KERR-McGEE RADIOLOGICAL HEALTH PROGRAM
RARE EARTHS FACILITY
WEST CHICAGO, ILLINOIS

Kerr-McGee Chemical Corporation, upon evaluating various alternatives for the decommissioning or stabilization of radioactive material at its Rare Earths Division located in West Chicago, Illinois, has determined that many tasks are common to all plans being considered.

These tasks are defined as follows:

1. Segregation of all loose organic materials into radioactive and non-radioactive categories.

2. Disposal in local land fill of above non-radioactive material.

3. Packaging of the above radioactive material in preparation for shipment to a licensed low-level radioactive material waste disposal site.

4. Arrange for transportation and disposal of packaged material in accordance with Department of Transportation (DOT) regulations.

5. Industrially clean interiors of buildings by:

   a. Sweeping with industrial sweeping compounds.
   b. Wet scrubbing.
   c. Vacuum cleaning.

6. Surfaces of items to be released for unrestricted use shall meet the criteria listed in Attachment A.

7. Secondary structures (components, pipes and non-load bearing walls) will be surveyed for removable radioactive material using the "smear" test technique.

8. Using "smear" test results as a criterion, secondary structures will be decontaminated if practical, to minimize contamination spread during dismantlement.

In those cases where radioactivity levels cannot be decreased, the affected areas will be painted.

9. Demolition Preparation

a) Secondary structures within major buildings will be dismantled taking care to segregate contaminated from clean components.

b) Clean components with the exception of metal, will be transported to a local landfill for burial. Clean metal may be sold as scrap.

c) Contaminated components will be packaged and stored for ultimate disposal.

10. Thorium Ore Handling System in Building No. 9

During manufacturing operations, thorium ore was received in Building No. 9. The ore was unloaded and transported to appropriate locations for processing. The transportation scheme was a conveyor and bag filter system located on top of the building. This system will be removed as follows:

a) The bag filter will be disconnected and sealed to preclude dust release.

b) The machinery associated with this system will be dismantled.

c) The bag filter and system components will be lowered from the roof.

d) All system components will be packaged as required by DOT regulations governing radioactive low-specific activity (LSA) materials.

e) Packages will be shipped to a licensed disposal site for burial.

11. Disposal Site

Preparation of the disposal site will be accomplished as follows:

General Clean-Up

a) Loose items and equipment, organic and other, will be surveyed for radioactive contamination.

b) Organic radioactive LSA materials will be packaged and shipped to a licensed radioactive waste disposal site.

c) Other materials which qualify as radioactive LSA materials will be stored for ultimate disposition.

d) All clean materials, with the exception of metals, will be shipped to a local landfill. Clean metal may be sold as scrap.

12. Buildings Nos. 17, 18 and 19 will be prepared for disposal in the following manner:

a) All three buildings will be industrially cleaned on the inside.

b) Roofs and walls will be carefully dismantled down to the concrete foundations.

c) Resultant waste materials will be separated into contaminated and uncontaminated areas.

d) Contaminated organic materials will be packaged and shipped to a licensed disposal site.

In order to minimize the radiological risks to the general public and the required site workers and to reduce industrial risks such as removal of unstable structures and fire hazards, Kerr-McGee has elected to perform the previously defined tasks.

Kerr-McGee Chemical Corporation has contracted with Chem-Nuclear Systems, Inc. (CNSI) to perform the above tasks under Kerr-McGee's source materials license No. STA 583.

Kerr-McGee will have an on-site representative who will report directly to the Kerr-McGee project manager. The Kerr-McGee Radiation Safety Officer or his designee will act as an advisor to the CNSI work force, will approve the radiological work permits, and will audit the operations for compliance with the radiological control program.

CNSI will provide a Project Site Supervisor who will plan and direct the efforts of work during this project. CNSI will provide a Radiological Control Supervisor who will, with his staff, administer the radiological control program, which ensures compliance with 10 CFR 20 (See Attachment B, which lists the project organization and the manning levels).

Most of the work on the site will be of a radiological nature and will be performed under the radiological work permits using CNSI's basic radiological control program. (See Attachment C, Article 213).

All workers who routinely perform radiological work will be trained in accordance with the program defined in Attachment C, Article 106.

A training study guide is prepared for each individual's use.

CNSI will provide a fully-qualified individual (in accordance with Article 107 of Attachment C) for the position of Radiological Control Supervisor. He will have the complete authority to stop any operation because of unresolved industrial or radiological control questions. At least one Radiological Control person on-site will be trained in basic First Aid practices.

The CNSI Radiological Control group on site will be responsible for:

1. Maintaining an adequate supply of disposable anti-contamination clothing and expendable supplies.
2. Source checking radiation detection equipment.
3. Training of personnel.
4. Performing radiological surveys on all equipment, tools, vehicles, packages, and waste which leaves the area.
5. Maintaining daily dosimeter reading records.
6. Issuance of TLD's to all personnel who routinely work on site.
7. Maintaining the respiratory protection equipment.
8. Changing TLD's monthly, or more often if needed, in accordance with CNSI radiation alert system (Attachment C, Article 216).
9. Maintaining logs, records, and reports as required to demonstrate compliance with the radiological controls program (Attachment C, Articles 121 and 122, as applicable).

All material which is released from the site as clean waste, sold as scrap, or disposed of in a local landfill shall be surveyed and determined to meet the criteria in Attachment A. Since this material can be contaminated with naturally occurring isotopes such as Postassium 40, Uranium 238, and Thorium 232, and their daughters, the release limit shall be that for insoluble Natural Thorium, the most limiting isotope.

In most instances, the work will be performed in a manner which does not produce airborne radioactivity. Any airborne activity generated will be long-lived and insoluble. Air samples will be taken to determine the air particulate concentration. This will be confirmed by periodically collecting ten cubic meter air samples and determining the gross alpha activity. Consideration will be given for sampling airborne radioactivity at the perimeter of the site, down-wind from work activity which may create dust releasable to uncontrolled areas. When applicable, this sampling will be made part of the radiation work permit. Samples will be recounted due to the presence of the short-lived daughter products. In order to protect the workers, all personnel working within the buildings when dust may be generated will be required to wear half-face respirators. Personnel who may work in airborne concentrations in excess of 6×10^{11} μCi/mℓ Natural Thorium will be required to wear full-face respirators and in no instance will personnel be allowed to work in areas which exceed 50 times this control limit. Personnel who perform work in respirators shall have an annual physical examination. All respirator equipment shall be NIOSH approved.

Workers involved in demolition or decontamination work will be required to wear safety shoes, safety glasses, hard hats, and work gloves as a general precaution. Additional clothing and protective equipment may be prescribed on the Radiation Work permit.

Radioactive solid waste which is packaged in accordance with DOT regulations may be released from the site by completing the required Radioactive Shipping Record and short form Bill of Lading. This waste

will be shipped via exclusive-use vehicle to a licensed waste burial site for disposal.

Radioactive liquids will be collected in containers and, prior to being discharged, will be analyzed by gross alpha counting techniques for degassed samples. Only the Kerr-McGee on-site Radiation Safety Officer or his designee can authorize such disposals to the environment. Released of liquid shall be in accordance with 10 CFR 20.

Emergency Conditions

Arrangements will be made with local emergency response organizations such as fire departments, police departments, ambulance teams, etc., to assist on-site personnel if an emergency condition should occur. Arrangements will also be made with a local doctor and hospital for medical assistance if needed.

In the unlikely event of a situation that presents a high potential for personnel internal contamination, a bio-assay plan such as In-vivo counting or fecal analysis, will be considered. However, no routine bio-assay program is planned.

Hygiene

Building No. 12 will be supplied with a change room, showers, eating facility, break room and restroom facilities.

ATTACHMENT A

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b,c,f]	MAXIMUM[b,d,f]	REMOVABLE[b,e,f]
U-nat, U-236, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228.	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-230, Th-228, Pa-231, Ac-227, I-125, I-129			
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5,000 dpm βγ/100 cm^2	15,000 dpm βγ/100 cm^2	1,000 dpm βγ/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate director for background, efficienty, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived from each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

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George Hannigan & Jerry Sinke (RPO @ W. Chicago, former)

1. Sect 4 of Draft decom. covers decon.
2. Decon plans covers ~~its~~ entire decom.
3. Phase I &

A Tasks for preparing site, only ships to landfill, contaminated organic matl to burial gnd, survey bldgs, pick up rubble, rad survey, fix areas which can't be decommed, dismantling wiring, piping, interior walls, sell clean metal, store all else, bag collector, wood from bldgs in 27 acre site.

B. Presupposes approval, excavating disposal site, no request for approval of this now.

Clean organic is only thing now which will go ~~to~~ landfill

4. Committed to respiratory protection program, but won't have it in effect for a while. Otherwise won't take credit for it.
5. Committed ~~to~~ ALARA not just to diminimus criteria.
6. Emergency conditions covered, mostly in decom plan

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(2)

7. Draft copy given to Rennels today
Mtg to answer ?s of Mayor & City Council on 8/6
Mtg w. public on 8/8.

GERALD J. SINKE, CSP
RADIATION HEALTH & SAFETY
COORDINATOR

KERR-McGEE NUCLEAR CORPORATION
KERR-McGEE CENTER
OKLAHOMA CITY, OKLAHOMA 73125
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8/1/79

K-M

② 1. Acceptance criteria for decontamination
2. Instruments
3. Training
4. Control of spread of RAM
5. Methods of disposal
① 6. Scope of work in decon plan

Lee

Cy of this plan + proced. to go NMSS for their formal

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Doug Sly. on K-M

equipment in bldg can be released to deminimus criteria, but try for zero. (This is to land fill)

Pipes, etc which are hard to clean should go to burial ground.

Soil + dirt should not go to land fill.

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MEMORANDUM FOR: File

FROM: A. B. Davis, Chief, Fuel Facility and Materials Safety Branch

SUBJECT: KERR-MCGEE FACILITY DECONTAMINATION, PHASE IA

In addition to a memorandum sent to Mr. Higginbotham dated August 3, 1979, the attached questions and comments were faxed to Doug Sly and Bill Crow on August 6, 1979. We then held a conference call to discuss these proposed questions and comments on Kerr-McGee Phase 1A decontamination plan. The results of these discussions are contained in my August 7 telephone log.

A. B. Davis, Chief
Fuel Facility and Materials
Safety Branch

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AUGUST 6, 1979

K-M Phase IA QUESTIONS AND COMMENTS

1. After we develope our position, we will inform USEPA, IL EPA, City, Attorney General Office, IL Department of Health.

2. All liquids containing Th will be filtered to remove 99% of particles 0.25 micron and larger.

3. Filtered liquids must meet 1% of 10 CFR 20 limits.

4. Deminimus criteria for the Th-nat and Th-228, which ever is more limiting must be met. Direct radiation of 0.1 mR/hr average and 0.5 mR/hr maximum. This is what we will buy, but we want them to go to ALARA.

5. Material for burial (clean) must meet a limit of 0.01 wt.% Th-nat.

6. Must meet State requirements for release of non-radioactive pollutants.

7. Environmental airborne monitoring must be continuous. Sample locations around perimeter of site and located near residences or areas of public occupancy.

8. Measurements with Eberline E-120 not sufficient. An alpha measurement must be made. Need scintillator to measure equipment with inaccessible interior surfaces.

9. Must look at alpha for smear samples.

10. Are other than organic materials going to be sent for licensed burial? (See 10e, K-M Radiological Health Program)

11. Plan must address interim storage of RAM to avoid spread of contamination. (See Item 12, K-M Rad Health Program)

12. Respiratory protection program must be in accordance with Part 20 to take credit for protection factors.

13. Need qualifications of rad supervisor; only training requirements are given.

14. Need hospital arrangements for contaminated injuries.

15. Familiarization training of fire and ~~police departments~~ of on-site conditions.

send cc to state people

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Add'n'l K-M items

1. Packaging of wastes for shipments must also meet applicable NRC regulations (10 CFR Part 71)

~~2. Reminder to [illegible] [illegible]~~

2. Painted materials must be assumed to be radioactive and dispose of accordingly.

7, 8, 9, 10, 11, 12, 13 8/10

1. Any piece of equipment or piping or conduit which is to be sold - we must notified and will be involved in release for unrestricted use.

2. Liquid discharges must ALARA with maximum limit of 10 CFR Part 20 App B, Table II.

Liquid discharges must be in accordance with State requirements for chemical pollutants.

3. If liquids are discharged, an effluent monitoring and control program must be provided for our review.

4. 5 There seems to be a discrepancy in the plan in that in some areas only organic material is stated to be shipped to licensed burial and in those areas other than organics are shipped for burial. We have no problem with any shipment provided it is properly packaged and controlled

5. See item 11. An Example is the chemical pits in Building 17.