsay Chemical process (appendix)
2. IR 6/16/58: \*30 tons monazite sand processed daily  
10,000 ton monazite sand inventory for demand (1)(4)  
\*description of extraction process (5-6)  
\*description of facilities and equipment (6-7)
3. IR 7/21/61: \*curtailed thorium operations hampered inspection (1)  
\*anticipates resumption of full scale thorium operations in early 1962 (§16)  
\*present inventory: 1,556,770 lbs monazite sand, approx. 5.5% thorium. 239,183 lbs thorium compounds (th contents range 40-99%).  
639,000 lbs thorium oxide (§19)
4. IR 8/27/62: \*30 tons of monazite sand used daily (§17) -  
\*chemical process has been submitted as confidential information (§20)
5. IR 8/27/62: description of process (§40-45)

6. IR 1/12/65: \*production of rare earth and thorium compounds - 4 tons monazite sand used daily. Sand now obtained Florida - 45% rare earths oxides, 4% thorium oxide (§14)
- \*flow diagram of process submitted to Division of Material Licensing, AEC (§16)
  - \*Description of process §30-33
  - \* Areas in Bldg. 9 dampened/hosed down in thorium work areas §60
  - \*Old/surplus equipment used in thorium process operations usually steam-cleaned prior to being sold as scrap; not always done §68
7. 3/15/72 ltr. Inventory report of thorium onsite as of 6/30/71 (including residues, dissolving residue pile Kg containing Th)
8. IR 2/29/72: \*Monazite sand as raw material in production of thorium, rare earth oxides. Sand obtained from Georgia - contains 3-3.5% Th by dry weight (§14)

\*Shift from acid to caustic process approximately 2 yrs. ago. Noncompliance with license condition #B (5/19/69 application) (§15)

\*10 tons of monazite sand per day - much less than original design of facility (§16)

b. Site characteristics

1. IR 4/2/56: operating area layout (appendix)
2. IR 6/16/58: description of tailings pile - 6000 tons solid waste (§19)
3. IR 8/27/62: sketches as Exhibit C (§25) (missing)
4. IR 1/12/65: \*R&D facilities at West Washington and Wood Streets - R&D chemical laboratories, small scale pilot plant operations (§27)  
\*Building 9 - 4 story thorium building (§29)
5. IR 2/17/67: \*description of production facility (§27-29)
6. IR 2/29/72: \*Licensee two separate facilities in West Chicago: 1. downtown West Chicago - Building W-1 (small R&D facility, houses small quantities of source material on occasion); 2. main production facility - most equipment old, shutdown. When licensee switched acid to caustic process, existing equipment modified, not purchase new equipment (§26-27)  
\*Description of 12 acres, 15 acres (§28)

7. IR 9/17/76: Two major locations - processing plant, large waste storage area. Both areas fenced, locked gates (§16)

c. Onsite activities

1. IR 7/21/61: \*Lindsay engaged large scale production rare earth and thorium compounds since 1941. Produces 95% of thorium compounds used in country  
\*1960 - reduced demand for thorium: curtailed thorium operations (§11)
2. IR 8/27/62: \*thorium production curtailed from 4/7/61 to 1/18/62. Full scale production resumed 2/15/62 (§19)  
\*Production of thorium and rare earths compounds - production facilities separate (§36)
3. IR 1/12/65: \*Rare earth portion of plant - full production; thorium compound production partially curtailed (§15)
4. IR 2/17/67: Routine daily washdown of thorium work areas (§47)
5. IR 3/23/70: \*Modification/rejuvenation of equipment since last inspection - use of monazite sand reduced from 25 to 2-7 tons per day (1) (§13)  
\*Thorium as "byproduct" production item (§13)

6. IR 3/23/70: \*Survey of scrap prior to release for sale (§33)  
\*Wet scrubbing of floors on daily basis in areas where thorium containing material handled (§35)
7. IR 2/29/72: \*Survey of scrap prior to release for sale, scrap taken to 12 acres for storage if incapable of survey/known thorium use (§40)  
\*Each railroad car bringing in monazite sand vacuumed and scrubbed down after emptied/surveyed alpha & beta-gamma contamination.  
Certificates issued to rr when car turned back  
certification: beta/gamma radiation less 10 mr/24 hours; average alpha contamination less 500 dpm/100 square centimeters (§43)  
\*Wet scrubbing of floors on daily basis where thorium handled. If spill-amount visible to eye considered; staircases in production buildings damp mopped on daily basis (§44)  
\*Independent radiation level measurements taken by inspect. (§48)  
\*Wipes, water and mud samples taken (§49)  
(missing from inspection rept.)
- B. IR 9/17/76: \*Plant undergoing decommissioning since operations closed 12/31/73 - decont. of bldg. 9 by pneumatic chipping, removal of contaminated concrete flooring (continuous water wash) (§14)

- \*Licensee not making evaluation of water effluents from decontamination operation (§21)
- \*Waste material from plant area decontamination loaded into steel waste bins - transferred to waste storage area and dumped (§22)
- \*Independent KRC measurements in waste storage area - rain wash areas: 40 mr/hr; sides of residue pile read about 20 mr/hr.  
Ground radiation levels outside fence - apparently result of contamination spread by effects of meteorological conditions on thorium processing residue pile (§26, 29)

2. Thorium Pathways

a. City storm sewer via site drainage system

1. IR 4/2/56: waste from process sent to company sewer or outside sump area (appendix)
2. IR 6/16/58: \*liquid process wastes discharged to plant sewerage system which empties into large sump basin within restricted storage area (1) (§19)  
\*liquid or solid plant wastes not disposed sanitary sewers (§19)



3. IR 9/1/81: \*Onsite laundry for washing contaminated clothes - samples taken: water discharged into sanitary sewer system. All pipes from factory plugged except only known hookup - from Bldg. 12 to sanitary system (5)

\*\* \*Drain lines from factory collect in Bldg. 14 sump - feeds into West Chicago storm sewer. Outflow discharged into Kress Creek. Releases to storm sewer currently monitored weekly and after each significant rainfall - primarily at sump, KC outflow. Samples collected here, 10 other stations analyzed for gross alpha, beta concentrations. Less than 20.106 (a) values valves (6)

\*n.b. IR states no items of noncompliance.

4. IR 2/22/82: \*Surface drains from factory collect in Bldg. 14 sump - overflows into West Chicago storm sewer that flows into Kress Creek. (4)

\*Licensee states sump sampled byweekly, inspected after every rain to see if water has reached level of overflow pipe. States that only known liquid discharge from sump in 1981: 4/28 after period of heavy rain (4)

\*Samples counted for gross alpha, beta activity, gamma spectroscopy to determine if gross alpha exceeds 15 pCi/liter (4)  
Licensee data indicates continuous flow from sump not exceed regulatory limits for releases unrestricted areas (4)

\*Licensee samples at 11 other locations, including storm sewers downstream of site, Kress Creek outfall. No releases exceeding regulatory limits. (4)

\*NRC personnel survey of Kress creek for contamination (4-5)

5. IR 9/14/82:

\*Two liquid effluent pathways - from laundry to sanitary sewer, other from surface water collections to storm sewer - both monitored by licensee (§8)

\*Surface water from 14 sample locations - outfall of Kress Creek added mid-March (§8)

\*Documentation of several releases from sump to storm sewer - sump samples collected weekly, after each rain. Levels within unrestricted area limits (§8)

\*Licensee log of 7/22/82 indicates water level rose to approximately 2 feet below top of sump: potential onsite overflow situation. Work on site water retention system to begin within one month (§8).

No items noncompliance noted.

- 6. IR 2/23/83:
  - \*Installation of water retention system - precludes runoff from draining into Bldg. 14 sump as previously (§4)
  - \*Period of exceptionally heavy rainfall - capacity of tanks released to prevent backflow onsite/possible offsite - no unrestricted limits exceeded (§4)
  - \*Storm sewer/surface water collections - onsite and offsite analyses. Regulatory requirements met (§5)
  - \*Releases from laundry into sanitary sewer (§5b)

b. Overland run-off - tailings piles

- 1. IR 4/2/56: Location and size of tailings pile (3)
- 2. IR 6/16/58: \*concern as to offsite contamination due to runoff from waste piles by rain/dispersion by wind. Licensee representative cooperating with Illinois State Department of Health on study program (2)
- 3. IR 7/21/61: Possibility that wind/rain may be carrying off concentrations of stored waste materials in excess of permissible limits (4)
- 4.

Date: 5-17-65  
 YK  
 REC'D  
 µc/ml x 10<sup>6</sup>  
 <0.05  
 <0.05  
 <0.0  
 <0.08  
 1.0  
 10.9  
 ranch

5. 7/23/76 ltr. fr. KM

\*Small amount of material in narrow drainage areas along SW 600' of fence line - above max. allowable radiation level. Material was to be removed - heavy rains prevented. Contour of property graded to prevent washoffs

\*Weekly visual exam will ensure integrity of contour; fence line will be surveyed for radiation semi-annually

\*Vehicles used to handle radioactive materials decontaminated before returned to use

6. IR 8/31/83:

\*Airborne Lead-212 concentrations above 10 CFR 20, App. B, Table II limits

\*Licensee installation water spray suppression system; CAL issued 3/16/83 - not significantly reduce lead 212 emissions (4) (?)

\*Asphalt suppression system - applied to high soil concentrations bet. sediment and tailings piles, tailings pile (4) (8)

\*NOV issued with Inspection Report (Licensee response dated 10/3/83)

5-17-6  
/ml x 10  
0.08  
0.1  
0.2  
0.05  
0.7  
0.2  
0.5  
0.2  
0.15  
0.2  
0.05  
0.05  
0.2

c. Disposal of solids

1. IR 6/16/58: Stockpiling of wastes not presently hazard/  
\*licensee states could be in future should  
surrounding area be considered for housing  
development (2)
2. IR 6/16/58: 6000 tons of waste accumulated since  
"inception of company" - stockpiled restricted  
storage area (1) (§19)
3. IR 6/12/59: waste products go to same 12-acre plot-  
fenced and posted/area restricted, entrance  
gates locked (2)
4. 7/21/61 \*Licensee not dispose solid wastes - use of  
12 acre plot  
\*Entire plant sewage system, excluding  
sanitary facilities functions so no  
radioactive process wastes leave plant  
\*No streams, rivers, waterways on  
property, no holding pond drain  
\*Waste piles stored fully exposed -  
subject atmospheric conditions (§18)  
\*Exhibit B - restricted waste storage area

17-6  
0.8  
2.5  
1.0  
2.5  
2.3  
1.3  
0.4  
2.0  
1.0  
1.0  
1.0  
2.5  
inch

5. IR 8/27/62: \*Description of waste disposal area -

- Twelve Acres (§46, 47)
- pond where licensee states all liquid process waste stored
- sides and bottom of pond not treated to provide for retention of liquid waste
- expectation that waste seeps through ground soil

\*12 aced fenced: chain link fence 6' high,

topped three strands barbed wire (§46)

- padlocks for gates and individual warehouses (§49)

\*Licensee states no waste streams as such, leaving plant site - solid waste stored for reprocessing, liquid waste discharged to pond at 12 acres. (§64) (83)

- Licensee has done some sampling of liquid discharge - "not routine"
- Results of one sample: values less than established for thorium release into sanitary sewer system [10 CFR 20.303(b)(1)], and on same order as values permitted for release into unrestricted areas [10 CFR 20.106(b)]

- Solid waste in form of a mud (1983)
- No record to show quantities of waste discharged - none released (1983, 84)

\*Thorium discharged to pond insoluble according to licensee. Pond has no exit - through leaching solid component (insoluble) retained by soil - thus liquid leached sufficiently to remove concentration such that within federal regulation limits (1985, 86)

\*Fenced open pond for disposal: violation of 20.301 (1987)

(n.b. not cited per 11/29/62 letter)  
(see memos dated 11/19/62, 11/28/62)

6. IR 1/12/65:

\*description of 12 acres and waste disposal (1934-37)

\*no waste streams from plant site, liquid waste discharged to pond - no samples of discharge since last inspection 1962

7. IR 2/17/67:

\*Transfer of wastes -

- liquid via closed piping
- solids via direct lines from one floor to another, uncovered portable bins §30

\*description of 12 acres - liquid waste allowed to seep through ground §31

\*with exception sanitary sewage system, all water produced throughout facility discharged to retention pond §49

\*Results of radioactive assays of retention pond water §49

\*AEC independent measurements including water from retention pond §61 and Exhibit B

8. IR 3/30/70:

\*Description of 12 acre waste pile area (§24)

9. IR 2/29/72:

\*12 acres - immediately south of production facility: waste mud pile located here, along retention pond for collection liquid process waste, misc. pieces of scrap, misc. materials (§28)

\*15 acres - immediately south of 12 acres: used exclusively overflow holding ponds (§28)



d. Filtration/overflow from sumps, ponds

1. IR 4/2/56: liquid waste pumped into open sumps, liquid seeps/leeches into subsurface (3)
2. IR 6/16/58: concern as to offsite contamination via leeching through soil/licensee representative cooperating with Illinois State Department of Health in study program (2)
3. IR 7/21/61: water in holding pond filters through subsoil (§19)
4. IR 3/23/70 liquid effluent samples taken on daily basis (described in application dated 5/19/69). Except for one week period in July 1969, all results (soluble/insoluble) less than water concentrations in 10 CFR Part 20, Appendix B, Table II (§29)
5. IR 2/29/72: \* No change licensee liquid active waste sampling program since last inspection - liquid effluent samples on daily basis; one quart grab samples from overflow hose that drains settling pot; daily samples put together as single composite weekly sample. Except week 12/70 - all water concentrations below 10 CFR Part 20, App. B, Table II (§34)

- \*Licensee takes 5 monthly water samples from DuPage River at: 1. north of sewer treatment plant; 2. Gary Mill Road at the DuPage River; 3. Mack Road Bridge at DuPage River; 4. Beecher & Summit Bridge - DuPage River near Winfield; 5. Mouth of storm sewer, 12th Street and plant. Results show nothing detectable, one exception ( $1.1 \times 10^{-6}$  uc/ml) (§35)
  
- 6. Note to file - 6/28/76
  - \*Site visit to obtain additional information for environmental assessment (Argonne to perform) in connection with license amendment
  
  - \*History of plant - 40-year processing: solid wastes disposed on northern half of 27 acre tract; liquid wastes pumped into settling ponds. Waste liquids allowed to percolate into ground through a series of ponds, one overflowing into other. Full plant operation - 500,000 gallons per day waste water disposed through percolation. All processing ceased 1973
  
  - \*Loss of bottom percolation as solid fines in waste settled, sealed bottoms

- \*Movement of percolating waste water from ponds detected in storm sewer south of property while plant in full operation. Storm sewer monitored weekly. Elevated fluoride levels detected. From storm sewer - water emptied into small creek that discharges into DuPage River.
- \*State EPA mapping/sampling water wells in area.
- \*Argonne samples taken: waste pond sediment, thorium bearing solids, sampled offsite.

1/21/66