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

January 11, 1978

MEMORANDUM FOR: Region III Files

THRU: G. T. Lonergan, Chief, Materials Radiological Protection Section No. 1

FROM: C. T. Oberg, Radiation Specialist

SUBJECT: KERR-MCGEE CHEMICAL CORP., WEST CHICAGO, ILLINOIS
LICENSE NO. STA-583
INSPECTION TOURS OF MOORE CHEMICAL STORAGE BARN
DECONTAMINATION PROGRESS BY CONTRACTOR AND
LICENSEE'S FACILITY

On October 4, 6 and 7, 1977, brief inspection tours were made of the subject sites to observe the work in progress and to maintain cognizance of the status of the facilities.

At the M. Moore Chemical Co. Storage Barn (Andres, IL), ATCOR personnel, under contract to the subject licensee, were transferring rare earth compounds from deteriorated fiber drums to new 55 gallon steel drums. The compounds, mostly neodymium carbonate and containing low amounts of thorium contamination were sold to Moore Chemical Co. by Kerr-McGee. ATCOR personnel are to perform radiation surveys, clean up spilled material, decontaminate, repackage material and classify the material as either acceptable for unrestricted use or as RADIOACTIVE-LSA (see attached procedure).

On October 4, 1977; inspection tour of Andres, IL, the Moore Chemical Co. Storage Barn. ATCOR personnel have been on the premises since the previous day and are just getting started with cleanup operation. At this time they were performing surveys to determine significant alpha and beta-gamma radiation levels. Significantly high readings appear to be found on rusty steel lids of the fiber drums.

Localized surface areas inside barn read up to 0.5 mR/hr and generally ranged between 0.4 and 0.2 mR/hr beta-gamma. Drums tagged with radiation signs and marked to contain as much as

20 mR/hr gave significantly lower readings similar to the range specified in the previous statement. Surveys performed outside of barn showed nothing significantly greater than background. The contractor personnel plan to establish a "clean area" at side door to barn. ATCOR has contracted for a six week completion date but the RPO, George Williams, hopes to finish the project in three weeks.

October 6, 1977; inspection tour to Andres, IL and Kerr-McGee, West Chicago, IL site. At Andres, IL, ATCOR personnel were opening fiber containers to survey contents, marking drums with appropriate identification and surveying lids of drums for disposal to normal or LSA trash as appropriate. They are employing a commercial type vacuum cleaner to clean areas and drums, and to collect dust created by opening drums. Personnel were suited in white coveralls, head covers, shoe covers, gloves and were wearing respirators. Presently six individuals are on the job; two will be leaving including present RPO, and then Mr. Owen Sullivan will take over as RPO with three others working under him. Inspector performed beta-gamma and alpha survey readings in barn. Generally, the beta-gamma surveys showed activity levels of between background and 0.1 mR/hr. The highest level of about 1 mR/hr was obtained in an office type area within the barn. Inspector also obtained samples from six opened drums at random. The drums sampled were identified as: No's. A-140, 79-2, 73, 41, ATCOR 40 and ATCOR 42. Drums with no identification numbers were identified using an ATCOR prefix with a consecutive numbering system. Survey data obtained to date was reviewed. ATCOR personnel have established a cut-off radiation level of 0.1 mR/hr contact for disposal. Anything below this will remain for unrestricted use while all at or above this level will be marked as LSA waste and returned to the Kerr-McGee, West Chicago, IL site. The 0.1 mR/hr level was based upon two times the averaged dose rate at the surface of the two fiber drums from which samples were taken previously by ATCOR and assayed by Teledyne Isotopes Co. (see attached Radiological Procedure, Section 3.e). The samples taken by the RIII inspectors were subsequently submitted to ANL for thorium assay.

At the Kerr-McGee, West Chicago, IL site, the inspector discussed the final transactions which took place with Kuhn and Auer Co. up to September 30, 1977; the date by which the Acting Site RSO (Mr. Roy MacLean) retired. Kuhn and Auer Co. will not be allowed to remove any material from the site after this date. The remaining Kerr-McGee site representative, Mr. Edward S. Juzwiak, will maintain nominal upkeep at the site. At the time of this visit, the electrical power company was removing their transformer from a fenced enclosure along the west side of the plant area. No other activities were in progress at this time with the exception of some general cleanup

work being performed by the site representative. The latter informed the inspector that a Kerr-McGee sales representative and a representative from Apache Chemical Co. would like to discuss with RIII personnel, the requirements for possible removal of some samarium-gadolinium carbonate at the West Chicago site. The material is presently stored in one of the sheds in the waste area. Kerr-McGee would like to sell the material. The inspector stated that arrangements would be made for this meeting. The inspector toured the plant and the security guard post on the roof. The site representative was informed that the inspector would return to review survey and security guard records.

October 7, 1977; inspection tour of Kerr-McGee, West Chicago, IL. Inspector reviewed the daily plant security log reports from Gloss Guard and Investigation Services, Inc. The contracted security guard is available each working day from 4:00 p.m. to midnight during which time the guard is stationed on the roof of the plant until dark. A patrol of the entire site is made at about midnight, 5:00 a.m. and 7:00 a.m. The plant is manned by Kerr-McGee personnel each working day from 7:00 a.m. to 4:00 p.m. On Saturdays, Sundays and Holidays, the Gloss Service is also on site from 8:00 a.m. until midnight. These arrangements provide the surveillance requirements for the site. Specific items such as trespassers, broken windows, fence openings, etc., are identified in the logs which appeared to be complete back through July, 1977, when the Gloss agency took over.

The record of shipments from the plant site since June 30, 1977, were reviewed. With the exception of those shipments tabulated in Table I, all others appeared to be acceptable. The tabulated shipments appeared to show radiation levels greater than those allowed in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use . . ." (Procedure 83895B dated April 1, 1977). The site representative was appraised of this situation and that the Kerr-McGee HQ offices in Oklahoma City, Oklahoma would also be advised. The inspector made some additional tours of the plant area with a Thyac II, gamma scintillation survey instrument. Some areas of relatively high activity were identified with readings up to several mR/hr. The inspector also observed the plant doors which had been nailed shut by the resident representative. Some of these doors had previously been mentioned in the security patrol log as having been found open, indicative of trespassers within the plant.

Brief inspection tours of the subject licensee's facilities and decontamination operation site in Andres, IL will continue as necessary to remain cognizant of the status of these facilities and the work in progress.

C. T. Oberg
Radiation Specialist

Attachments: As stated

TABLE I

SHIPMENTS RELEASED BY KERR-MCGEE, WEST CHICAGO, IL

Shipment No.	Date	Receiver	Material	Survey Data		
				Direct Reading		Wipes
				alpha dpm/100 cm^2 (No) High/Ave.	Beta Gamma mR/hr (No) High/Ave.	dpm/100 cm^2 (No) High/Ave.
56	9/21/77	Auer Const. Co.	Front End Loader	4200/<2500 (7)	0.25/<0.12 (21)	50/<35 (4)
59	9/26/77	Auer Const. Co.	Two Fork Lift Trucks	4800/2500 (8)	0.44/0.16 (21)	100/<50 (6)
61	9/27/77	Auer Const. Co.	One Fork Lift Truck	3800/<3000 (6)	0.6/<0.2 (18)	70/<50 (4)

JOB #2342
September 22, 1977

RADIOLOGICAL PROCEDURE FOR THE DECONTAMINATION OF MARVIN MOORE CHEMICAL COMPANY WAREHOUSE, ANDRES, ILL.

Reference: Radiological Assessment Survey of Marvin Moore Chemical Company Warehouse

1. Background Information
   a. There are about 300 fiberboard drums of Neodymium Carbonate in this warehouse that have concentrations of natural Thorium in the range of 10 pci/gm.
   b. The floor of the warehouse is contaminated to levels as high as 100,000 dpm/100 cm^2 and average about 7,000 dpm/100 cm^2.
   c. All of the high concentration Thorium have been previously removed by ATCOR, Inc.
   d. The general radiation levels within the warehouse are between 0.05 mrem/hr and 0.2 mrem/hr. The dose rates do not warrant wearing of self-reading dosimeters as the total weekly exposure to employees will be less than 5 mrem. (48 hours x 0.1 mr/hr)
   e. Airborne activity can be expected from Thoron gas released as a daughter product from the floor contamination.

2. Specific Radiological Control Measurements Required
   a. Masks will be required throughout the project. This will be to insure no long lived activity (Th-232) is inhaled which may be masked by the relatively high concentrations of Thoron daughter products.
   b. Anti-contamination clothing will be worn within the warehouse: coveralls, shoe covers, and gloves.
   c. Anti-contamination clothing will not be worn outside of the warehouse.

d. Surveys of the contents of each fiberboard drum shall be conducted to insure the contents do not contain higher concentrations of Thorium than that which had been assayed.

e. Airborne samples will be taken periodically during the day and samples will be recounted each day to determine if personnel were exposed to any significant concentrations of natural Thorium.

f. Personnel frisking will be required on leaving the warehouse.

g. Due to the low profile required such that residents in Andres are not alarmed by our activities, we will not post the area with normal signs and will mark only tops of drums containing radioactive waste as Radioactive-LSA.

3. Radiological Control Procedures

a. A crew consisting of a radiation protection officer and two decontamination technicians will vacuum clean the floors of the building in order to reduce the surface contamination to as low as reasonably achievable.

b. Establish a clean area within the warehouse for monitoring and repackaging contents within the fiberboard containers.

c. Receive about 240 new 55 gallon drums and store them outside the warehouse.

d. Rig up a hoist from the beams to lift and transfer the contents of the fiberboard drums to the 55 gallon drums.

e. Monitor the contents in the fiberboard drums by the following technique and procedural control.

1) Monitor the beta-gamma dose rate at the surface of the two containers assayed by Teledyne Isotopes.

2) Document these levels in the Health Physics log.

3) Monitor the beta-gamma dose rate of each fiberboard drum.

4) Record the beta-gamma dose rate. Use Marvin Moore

Chemical Company assay number for control purposes.

5) All fiberboard drums containing twice the beta-gamma levels of the assayed material will be overpacked in 55 gallon drums and designated as radioactive waste material.

6) The remaining fiberboard drums will be transferred into 55 gallon drums by dumping directly into the clean drum.

7) The contents will then be monitored again for beta-gamma levels. If the levels are less than twice the beta-gamma levels of the assayed material, the 55 gallon drum will be marked with the identified markings which were on the fiberboard drums and transferred to a clean area either inside the warehouse or outside. If the contents exceed two times the acceptable beta-gamma levels, the drum will be designated as radioactive waste.

8) All 55 gallon drums will be sealed and its contents will be identified with either the Marvin Moore Chemical Company's assay number or identified as radioactive waste.

f. Empty fiberboard drums will be surveyed for alpha contamination. Those contaminated containers will be disposed of in 55 gallon drums and the remaining clean drums will be carted to local land fill or refuse area for disposal.

g. All radioactive waste will be transported to Kerr-McGee's West Chicago facility for storage prior to final disposition.

4. Facility Release Guidelines

a. Transferrable surface contamination <200 dpm/100 cm^2.

b. Fixed alpha surface contamination .
average* $<1{,}000$ dpm/100 cm^2
maximum $<3{,}000$ dpm/100 cm^2

c. Radiation as measured with E-120 with HP 190 probe.
average* $\leq$0.2 mr/hr
maximum $\leq$1 mr/hr
*averaging techniques should not exceed 1 square meter.

5. Decontamination Techniques to be used
   a. Vacuum clean floor as required during conduct of job.
   b. Remove all loose floor covering and dispose as radioactive waste.
   c. Selectively remove highly contaminated flooring if required with the approval of the Project Manager.

6. Special Samples
   Collect earth samples in plastic containers for analysis by Teledyne Isotopes.
   a. Outside roll door in front of warehouse.
   b. Outside side door entrance.
   c. Under removed flooring within warehouse.
   d. 6 feet from side door entrance in south direction.
   e. 12 feet from side door entrance in south direction.