

UNITED STATES GOVERNMENT

Memorandum

TO : Files

DATE:

DEC 28 1964

FROM : Robert L. ²⁰⁰Jayfield
Source and Special Nuclear Materials Branch, DML

SUBJECT: TERMINATION OF SPECIAL NUCLEAR MATERIAL LICENSE NO. SNM-154 - SPENCER CHEMICAL COMPANY, MERRIAM, KANSAS - DOCKET 70-146

DML:RLI

On November 20, 1962, the Spencer Chemical Company requested termination of Special Nuclear Material License No. SNM-154 covering activities performed by the Company at their "Jayhawk Works" plant near Pittsburgh, Kansas. In reply to the Spencer request, we transmitted by letter dated December 18, 1962, certain conditions which we believed should be met for termination of the license. The Spencer Company submitted the results of their surveys of the facilities concerned in letters dated January 29, and March 2, 1964. The maximum external radiation level reported was 0.5 mr/hr at one centimeter and the highest alpha activity was reported as 271 d/m/100 cm²; beta activity 874 d/m/100 cm². On April 30, 1964, Region IV, Division of Compliance, visited the "Jayhawk Works" plant to conduct a close out inspection. The inspector made a thorough investigation, taking smears and radiation level readings at various points in the facility, and identifying certain areas of consideration such as a burial ground for contaminated equipment, incineration of contaminated combustibles, and holding pond for plant sewage. In summary of the inspector's conclusions, it appears that the facilities formerly used in conjunction with License No. SNM-154, meet our expressed conditions for termination of the license. (A copy of the inspection may be seen in the files for Docket 70-146)

In this inspection report there appears only one area where there might be some concern for an unknown factor - the holding pond. However, considering that the pond is within the confines of Spencer Chemical Company's property, that the pond is still used for sewage disposal and the liquid turnover (25 million gallons per day) in the pond, it does not appear that there should be any great concern over the radioactive material which might be held in the pond residue.

Upon consideration of the licensee's reports and those submitted by the Region IV, Compliance Office, I believe that release of any remaining facilities at the licensee's "Jayhawk Works" plant for unregulated use would not be detrimental to the public and therefore License No. SNM-154 should be terminated.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

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on 1-1-64
action required
No enforcement
File
Leo Dubinski, Assistant Director for
Materials, Division of Compliance, H.

6. P
M
MAY 20 1964

Donald I. Walker, Director
Region IV, Division of Compliance
Original Signed
Donald I. Walker
Denver

SPENCER CHEMICAL COMPANY, MERRIAM, KANSAS - SPECIAL NUCLEAR
MATERIAL LICENSE NO. SNM-154 (DOCKET NO. 70-146)

CO:IV:GHS

The subject licensee's "Jayhawk Works" was visited by George H. Smith, Radiation Specialist, Region IV, Division of Compliance, on April 30, 1964. The "Jayhawk Works" are located approximately twenty-two miles south of Pittsburg, Kansas. The purpose of the visit was to conduct a close-out inspection of the subject licensee's facilities as was requested by T. W. Brockett, CO Headquarters, in his memo route slip of April 13, 1964.

The following persons were contacted during the course of the visit:

George E. Chenoweth, Works Engineering Manager,
Jayhawk Works, Pittsburg, Kansas

Ralph J. Jopp, Assistant Superintendent, Specialty
Chemicals, Jayhawk Works, Pittsburg, Kansas

Norman A. Greenlee, Research Engineer,
Merriam, Kansas

The writer was accompanied, during the course of the visit, by S. J. Reno, Director, Industrial Radiation and Air Hygiene, Kansas State Department of Health, and G. L. Oldfield, Supervisor, Radiation Hygiene Service, Kansas State Department of Health.

Mr. Chenoweth stated that, prior to the sale of their Nuclear Fuels Department to Kerr McGee Oil Industries, Inc. (Source Material License No. SMB-664 and Special Nuclear Material License No. SNM-695), he was Superintendent of the Nuclear Fuels Department, and that Mr. Jopp was the Assistant Superintendent of the Nuclear Fuels Department.

Mr. Chenoweth stated that all processing of radioactive material was conducted in Buildings 702 and 709. A description of the facilities was submitted with the licensee's letter to the Division of Licensing and Regulation dated April 7, 1959. Chenoweth stated that 95 percent of the processing was conducted in Building 702 and that the remaining 5 percent of the operation was conducted in Building 709. Chenoweth stated that one of the conditions of the sale of the Nuclear Fuels Department to Kerr McGee Oil Industries was that all equipment associated with the processes would be transferred to Kerr McGee.

Chenoweth stated that in September 1962 (he could not remember, nor did he have a record of the exact date), after Kerr McGee Oil Industries, Inc., had removed all of the equipment that they wanted from the two buildings, Building 702 was thoroughly washed down with soap and water. Chenoweth said that after the building was washed down, all remaining equipment was removed from the building and was transferred to the disposal pit. The disposal pit is located on Spencer Chemical Company property in an open field approximately 0.4 miles from the nearest "Jayhawk Works" building. It was observed that the pit is approximately one mile from the nearest perimeter fence of the licensee's property. Chenoweth stated that this pit was approximately 100 feet wide, 200 feet long, and 8 feet deep. Chenoweth said that, after all equipment had been removed, Building 702 was surveyed; Chenoweth said that a civil defense Geiger counter was borrowed from the Pittsburg, Kansas, Civil Defense Agency for the purpose of conducting this survey. Chenoweth said that a record of the survey was not maintained but that the survey indicated that the building was not highly contaminated. Chenoweth said that after the survey, the building was cut up into sections and transported to the disposal pit on a fork-lift truck. Chenoweth said that the sectioned building was then burned in the pit and the pit was filled and tamped. It should be noted that the licensee reported the incineration of the building in their letter to AEC of January 29, 1964. It was observed that the pit area has been planted in grass; Chenoweth said that the planting was done to prevent wind erosion. Chenoweth said that he was sure that Spencer Chemical Company would never sell the land on which the pit was located.

Jopp stated that after Building 709 was thoroughly washed down with soap and water, he surveyed the building for external radiation and contamination. Jopp stated that the civil defense Geiger counter was used for the external radiation survey and that the smears which were collected during the contamination

survey were sent to the Kansas State Department of Health for analysis. A review of the records showed that the survey consisted of taking external radiation readings and smears at six locations on the facility's floor and at two locations on the facility's walls; the direct radiation readings were recorded as ranging from a low of 0.05 to a high of 0.3 mr/hr beta-plus-gamma and a low of 0.04 to a high of 0.06 mr/hr gamma. The analysis results of the smears as reported by the Kansas State Department of Health ranged from a low of zero to a high of 271 dpm/100 cm² removable alpha; a low of 13 to a high of 874 dpm/100 cm² removable beta; and, all smears were reported as zero for removable gamma activity.

Chenoweth stated that the water which was used during the cleaning of the two buildings was released directly to the plant's sewage system. Chenoweth stated that the plant's sewage goes to a holding pond and is subsequently released to the Spring River. Chenoweth stated that he did not know the exact size of the holding pond, but that the liquid turnover in the pond (the plant input versus the quantity of liquid released to the river is equal), was approximately 25 million gallons per day and that this quantity represents a small fraction of the total liquid contained in the holding pond. Reno stated that the State had taken monthly liquid samples from the holding pond and the Spring River, but that they had stopped taking these samples in July 1962 (decontamination of the building was conducted in September 1962).

The writer observed that, with the exception of a few light fixtures and one work bench, Building 709 was completely stripped. Chenoweth stated that, as of April 30, 1964, Building 709 is used only for temporary storage of plant equipment, i.e., electrical motors, pumps, etc., which are held in standby, and that they "would like to tear the building down because it is nothing but an eyesore". It was observed that some of the inner walls of the building were of three-foot thick concrete and that these walls contained as many as sixty pipe penetrations.

The following instruments were utilized to conduct a survey of the facility:

1. A Friescke Hoepfner, Model FH-40-T, which was calibrated by the Dow Chemical Company, Rocky Flats Division, on April 6, 1964. This instrument is equipped with an audible accessory and the detector tube has a tissue equivalent thickness of 30 milligrams/cm².

2. An Eberline Instrument Company "Portable Alpha Counter Scintillation Type", Model PAC-1SA. This instrument was calibrated by the Dow Chemical Company, Rocky Flats Division on April 7, 1964. This instrument has an active detector area of approximately 60 cm^2 and an efficiency of approximately 50 percent.

The survey was conducted as follows: approximately twenty smears were taken at random from the floor, walls, light fixtures, etc., of the facility. The facility was then thoroughly surveyed with the portable alpha and beta-gamma detection instruments; whenever a reading in excess of 200 cpm was noted on the alpha survey instrument, a smear of the area was taken (a reading of 200 cpm on the alpha survey instrument is equivalent to $675 \text{ dpm}/100 \text{ cm}^2$). By utilizing the aforementioned technique, the writer collected a total of 38 smears. During the collection of the smears, Whatman 41 filter paper was utilized, and an area in excess of 100 cm^2 was smeared; the smears were analyzed by the Health Physics Section, Dow Chemical Company, Rocky Flats Division. A compilation of the results of the survey follows:

1. The maximum reading obtained with the portable alpha survey instrument was 5000 cpm (this reading is equivalent to $16,000 \text{ dpm}/100 \text{ cm}^2$). This reading was noted on an electrical conduit on one wall of the facility. The next highest reading obtained was 2000 cpm (this reading is equivalent to $6,700 \text{ dpm}/100 \text{ cm}^2$). This reading was noted in one corner of the floor of the facility. All other readings were less than 1500 cpm (the equivalent of $5000 \text{ dpm}/100 \text{ cm}^2$).
2. All readings obtained with the portable beta-gamma survey instrument were background. The audible attachment was utilized with this instrument.
3. The maximum removable alpha contamination noted on one of the smears was $894 \text{ dpm}/100 \text{ cm}^2$. This smear was taken from the top of a light fixture in the facility. The next highest quantity of removable alpha contamination was $346 \text{ dpm}/100 \text{ cm}^2$; this smear was also collected from the top of a light fixture. With the exception of the two aforementioned smears, all removable contamination was less than $200 \text{ dpm}/100 \text{ cm}^2$. Two smears were taken on the electrical conduit from which the highest reading was observed with the portable alpha survey instrument; these smears showed levels of 46 and 63 $\text{dpm}/100 \text{ cm}^2$ removable alpha contamination.

4. The maximum amount of removable beta-plus-gamma contamination noted was 490 dpm/100 cm². This level was noted on one of the smears taken from a light fixture discussed in subparagraph 3, above. With the exception of the aforementioned smear, all smears were less than 200 dpm/100 cm², removable beta-plus-gamma contamination.

In conclusion it is noted that:

1. The licensee has not conducted a rigorous survey of the remaining facility. However, the survey which was conducted by the inspector indicates that the facility is not contaminated to levels exceeding the standards specified in AEC's letter of December 18, 1962.
2. The licensee did not retain a record of the survey which was conducted in September 1962, on Building 702, as specified in 10 CFR 20.401(b). Therefore, it cannot be determined if the licensee incinerated licensed material in violation of 10 CFR 20.305.
3. The licensee did not conduct a survey as required by 10 CFR 20.201(b), prior to releasing potentially contaminated water to the unrestricted area in order to determine compliance with the limits specified in 10 CFR 20.106(b).

The results of the writer's external radiation survey and the deficiencies noted were discussed with Chenoweth, Jopp and Greenlee at the termination of the inspection.

cc: ✓ R. G. Page DCLR
D. A. Nussbaumer LBL

APR 7 1964

Leo Dubinski
 Assistant Director for Materials, CO
 THRU: R. G. Page, Chief, Enforcement Branch, S&LR
 Donald A. Nussbaumer, Chief
 Source and Special Nuclear Materials Branch
 Division of Materials Licensing
 SPENCER CHEMICAL COMPANY, MERRIAM, KANSAS, DOCKET NO. 70-146,
 LICENSE NO. SNM-154.

DML:RLI

Enclosed is a letter dated March 2, 1964, from the subject licensee specifying the results of a survey of residual contamination remaining in their facilities. The licensee has requested termination of his license.

In view of the type and scope of work performed at this facility, we request that a close-out inspection of this facility be performed, and the results forwarded to this office so that we may close this license file.

Attachment:
 Cy ltr. dtd. 3-2-64

OFFICE ▶	ML	ML	S&LR		
SURNAME ▶	RLayfield	DNussbaumer	RPage		
DATE ▶	4/6/64	4/7/64	4/8/64		



DOCKET NO.

70-146
For Div. of Compliance

Spencer Chemical Company
Research Center
9009 WEST 67TH STREET
Merriam, Kansas

March 2, 1964

File: 9900

Mr. Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Nussbaumer:

This is to supplement our letter of January 29, 1964
concerning termination of SNM-154 (Docket No. 70-146).

We have now received the results of activity counts on
smear samples taken at various points throughout the
building. The highest alpha activity was 271 d/m/
100 cm² and the highest beta activity was 874 d/m/
100 cm². In all cases the gamma activity was found to
be not significantly different from background.

Very truly yours,

N. A. Greenlee

N. A. Greenlee

NAG:gb

RECEIVED

MAR 18 1964

IN COMPLIANCE



70-146

For Div. of Compliance
GDB

SPENCER
Spencer Chemical Company
Research Center
9009 WEST 67TH STREET
Merriam, Kansas

January 29, 1964

Mr. Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Nussbaumer:

This is in reply to your letters of December 18, 1962 and January 6, 1964 requesting information prior to termination of SNM-154 (Docket No. 70-146).

Processing of uranium under this license was carried out in two separate buildings. The equipment was decontaminated and most of it transferred in the sale of the Nuclear Fuels Department. One of the buildings was decontaminated, dismantled, burned, and buried.

The remaining building has been thoroughly checked with a Geiger counter. The highest radiation level detected anywhere in the building at 1 cm. from the surface was 0.5 mr/hr. for beta plus gamma radioactivity.

Smear samples have also been taken throughout the building and submitted for a radioactivity count. Results will be forwarded as soon as they are available.

Sincerely,

N. A. Greenlee

N. A. Greenlee

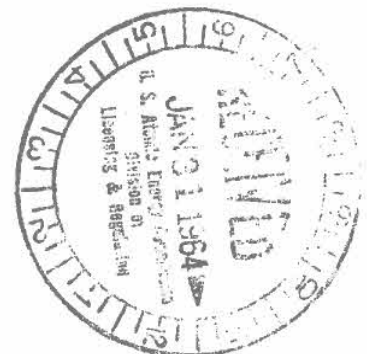
NAG:gb

RECEIVED

FEB 17 1964

IN COMPLIANCE

From CO - Hdqrs.



ACKNOWLEDGED

16

SEP 3 1962

Donald I. Walker, Director
Region IV, Division of Compliance

Roger T. Woolsey, Radiation Specialist (Reviewer)
Region IV, Division of Compliance

Original signed by
Roger T. Woolsey

SPENCER CHEMICAL, PITTSBURG, KANSAS

CO:IV:RTW

Recent correspondence indicates that this firm has been purchased by Kerr-McGee, and that they plan to move their operations to the "State" of Oklahoma.

Suggest that we determine what actions they plan to take towards releasing their present site.

cc: Glen Brown, Radiation Specialist (Supervisory)
Region IV, Division of Compliance

OFFICE ▶	CO:IV					
SURNAME ▶	RT Woolsey:ew					
DATE ▶	9/3/62					

MAY 29 1962

Howard K. Sheper
Counsel, Licensing and Compliance

Donald A. Nussbaumer, Chief
Source and Special Nuclear Materials Branch

SPENCER CHEMICAL CO., - IN THE MATTER OF REVOCATION OF
AMENDMENT TO LICENSE AND DENIAL OF APPLICATION FOR LICENSE
AMENDMENT DOCKET 70-146

LR:JJL

Please draft an Order to the Spencer Chemical Company to
(a) revoke an amendment to their license ~~SW-154~~ granted
September 11, 1961, in response to their application
dated August 3, 1961, and (b) deny without prejudice
their application for license amendment dated September 21, 1961.

The attached Analysis and Findings sets forth in detail the
background and basis for this Commission action. We will be
glad to discuss this matter with you.

Attachment

OFFICE	LR	LR				
SURNAME	JJLane/ey	DANussbaumer				
DATE	5/21/62	5/29/62				

MAR 26 1962

L. Dubinski, Asst. Dir. for Materials
Division of Compliance

R. E. Cunningham, Chief, Enforcement Branch
Division of Licensing and Regulation

COMPLIANCE INSPECTION REPORT FOR SPENCER CHEMICAL COMPANY
DWIGHT BUILDING
KANSAS CITY, MISSOURI
INSPECTION CONDUCTED ON MAY 2 - 5, 1961

LICENSE NOS. C-4352 (DOCKET NO. 40-6673)
SM-154 (DOCKET NO. 70-146) ✓
SM-329 (DOCKET NO. 70-146)

LR:CMW

Attached is a notice of violation to subject licenses for
your concurrence.

We are not citing the licenses for exposing individuals in
excess of the limits specified in Section 20.103(a),
since there is not sufficient information provided in the
report to establish that any individual has been exposed to
average weekly concentrations of airborne radioactivity in
excess of the MPC. We are citing the licenses under
Section 20.201(b) for failure to conduct surveys sufficient
to determine compliance with Section 20.103(a).

In addition, we are requesting that the licenses submit
weighted exposure data on employees who work in areas with
air concentrations in excess of the MPC.

SIGNED CONCURRENCE COPY IN DOCKET 70-146

OFFICE ▶	LR:EB CGW:lrw	LR:EB RECunningham				
SURNAME ▶	CGW	RECunningham				
DATE ▶	3-16-62	3/21/62				

UNITED STATES GOVERNMENT

Memorandum

TO : Robert Lowenstein, Acting Director
Division of Licensing and Regulation, Hq

DATE: JUN 30 1961

FROM : *R T Woolsey*
Roger T. Woolsey, Acting Director
Compliance Division, AL

SUBJECT: SPENCER CHEMICAL COMPANY, KANSAS CITY, MISSOURI, (JAYHAWK WORKS, PITTSBURG, KANSAS); LICENSE NOS. C-4352, SNM-154 AND SNM-329, AL INSPECTION NO. 794

PC:AJW (3007)

Enclosed is a report of an announced inspection of the subject licensee.

Those interviewed during the inspection included Mr. George Chenoweth, Supervisor of the Nuclear Fuels Section; Mr. Ralph Jopp, Assistant Supervisor of the Nuclear Fuels Section; Mr. James Wood, Safety Analyst of the Nuclear Fuels Section; Mr. Donald Rohdes, Senior Chemist and Senior Supervisor of the Technical Area (Building #702 or "T"-House); Mr. Nori Greenlee, Senior Staff Member (Kansas City office).

Mr. Chenoweth is directly responsible for the health and safety of all personnel and facilities of the Nuclear Fuels Section located at the Jayhawk Works. Mr. Wood, Mr. Rohdes and Mr. Greenlee have been delegated the responsibility by Mr. Chenoweth or Mr. Lambertus (General Manager, Kansas City office). Mr. Wood is actually the accountability officer and about 10% of his time as safety analyst for the Nuclear Fuels Section. Mr. Rohdes is a consultant safety man to Mr. Chenoweth. Mr. Greenlee has assigned control of all written instructions and license applications regarding health and safety including all criticality aspects. His office is at Kansas City, Missouri and he visits the Jayhawk Works as he deems necessary or when called upon by Mr. Chenoweth. These delegations of responsibility are an outcome of the last inspection.

Mr. Chenoweth and Mr. Greenlee have an excellent knowledge of the applicable rules and regulations pertinent to the operation. The rest of the interviewees only had a fair knowledge of the pertinent rules and regulations.

Plant #2 used for processing uranium with enrichment less than 5% seems adequate although it was not thoroughly checked from the criticality aspect.

(continued)

JUN 30 1961

The change areas, shower area and lunch room have been completely separated from Plant #2 thereby minimizing the contamination hazard to these areas. Building #702 ("T" House), on the other hand, has been gradually taken over by the Nuclear Fuels Section. It is the inspector's opinion that the layout of the "rooms" (work areas) is poor because contamination may be carried from one area to another. These areas, which should be clean at all times, include the lunch room, shower and locker area, wash room, etc. This opinion is borne out by the contamination survey results which indicate that contamination had been spread to the various "cold" areas. Housekeeping was only fair in this building. The change area was inadequate and poorly located in that it was used as a "hot" and "cold" change area. Access to this change area is through the wash room (cold area). Personnel who may be wearing contaminated clothing go through the wash room to get to the change room; therefore they could spread contamination through this cold area.

The respirators used by the personnel were on a shelf in the hall. They were examined by the inspector and those observed were not clean. They were dusty and this dust may have been uranium dust. There is no adequate place to clean and store these respirators. There was clothing piled up on top of the lockers in the change area and a respirator was stuck into a work shoe. Some of the floor tiles in the wash room were missing and thereby made a good perspective catch-all for contamination.

The laundry is located next to the room processing 93% material. The men wash their own work clothes and there is no area for sorting or changing this dirty or clean clothing. This condition permits the possibility for the men to contaminate their street clothes if these are worn during the washing process. The possibility of airborne contamination also exists during the movement of potentially contaminated clothing. These possibilities in some cases were a reality in the fact that the contamination survey records indicated that the laundry was contaminated at one time or another.

It should be noted that the licensee tries to maintain a clean operation in that the area is wet mopped and vacuumed on a daily basis. Wherever the survey indicated contamination, the area in question was immediately cleaned. Also, if an area "looked" as though it needed cleaning, it was cleaned.

It seems that the licensee's biggest "enemy" is the building layout (see Appendix B of the report proper).

In regard to personnel exposure, it is noted that the film badges were unduly high for operations such as the licensee performs. The maximum

(continued)

JUN 30 1961

for 1960 indicate 960 mr/month for gamma and 880 mr/month for beta (not on same badge). The vendor's result sheets also indicate that greater than 50% of the badges show evidence of contamination. If this is so, then the film badge results are erroneous and the evidence of airborne contamination (uranium dust settling on the badges) is very strong. The result sheet further indicated that this condition existed for more than a year (January, 1960 to February, 1961). The licensee took no action to correct this situation until March, 1961 at which time the badges were placed in plastic bags to prevent contamination.

The contaminated film badge situation and the situation in the "T"-House indicates to the inspector that management is somewhat lax.

The discrepancies noted during this inspection include: (1) failure to follow procedures indicated as a condition of the license; (2) failure to make surveys to determine contamination in unrestricted areas, and (3) exposing personnel to airborne contamination. These discrepancies, as well as the situation in Building 702 ("T"-House) and the contaminated bags were discussed with the interviewees who indicated that measures would be taken to rectify the noted discrepancies.

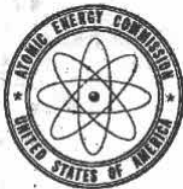
It is recommended that the licensee be cited for the discrepancies noted in paragraph six of this report. This letter should request the method of corrective action and when it is instituted. The correspondence should be forwarded to Mr. Harold Lambertus at the Kansas City, Missouri office of the Spencer Chemical Company. A copy should be forwarded to Mr. Che at the Jayhawk Works of this licensee.

A reinspection of this licensee is due in October, 1961. It would be appreciated if the correspondence is completed prior to the reinspection.

Enclosure:

AL Inspection No. 794.

cc: L. D. Low, Dir, Div of Comp, Hq w/encl
Compliance Division, OROO w/encl



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

IN REPLY REFER TO:

ENCL. 1
73-146

DEC 28 1964

DELETED

CO: 1 V
Walker W
Brown BM
Brady Z
Ellen

Spencer Chemical Company
Research Center
1009 West 6th Street
Berrien, Kansas

Attention: Mr. E. J. Greenlee

Gentlemen:

The information contained in your letters dated January 29, and March 2, 1964, regarding the levels of uranium contamination remaining in your facility after completion of decontamination procedures, has been reviewed in connection with the activities performed under the license.

As a result of this review, we have concluded that due to the insignificance of the contamination which might be present in this particular instance, no hazard to health and safety is involved, and no license would be required for any persons possessing or occupying such facilities. Therefore, pursuant to your letter of November 20, 1962, license 524-174 is hereby terminated.

Sincerely yours,

Lyall Johnson
Acting Director
Division of Materials Licensing

DELETED

Office of the Director of Regulation

DISSEMINATION:
Mr. A. Div. 216
Englehardt
Suppl.
N. J. McAluff, CEO
D. George, RM
H. Deules, ME
D. Hunsbarger, ME
R. Layfield, ME
State Health

From CO - Hdqrs.

DOCI

70-146

SPENCER CHEMICAL COMPANY
Research Center
9009 West 67th Street
Merriam, Kansas

For Div of Compliance

November 20, 1962

Mr. Lyell Johnson
Assistant Director for Materials Licensing
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Washington 25, D.C.

Dear Mr. Johnson:

This is in reply to your letter dated October 26, 1962, referring to our Special Nuclear Material License SNM-154 and our letters of August 3 and September 20, 1961.

The last shipment of enriched uranium held under SNM-154 was made to Station COC on May 12, 1961. Our Material Status Report (AEC-578) for the period ending June 30, 1962, reported that Spencer had no special nuclear material on hand, and none has been received since that time.

Since we have discontinued all activities with special nuclear material and dismantled processing equipment, there is no need to keep SNM-154 active. Please advise if we need to take further action to terminate SNM-154.

Very truly yours,

N. A. Greenlee

N. A. Greenlee

NAG:fg



RECEIVED
DEC 28 1962
IN COMPLIANCE

From GO - Hdqrs.



UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D.C.

IN REPLY REFER TO:

MAIL
70-116 and 70-110

Spencer Chemical Company
Research Center
9009 West 67th Street
Merriam, Kansas

Attention: Mr. H. A. Greenlee

Gentlemen:

This refers to your letter of November 20, 1962, informing us of your action to terminate License SM-15a.

At least fifteen days prior to vacating this facility, or using it for any purpose other than authorized under your license you are requested to submit to us a report indicating the levels of fixed and removable uranium contamination existing in the facilities. We believe the following levels should not be exceeded:

1. For alpha radioactivity
 - a. 25,000 d/p/100cm² peak
 - b. 5,000 d/p/100cm² average
 - c. 1,000 d/p/100cm² maximum removable by wiping the area with a dry filter or soft absorbent paper.
2. Beta and Gamma
 - a. 1.0 millirad per hour maximum at one centimeter from any contaminated surface measured with a beta-gamma survey meter through a tissue equivalent absorber of 0.04 cm thickness.
 - b. 0.2 millirad per hour average, measured as above.
 - c. 1,000 d/p/100cm² maximum removable by wiping the area with a dry filter paper or soft-absorbent paper.

Consideration will be given to cancellation of License SM-15a on receipt of your report of contamination levels. Please note that pipes, columns, ducts or other areas difficult to survey for built-up contamination must be treated as containing special nuclear material and should be disposed of prior to termination of the special nuclear material license.

DEC 20 1962

U.S. MAIL

0 - Hdqrs.

TV

Brown
Wooler RW
Whelan W

we probably should
do a survey of facility
prior to closing out
license. Roy
DEC 18 1962

Spencer Chemical Company

- 2 -

DEC 18 1962

In connection with the expiration of License SM-329 you are requested to submit at least fifteen days prior to vacating the facility under License SM-329 or using it for any purpose other than previously authorized under your license a report indicating the levels of fixed and removable uranium contamination existing in the facility. We believe that the levels outlined in items 1 and 2 above should not be exceeded and similar consideration, as previously mentioned, should be given to those areas of equipment which are difficult to survey for built-up contamination.

FOR THE ATOMIC ENERGY COMMISSION

Donald A. Hunsbauer, Chief
Source and Special Nuclear Materials Branch
Division of Licensing and Regulation

Distribution:

Compliance Hdqrs (2) w/2c ltr dtd 11/20/62

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DEC 28 1962

IN COMPLIANCE

DOCKET 1

SPENCER

Spencer Chemical Company

DWIGHT BUILDING

Kansas City 5, Missouri

Nuclear Fuels Department

January 21, 1959

*File G.
Telephone
BA-1-6600*

Mr. J. C. Delaney
Licensing Branch
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Washington 25, D. C.



Dear Mr. Delaney:

Under our Source Material License No. C-4352 we have been conducting certain experiments on the thermal densification of uranium oxide powders. We now wish to modify our Special Nuclear Material License SNM-154 to permit the use of these same techniques on enriched materials.

Since we consider these techniques to be company-confidential, the details are covered in an appendix attached hereto, and we request that this appendix be withheld from public inspection.

We have already received orders for experimental quantities of materials produced by this process. A prompt consideration of this modification request will, therefore, be sincerely appreciated. Please telephone collect if there are any questions regarding this request.

Sincerely,

L. H. Landrum
L. H. Landrum, Director
Nuclear Fuels

LHL:el

Enclosure: ~~Company confidential appendix~~
as noted above.

3/4/59

Spencer Chemical Company

Nuclear Fuels Department

DOCKET NO. 70-146

File 4



APPENDIX TO MODIFICATION REQUEST SNM-154

January 21, 1959

~~COMPANY CONFIDENTIAL~~

DOCKET N

7-2-46
File by

Spencer Chemical Company
Nuclear Fuels Department

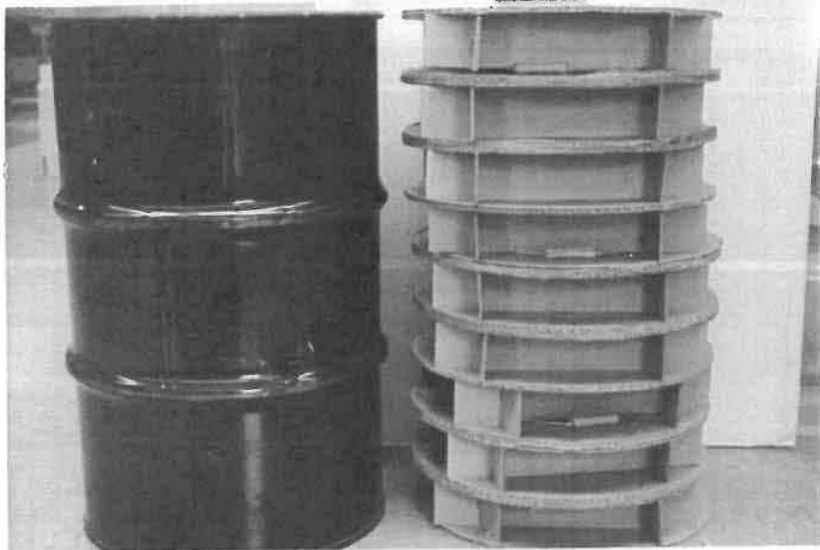
APPENDIX TO LETTER DATED JANUARY 21, 1959

~~COMPANY-CONFIDENTIAL~~

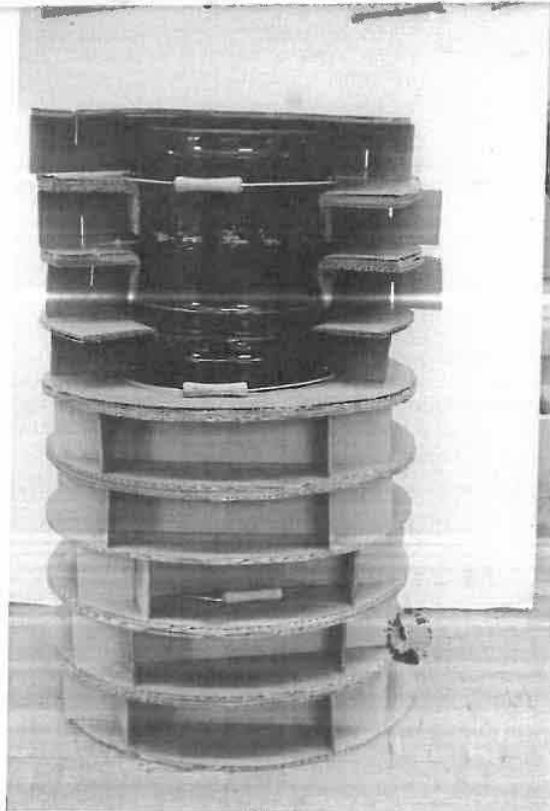
Under our Source Material License C-4352 we have been conducting laboratory scale experiments aimed at the densification of uranium oxide powders by heating these powders electrically in refractory crucibles. The results have been encouraging, and we now wish to extend this work to enriched uranium under our Special Nuclear Material License SNM-154. This is a batch process, and criticality problems will be avoided by limiting the material charged to the crucible to less than 1 pound of U-235 per batch. The materials and the surrounding atmosphere are dry and non-hydrogenous. The operation will be conducted within a force-ventilated enclosure and suitable traps and filters will remove any entrainment. The operator will control the operation from outside this enclosure.

As stated in the cover letter, we have customers awaiting experimental quantities of material produced by this process. We would, therefore, sincerely appreciate a prompt consideration of this request.

L. H. Kaufman



1



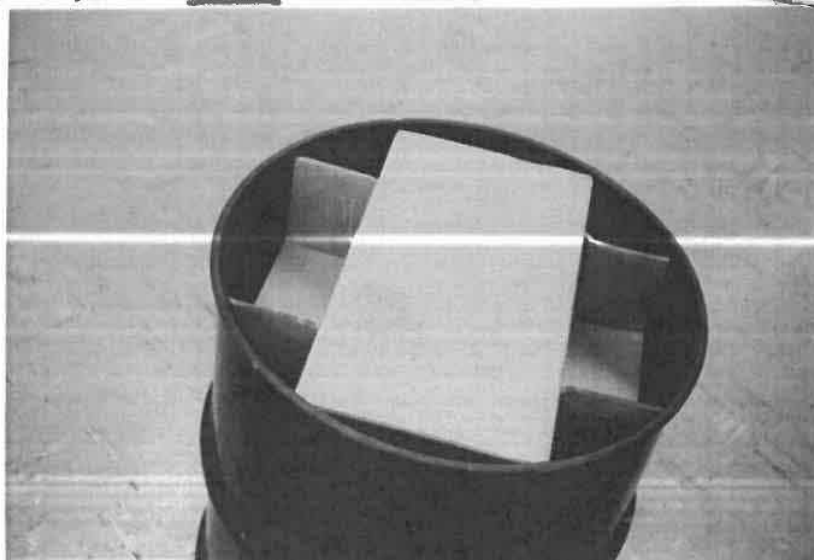
2

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Photos 142



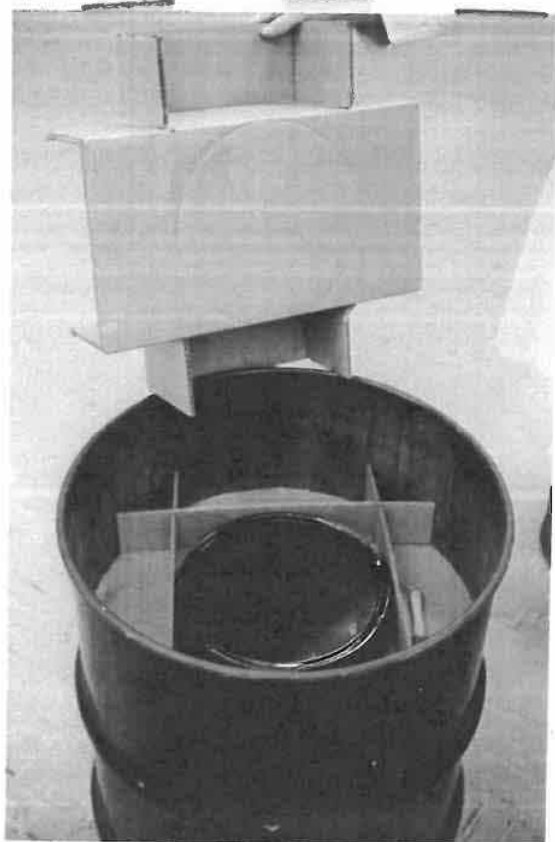
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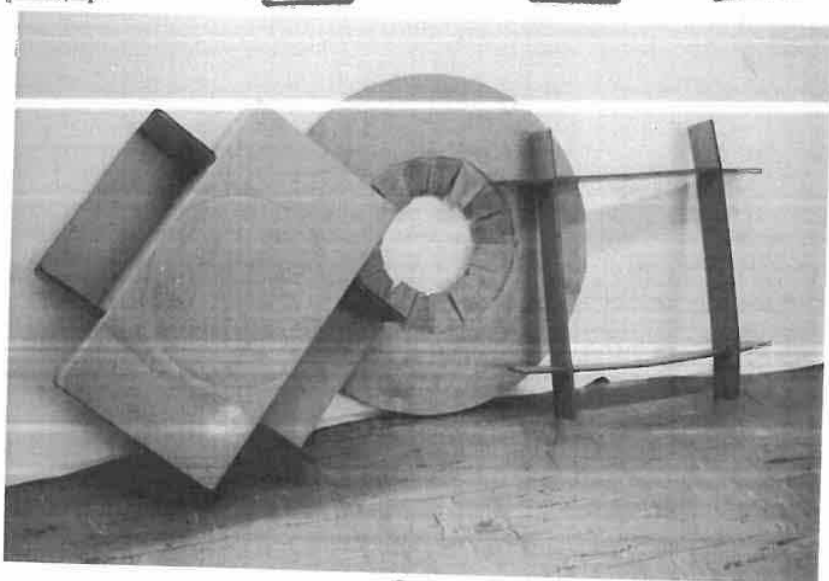
4

Please do not remove
R.D.
10/31

Photos 3 + 4



5



6

Please do not remove
R08/02/1

Photos 5 & 6

DOCKET

SPENCER CHEMICAL COMPANY
PROCESS DEVELOPMENT DEPARTMENT

70-146
Filey



MODIFICATIONS TO
SPECIAL NUCLEAR MATERIAL LICENSE SNM-154

May 16, 1958

APPENDIX II A

~~(This section is to be held in confidence
between Spencer Chemical Company and the
U. S. Atomic Energy Commission, and should
not be revealed to the general public.)~~



6/20/58
Filed

APPENDIX II A

A. CHANGES TO BASIC FULLY ENRICHED PLANT

1. Columns. To increase the throughput of the plant, two additional columns 2 inches I.D. by 17 feet long will be installed on a 2-foot center-to-center spacing in the same plane as the existing columns. Separating sections will be 6 inches I.D. by 2 feet long. Provisions were made in the original layout for the installation of 2 additional columns.
2. Evaporator. An evaporator of the thermal syphon type has been installed in the process between the strip column and the precipitator. Its physical location is shown on Drawings 48-12 and 48-13, and it is designated "Item 11" on Drawing 48-13. It is of always-safe diameter (slightly less than 5 inches).
3. Precipitator. The change from the original application is that two identical precipitator vessels may be located in two of the three positions as shown on Drawings 48-12 and 48-13. These are vessels 5 inches I.D. by 2 feet long where ammonia and uranyl nitrate are brought together forming a slurry of up to about 45% solids. The closest approach of the precipitator in any of the three positions to any other processing vessel or furnace is 3 feet.
4. Filter. The filters (vessels V-11 and V-12, page B-2, as shown in the original application) have been deleted. The slurry from the precipitate will be fed directly to the furnaces.
5. Dissolver. The dissolver (V-14), which is a 5 inch I.D. by 6 foot vessel, has been moved to the location shown on Drawing 48-9.
6. Blender. A blender will be installed in line with the dry box and will be operated in conjunction with the dry box on "mass safe" criteria for dry powders (less than 1% moisture), which is 18.5 Kg of contained U-235 (LA-2063) -- (safety factor of two for double batching error.) That is, the total amount in the dry box and blender will not exceed the 18.5 Kg of contained U-235.
7. Storage Vault. The storage of incoming UF₆ and product will not be in the processing building as originally proposed. There is a reinforced concrete vault with a steel, combination lock door, 14 feet by 20 feet, located nearby on protected plant property, which will be used for storage. All incoming UF₆ and product containers will be caged in the vault at all times to maintain 12 inch edge-to-edge minimum and 2 foot center-to-center as specified in LA-2063.
8. Change Room and Lockers. These facilities will be located on the plant property in a building separate from the processing building.
9. Product from Plant. We expect to expand our product to include other oxides of uranium such as UO₃ and U₃O₈.



APPENDIX II A



B. ADDITION OF EQUIPMENT FOR HANDLING
ENRICHMENTS UP TO 10% U-235

The reason for providing this equipment is:

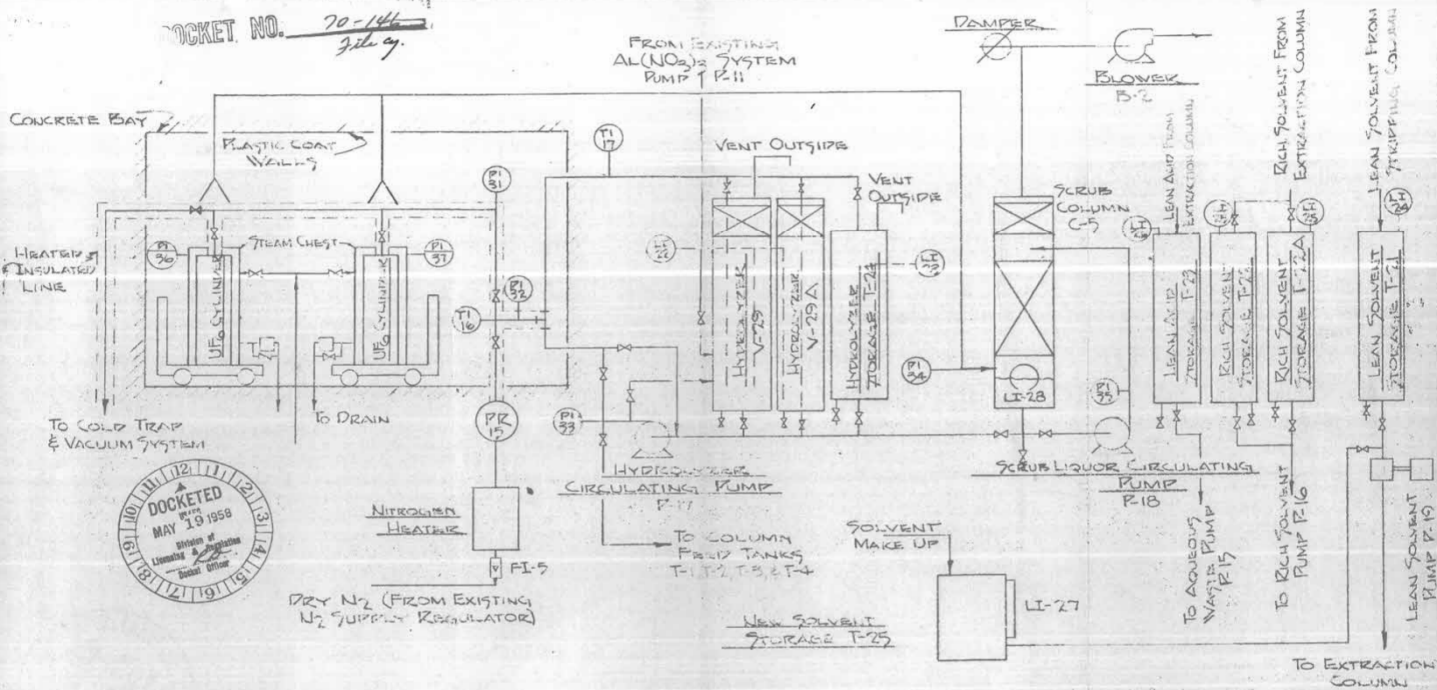
1. To permit ease in operation.
2. To enable a higher production rate.

These conditions dictate maintenance of relatively high solution volumes in inventory.

Therefore, as shown on the drawings, additional tanks are being installed for handling enrichment up to 10% U-235. These tanks will store hydrolyzed UF₆ solutions and streams from the basic plant when processing up to 10% enrichment. One UF₆ vaporizing system will serve up to the 10% enrichment. All tank spacing will conform to 12 inch edge-to-edge minimum and 24 inch center-to-center. Tanks for up to 5% enrichment will be 10.25 inches I.D., while tanks for enrichments $>5\% \leq 10\%$ will be 8.25 inches I.D. To preclude the possibility of transferring enrichments greater than 10% to the additional tanks, all lines connecting the tanks will be physically severed when the higher enrichments are being processed. When enrichments $>5\% \leq 10\%$ are being handled, the 5% enrichment tanks will be physically isolated.

DOCKET NO. 70-144
File 9.

FROM EXISTING
AL(NO₃)₃ SYSTEM
PUMP P-11



SPENCER CHEMICAL COMPANY
KANSAS CITY, MISSOURI

PROCESS DEVELOPMENT DEPARTMENT
UPPP FLOW SHEET UFG SYSTEM & TANKAGE FOR
ENRICHMENTS BELOW 5% U-235
DRAWN BY RM DATE 5/15/58 CHKD. BY WJ DATE 5/15/58
SCALE 1"=1'-0" PROJ. NO. 48-80 DWG. NO. 48-80

REVISE	NO.	DESCRIPTION	MADE BY	CHKD. BY	APPROV. DATE

Spencer Chemical Company

DWIGHT BUILDING

Kansas City 5, Missouri

P. L. WELLER, EASTERN REPRESENTATIVE
RESEARCH & DEVELOPMENT DIVISION
ROOM 5125
500 FIFTH AVENUE
NEW YORK 36, NEW YORK

March 13, 1958

Mr. Charles R. Manly
Chief, Commercial Development Branch
Division of Civilian Application
United States Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Manly:

It certainly was a pleasure to have an opportunity to make your acquaintance in Washington last week. I am happy to know about your great interest in the development of a civilian program for atomic energy. I know all of us here at Spencer will thoroughly appreciate whatever guidance and assistance you can give us.

Following your suggestion, I called Dave Short at Schenectady in regards to the sample of enriched scrap that we want to obtain for demonstrational purposes at the Norton Company. He advised me that the whole program was being shifted to the New York office. He, in turn, suggested that I contact S. J. Braiden there who I understand is the Chief Accountability Officer.

In explaining the request to Mr. Braiden, he thought it would be just as easy to obtain for us the 200 gram sample of fully enriched scrap at Norton. He felt that the Commission did not have any other material available in his area at this time. He requested that I write him a letter explaining the request and the purpose. This I have already done. Then he would arrange for the necessary paper work. This letter gave him Spencer's A.E.C. license numbers.

However, in discussing the transfer of this material, the subject of the use charge was mentioned. Mr. Braiden said that since the Commission also had an interest in seeing a demonstration of our scrap recovery program and in knowing the sintering properties of enriched material by our process, he felt the use charge could be waived. He stated that he thought the elimination of the use charge could best be handled through your office. Consequently, in view of the nature of this demonstration, I am wondering if you can make these arrangements for us. I feel sure the entire test should not take more than 45 days from the time we receive the material. We would guarantee a maximum of 3% loss in recovering the scrap from its present condition and, also, in recovering the material after sintering tests by Norton. The processing will, of course, be done at our cost. If you have any other questions on this proposition, I will certainly appreciate your advice.

200 gr x 17 = \$3400.00 - \$1351.00
The amount involved, a 2 month use charge
is about \$2050.00

Spencer Chemical Company

Mr. Charles R. Nealy

- 2 -

March 13, 1958

At the risk of making this letter too long, there are a couple of other matters I would like to mention at this time. The first is in regards to the uranium compounds requested by General Electric at San Jose. Mr. Taylor from your office called last week in regards to this subject, and I assume you already have received this information. Briefly we are not in position to supply samples on any of these compounds. We have no plans to manufacture or produce these materials experimentally. However, we are interested in knowing further details about General Electric's interest in these uranium compounds and their probably future demand. If there appears to be a potential for these compounds, we would certainly want to take them under consideration. We also, of course, realize that these questions may be difficult to answer because this is the result of a research program.

The other matter I want to mention is the letter of February 24, 1958, from the Commission authorizing field offices to purchase UO_2 and scrap recovery services from private sources. On March 12, 1958, I called on Lt. W. E. Darst, Accountability Representative at the Lockland office of the A.E.C., which, of course, comes under the jurisdiction of the Chicago office. I found that they can use considerable quantities of UO_2 here and have need for scrap recovery services. Also, I think the excellent sintering properties of Spencer's UO_2 powder will be of great value to the research program here. However, Lt. Darst said his office was not aware that they could purchase from sources other than Oak Ridge. Since, as I understand it, General Electric at this facility purchases from the A.E.C., they could just as well in the development of private sources buy from Spencer with approval of the local A.E.C. representatives.

We would like to submit samples of our material to General Electric at this A.N.P.D. laboratory, but Lt. Darst felt that he should first check on the authority to use material from private sources before we sent them. Therefore, realizing that it takes some time in any organization to have rulings circulated and confirmed, I am wondering if it would be appropriate to request your office to help us in this matter with Lt. Darst.

Again, let me apologize for this rather lengthy letter, but let me thank you for your kind interest. I will write you separately in regards to the proposed letter outlining, for your records, Spencer's entrance into the nuclear fuel field. I assume you will be at the Chicago meeting next week, and I will look forward to the possibility of visiting further with you at that time.

With kindest personal regards, I remain,

Sincerely yours,

Paul L. Weller

Paul L. Weller
Eastern Representative

PLW/12

From: <RElder@kdhe.state.ks.us>
To: <vxv@nrc.gov>
Date: Tue, Oct 31, 2000 12:14 PM
Subject: Jayhawk Chemical (Spencer) PLEASE READ

As dicussed FYI

----- Forwarded by Rob Elder/Kdhe on 10/31/00 12:12 PM -----

Sharon Watson

To: Rob Elder/Kdhe@Kdhe, William
Bider/Kdhe@Kdhe
10/31/00
11:55 AM cc: Victor Cooper/Kdhe@Kdhe, Tom
Conley/Kdhe@Kdhe
Subject: Jayhawk Chemical (Spencer) PLEASE
READ

SOME OF YOU MAY GET CALLS ON THIS, AND PROBABLY ALREADY HAVE, BUT
JUST SO WE'RE ALL ON THE SAME PAGE WITH THIS CONTINUING NEWS STORY:

Joann Smith with the Joplin Globe continues to get calls from the community and here rumors about Jayhawk. As most of you know, the county emergency management director, Jerry Eckhardt, has been complaining that this place still has nuclear contamination that needs to be cleaned up. NRC came down last week, and apparently couldn't substantiate his claims.

However, Jerry is telling the reporter that NRC did find something and did substantiate his claims. Yesterday, a question about 55 gallon drums being pulled from a dewatered pond (by KDHE) came up when someone called the reporter and told her this had happened. After talking to al of you, I learned it wasn't us.

Anyway, I suggested the reporter tell Jerry to call Bill Bider if he thought there was hazardous waste that wasn't being properly stored, disposed of, etc. I told her to check with the plant to see if they were doing any pond draining. She's planning to do that, as well as to call NRC, and to also call EPA to see if they are doing anything.

Jerry has given her many phone numbers of people he has had contact with in these organizations, including KDHE phone #'s. If you don't want to talk to her when and if she calls you, please refer her to me. I basically told her yesterday that no one from waste management, environmental remediation, or air & radiation was involved in a pond dewatering project in recent weeks.

Kansas Department of Health and
Environment
Clyde D. Graeber, Secretary
Division of Environment
Bureau of Air and Radiation
Forbes Field, Bldg. 283, Topeka, KS 66620

M E M O R A N D U M

DATE: Friday, September 29, 2000
TO: Case Number: KS000019
License/Reg No: NON LICENSEE
FROM:
SUBJECT: Preliminary Investigation Report

Case Number: KS000019
09/29/2000

Event Details

Abstract:

Received a phone call through the EPA (George Hess - 913-551-7540). The Cherokee County Emergency Coordinator (Gerald Eckhardt - 316-429-1857) had information of radioactive material buried at the Jayhawk Chemical facility North of Riverton Kansas.

Mr. Eckhardt was interviewed on 9/25/00. As a result of the interview, it was discovered the material involved was DOE/DOD fuel cycle and weapons production material. The original property owners were NRC licensees during the 1940's while this activity was in progress. The use of radioactive materials was terminated and the buildings demolished and burned with the ashes buried on site. KDHE management was notified and the decision was made to not visit the site but to return with the collected information and make contact with the NRC as this was not within KDHE jurisdiction.

Event Date/Time	Discovery Date/Time	Report Date/Time
		09/13/2000 1500 CDT

Licensee/Registrant Information:

Agreement State?:	no	Reciprocity:	
License No:	NON LICENSEE	Licensee:	NR
Docket:	NA	City:	NR
Program Code:	NA	State:	NR
Other License No:		NRC Region Office:	4

Site of Event:

License No:	Site Name:
	State:
Additional Involved Party:	Name:
License No:	City:
	State:

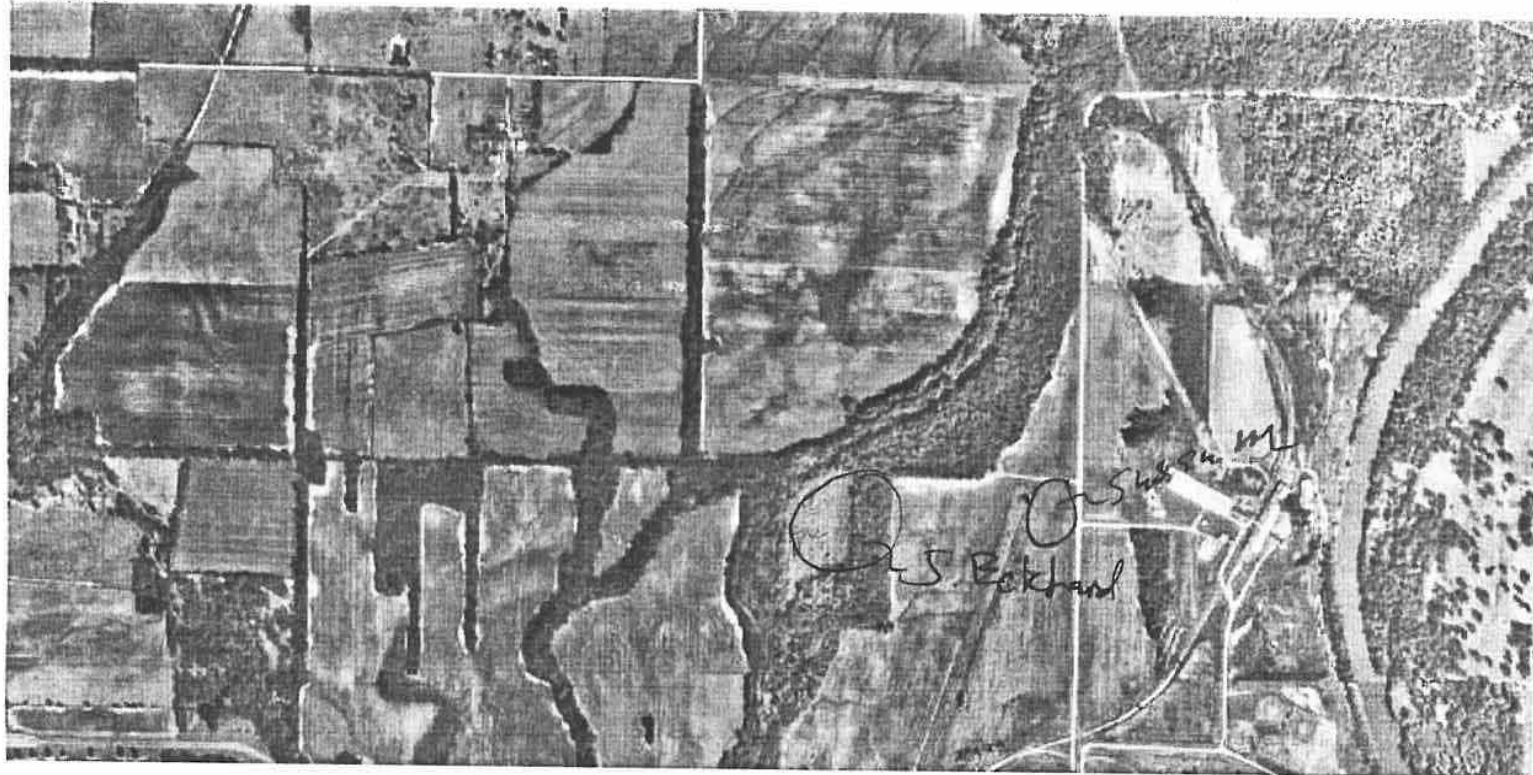
Other Information:

Microsoft TerraServer

Display Image

USGS Aerial Photograph

16 km W of Joplin, Missouri, United States 28 Feb 1995



KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
Division of Environment
Bureau of Air and Radiation
Radiation Control Program

LICENSEE/REGISTRANT TELEPHONE CALL RECORD

Instructions: Complete this form when contacting or contacted by a licensee/registrant regarding significant information about the license, registration or inspections. When complete the form is to be filed in the appropriate section of the license/registration file.

Date	Lic/Reg #	Phone #	Lic/Reg Individual	Staff Name
October 2, 2000	NA	316-429-1857	Gerald Eckhardt	<i>[Signature]</i>
Facility Name:	Cherokee county emergency management			
Subject:	Follow-up on Jayhawk investigation			

Notes:
Mr. Eckhardt ask if KDHE had made any decisions yet based on the information obtained from the visit on 9/25/00. Response - Not at this time. Contact has been made with the NRC since Jayhawk was a NRC licensee at the time fuel was being produced. KDHE is waiting on documents to be provided by the NRC before making any decisions. Mr. Eckhardt offered additional information from his sources that Jayhawk was producing fuel in 1965. Mr. Eckhardt requested he be notified when KDHE returns to Jayhawk. Response - This would be considered but the return may be by other agencies and this office may not have any knowledge or control over notifications, timing etc.

Follow-up Needed?	No	Date:
Notes:		

09/29/2000

Reportable Event: N
Agreement State Reportability: N
Atomic Energy Act Material: Y
Consultant Hired: N

Abnormal Occurrence: N
Investigation: I
NRC Report: N

OTH

Cause: UNKNOWN

Post Event EvaluationNRC Notified? (check if yes) ☐ Date:Event Closed (check if yes) ☐ Date:

Notification: (How were we notified and how did we notify others - timely and accurate?)

Notified by telephone from the EPA

Communication: (What methods were used and were they adequate?)

Resources: (What resources were available and used and were some needed but not available? Consider people, equipment and information?)

Supervisor EREP _____ Date: _____

Supervisor RMXRay _____ Date: _____

Section Chief _____ Date: _____

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
Division of Environment
Bureau of Air and Radiation
Radiation Control Program

M E M O R A N D U M

DATE: August 5, 1993

TO: Investigation File
Ref. Previous Investigation #82-25 Jayhawk Plant (Gulf Chemical) and
Gulf Oil Chemical Co. License # 26-C229-02

FROM: Harold Spiker *HLS*

SUBJECT: Site Survey At The Jayhawk Plant By The Nuclear Regulatory Commission

Early in August 1992, the author received a telephone call from Mr. Wesley Holley of the NRC Region IV office (817/860-8198) inquiring about the Gulf Oil Chemical Co. operations at the Jayhawk Plant, near Crestline, Kansas. He indicated that, based upon some recent problems discovered at Gulf Oil facilities in Oklahoma, they thought they should look at other Gulf Oil facilities in the region. I explained about the decontamination activities which we regulated at that facility back in 1982 and sent him a copy of the investigation report (#82-25) and subsequent licensing documentation from the Gulf Oil Chemical Co. license (#26-C229-02) file.

Mr. Holley telephoned later and asked if we would arrange for a site survey at the Jayhawk Plant and plan to accompany him during such. I agreed.

Since the Jayhawk Plant facilities are currently owned in part by three different companies, the author contacted the following individuals and made arrangements for a site survey to be conducted on September 29, 1992:

1. Mr. Howard Ryser, Vice President (Tele. 9-16-92)
Manufacturing
Allco Chemical Corporation
P.O. Box 247
Galena, KS 66739
316/783-1321
2. Mr. Thomas Segar, Environmental Manager (Tele. 9-18-92)
External Affairs
Koch Refining Co.
P.O. Box 64596
St. Paul, Minnesota 55164
612/437-0701

3. Ms. Kathy Emerson, P.E. (Tele. 9-16-92)
Environmental Projects Engineer
Environment & Health Protection
Chevron Chemical Company
6001 Bollinger Canyon Road
San Ramon, California 94583-0947
510/842-5890

All three of the individuals contacted gave their approval for the site survey and Mr. Segar and Ms. Emerson indicated that they would defer to Mr. Ryser or his staff to accompany us on the site survey.

I also visited with Mr. Rob Elder and Ms. Pam Chaffee, of KDHE's Bureau of Environmental Remediation, regarding the Jayhawk Plant since they have been involved in an ongoing site screening investigation at that facility. Ms. Chaffee agreed to accompany me on the site survey.

Arrangements were made for the author and Ms. Chaffee to meet Mr. Holley at the junction of Hwy. 69 ALT and the Jayhawk Plant access road at approximately 10:30 AM on September 29, 1992 and then to proceed to the site to meet Mr. Ryser.

The author, Ms. Chaffee and Mr. Holley met with Mr. Ryser and Steve Mahaffey at the Allco site office building. It was agreed that Mr. Mahaffey would serve as a guide/escort for our site survey. The survey was conducted by the author using a Ludlum Model 19 Micro-R Meter, Serial #37446. Mr. Holley, of the NRC, also used a Ludlum Model 19 Micro-R Meter.

The Jayhawk Plant property and facilities surveyed are indicated on Attachment 1. Since the site is so large (approx. 1200 acres), only those areas and facilities where radioactive materials were known or suspected of being used or stored were surveyed. Areas used for any kind of dumping were also surveyed. These locations were determined on the basis of information contained in KDHE files, provided by Jayhawk Site personnel, and obtained from old Jayhawk Site photographs. No radioactivity above background readings of approximately 5 uR/hr were detected at any of the areas and facilities surveyed except for a pile (approximately 18' in diameter and 5' in height) of what appeared to be a catalyst material. See Attachment 2. Readings obtained at contact with the pile were approximately 20 uR/hr. The location of this material is indicated on Attachment 1, apparently on property owned by Chevron Chemical Co. A sample of this material was collected and returned to the KDHE Radiation Laboratory for analysis. See attached lab reports. The findings of the survey were discussed by the survey team (Holley, Spiker and Chaffee) at an exit interview with Mr. Ryser and Mr. Mahaffey at approximately 3:30 PM. The author discussed the pile of material found on the Chevron Chemical Co. property and indicated that we would report our findings to him regarding our evaluation of the material. See Attachment 4.

Unless the concentration of radioactive material in the catalyst requires further action, this investigation is considered closed.

A copy of the NRC report on this survey will be attached to this report. See Attachment 5.

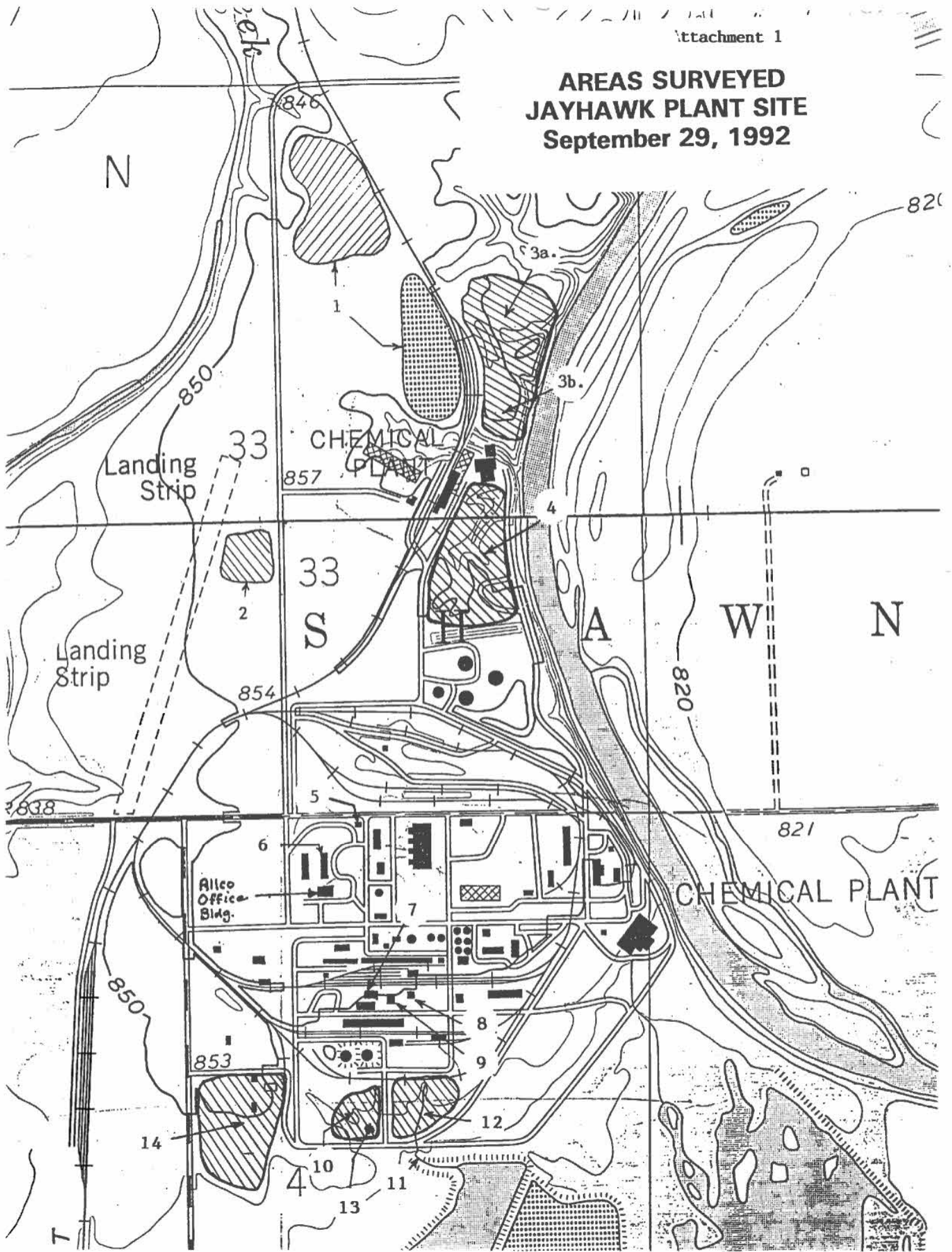
C Mr. Wesley Holley
Ms. Pam Chaffee

**LISTING OF AREAS SURVEYED
JAYHAWK PLANT SITE
September 29, 1992**

See Attached Map

1. Land area where sludge was pumped and spread - void of vegetation. Apparently the sludge contained Ammonium Nitrate. Allco Chemical Corp.
2. Area where a large pit was dug for the disposal of debris from the demolition of the nuclear fuels building. The debris was placed in the pit, burned, and the pit filled. Allco Chemical Corp.
- 3.a. Old landfill. Allco Chemical Corp.
- 3.b. Old sanitary landfill (newer). Allco Chemical Corp.
4. Area where trash was dumped and burned at one time. Allco Chemical Corp.
5. Remaining foundation of the old nuclear fuels building. Allco Chemical Corp.
6. Old Cafeteria building. Allco Chemical Corp.
7. New Allco office building. Not surveyed.
8. Quality Control Building. Possible use if this facility in the uranium nuclear fuels process. Koch Refining Co.
9. Plant #1 - Possible use if this facility in the uranium nuclear fuels process. Koch Refining Co.
10. Old dump and burning areas. Koch Refining Co.
11. Open drainage trench to evaporation ponds. Process chemicals were dumped here. Koch Refining Co.
12. Old lateral field. Koch Refining Co.
13. Pile of catalyst material (NORM). Koch Refining Co.
14. Quaker Valley salvage area. Chevron Chemical Co./Koch Refining Co.

**AREAS SURVEYED
JAYHAWK PLANT SITE
September 29, 1992**



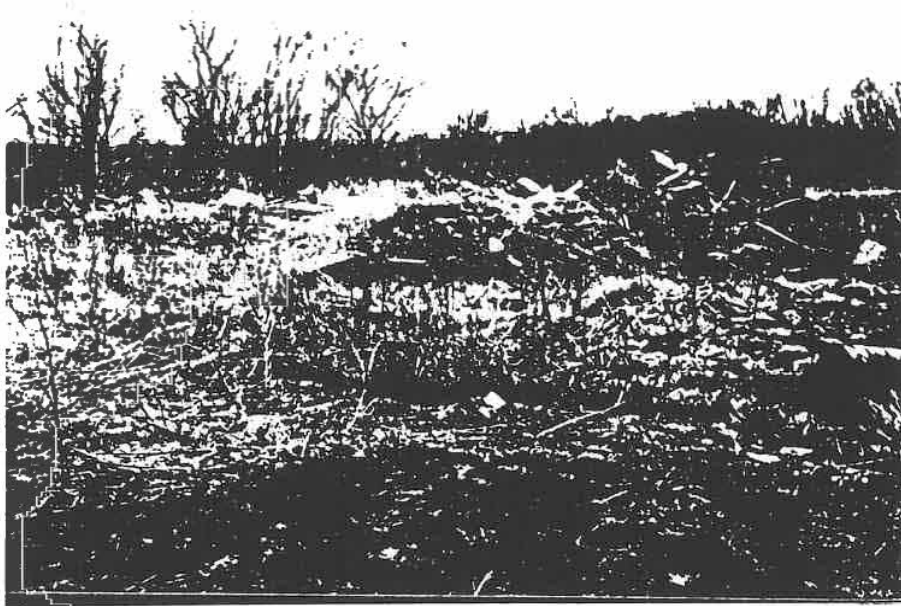


Figure 1
Pile of catalyst material in Area 10.



Figure 2
Catalyst material in Area 10.

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
 Division of Laboratories and Research
 Radiation Chemistry Laboratory
 Bldg. 740, Forbes Field, Topeka, KS 66620-8420
 (913) 296-1630

Attachment 3

REPORT OF LABORATORY ANALYSES

Report To: Radiation Control Acct Code: RT Sample ID:

Location: JAYHAWK PLANT PROPERTY
 Source:
 Type: ~~Soil~~ CATALYST MATERIAL
 Coll By: H.SPIKER
 Del By: ~~BY HAND~~ DAVE WHITEILL

Lab Number: 306611RC

Date Collected: 9-29-92
 Date Received: 10-6-92
 Date Reported: 10-30-92

Remarks: RESULT=PCI/KG.

* * * * *

ANALYTICAL RESULTS

Results are in Units of Picocuries per Kilogram

Parameter	Concentration	Error	Det. Limit	Confidence Level
Gross Alpha	NA			
Gross Beta	NA			
Tritium	NA			
Total Solid	NA			
Chromium-51	ND		35	
Manganese-54	ND		44	
Iron-55	NA			
Iron-59	ND		51	
Cobalt-57	ND		17	
Cobalt-58	ND		45	
Cobalt-60	ND		56	
Nickel-63	NA			
Zinc-65	ND		48	
Gallium-67	NA			
Strontium-89	ND		200	
Strontium-90	ND		200	
Zirconium-95	ND		35	
Molybdenum-99	ND		73	
Technetium-99m	NA			
Ruthenium-103	ND		29	
Ruthenium-106	ND		269	
Indium-111	ND		12	
Iridium-192	ND		12	
Iodine-123	NA			
Iodine-125	NA			

Sample Number:

Lab Number: 306611RC

Parameter	Concentration	Error	Det. Limit	Confidence Level
Iodine-129	NA			
Iodine-131	ND		33	
Cesium-134	ND		44	
Cesium-137	ND		49	
Barium-140	ND		26	
Ytterbium-169	ND		24	
Carbon-14	NA			
Phosphorus-32	NA			
Radium-226	18700	589		
Radium-228	NA			
Radon-222	NA			
Gross Uranium	653	47		
Potassium	NA			

All results are expressed at the 95% confidence level except as noted.

NA - Not Analyzed

ND - Not Detected

Analyst: HC

Copy: RAD.CONTROL



UNITED STATES
NUCLEAR REGULATORY COMMISSION

Attachment 5

REGION IV

611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

NOV 24 1992

RECEIVED

NOV 30 1992 HKS

RADIATION CONTROL
PROGRAM

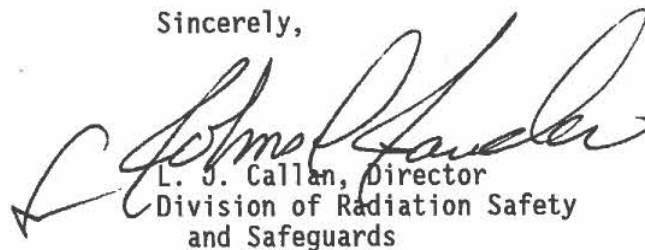
State of Kansas Department of
Health and Environment
ATTN: Harold L. Spiker, Chief
Environmental Radiation and
Emergency Preparedness Section
Bureau of Environmental Health Services
Division of Health
109 S.W. 9th
Mills Building, Suite 602
Topeka, Kansas 66612

Dear Mr. Spiker:

This forwards are the findings of a visit to the Jayhawk Works site made by yourself and Mr. Wesley L. Holley of the U.S. Nuclear Regulatory Commission (NRC), Region IV office, on September 29, 1992. This visit was part of an NRC review of potentially contaminated sites throughout the nation. Within the scope of this visit, no measurements or observations indicated or suggested that any portion of the site is contaminated by NRC-regulated radioactive material.

If you have any questions concerning the visit or this letter, please call Mr. Holley at (817) 860-8198.

Sincerely,


L. J. Callan, Director
Division of Radiation Safety
and Safeguards

Enclosure: As stated

ATTACHMENT

BACKGROUND:

The former 1200-acre Spencer Chemical Corporation Jayhawk Works site is located in the extreme southeast corner of the state of Kansas, approximately 6 miles north of Oklahoma and 7 miles west of Missouri. Spencer Chemical Corporation (SCC) had a shipping designation of Military, Kansas. The site is still known as the Jayhawk Works even though SCC no longer owns it. Currently the site is divided and has several owners.

SCC was licensed by U.S. Atomic Energy Commission (AEC) to possess enriched uranium and thorium. The AEC licenses allowed SCC to receive UF₆ and to process it into enriched uranium oxides and uranium carbides in the physical form of fused ceramic pellets and finely divided powder. License SNM-329, which authorized this process for production, expired on September 30, 1962. License SNM-154, which authorized a pilot plant for this process, was terminated on December 28, 1964.

SCC had ceased operations and had disposed of its licensed material by May 12, 1961. During the decontamination of the site, a process building was decontaminated, dismantled, burned, and buried. Other areas of the site were decontaminated, surveyed, and returned to unrestricted use.

After the termination of SCC's AEC license SNM-154 in 1964, Kansas became an Agreement State. On September 29, 1982, the state issued a license to Gulf Oil Corporation (owner of the Jayhawk Works at that time) requiring Gulf to decontaminate the site, if needed, and to perform a thorough final survey. Gulf Oil Corporation (GOC) performed radiation and contamination/smear surveys of the areas where uranium and thorium had been used by SCC. GOC used nitric acid, hammer and chisel, and jackhammer to clean up residual radioactivity. The areas were decontaminated according to the criteria in "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. Nuclear Regulatory Commission, Division of Fuel Cycle and Material Safety; July 1982. The waste from these decontamination activities was shipped to a waste vendor for burial.

Where the dismantled process building had been burned and buried, an area approximately 40 feet by 200 feet, GOC core sampled in 12 places in an evenly spaced grid. Samples were taken from the surface to a 10-foot depth at 1 to 2-foot intervals. The maximum concentrations were 0.5 pCi per gram of soil for both uranium and thorium. These samples also revealed that a clay bed had been placed at 6 feet under the material that was burned, a 1-foot clay/rock mixture had been placed over the burned material, and 1 foot of topsoil had been placed over the area.

After GOC performed the final survey, the state of Kansas, Department of Health and Environment, performed a final confirmatory survey and subsequently terminated GOC's license.

Presently the Jayhawk Works site has been divided and is owned by Allco Chemical Corporation, Koch Refining Company, and Chevron Chemical Company.

ORNL POTENTIALLY CONTAMINATED SITE ACTIVITIES

Oak Ridge National Laboratory (ORNL) was contracted by NRC to evaluate approximately 17,000 retired licenses for potential to have significant contamination. Using the criteria that ORNL developed and not knowing about the decommissioning and surveys of the Jayhawk site performed under auspices of the state of Kansas, SCC was ranked ninth in the nation because of the large amounts of licensed material possessed and processed, and because of the burned and buried building.

REGION IV ACTIVITIES

Upon learning of the high rank of SCC on the ORNL list, Region IV gave high priority to determining the history and condition of the Jayhawk site. After reviewing the available docket files on SCC, Region IV contacted the state of Kansas to determine their knowledge about the site. In learning of the activities of the state of Kansas concerning SCC and in reviewing the decommissioning and survey activities documented by Kansas, NRC identified nothing to indicate that SCC had not been decommissioned adequately.

However, in view of its size and sketchy history, Region IV arranged to visit the Jayhawk site.

On September 29, 1992, a Region IV inspector accompanied 2 State of Kansas (Agreement State) personnel on a tour of the Jayhawk site. One of the Kansas personnel had been involved in the GOC cleanup of the site and the final confirmatory survey. Our guide during this tour was an employee of Allco Chemical Corporation.

The NRC inspector and Kansas personnel performed a cursory survey utilizing micro R meters. Four buildings were surveyed where Jayhawk personnel thought radioactive material might have been during the SCC era. Also, 7 potential and actual waste/trash/burial/dump sites were surveyed. These sites were determined from information provided by State of Kansas personnel, Jayhawk site personnel, and old photographs.

The approximate average background of the Jayhawk site was 6-8 micro R per hour. All exposure rates were determined at approximately 3 feet from the surface of the area surveyed. The exposure rates measured at 3 feet and at the surface were approximately the same. Exposure rates generally varied from 4-13 micro R per hour, although in a former waste dump area (Quaker Valley) a small area (approximately 6 inches by 6 inches) was found to read 14 micro R per hour with the general area average exposure rate of approximately 7-8 micro R per hour.

In another former SCC trash dump area, there was a 4-foot high by 15-foot diameter pile of what appeared to be black catalytic beads. The maximum exposure rate was approximately 30 micro R per hour at 3 feet from the surface and about 50 micro R per hour at the surface of the pile. A sample analyzed by the State of Kansas indicated the radioactivity to be from natural,

nonlicensable sources. In this trash dump area the exposure rate varied from 5-9 micro R per hour except for the pile of beads.

CONCLUSIONS

Because of the decommissioning efforts of GOC and the final confirmatory survey performed by the State of Kansas, Region IV concludes that the licensed material process areas at the Jayhawk site probably were decontaminated adequately for unrestricted use. Surveys performed by the NRC Region IV inspector and the State of Kansas on September 29, 1992, of the buildings and waste/trash/burial/dump sites of potential contamination resulted in exposure rates of such low magnitude that further investigation appears not to be warranted. The Jayhawk site appears to have been adequately decontaminated such that unrestricted occupation of the site will not result in significant radiation exposure from this material.

We recommend that the SCC/Jayhawk site be removed from the ORNL list of potentially contaminated sites.



UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV

611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

OCT 27 1992

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FEB 08 1993

RADIATION CONTROL
PROGRAM

Kansas Department of Health and Environment
ATTN: John Irwin, Director
Bureau of Air and Radiation
109 S.W. 9th Street
Topeka, Kansas 66612-1228

Gentlemen:

SUBJECT: APPRECIATION OF ASSISTANCE PROVIDED BY HAROLD L. SPIKER
AND PAMELA K. CHAFFEE

This letter documents our appreciation for the assistance provided by Mr. Harold L. Spiker and Ms. Pamela Chaffee of your staff during a recent survey of potentially contaminated areas at the old Spencer Chemical Corporation site, which is located on 1200 acres at the Jayhawk Works, south of Crescent, Kansas.

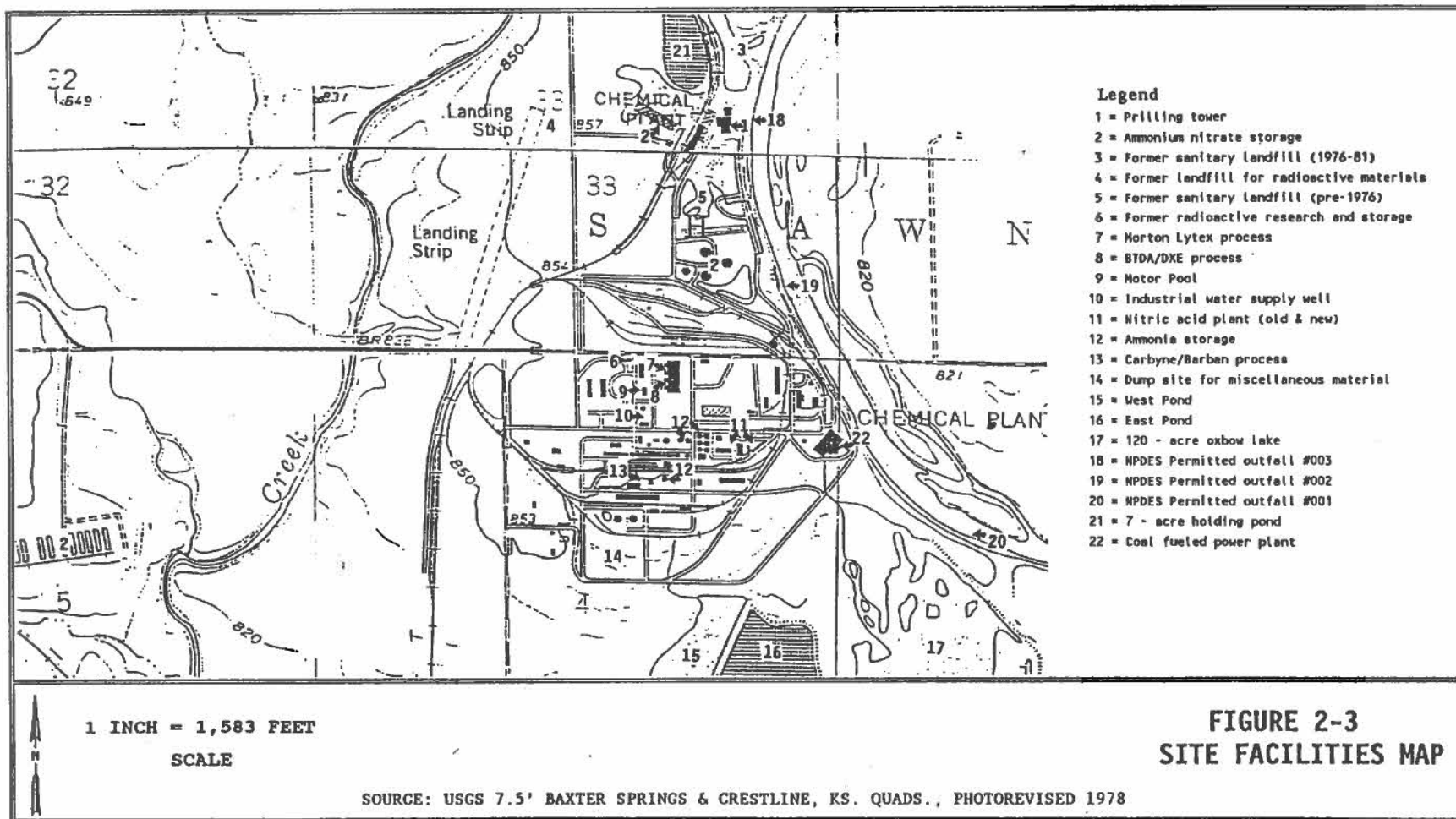
Mr. Spiker and Ms. Chaffee accompanied our inspector all over the site (through high weeds and rough terrain) as eight potential burial sites or waste dumps and four buildings were surveyed. The assistance was of great value, and was most appreciated.

Please pass on our appreciation to your staff.

Sincerely,


L. J. Callan, Director
Division of Radiation Safety
and Safeguards

cc:
Kansas Radiation Control Program Director



PRELIMINART ASSESSMENT OF GOCJ-JAYHAWK PLANT SITE
AUGUST 1990

Gulf Oil Corporation

P. O. Box 3240, Pittsburgh, Pennsylvania 15230

August 7, 1984

Harold L. Spiker
State of Kansas
Department of Health and Environment
Division of Environment
Bureau of Radiation Control
6700 South Topeka
Topeka, KS 66620

REC-1
AUG 8 1984
BUREAU OF RADIATION CONTROL

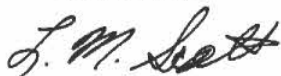
Dear Mr. Spiker:

This is a follow-up to our telephone conversation of August 7, 1984. Gulf Oil Corporation owns a settling pond known as Spencer Lake located in the vicinity of the Jayhawk Plant near state highway 26 north of Baxter Springs, Kansas. Analysis of sediment from the pond reveal a maximum concentration of 10.3 pCi/gm of U-234 and 4.9 pCi/gm of U-238 at a depth of 12-18 inches. Two preliminary grab samples taken in late 1982 at uncertain locations (to me at least) revealed gross alpha of 8.1 and 12.0 pCi/gm and gross beta of 25.0 and 42.0 pCi/gm. The level of 15.2 pCi/gm (10.3 + 4.9) is well within the limit given in the Nuclear Regulation Commission Branch Position on Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations. It is our intent to dispose of the Uranium traced waste in accordance with the disposal plans filed with Kansas.

The following documents are attached:

1. Radiochemical Analysis Results of Core Samples.
2. Excerpt from the Federal Register, October 23, 1981.
3. Table 14 from NCRP Publication #45.
4. Pertinent pages from the Nuclear Regulatory Commission file on the Jayhawk Plant.

Sincerely,



L. M. Scott
Corporate Director,
Radiation Health Physics

LMS:eid

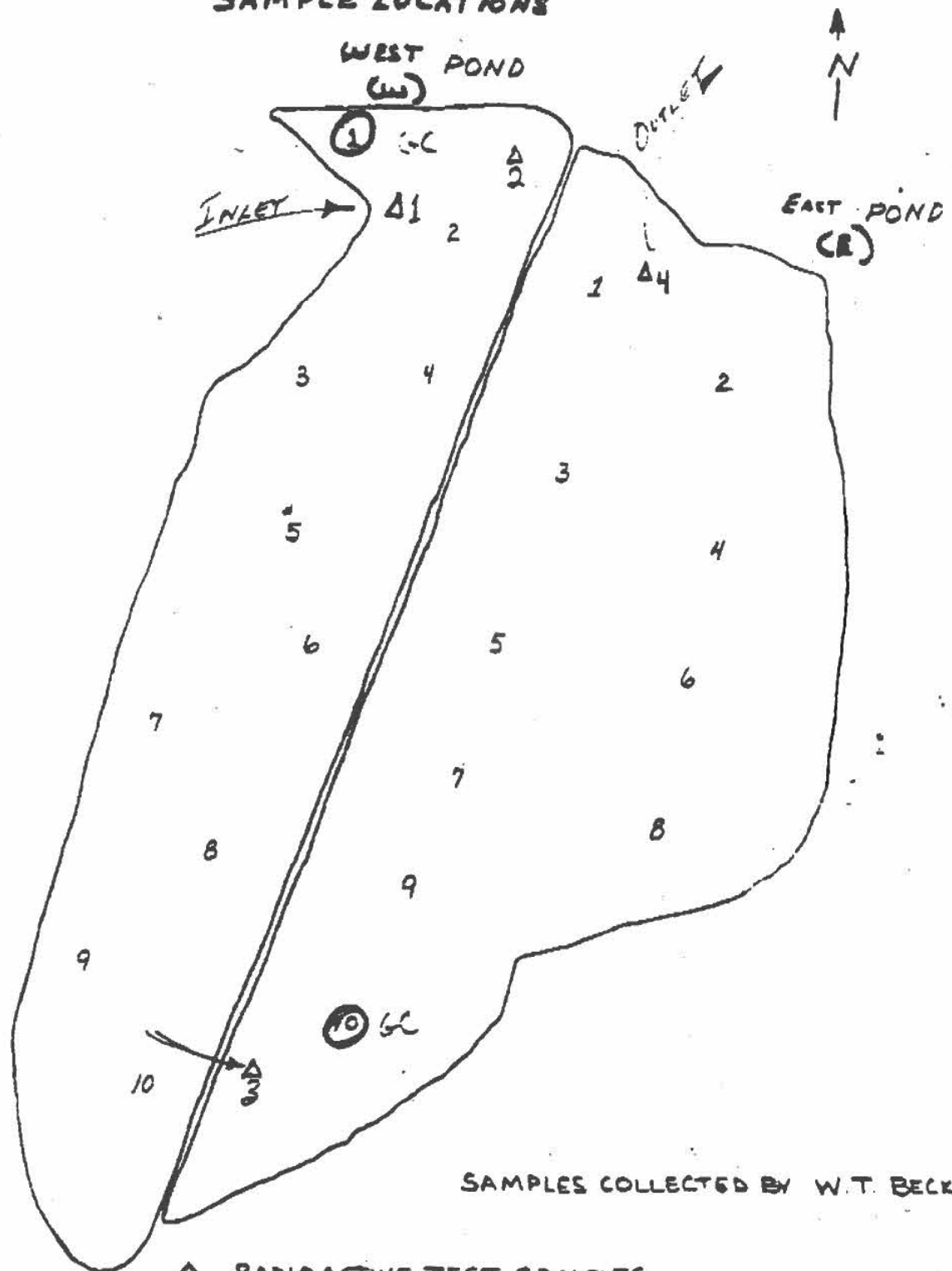
Attachments

cc wo/att.: C. L. Richards - Houston
H. E. Runion - Harmarville



SAMPLE LOCATIONS FOR
GULF OIL - JAYHAWK PLANT
(TAKEN 5/2/84)

SAMPLE LOCATIONS



SAMPLES COLLECTED BY W.T. BECK

Δ RADIOACTIVE TEST SAMPLES
O = Full GC/MS analysis

SCALE: 1" = 350'

REI

HOUSTON GULF TOWER 2

CUSTOMER GULF OIL PRODUCTS CO.
ATTENTION
ADDRESS
CITY
S.O. NO. E-3895

P.03
ALBUQUERQUE LABORATORY



TYPE OF ANALYSIS

CUSTOMER ORDER NUMBER

SAMPLES RECEIVED

Customer
Identification

Date
Collected

Type of
Analysis

pCi/g (dry)

Total
Wt. (g)
wet/dry

Field #4 Shelby tube
Bottom 6"

5/15

U-234
U-235
U-238

1.2±0.4
<0.1
1.3±0.4

SAFETY, HEALTH & ENVIRONMENT			
AUG 02 1984			
104		VJL	
105		OLD	
106		CLR	
107		SEC	
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REPORTED VIA TELEPHONE

REPORTED VIA TWX

PAGE 2 OF 2 PAGE

berline

ADVISOR OF
Thermo
Electron
CORPORATION

APPROVED BY

CHANDRASEKARAN, E.S., MANAGER

7/27/84
DATE

O BOX 3874 ALBUQUERQUE NEW MEXICO 87190

CUSTOMER GULF OIL PRODUCTS CO.
 ATTENTION P.O. BOX 2001
 ADDRESS HOUSTON, TX 77252
 CITY
 S.O. NO. E-3895



Radiochemical analyses of sludge.
 TYPE OF ANALYSIS

250-01
 CUSTOMER ORDER NUMBER

SAMPLES RECEIVED 5/23/84

Customer Identification	Date Collected	Type of Analysis	pCi/g (dry)	Total Wt. (g) wet/dry
Field #1 Shelby Tube TOP	5/15	U-234 U-235 U-238	1.4±0.2 <0.1 1.3±0.2	596/433
Field #1 Shelby tube 6" - 12"	"	U-234 U-235 U-238	0.8±0.2 <0.1 0.8±0.2	1006/811
Field #1 Shelby tube 12" - 18"	"	U-234 U-235 U-238	0.9±0.4 <0.1 <0.1	891/693
Field #1 Shelby tube 18" - 24"	"	U-234 U-235 U-238	1.0±0.3 <0.1 1.0±0.3	788/568
Field #1 Shelby tube Bottom 6"	"	U-234 U-235 U-238	0.8±0.1 <0.1 0.8±0.1	1115/832
Field #3 Shelby tube TOP	"	U-234 U-235 U-238	1.3±0.1 0.1±0.1 1.0±0.1	407/235
Field #3 Shelby tube 6" - 12"	"	U-234 U-235 U-238	6.3±0.9 0.3±0.2 3.3±0.7	704/328
Field #3 Shelby tube 12" - 18"	"	U-234 U-235 U-238	10.3±0.3 0.4±0.1 4.9±0.2	663/371
Field #3 Shelby tube Bottom 6"	"	U-234 U-235 U-238	0.8±0.1 <0.1 0.7±0.1	1164/929
Field #4 Shelby tube TOP	"	U-234 U-235 U-238	1.4±0.9 0.1±0.1 1.3±0.4	1260/890

☐ REPORTED VIA TELEPHONE

☐ REPORTED VIA TWX

PAGE 1 OF 2 PAGE

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ADVISOR
 THERMO
 ELECTRON
 CORPORATION

APPROVED BY

Chandrasekaran

CHANDRASEKARAN, E.S., MANAGER

7/27/84

DATE

The Assistant Secretary finds that good cause exists for not publishing the supplement to the Puerto Rico State Plan as a proposed change and making the Regional Administrator's approval effective upon publication for the following reasons:

1. The standards are identical to the Federal standards which were promulgated in accordance with Federal law meeting requirements for public participation.

2. The standards were adopted in accordance with the procedural requirement of State Law and further participation would be unnecessary.

The decision is effective October 23, 1981.

(Sec. 18 Pub. L. 97-596, 84 Stat. 1808 (29 U.S.C. 887))

Signed at New York City, New York, this 15th day of June 1981.

Roger A. Clark,

Regional Administrator.

(FR Doc. 81-30743 Filed 10-12-81; 8:45 am)

BILLING CODE 4910-26-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards, Subcommittee on Callaway Plant Location Change

The ACRS Subcommittee on Callaway Plant will hold a meeting on November 4 and 5, 1981, at the HOLIDAY INN-WEST, 1900 I-70 Drive Southwest, Columbia, MO instead of the Hilton Inn.

Notice of this meeting was published in the Federal Register on October 18, 1981 (46 FR 51329), and all other items remain the same except for the location change as indicated above.

Dated: October 15, 1981.

John C. Hoyle,

Advisory Committee, Management Officer.

(FR Doc. 81-30723 Filed 10-12-81; 8:45 am)

BILLING CODE 7580-01-M

Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations

AGENCY: Nuclear Regulatory Commission (NRC).

ACTION: Discussion of options for NRC approval of applications for disposal or onsite storage of thorium or uranium wastes; interim use and public comment.

SUMMARY: This notice discusses five options for NRC approval of disposal or onsite storage of thorium or uranium wastes from past nuclear operations. The options are contained in a Branch

Technical Position for administration by the Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

DATES: Comments on the options for disposal or onsite storage of thorium or uranium are encouraged. Such comments will be considered in any subsequent revision of the Branch Technical Position. Comments are due December 22, 1981.

Note.—Comments received after the expiration date will be considered if it is practical to do so, but assurance of consideration cannot be given except as to comments filed on or before that date.

FOR FURTHER INFORMATION CONTACT:

Ralph G. Page, Chief, Uranium Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, telephone 301-427-4309.

SUPPLEMENTARY INFORMATION:

I. Introduction

Some of the sites formerly used for processing thorium and uranium are known today to be contaminated with residual radioactive materials. Some are currently covered by NRC licenses. Others were once licensed, but the licenses to possess and use material have expired. In many cases, the total amount of contaminated soil is large, but the activity concentrations of radioactive materials are believed sufficiently low to justify their disposal on privately owned lands or storage onsite rather than their transport to a licensed radioactive materials disposal (commercial) site. In many instances packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health or cost-benefit. Furthermore, because of the total volume of these wastes, limited commercial waste disposal capacity, and restrictions placed on receipt of long-lived wastes at commercial sites, it is not presently feasible to dispose of these wastes at commercial low-level waste disposal sites.

Effective January 28, 1981, NRC regulations in 10 CFR 20, "Standards for Protection Against Radiation", were amended (45 FR 71761-71762) to delete § 20.304 which provided general authority for disposal of radioactive materials by burial in soil. Under the amended regulations, licensees must apply for and obtain specific NRC approval to dispose of radioactive materials in this manner under the provisions of 10 CFR 20.302. A case-by-case review was believed needed to

assure that burial of radioactive wastes would not present an unreasonable health hazard at some future date.

The deleted provisions of § 20.304 previously permitted burial of up to 100 millicuries of thorium or natural uranium at any one time, with a yearly limitation of 12 burials for each type of material at each site. The only disposal standards specified were (1) burial at a minimum depth of four feet, and (2) successive burials separated by at least six feet. Thus a total of 1.2 curies of these materials were permitted to be disposed of each year by burial in a 12 foot by 18 foot or larger plot of ground.

Under the amended regulations, it is incumbent on an applicant who wants to bury radioactive wastes to demonstrate that local land burial is preferable to other disposal alternatives. The evaluation of the application takes into account the following information: Types and quantities of material to be buried

Packaging of waste

Burial location

Characteristics of burial site

Depth of burial

Access restrictions to disposal site

Radiation safety procedures during disposal operations

Recordkeeping

Local burial restrictions, if any

For applications involving disposal of soils contaminated with low level concentrations of thorium and uranium (other than concentrations not exceeding EPA cleanup standards), the matters of principal importance are:

Concentrations of thorium and uranium (either in secular equilibrium with their daughters or without daughters present)

Volume of contaminated soil

Costs for offsite and onsite disposal

Availability of offsite burial space

Disposal site characteristics

Depth of burial and accessibility of buried wastes

State and local government views

II. Branch Technical Position

There are five acceptable options for disposal or onsite storage of thorium and uranium contaminated wastes. Applications for disposal or storage will be approved if the guidelines discussed under any option are met. Applications for other methods of disposal may be submitted and these will be evaluated on their own merits.

1. Disposal of acceptably low concentrations (which meet EPA cleanup standards) of natural thorium with daughters in secular equilibrium, depleted or enriched uranium, and

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uranium ores with daughters in secular equilibrium with no restriction on burial method.

Under this option, the concentrations of natural thorium and depleted or enriched uranium wastes are set sufficiently low that no member of the public is expected to receive a radiation dose commitment from the disposed materials in excess of 1 millirad per year to the lung or 3 millirads per year to the bone from inhalation and ingestion, under any foreseeable use of the material or property. These radiation dose guidelines were recommended by the Environmental Protection Agency (EPA) for protection against transuranium elements present in the environment as a result of unplanned contamination (42 FR 80956-80959). In addition, the concentrations are sufficiently low so that no individual may receive an external dose in excess of 10 microroentgens per hour above background. This is compatible with guidelines EPA proposed as cleanup standards for inactive uranium processing sites (46 FR 2556-2563).

For natural uranium ores having daughters in equilibrium, the concentration limit is equal to that set by the EPA (46 FR 2556-2563) for radium-226 (i.e., 5 pCi/gm, including background) and its decay products.

The concentrations specified below are deemed appropriate to apply. It is expected, however, that currently licensed operations will be conducted in such a manner as to minimize the possibility of soil contamination and when such occurs the contamination will be reduced to levels as low as reasonably achievable.

Kind of material	Concentration (pCi/gm)
Natural thorium (Th-232 plus Th-232) if all daughters are present and in equilibrium	10
Depleted Uranium	35
Enriched Uranium	30
Natural Uranium Ores (U-238 plus U-234) if all daughters are present and in equilibrium	10

The analysis upon which the Branch Technical Position is based is available for inspection at the Commission's Public Document Room at 1717 H St., N.W., Washington, D.C.

The concentrations specified under this option may be compared with naturally occurring thorium and uranium ore concentrations of 1.3 pCi/gm in igneous rock and uranium concentrations of 120 pCi/gm in Florida phosphate rock and 50-80 pCi/gm in Tennessee bituminous shale. Concentration limits for natural thorium

and natural uranium ore wastes containing daughters not at secular equilibrium can be calculated on a case-by-case basis using the applicable isotopic activities data.

2. Disposal of certain low concentrations of natural thorium with daughters in secular equilibrium and depleted or enriched uranium with no daughters present when buried under prescribed conditions with no subsequent land use restrictions and no continuing NRC licensing of the material.

Under this option the concentrations of natural thorium and uranium are set sufficiently low so that no member of the public will receive a radiation dose exceeding those discussed under option 1 when the wastes are buried in an approved manner absent intrusion into the burial grounds. This option will require establishing prescribed conditions for disposal in the license, such as depth and distribution of material, to minimize the likelihood of intrusion. Burial will be permitted only if it can be demonstrated that the buried materials will be stabilized in place and not be transported away from the site.

Acceptability of the site for disposal will depend on topographical, geological, hydrological and meteorological characteristics of the site. At a minimum, burial depth will be at least four feet below the surface. In the event that there is an intrusion into the burial ground, no member of the public will likely receive a dose in excess of 170 millirems to a critical organ. An average dose not exceeding 170 millirems to the whole body for all members of a general population is recommended by international and national radiation expert bodies to limit population doses. With respect to limiting doses to individual body organs, the concentrations are sufficiently low that no individual will receive a dose in excess of 170 millirems to any organ from exposure to natural thorium, depleted uranium or enriched uranium.

The average activity concentration of radioactive material that may be buried under this option in the case of natural thorium (Th-232 plus Th-232) is 50 pCi/gm, if all daughters are present and in equilibrium; for enriched uranium it is 100 pCi/gm if the uranium is soluble and 250 pCi/gm if insoluble; for depleted uranium it is 100 pCi/gm if the uranium is soluble and 300 pCi/gm if insoluble. Natural uranium ores containing radium 226 and its daughters are not included under this option, because of possible radon 222 emanations and resultant higher than acceptable exposure of individuals in private residences if houses were built over buried materials.

3. Disposal of low concentrations of natural uranium ores, with all daughters in equilibrium, when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the specified land contains buried radioactive materials and are conditioned in a manner acceptable under state law to impose a covenant running with the land that the specified land may not be used for residential building. (There is no continuing NRC licensing of the material.)

Disposal will be approved if the burial criteria outlined in option 2 (including burial at a minimum of 4 feet) are met. Depending upon local soil characteristics, burials at depths greater than 4 feet may be required. In order to assure protection against radon 222 releases (daughter in decay chain of uranium 238 and uranium 234), it is necessary that the recorded title documents be amended to state in the permanent land records that no residential building should be permitted over specified areas of land where natural uranium ore residues (U-238 plus U-234) in concentrations exceeding 10 pCi/gm has been buried. Industrial building is acceptable so long as the concentration of buried material does not exceed 40 pCi/gm of uranium (i.e., Ra-226 shall not exceed 20 pCi/gm).

4. Disposal of land-use-limited concentrations of natural thorium or natural uranium with daughters in secular equilibrium and depleted or enriched uranium without daughters present when buried under prescribed conditions in areas zoned for industrial use and the recorded title documents are amended to state that the land contains buried radioactive material and are conditioned in a manner acceptable under state law to impose a covenant running with land that the land (1) may not be excavated below stated depths in specified areas of land unless cleared by appropriate health authorities, (2) may not be used for residential or industrial structures over specified areas where radioactive materials in concentrations higher than specified in options 2 and 3 are buried, and (3) may not be used for agricultural purposes in the specified areas. (There is no continuing NRC licensing of the disposal site.)

Under this option, conditions of burial will be such that no member of the public will receive radiation doses in excess of those discussed under option 1 absent intrusion into the burial ground. Criteria for disposal under these conditions is predicated upon the assumption that intentional intrusion is less likely to occur if a warning is given

in land documents of record not to excavate below burial depths in specified areas of land without clearance by health authorities; not to construct residential or industrial building on the site; and not to use specified areas of land for agricultural purposes. Because of this, we believe it appropriate to apply a maximum critical organ exposure limit of 500 millirems per year to thorium and uranium buried under this restriction instead of 170 millirems as used in options 2 and 3. In addition, any exposure to such materials is likely to be more transient than assumed (essentially continual exposure) under those options. These two factors combine to increase the activity concentration limits calculated under option 2 by about 10. Thus, the average concentration that may be buried under this option for thorium (Th-232 plus Th-228) is 500 pCi/gm if all daughters are present and in equilibrium; for enriched uranium it is 1000 pCi/gm if the uranium is soluble and 2500 pCi/gm if insoluble; and for depleted uranium it is 1000 pCi/gm if the uranium is soluble and 3000 pCi/gm if insoluble.

With respect to natural uranium with daughters present and in equilibrium, the concentration that may be buried under this option is 200 pCi/gm of U-238 plus U-234, i.e., 100 pCi/gm Ra-226. This concentration is based on a limited exposure of 2.4 hours per day to limit the radon dose to less than 0.5 working level month (WLM) which is equivalent to continuous exposure to 0.02 working level (WL). Depending upon local soil characteristics, burials at depths greater than 4 feet may be required.

SUMMARY OF MAXIMUM CONCENTRATIONS PERMITTED UNDER DISPOSAL OPTIONS

Kind of Material	Disposal Options			
	1 ¹	2 ²	3 ³	4 ⁴
Natural Thorium (Th-232 + Th-228) with daughters present and in equilibrium	10	50		500
Natural Uranium (U-238 + U-234) with daughters present and in equilibrium	10		40	200
Depleted Uranium:				
Soluble	35	100		1,000
Insoluble	35	300		3,000
Enriched Uranium:				
Soluble	30	100		1,000
Insoluble	30	250		2,500

¹ Based on EPA cleanup standards.

² Concentrations based on limiting individual doses to 170 mrem/yr.

³ Concentration based on limiting equivalent exposure to 0.02 working level or less.

⁴ Concentrations based on limiting individual doses to 500 mrem/yr and, in case of natural uranium, limiting exposure to 0.02 working level or less.

5. Storage of licensed concentrations of thorium and uranium onsite pending

the availability of an appropriate disposal site.

When concentrations exceed those specified in option 4, long term disposal other than at a licensed disposal site will not normally be a viable option under the provisions of 10 CFR 20.302. In such cases, the thorium and uranium may be permitted to be stored onsite under an NRC license until a suitable method of disposal is found. License conditions will require that radiation doses not exceed those specified in 10 CFR Part 20 and be maintained as low as reasonably achievable.

Before approving an application to dispose of thorium or uranium under options 2, 3, or 4, NRC will solicit the view of appropriate State health officials within the State in which the disposal would be made.

Dated at Silver Spring, Maryland this 19th day of October, 1981.

Richard E. Cunningham,

Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards.

(FR Doc. 81-20085 Filed 10-22-81; 8:45 am)

BILLING CODE 7590-01-01

OFFICE OF PERSONNEL MANAGEMENT

Postponement of Application Deadline for Fund-Raising Privileges Among Federal Employees by Private Voluntary Organizations

Section 5.43 of the "Manual on Fund-Raising Within the Federal Service for Voluntary Health and Welfare Agencies" sets December 1 of each year as the deadline by which national voluntary agencies must submit applications for participation in the Combined Federal Campaign (CFC) to be conducted in the fall of the following year. This year's deadline is being postponed from December 1, 1981, to February 1, 1982. In June 1981, the U.S. Office of Personnel Management (OPM) announced that the eligibility criteria for participation in the 1982-83 CFC are being reviewed. The deadline date is being postponed to avoid national voluntary agencies having to revise their applications to meet eligibility criteria which may be changed.

Donald J. Devine,

Director.

(FR Doc. 81-20730 Filed 10-22-81; 8:45 am)

BILLING CODE 5325-01-01

OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

Resolution of Complaint of Price-Undercutting of Subsidized Cheese Imports

On October 1, 1981, the United States Trade Representative received a letter from the Secretary of Agriculture informing him of the Secretary's finding that imported Grade A Swiss type cheese produced in Finland has been offered for sale in the United States at duty-paid wholesale prices which are five cents per pound less than the domestic wholesale market price of similar cheese produced in the United States.

In accordance with Section 702(c)(2) of the Trade Agreements Act of 1979 (the Act) (19 U.S.C. 1202 note), the Office of the United States Trade Representative notified Finland of the price undercutting determination made by the Secretary of Agriculture, requested that corrective action be taken, and asked for appropriate assurances concerning the commitments made in the Arrangement Between the United States and Finland Concerning Cheese.

On October 14, 1981, Finland notified the United States Trade Representative that measures have been taken to ensure that the duty-paid wholesale price of imported Grade A Swiss type cheese produced in Finland will not be less than the domestic wholesale market price of similar cheese produced in the United States. In addition, Finland gave assurance that it will respect the price commitments in the Arrangement. Since the above notification by Finland has occurred within the 15-day period provided in Section 702(c)(3) of the Act, the United States Trade Representative has notified the Secretary of Agriculture of his belief that no further action is required.

William E. Brock,

United States Trade Representative.

(FR Doc. 81-20086 Filed 10-22-81; 8:45 am)

BILLING CODE 7590-01-01

SECURITIES AND EXCHANGE COMMISSION

[Release No. 22236; 70-6650]

Arkansas Power & Light Co.; Proposed Issuance and Sale of First Mortgage Bonds

October 12, 1981.

Arkansas Power & Light Company

397

NCRP REPORT No. 45

NATURAL BACKGROUND RADIATION IN THE UNITED STATES

N C R P

National Council on Radiation Protection and Measurements

4.5 Summary of Major Radionuclide Concentrations

Table 14 presents a summary of concentrations and activities of potassium, rubidium, thorium, and uranium in major rock types and soils exposed at the earth's surface. Compilations showing locations of occurrences of radioactivity are given by Butler *et al.* (1962) for uranium, and by Olson and Adams (1962), Olson and Overstreet (1964) and Overstreet (1967) for thorium and monazite. The monograph of Pertsov (1964) gives a comprehensive discussion of natural radioactivity in the Soviet Union.

TABLE 14—Summary of concentrations of major radionuclides in major rock types and soils^a

Rock Type	Potassium-40		Rubidium-87		Thorium-232		Uranium-238	
	percent total Potassium	pCi/g	ppm total Rubidium	pCi/g	ppm	pCi/g ^b	ppm	pCi/g ^c
Igneous Rocks								
Basalt (Crustal average)	0.8	7	40	0.9	3-4	0.3-0.4	0.5-1	0.2-0.3
Mafic ^d	0.3-1.1	2-9	10-50	0.2-1	1.6, 2.7	0.2, 0.3	0.5, 0.9	0.2, 0.3
Salic ^d	4-5	30-40	170-200	4-8	16, 20	1.7, 2.2	3.9, 4.7	1.3, 1.6
Granite (Crustal average)	>4	>30	170-200	4-5	17	1.9	3	1
Sedimentary Rocks								
Shale	2.7	22	120 ^e	3	12	1.3	3.7	1
Sandstones:								
clean quartz	<1	<5	<40 ^e	<1	<2	<0.2	<1	<0.3
dirty quartz	2?	10?	90?	2?	3-6?	0.3-0.7?	2-3?	1?
arkose	2-3	16-24	80-120 ^e	2	2?	0.2?	1-2?	0.3-0.7?
Beach sands (unconsolidated)	<1	<8?	<40?	<1?	6	0.7	3	1
Carbonate Rocks	0.3	2	10 ^e	0.2	2	0.2	2	0.7
Soils ^f	1.5	12	85 ^e	1.4	9	1	1.8	0.6

^a References cited in text unless otherwise noted; single values are averages; values estimated in absence of reference are followed by question mark.

^b To obtain series equilibrium alpha, beta, or approximate gamma (excluding bremsstrahlung and x radiation) activity, multiply by 6, 4, or 3 respectively.

^c To obtain series equilibrium alpha, beta, or approximate gamma (excluding bremsstrahlung and x radiation) activity, multiply by 8, 6, or 3, respectively.

^d From Clark *et al.* (1966); for potassium and rubidium, the range of values for rocks within the class is given; for thorium and uranium, the median and mean value are given, respectively.

^e Estimated by application of crustal abundance ratio with respect to potassium.

^f In-situ gamma-spectral measurements at 200 locations by Lowder *et al.* (1964).

Memorandum

TO : Files

DATE:

FROM : Robert L. ~~Jayfield~~
Source and Special Nuclear Materials Branch, DML

SUBJECT: TERMINATION OF SPECIAL NUCLEAR MATERIAL LICENSE NO. SRM-154 - SPENCER CHEMICAL COMPANY, MERRIAM, KANSAS - DOCKET 70-146

DML:RLI

On November 20, 1962, the Spencer Chemical Company requested termination of Special Nuclear Material License No. SRM-154 covering activities performed by the Company at their "Jayhawk Works" plant near Pittsburgh, Kansas. In reply to the Spencer request, we transmitted by letter dated December 18, 1962, certain conditions which we believed should be met for termination of the license. The Spencer Company submitted the results of their surveys of the facilities concerned in letters dated January 29, and March 2, 1964. The maximum external radiation level reported was 0.5 mr/hr at one centimeter and the highest alpha activity was reported as 271 d/m/100 cm²; beta activity 874 d/m/100 cm². On April 30, 1964, Region IV, Division of Compliance, visited the "Jayhawk Works" plant to conduct a close out inspection. The inspector made a thorough investigation, taking smears and radiation level readings at various points in the facility, and identifying certain areas of consideration such as a burial ground for contaminated equipment, incineration of contaminated combustibles, and holding pond for plant sewage. In summary of the inspector's conclusions, it appears that the facilities formerly used in conjunction with License No. SRM-154, meet our expressed conditions for termination of the license. (A copy of the inspection may be seen in the files for Docket 70-146)

In this inspection report there appears only one area where there might be some concern for an unknown factor - the holding pond. However, considering that the pond is within the confines of Spencer Chemical Company's property, that the pond is still used for sewage disposal and the liquid turnover (25 million gallons per day) in the pond, it does not appear that there should be any great concern over the radioactive material which might be held in the pond residue.

Upon consideration of the licensee's reports and those submitted by the Region IV, Compliance Office, I believe that release of any remaining facilities at the licensee's "Jayhawk Works" plant for unregulated use would not be detrimental to the public and therefore License No. SRM-154 should be terminated.



Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

Enrichment Asset
Jayhawk Chemical Company
Kansas City, Missouri
Pittsburg, Kansas

August 23, 1958

16. Company Confidential. The transfer forms and receipts were reviewed. The receipts dated from November 13, 1956, to July 24, 1958, and transfers and process losses from January 2, 1958, through August 20, 1958. These quantities amounted to the following quantities for each enrichment of uranium:

TABLE I

Enrichment	Transfers to Licensed Users	Loss During Processing	Received
93%	78.5 gm	4.9 gm	84.4 gm
27%	995.4 gm	10.1 gm	1,013.0 gm
10%	2,010.0 gm	26.5 gm	2,057.0 gm
2.3%	199,170.0 gm		299,656.0 gm
Normal	45,135.0 gm	2,302.0 gm	4,115.0 gm
NS-40	28,432.0 gm	15,041.0 gm	116,952.0 gm

Samples of enriched uranium were sent to the AEC laboratories at New Brunswick, New Jersey, and to company office at Kansas City for analysis at the Rockhurst College in Kansas City, Missouri.

TABLE II

Enrichment	Amount of Sample	Receiver
2.3%	2.0 gm	AEC
2.3%	25.0 gm	Rockhurst College
10%	2.3 gm	AEC
10%	3.2 gm	Rockhurst College
27%	1.0 gm	AEC

The licensee had no evidence to substantiate whether or not these installations were licensed to receive special nuclear material. The detailed breakdown, of the above tables, which includes: licensees, license numbers, dates, etc., is on file as back-up material for this report.

Condition 10 of License No. SNM-154 states: "Unless otherwise specified, the authorized place of use is the licensee's address stated in item 2 above." Authorized activity to be conducted at licensee's Jayhawk Works located between Pittsburg, Kansas, and Joplin, Missouri. The fact of noncompliance is indicated in the above table (II). The material is being used at Rockhurst College, Kansas City, Missouri. The isotopic content and amounts are also indicated on Table II. Company Confidential.

Procurement and Inventory

17. Mr. L. H. Landrum, Director of Process Development, of the Jayhawk Works, requests the needed material from Mr. L. D. Jones of central purchasing, Kansas City installation. Mr. Jones then processes the order through the purchasing department. The material is then received at the Jayhawk Works.
18. Company Confidential. The inventory on hand is as follows:

May 2-5, '96

The stack discharge of the various areas was also sampled. The general air that is discharged by fans (not process air) was sampled and measured several times. These samples averaged less than the maximum permissible limit established in Part 20 (7×10^{-11} $\mu\text{c}/\text{ml}$). Samples of the process air discharge was about 0.3 grams of uranium in 14 hours of blower operation during the production of 500 pounds of 2.5% UO_2 . This calculates to be 3×10^{-10} $\mu\text{c}/\text{ml}$. A second test of the same area over 19 hours of operation yielded 0.115 grams of uranium. This calculated to be approximately 7.4×10^{-11} $\mu\text{c}/\text{ml}$. Because of the moisture in the above noted discharge, a special sampler was devised to trap the uranium particles. Essentially all uranium is in particulate form and was trapped by the frit (sub-micron filter) within the sampler. This particular exhaust was all funneled through this special sampler. This operation is a continuous operation 24 hours a day, seven days a week.

No measurement has been made of the effluent of the UF_6 areas. This air is processed through a scrubber before it is discharged to the room atmosphere. The air of this hydrolysis room is vented to the outside atmosphere through a high capacity blower (3500 cfm). Air samples taken in the room atmosphere indicated average results of less than 10^{-12} $\mu\text{c}/\text{ml}$.

24. The contamination surveys are made on a weekly basis after receipt of the counting equipment at the Jayhawk Works about January 24, 1961. These surveys are conducted in both Plant #2 and the "T" House. All areas including "work" areas, packaging, shipping, storage, change, lunch and office areas were included in the surveys. Although there is continuous cleaning in the various areas, the trend of the results indicate that in the "T" House, contamination is tracked from the "work" areas to the "non-work" areas. Contamination surveys of the shipping containers are made before and after filling and before shipping.

25. Radiation monitoring (Beta-gamma) is conducted by the licensee to determine compliance with 20.101, 105 and 203. This monitoring is done with a Sears-Roebuck Tower survey meter Model FR-7. This instrument is calibrated weekly with a check source and yearly against a standard radium source. These surveys are conducted throughout the "T" House, Plant #2, all storage areas and supporting facilities.

26. The licensee processes material for the ABC (accountability station SCC), licensee material (not owned) for organizations like General Electric, Westinghouse, Aerojet, Atomics International, etc., licensee material (Spencer owned) for resale to other licensees. This material is controlled through an accountability system. The accountability officer responsible for the receipt, use and disposition of the material is Mr. Wood. The licensee has records for each contractor, supplier and licensee which are involved in their program.

27. Liquid waste is collected in hold-up tanks before release into the storm sewer. The storm sewer enters a pond referred to as Spencer Lake. This pond empties into the Spring River. This complete system up to the point that the pond discharges into the river is considered as a restricted area and is within the licensee's fenced area. The average daily discharge to the pond is approximately 3000 gallons of .15 grams per gallon solution.

The daily effluent from the pond to the river is 30×10^6 gallons and the pond capacity is 330×10^6 gallons. Therefore, the concentration at the point of discharge to the river calculates to be 1.6×10^{-9} $\mu\text{c}/\text{ml}$ which is less than the mpc in Part 20 (3×10^{-9} $\mu\text{c}/\text{ml}$).

Weekly water samples are collected one mile above the effluent discharge (Spring River at Spencer Park), at the discharge point (Spencer Lake at the overflow) and two miles below the discharge point (Spring River and Hwy 66). A silt sample of Spencer Lake was also collected. These samples were processed and counted by the Kansas State Board of Health. These samples results also indicate less than mpc as per 10CFR20.

Continuation Sheet 3
Spencer Chemical Company
Kansas City, Missouri
(Pittsburg, Kansas)

August 28, 1958

28. The second written safety procedure is incorporated in the "Temporary Operating Instruction, Uranium Pilot Plant #1," dated February 15, 1958. This section (UI-406) called "Health and Safety," deals exclusively with the problems of criticality and general safety of each component of the uranium pilot plant.
29. The emergency procedures are included in the aforementioned manuals.
30. Company Confidential. The waste from the Jayhawk Works is disposed of through the plant sewer system and waste treatment plant. The settling basin (pond) of the treatment plant has a dilution factor of about 50, with a flow of about 950,000 gallons of H_2O /hour. This is all within the restricted area of the Jayhawk Works. The effluent of the treatment plant flows into a stream, which is adjacent to the Spencer Chemical Corporation property. Samples of the waste material, various effluents, etc., are taken on a routine basis as is described in the Health and Safety Manual and the Operating Manual. The waste from the uranium pilot plant to the settling basin is recorded in the pilot plant log. The following are sample amounts of waste sent through the waste processing plant: 195 liters at .05 grams/liter; 190 liters at .09 grams/liter, and 195 liters of < .05 grams/liter. There was also 17 gallons of gas condensate at .18 grams/liter. The foregoing results are all less than 7×10^{-6} microcuries/ml as specified in 10 CFR 20.103. The total amounts disposed of from November 5, 1957, through the date of inspection (August 28, 1958) are tabulated in the "loss in process" column of Table I. The data from which these results were obtained is in the backup for this report. Company Confidential.
31. A survey, of various areas, conducted by the inspector indicated these maximum amounts: In the uranium pilot plant a maximum of 1 mr/hour was noted at the surface of the storage tanks (T-1 - T-7) containing source material. The rest of the uranium pilot plant is < 1 mr/hour. A bag of scrap source material in the storage vault indicated a maximum dose rate of 10 mr/hour. The change area and laundry area was < 1 mr/hour. The analytical laboratory was < 1 mr/hour.
32. The containers in the storage vault containing the UO_2 , scrap metal, ammonium dichromate, etc., were not labeled in accordance with 10 CFR 20.203 (b) (1) and (b) (4). These containers held quantities of licensed material in excess of 50 microcuries (.165 pounds) as is specified in this section of the 10 CFR 20.
33. The storage vault which contained the processed and unprocessed licensed material had a dose rate of 10 mr/hour at one inch from the containers of scrap metal. This area also had licensed material in excess of 500 microcuries (1.65 pounds) within it. The area was not posted in any manner to indicate the presence of radioactive material or as a radiation area.
34. The storage containers in the uranium pilot plant may contain up to 25 pounds of uranium. These tanks are not labeled nor were they ever labeled, although at one time or another they did contain the maximum volume. At the time of the inspection the maximum amount of uranium (.7%) contained in these storage tanks was < 1.65 pounds (500 microcuries), therefore labeling was not required.

May 2-5, 1961.

urinalysis tests made. The results of the subsequent bi-weekly tests are: February 15, 1961, 425 d/m/l; February 23, 1961, 218 d/m/l; March 1, 1961, 149 d/m/l; March 14, 1961, 107 d/m/l; March 27, 1961, 145 d/m/l; April 3, 1961, 132 d/m/l; April 17, 1961, 58 d/m/l; and April 24, 1961, 151 d/m/l. Mr. Hutchens has not yet been returned to work with uranium. Mr. P. D. Frazee's urinalysis for March 1, 1961 indicated 93.4 d/m/l. His subsequent test on March 15, 1961 indicated a result of 59.5 d/m/l. The April 20, 1961 urinalysis for Mr. M. L. Cooky indicated 133.8 d/m/l. He was removed from the uranium work area. The April 24, 1961 urinalysis report indicated that Mr. W. S. Livingston had a result of 142 d/m/l. He also was removed from working with uranium.

A file memorandum written by Mr. Chenoweth and included as Appendix D of this report indicates the action taken to decrease the potential exposures.

When it was discovered that Messrs. Frazee, Cooky and Livingston had high urinalysis results, further air samples were made. These indicated that the blending machine was leaking dust into the general atmosphere due to faulty seals. This was in the process of rectification at the time of this inspection.

33. The results of the contamination surveys dating from January 24, 1961 to April 28, 1961 were reviewed. These results indicated a maximum of 6250 d/m/100 cm² (beta-gamma) and a minimum of 3.8 d/m (beta-gamma). An average result is less than 1000 d/m/100 cm². These results are a composite of all the areas surveyed in this manner. The various areas are cleaned daily by wet-mop and vacuum to keep the contamination at a low level.

34. The results of the radiation surveys dating from January 8, 1960 through March 2, 1961 indicates a maximum of 0.6 mr/hr, a minimum of 0.02 mr/hr (background) and an average of 0.08 mr/hr. These were beta-gamma surveys conducted by the licensee of the Plant #2 and the "T" House areas.

35. The waste disposal log from January 1, 1960 through March 23, 1961 indicated a total of 400,506 gallons of waste having approximately 21,306 grams of uranium (ranging from depleted to 93% enrichment) disposed of through the waste disposal process at this installation.

36. The records also indicated that 244 water and silt samples have been taken. These records indicate the following maximum, minimum and average results.

MAXIMUM

Location	(1)Filterable (2) Non-filterable	Activity ¹ mc/l. ²		Activity ¹ mc/gm ²	
		Alpha ³	Beta ³	Alpha ³	Beta ³
Spring River at Spencer Park (1 mi. above effluent discharge)	(1)Filterable	3.8 ± 2.4	23 ± 14.0		
	(2)Non-filterable	1.4 ± 2.4	32 ± 35		
Spring River at Hiway 66 (2 mi. below effluent discharge)	(1)Filterable	18 ± 1.3	15 ± 8.8		
	(2)Non-filterable	8.6 ± 1.4	17.0 ± 17		
Spencer Lake at Overflow (at effluent discharge)	(1)Filterable	1.3 ± 1.4	21 ± 14		
	(2)Non-filterable	6.6 ± 12	25 ± 37		
Silt from Spencer Lake				21 ± 8.4	93 ± 33

May 2-5, 1957

Location	(1)Filterable (2)Non-filterable	Activity ¹ $\mu\text{mc}/\text{l}^2$		Activity ¹ $\mu\text{mc}/\text{cm}^2$	
		Alpha ³	Beta ³	Alpha ³	Beta ³
Spring River at Spencer Park (1 mi. above effluent discharge)	(1)Filterable (2)Non-filterable	background ⁴ background ⁴	background ⁴ background ⁴		
Spring River at Hiway 66 (2 mi. below effluent discharge)	(1)Filterable (2)Non-filterable	background ⁴ background ⁴	background ⁴ background ⁴		
Spencer Lake at Overflow (at effluent discharge)	(1)Filterable (2)Non-filterable	background ⁴ background ⁴	background ⁴ background ⁴		
Silt from Spencer Lake				0.8 \pm 5.2	back - ground ⁴
AVERAGE					
Spring River at Spencer Park (1 mi. above effluent discharge)	(1)Filterable (2)Non-filterable	6.7 \pm 5.6 0.44 \pm 1.1	5.8 \pm 6.1 7.0 \pm 10.6		
Spring River at Hiway 66 (2 mi. below effluent discharge)	(1)Filterable (2)Non-filterable	2.0 \pm 0.6 0.6 \pm 1.3	6.6 \pm 5.4 3.7 \pm 6.6		
Spencer Lake at Overflow (at effluent discharge)	(1)Filterable (2)Non-filterable	0.6 \pm 0.7 1.3 \pm 2.0	6.9 \pm 8.0 4.9 \pm 11.7		
Silt from Spencer Lake				13.65 \pm 7.5	39.43 \pm 26

1-Activity: \pm counting error at 95% confidence level

2- $\mu\text{mc}/\text{l} \times 10^{-9} = \mu\text{c}/\text{ml}$

3-based on natural uranium

4-background not greater than instrument background

The above tabulation results indicate that the ABC standard in 10CFR20 was not exceeded.

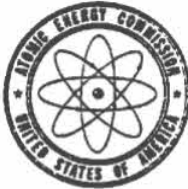
Items of Noncompliance

37. The following items of noncompliance were noted:

A. Item 8 of License SNM-154, Amendments dated February 2, 1960 and March 17, 1960- is that the procedures described in the amendments were not adhered to by the licensee.

1). Item 8 of the license states "In process of converting UF_6 to UO_2 or scrap metal to nitrate or oxide, using the procedures described in the applications of September 13, October 7 and December 19, 1957; April 16, May 14 and 16, June 6 and 23 and November 24, 1958 and January 21, 1959; except that approval is given under the May 16, 1958 application for the blending of materials up to 2.3% enriched in U-235 in a maximum batch size containing no more than two kilograms of U-235 provided the blending operation is conducted in a dry non-hydrogenous atmosphere."

2). The amendment dated February 2, 1960 states "Your license SNM-154 amended this date to authorize chemical conversion activities described in your application of January 4, 1960." Page 3, Item 1 under the paragraph headed "Material Movement Control" states "The entire production operation will be carried out in (a) primary



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

IN REPLY REFER TO:

ENG:MLL
70-146

DEC 28 1964

DELETED

CC: 1 X
Walter W
H. J. McAluff
L. J. Layfield
E. J. Doolan

Spencer Chemical Company
Research Center
5009 West 67th Street
Merriam, Kansas

Attention: Mr. E. A. Greenlee

Gentlemen:

The information contained in your letters dated January 29, and March 2, 1964, regarding the levels of uranium contamination remaining in your facility after completion of decontamination procedures, has been reviewed in connection with the activities performed under the license.

As a result of this review, we have concluded that due to the insignificance of the contamination which might be present in this particular instance, no hazard to health and safety is involved, and no license would be required for any persons possessing or occupying such facilities. Therefore, pursuant to your letter of November 20, 1962, license 58-154 is hereby terminated.

Sincerely yours,

DISTRIBUTION:

Doc. Rm.
Br. & Div. rfs
Compliance
Suppl.
H. J. McAluff, ORO
D. George, MEM
E. Doolan, ML
D. Hunsbarger, ML
R. Layfield, ML
State Health

Lyall Johnson
Acting Director
Division of Materials Licensing

DELETED

Office of the Director of Regulation

From CO - Hders

KANSAS BUREAU OF RADIATION CONTROL

Subject

Gulf (Spencer) Lake
C.W. Allen

Date Aug 14, 1984

Reviewed by

Checked

Sketch
Sheet 13

of

Sketch
Sheet 13

Sample Site
Aug 14/84



Plant Site

DRAW

Weir

SAMPLE STATION #3

WOODEN POST

PHOTOGRAPH

SAMPLE

#1/B Surface sample from
South side Canal/
with east point
STATION #2
SURFACE #1/B

#2 Surface sample 1/4 east
of water pole middle of
stream canal from weir
to lake
SAMPLE #2 STATION #2
SURFACE #2

#2 sub-surface sample from
same location as #2
except from 18" deep
SAMPLE #2 STATION #2
SUB-SURF

#3 Surface sample from area
1/4 west of wooden post
SAMPLE #3 STATION #2
SURFACE

#3 sub-surface sample from
same area as #3
only 18" sub-surface
SAMPLE #3 STATION #2
SUB-SURF

#3 sub-surface sample from same area as #3 only 18" sub-surface SAMPLE #3 STATION #2 SUB-SURF

KANSAS BUREAU OF RADIATION CONTROL

Subject Gulf (Spinner) Lake
G.W. Allen

Date May 16, 1981

Reviewed by _____

Checked _____

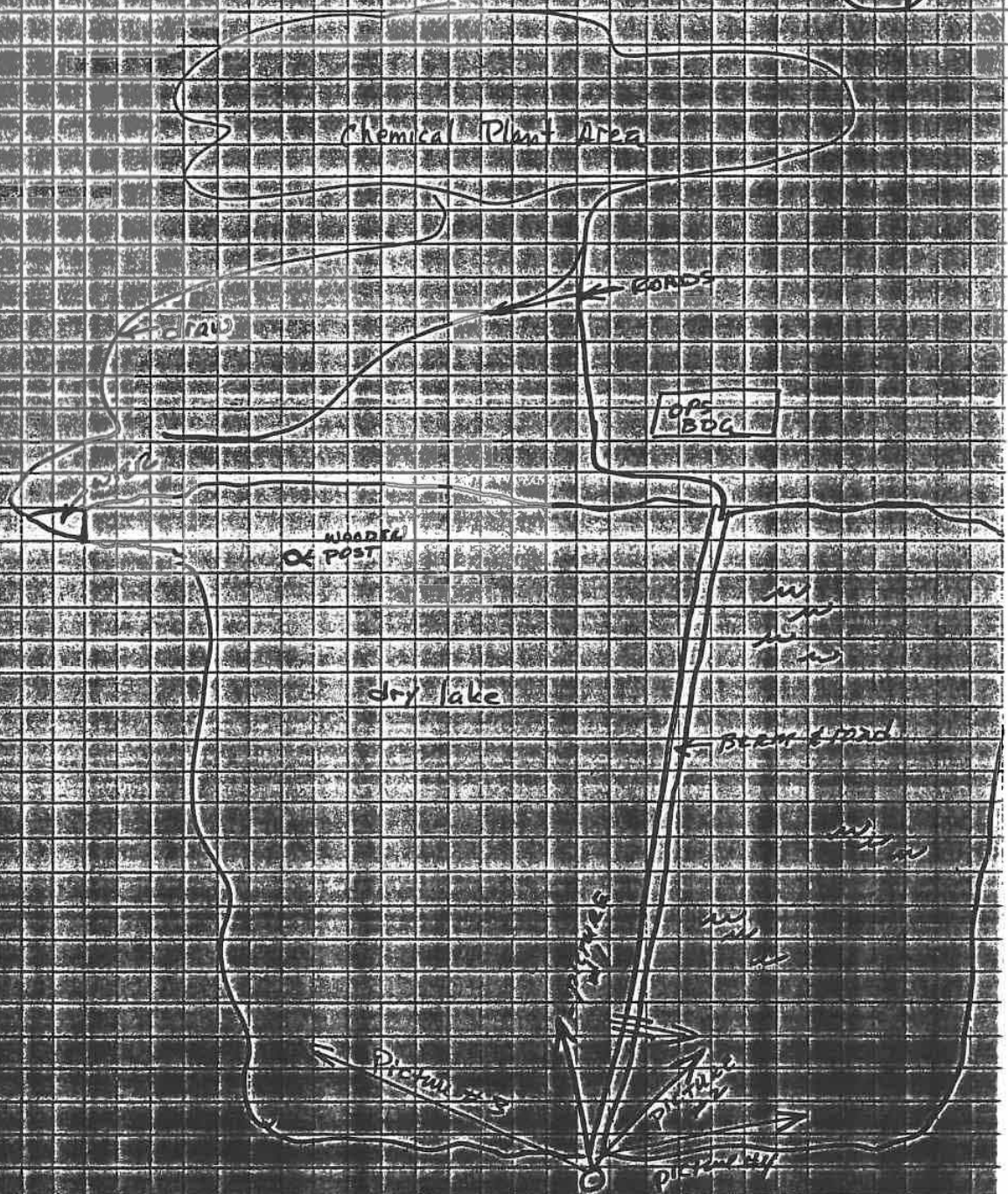
Sketch

Sheet 1 of _____

Sketches

_____ Sheets

General Plan View



Gulf Oil Chemicals Company

INDUSTRIAL AND SPECIALTY CHEMICALS DIVISION

JAYHAWK PLANT

P. O. Box 6200 B
Pittsburg, Kansas 66762

June 15, 1983

RECEIVED

JUN 16 1983

BUREAU OF
RADIATION CONTROL

State of Kansas
Department of Health & Environment
Bureau of Radiation Control
Topeka, Kansas 66620

Gentlemen:

Please cancel the radioactive license we requested on August 20, 1982, which was to cover the possession, decontamination, and disposal of U 235 present on a concrete foundation at the Jayhawk Plant.

Enclosed are copies of a Nuclear Material Transaction Report and a Radioactive Material Shipment and Transfer Form. The U 235 was transferred to RAMP Industries, 476 Kenton Street, Aurora, Colorado, for disposal on May 19, 1983. RAMP is authorized to possess the material under Colorado License Number 523-01.

Your cooperation is appreciated.

Very truly yours,

GULF OIL CHEMICALS COMPANY

G. E. Tolle

G. E. Tolle
Technical Manager

GET:as

cc: K. H. Autry
R. J. Jopp
A. G. Chancellor
G. M. McCormack - Houston



A DIVISION OF GULF OIL CORPORATION

TWX 910-740-1260 GALENA, KANSAS
TELEPHONE: 316/783-1321

[illegible]

RADIOACTIVE MATERIAL SHIPMENT & TRANSFER FORM
RAMP Industries Incorporated
476 Kenton Street, Aurora CO 80010
(303) 363-8333
(303) 480-1481

SHIP ALL MATERIALS TO:
RAMP Industries Incorporated
1031 West 46th Avenue
Denver, Colorado

TOTAL QUANTITY	PROPER SHIPPING NAME & HAZARD CLASS (PER 49 CFR 172.101)	IDENTIFICATION NUMBER	TOTAL WEIGHT IN POUNDS
	Radioactive Device, N.O.S. — Radioactive Material	UN2911	
	Radioactive Material, Low Specific Activity, N.O.S. — Radioactive Material	UN2912	
1	Radioactive Material, N.O.S. — Radioactive Material	NA9181	100 lbs.
	Radioactive Material, Limited Quantity, N.O.S. — Radioactive Material	UN2910	
	Radioactive Material, Special Form, N.O.S. — Radioactive Material	NA9182	

SOLIDIFICATION or ABSORPTION MEDIA

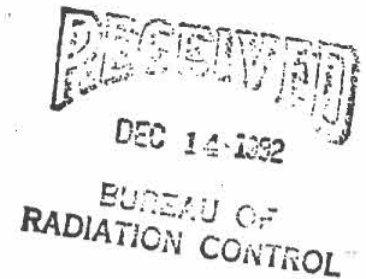
1. Speedi Dry
2. Florco & Florcox
3. Zonolite #2, 3, 4
4. Other _____

5. Concrete
6. Envirostone
7. Urea/Formaldehyde
8. Other _____

G. E. Lile Tech. Mgr. 5/19/83
Authorized Signature Title

December 12, 1982

Mr. Harold Spiker
Chief, Surveillance and Emergency Planning
Bureau of Radiation Control
Kansas Department of Health and Environment
Forbes Field, Topeka 66620



Reference: Jayhawk Nuclear Fuels Processing Plant- Crestline, Kansas
Spencer Chemical Company, Nuclear Fuels Department

Dear Mr. Spiker,

Enclosed is information and a few documents which may be of some interest to you.

Documents and correspondence enclosed includes:

Application for Special Nuclear Material License dated Sept. 15, 1957 for Building 709-Pilot Plant (Converted Pressure Vessel Test Lab)

Application for Special Nuclear Material License dated June 22, 1959 for Building 702-Advanced Materials Plant

Internal AEC Memo dated Sept. 3, 1962

Kerr-McGee letter to AEC dated Sept. 6, 1962

AEC letter to Spencer dated Oct. 26, 1962

Spencer letter to AEC dated Nov. 20, 1962

AEC letter to Spencer dated Dec. 18, 1962

Internal AEC Memo dated June 26, 1963

Internal AEC Memo dated July 10, 1963

AEC letter to Spencer Jan. 6, 1964

Spencer letter to AEC dated Jan. 29, 1964

Spencer letter to AEC dated March 2, 1964

Internal AEC Memo dated April 7, 1964

AEC Close-out Site Inspection dated May 20, 1964

Internal AEC Memo dated July 14, 1964

AEC letter to Spencer Dec. 28, 1964

II. Sample Information (continued from page 1)

Sample #	Depth	G. C. Reading	Observation
4-41	4'	.02 Area	Clay only
4-A	6'	.02 Area	burnt metal at 4'
4-B	8'	.02 hole	material
4-C	10'	.02 MTL.	some unburnt material
5-A	4'	.01 area	no sign of
5-B	5'	.02 hole	at 4 1/2 to 6'
5-C	6'	.02 MTL.	burnt mtl. at
6-A	2.5'	.03 area	about 2 1/2' to
6-B	4'	.03 hole	about 4' then clay
6-C	6'	.025 MTL.	
7-41	4'	.03 area	metal at 4' H ₂ O
7-A	6'	.03 area	at 5.03 G. C. reading
7-B	8'	.04 hole	clay at 6'
7-C	10'	.04 MTL.	clay only no
8-A	4'	.02 area	sign of material
8-B	5'	.02 hole	
8-C	6'	.02 MTL.	
9-A	2.5'	.02 area	metal at 2.5'
9-B	4'	.02 hole	burnt metal at 4'
9-C	6'	.02 MTL.	clay at 6'
10-A	4'	.03 area	metal at 4' wood
10-B	5'	.03 hole	unburnt burnt
10-C	6.5'	.03 MTL.	at 5' clay at 6.5'
11-A	NO SAMPLE		INTO CLAY
11-B	NO SAMPLE		ONLY
11-C	NO SAMPLE		
12-A	4'	.02 area	clay only
12-B	5'	.02 hole	no sign of
12-C	6'	.02 MTL.	material

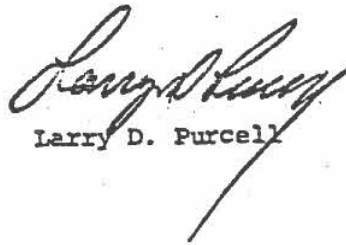
III. Summary

The site appears to have been approximately forty (40) feet wide, two hundred (200) feet long at a depth of six (6) feet a clay bed had been packed in, material was placed and burned. Eighty to ninety percent of the material appeared to have been destroyed by fire and then covered with another foot of clay and rock mixture, then the top soil replaced to one foot of depth. Giger counter readings taken for Beta show only slightly above the ambient readings described earlier. Two holes (#1 and #7) had water standing at a depth of four and one half (4 1/2) to five (5) feet, however, no significant difference was noticed in G.C. readings on the materials or water found. It is felt, subject to analysis by G. S. & T., that no problems exist and all findings were as previously indicated.

page 3

We will be awaiting results of analysis by your group in hopes of alleviating this matter.

If you have any questions or wish additional information please feel free to contact me.



Larry D. Purcell

LDP:sh

cc: G. M. McCormack
K. H. Autry
P. E. Wachter
G. E. Tolle
R. J. Jopp
S. Will

FROM L. D. Purcell

AT Jayhawk

IN REPLY
REFER TO

TO Mr. L. Max Scott

AT Hammarville

DATE October 14, 1981

SOIL SAMPLES - BURN SITE
NUCLEAR FUEL R & D LAB - JAYHAWK

On October 9, 1981, samples were taken of the soil at various depths to ascertain the existence of absence of unwanted waste. Drilling was conducted using the "A" shot hole drilling rig and two operators supplied by P & M Coal Company. All samples were collected and tagged by Larry Purcell of Gulf Oil Chemicals Company, Jayhawk plant.

I. Procedures

A. Protection

1. P & M operators wore coveralls, boots, glasses and hats.
2. The samplers wore coveralls, boots, glasses, gloves and respirators (Cumfo II dual cartridge dust filter).

B. Equipment

1. A model E 500B giger counter (C. & G.) was used to sample beta radiation in the area prior to sampling, and at each drill hole during and after drilling.

- a) A calibration source CS-137 #863 was used to calibrate the instrument prior to sampling.
- b) Ambient readings were taken in the vehicle parking lot West of the Jayhawk administration building and approximately 1/4 mile South of the actual site. They were .025 Mr./Hr.

C. Samples were collected at various depths (indicated below), placed in numbered top-sealed plastic bags and were forwarded to G.S. & T., Health Physics to be analyzed.

D. The area being sampled contained a mature soybean field approximately two weeks from harvest.

II. Sample Information (See Attachment "A")

<u>Sample #</u>	<u>Depth</u>	<u>G. C. Reading</u>	<u>Observation</u>
1-A	2.5'	.02 Area	H ₂ O at 5'
1-B	4'	.02 hole	Metal at 5 1/2'
1-C	6'	.025 MTL.	Burnt mtl. at
2-A	4'	.02 Area	No sign of
2-B	5'	.02 hole	material
2-C	6'	.02 hole	
3-A	4'	.025 area	clay only
3-B	5'	.025 hole	no sign of
3-C	6'	.025 mtl.	material

II. Sample Information (continued from page 1)

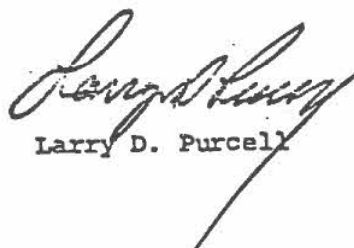
<u>Sample #</u>	<u>Depth</u>	<u>G. C. Reading</u>	<u>Observation</u>
4-41	4'	.02 Area	Clay only
4-A	6'	.02 Area	burnt metal at 4'
4-B	8'	.02 hole	material
4-C	10'	.02 MTL.	some unburnt material
5-A	4'	.01 area	no sign of
5-B	5'	.02 hole	at 4 1/2 to 6'
5-C	6'	.02 MTL.	burnt mtl. at
6-A	2.5'	.03 area	about 2 1/2' to
6-B	4'	.03 hole	about 4' then clay
6-C	6'	.025 MTL.	
7-41	4'	.03 area	metal at 4' H ₂ O
7-A	6'	.03 area	at 5.03 G. C. reading
7-B	8'	.04 hole	clay at 6'
7-C	10'	.04 MTL.	clay only no
8-A	4'	.02 area	sign of material
8-B	5'	.02 hole	
8-C	6'	.02 MTL.	
9-A	2.5'	.02 area	metal at 2.5'
9-B	4'	.02 hole	burnt metal at 4'
9-C	6'	.02 MTL.	clay at 6'
10-A	4'	.03 area	metal at 4' wood
10-B	5'	.03 hole	unburnt burnt
10-C	6.5'	.03 MTL.	at 5' clay at 6.5'
11-A	NO SAMPLE		INTO CLAY
11-B	NO SAMPLE		ONLY -
11-C	NO SAMPLE		
12-A	4'	.02 area	clay only
12-B	5'	.02 hole	no sign of
12-C	6'	.02 MTL.	material

III. Summary

The site appears to have been approximately forty (40) feet wide, two hundred (200) feet long at a depth of six (6) feet a clay bed had been packed in, material was placed and burned. Eighty to ninety percent of the material appear to have been destroyed by fire and then covered with another foot of clay and rock mixture, then the top soil replaced to one foot of depth. Giger counter readings taken for Beta show only slightly above the ambient readings described earlier. Two holes (#1 and #7) had water standing at a depth of four and one half (4 1/2) to five (5) feet, however, no significant difference was noticed in G.C. readings on the materials or water found. It is felt, subject to analysis by G. S. & T., that no problems exist and all findings were as previously indicated.

We will be awaiting results of analysis by your group in hopes of alleviating this matter.

If you have any questions or wish additional information please feel free to contact me.



Larry D. Purcell

LDP:sh

cc: G. M. McCormack
K. H. Autry
P. E. Wachter
G. E. Tolle
R. J. Jopp
S. Will

Gulf Oil Chemicals Company

INDUSTRIAL AND SPECIALTY CHEMICALS DIVISION

JAYHAWK PLANT

P. O. Box 6200 B
Pittsburg, Kansas 66762

October 27, 1982

Mr. Gerald W. Allen
Director, Bureau of Radiation Control
Department of Health and Environment
Forbes Field
Topeka, Kansas

Dear Mr. Allen:

Attached is the summary of activities related to the uranium decontamination carried out under License No. 26-C229-02. It is our belief that the site has been effectively decontaminated and meets the U.S. Nuclear Regulatory Commission guidelines for release of sites for unrestricted use.

The site is available to you for your confirmatory survey. Let us know if we can assist you with your survey.

Sincerely yours,

GULF OIL CHEMICALS COMPANY

RECEIVED
OCT 29 1982
BUREAU OF
RADIATION CONTROL

K. H. Autry
K. H. Autry
Plant Manager

KHA:as

Attachment

cc: R. J. Jopp
G. E. Tolle
L. Max Scott - Harmarville



A DIVISION OF GULF OIL CORPORATION

TWX 910-740-1260 GALENA, KANSAS
TELEPHONE 316/783-1321

FROM L. Max Scott AT Harmarville DATE October 22, 1982
TO Mr. K. H. Autry AT Jayhawk REFERENCE HM05-63-03
SUBJECT DECONTAMINATION OF CONCRETE BUNKER SITE

On October 12-14, I supervised the decontamination of the concrete bunker site. All areas which were contaminated with enriched uranium (approximately 1.5% ^{235}U) were decontaminated and meet the criteria recommended by the U.S. Nuclear Regulatory Commission for release for unrestricted use of facilities. Attached are the results of surveys made and decontamination protocol followed for this activity.

In my opinion, once the drum of uranium contaminated waste is shipped for disposal, you will no longer have licensable quantities of enriched uranium.



L. Max Scott
Corporate Director of Health Physics
Certified Health Physicist

LMS:et

Attachments

STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

COPY

Pursuant to the Nuclear Development and Radiation Control Act (L. 1963, ch. 290) and the Radiation Protection Regulations, Part 3, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the State Department of Health and to any conditions specified below.

<p style="text-align: center;">Licensee</p>		<p>3. License number</p> <p style="text-align: center;">26-C229-02</p>
<p>1. Name Gulf Oil Corporation Jayhawk Chemical Plant</p>		<p>4. Expiration date</p> <p style="text-align: center;">September 30, 1983 (I 83)</p>
<p>2. Address 20 South Pittsburg Highway 26 Pittsburg, Kansas 66762</p>		<p>5. Reference number</p>
<p>6. Radioactive materials (element and mass number)</p> <p style="text-align: center;">A. Uranium enriched in Uranium-235 to approximately 1.5%.</p>	<p>7. Chemical and/or physical form</p> <p style="text-align: center;">A. Any.</p>	<p>8. Maximum quantity licensee may possess at any one time</p> <p style="text-align: center;">A. 645 grams.</p>

CONDITIONS

9. Authorized use. (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)
- A. The licensee is authorized to remove the radioactive material described in Items 6, 7, and 8 of this license from concrete and soil as described in the application dated September 7, 1982, and signed by Gregory M. McCormack, with attachments.
10. Radioactive material shall be used by or under the supervision of L. Max Scott, Corporate Director of Health Physics, Gulf Oil Corporation.
11. The licensee shall comply with the provisions of Part 4 of the Kansas Radiation Protection Regulations, "Standards for Protection Against Radiation" and Part 10 of the Kansas Radiation Protection Regulations, "Notices, Instructions and Reports to Workers; Inspections".

STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

Complementary Sheet

License Number 26-C229-02

12. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in the following documents:
- (a) The application dated September 7, 1982, signed by Gregory M. McCormack, with attachments.
13. Upon completion of licensed operations, the licensee shall perform a comprehensive radiation survey of the facility. A written report of the results of this survey shall be submitted to the Department for review and shall include:
- (a) Name and location of the facility at which licensed operations were performed.
 - (b) Date the licensed operations were completed and the date(s) the final radiation survey was performed.
 - (c) Radiation levels and levels of radioactive materials remaining in the facility after licensed operations have been completed.
14. Any decision by the Department to approve the release of the facility for unrestricted use and/or termination of this license will be based on a determination that the required final survey report and a confirmatory survey performed by the Department indicates that radiation levels and residual radioactive materials have been reduced to levels which are as low as reasonably achievable.

SEP 29 1982

Date _____

FOR THE STATE DEPARTMENT OF HEALTH
& ENVIRONMENT

By _____

33-2079

32-69-476

Gerald W. Allen, Director
Bureau of Radiation Control

FROM THE DESK OF

GREG McCORMACK

Dear Harold

I appreciate your
telephone call on this
application. It is
signed now.

Timothy McGowan

RECEIVED

SEP 9 1982

BUREAU OF
RADIATION CONTROL
Gulf

JAYHAWK PLANT

M E M O R A N D U M

August 30, 1982

TO: Investigation/Gulf Oil Chemicals Co. Files

FROM: Harold L. Spiker

SUBJECT: Pre-licensing Investigation/Inspection at Gulf Oil Chemicals Co. Jayhawk Plant.

In response to several telephone inquiries by L. Max Scott, Corporate Director of Radiation Health Physics for Gulf Oil Chemical Co., and receipt of a draft license application for enriched uranium ($\approx 1.5\%$ U-235) at the Company's Jayhawk Plant southeast of Crestline, Kansas, the author conducted an investigation/inspection at the aforementioned facility on August 3, 1982.

The facility originally consisted of an advanced materials building and a pressure vessel testing laboratory which was built and used by Spencer Chemical Company in the 1950's. All processing and use of radioactive materials at the site was confined to these two structures under an A.E.C. license for development of a uranium enrichment process. When the project was completed the steel floor and partial walls of the advanced materials building were removed and the remainder of the wooden structure demolished, hauled to a disposal site on the Company's property, burned, and buried. The wooden structure of the pressure vessel testing laboratory was also demolished, hauled to the disposal site, burned, and buried. The reinforced concrete remains of the pressure vessel testing laboratory were apparently decontaminated with nitric acid solution and considered acceptable for unrestricted use by the A.E.C. and Spencer Chemical Co.

In addition to the inspector, other individuals present at the site during the inspection included:

- . L. Max Scott, Corporate Director of Health Physics
- . Glenn E. Tolle, Manager-Technical Dept.
- . Ralph Jopp, Manager-Specialty Chemicals

A survey of the remaining reinforced concrete structure was conducted by the inspector for gross alpha surface contamination, using an Eberline PAC-3G instrument. Swipe samples were taken to determine removability and character of the contamination. A diagram of the structure is attached as Attachment A. Surface readings in cpm and corresponding locations are indicated in Attachment A as well as locations where swipes were taken. Low level contamination (<100 cpm) was found in several areas of the structure, most notably on the outsides of the walls of the rooms and on the base of what was once a blast wall. Only the most significant areas of contamination found are indicated on Attachment A. No readings

above background were obtained during a survey with a Thyac II with 1½" X 1½" NaI scintillation detector. In most instances, detectable contamination was also visible as a yellow discoloration on the concrete. The contamination was removable with swipes. See attached Radiation Laboratory swipe analysis reports.

During the inspection, Mr. Scott and Mr. Tolle attempted to remove the contamination from a small area of the concrete blast wall base using nitric acid. A significant reduction in the detectable surface contamination was observed (after drying), indicating that washing with an acid solution may be an effective method for removing or reducing the remaining contamination.

Several pictures of the structure were taken and are attached as Attachment B.

Because of the extensive survey already conducted at the disposal/burn site by Mr. Scott, including core sampling, (see license file for report) a survey was not conducted at that location by the inspector.

A close-out meeting was held at the conclusion of the investigation/ inspection. In addition to the inspector, those present at the meeting were:

- . G.M. McCormack, Plant Manager
- . L. Max Scott
- . Glenn E. Tolle

Based upon the preliminary results of the inspection, the following suggestions/ recommendations were made:

1. Based upon the survey conducted by the inspector, the estimates of total remaining U-235 contamination at the site which was included in the draft license application, appears to be too high. It was suggested that these estimates be re-evaluated.
2. Rather than demolishing, removing and disposing of the concrete blast wall base, it was suggested that decontamination be attempted in areas of the structure where significant surface contamination remains and that contamination be reduced to levels which are as low as reasonably achievable.
3. It was recommended that Gulf Oil Chemical Co. proceed with submitting an application for a Kansas Radioactive Materials License based upon the revised estimate of total remaining contamination and including the proposed decontamination procedures to be used as well as the required health and safety precautions.

Mr. Scott indicated that he would telephone the office to discuss the application before actually submitting it. It was also indicated that the application and related correspondence would be submitted through Mr. McCormack.

HLS:kaa56S

STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

Pursuant to the Nuclear Development and Radiation Control Act (L. 1963, ch. 290) and the Radiation Protection Regulations, Part 3, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the State Department of Health and to any conditions specified below.

Licensee		3. License number
1. Name Gulf Oil Corporation		26-C229-02
Jayhawk Chemical Plant		4. Expiration date
2. Address 20 South Pittsburg Highway 26		September 30, 1983 (I 83)
Pittsburg, Kansas 66762		5. Reference number
6. Radioactive materials (element and mass number)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Uranium enriched in Uranium-235 to approximately 1.5%.	A. Any.	A. 645 grams.

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STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

Supplementary Sheet

License Number 26-C229-02

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SEP 29 1982

Date _____

FOR THE STATE DEPARTMENT OF HEALTH
& ENVIRONMENT

By _____

13-2079

12-68-6W

Gerald W. Allen, Director
Bureau of Radiation Control

State of Kansas
DEPARTMENT OF HEALTH AND ENVIRONMENT
Topeka

M E M O R A N D U M

August 30, 1982

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FROM: Harold L. Spiker
SUBJECT: Pre-licensing Investigation/Inspection at Gulf Oil Chemicals
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- . Glenn E. Tolle

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Mr. Scott indicated that he would telephone the office to discuss the application before actually submitting it. It was also indicated that the application and related correspondence would be submitted through Mr. McCormack.

HLS:kaa56S

Gulf Oil Chemicals Company

INDUSTRIAL AND SPECIALTY CHEMICALS DIVISION

JAYHAWK PLANT

G. M. McCormack
PLANT MANAGER

P. O. Box 6200 B
Pittsburg, Kansas 66762

August 20, 1982

State of Kansas
Department of Health & Environment
Bureau of Radiation Control
Topeka, Kansas 66620

Gentlemen:

Enclosed please find our application for radioactive material license to cover the possession, decontamination, and disposal of U^{235} present on a concrete foundation at our Jayhawk Chemical Plant.

It is our hope to complete the removal of this material prior to cold weather. Therefore, if you could expedite this request, we would appreciate it.

Sincerely yours,

GULF OIL CHEMICALS COMPANY

RECEIVED

AUG 23 1982

BUREAU OF
RADIATION CONTROL



G. M. McCormack
Plant Manager

LMS:GMM:as

Enclosure

cc: L. Max Scott
G. E. Tolle
R. J. Jopp



A DIVISION OF GULF OIL CORPORATION

TWX 910-740-1260 GALENA, KANSAS
TELEPHONE 316/783-1321

STATE OF KANSAS
DEPARTMENT OF HEALTH AND ENVIRONMENT

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

INSTRUCTIONS- Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail one copy to: State of Kansas, Department of Health and Environment, Bureau of Radiation Control, Topeka, Kansas, 66620. Upon approval of this application, the applicant will receive a Kansas Radioactive Material License, issued in accordance with the general requirements contained in State of Kansas, Department of Health and Environment, Radiation Protection Regulations and the Kansas Nuclear Energy Development and Radiation Control Act.

<p>1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc.)</p> <p>Gulf Oil Corporation Jayhawk Chemical Plant 20 South Pittsburg Highway 26</p>	<p>(b) STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED: (If different from 1 (a).)</p> <p>same</p>
<p>2. DEPARTMENT TO USE RADIOACTIVE MATERIAL.</p> <p>Maintenance.</p>	<p>3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)</p> <p>Current license 22-B229-01</p>
<p>4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of radioactive materials. Give training and experience in Items 8 and 9.)</p> <p>L. M. Scott Corporate Director of Radiation Health Physics</p>	<p>5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as Items 8 and 9.)</p> <p>L. M. Scott Corporate Director of Radiation Health Physics</p>
<p>6. (a) RADIOACTIVE MATERIAL. (Elements and mass number of each).</p> <p>Enriched Uranium = 1.5% ²³⁵U</p>	<p>(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM QUANTITY OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)</p> <p>Contaminated Concrete Less than 15 grams of ²³⁵U (see attached)</p>
<p>7. DESCRIBE PURPOSE FOR WHICH RADIOACTIVE MATERIAL WILL BE USED. If radioactive material is in the form of sealed sources, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)</p> <p>Possess, decontaminate and dispose</p>	

(Continued on reverse side)

COPY

STATE OF KANSAS RADIOACTIVE MATERIALS LICENSE

Page 1 of 6 Pages

Pursuant to the Nuclear Development and Radiation Control Act (L. 1963, ch. 290) and the Radiation Protection Regulations, Part 3, and in reliance on statements and representations heretofore made by the licensee designated below, license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the State Department of Health and to any conditions specified below.

Licensee		3. License number
1. Name Gulf Oil Corporation Jayhawk Chemical Plant		26-C229-02
2. Address 20 South Pittsburg Highway 26 Pittsburg, Kansas 66762		4. Expiration date September 30, 1983 (I 83)
		5. Reference number
6. Radioactive materials (element and mass number)	7. Chemical and/or physical form	8. Maximum quantity licensee may possess at any one time
A. Uranium enriched in Uranium-235 to approximately 1.5%.	A. Any.	A. 645 grams.

CONDITIONS

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STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

Page _____ of _____ pages

Supplementary Sheet

License Number 26-C229-02

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SEP 29 1982

Date _____

FOR THE STATE DEPARTMENT OF HEALTH
& ENVIRONMENT

By _____

22-2079

22-69-418

Gerald W. Allen, Director
Bureau of Radiation Control

STATE OF KANSAS
DEPARTMENT OF HEALTH AND ENVIRONMENT

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

INSTRUCTIONS- Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail one copy to: State of Kansas, Department of Health and Environment, Bureau of Radiation Control, Topeka, Kansas, 66620. Upon approval of this application, the applicant will receive a Kansas Radioactive Material License, issued in accordance with the general requirements contained in State of Kansas, Department of Health and Environment, Radiation Protection Regulations and the Kansas Nuclear Energy Development and Radiation Control Act.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc.) Gulf Oil Corporation Jayhawk Chemical Plant 20 South Pittsburg Highway 26	(b) STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED. - (If different from 1. (a).) same
2. DEPARTMENT TO USE RADIOACTIVE MATERIAL. Maintenance	3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) Current license 22-B229-01
4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of radioactive materials. Give training and experience in Items 8 and 9.) L. M. Scott Corporate Director of Radiation Health Physics	5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as Items 8 and 9.) L. M. Scott Corporate Director of Radiation Health Physics
6. (a) RADIOACTIVE MATERIAL. (Elements and mass number of each). Enriched Uranium ≈ 1.5% ²³⁵ U	(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM QUANTITY OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.) Contaminated Concrete Less than 15 grams of ²³⁵ U (see attached)
7. DESCRIBE PURPOSE FOR WHICH RADIOACTIVE MATERIAL WILL BE USED. If radioactive material is in the form of sealed sources, include the make and model number of the storage container and/or device in which the source will be stored and/or used.) Possess, decontaminate and dispose	

(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary).

7. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection Union	Carbide Gulf	21 years	<input checked="" type="radio"/> YES <input type="radio"/> NO	YES <input checked="" type="radio"/> NO
b. Radioactivity measurements standardizations and monitoring techniques and instruments	"	21 years	<input checked="" type="radio"/> YES <input type="radio"/> NO	YES <input checked="" type="radio"/> NO
c. Mathematics and calculations basic to the use and measurement of radioactivity	"	21 years	<input checked="" type="radio"/> YES <input type="radio"/> NO	YES <input checked="" type="radio"/> NO
d. Biological effects of radiation	"	21 years	<input checked="" type="radio"/> YES <input type="radio"/> NO	YES <input checked="" type="radio"/> NO

9. EXPERIENCE WITH RADIATION (Actual use of radioisotopes or equivalent experience).

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE.
		see attached		

10. RADIATION DETECTION INSTRUMENTS (Use supplemental sheets if necessary).

TYPE OF INSTRUMENTS (Include make and Model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, Surveying, Measuring)
		see attached			

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

see attached

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED (For film badges, specify method of calibrating and processing, or name of supplier).

none

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached (Circle answer) ☒ Yes ☐ No
14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.
15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved.

CERTIFICATE

(This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH STATE OF KANSAS, DEPARTMENT OF HEALTH AND ENVIRONMENT, RADIATION PROTECTION REGULATIONS AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Date: 9/7/82

GULF OIL CHEMICALS
Applicant named in Item 1

By:

G.M. McClouch
PLANT MGR

Title of certifying official authorized to act on behalf of the applicant

Gulf Oil Chemicals Company

INDUSTRIAL AND SPECIALTY CHEMICALS DIVISION

JAYHAWK PLANT

P. O. Box 6200 B
Pittsburg, Kansas 66762

June 15, 1983

RECEIVED

JUN 16 1983

BUREAU OF
RADIATION CONTROL

State of Kansas
Department of Health & Environment
Bureau of Radiation Control
Topeka, Kansas 66620

Gentlemen:

Please cancel the radioactive license we requested on August 20, 1982, which was to cover the possession, decontamination, and disposal of U 235 present on a concrete foundation at the Jayhawk Plant.

Enclosed are copies of a Nuclear Material Transaction Report and a Radioactive Material Shipment and Transfer Form. The U 235 was transferred to RAMP Industries, 476 Kenton Street, Aurora, Colorado, for disposal on May 19, 1983. RAMP is authorized to possess the material under Colorado License Number 523-01.

Your cooperation is appreciated.

Very truly yours,

GULF OIL CHEMICALS COMPANY

G. E. Tolle

G. E. Tolle
Technical Manager

GET:as

cc: K. H. Autry
R. J. Jopp
A. G. Chancellor
G. M. McCormack - Houston



A DIVISION OF GULF OIL CORPORATION

TWX 910-740-1260 GALENA, KANSAS
TELEPHONE 316/783-1321

COPY

STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

Pursuant to the Nuclear Development and Radiation Control Act (L. 1963, ch. 290) and the Radiation Protection Regulations, Part 3, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the State Department of Health and to any conditions specified below.

Licensee 1. Name Gulf Oil Corporation Jayhawk Chemical Plant 2. Address 20 South Pittsburg Highway 26 Pittsburg, Kansas 66762		3. License number 26-C229-02 4. Expiration date September 30, 1983 (I 83) 5. Reference number
6. Radioactive materials (element and mass number) A. Uranium enriched in Uranium-235 to approximately 1.5%.	7. Chemical and/or physical form A. Any.	8. Maximum quantity licensee may possess at any one time A. 645 grams.

CONDITIONS

9. Authorized use. (Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.)
- A. The licensee is authorized to remove the radioactive material described in Items 6, 7, and 8 of this license from concrete and soil as described in the application dated September 7, 1982, and signed by Gregory M. McCormack, with attachments.
10. Radioactive material shall be used by or under the supervision of L. Max Scott, Corporate Director of Health Physics, Gulf Oil Corporation.
11. The licensee shall comply with the provisions of Part 4 of the Kansas Radiation Protection Regulations, "Standards for Protection Against Radiation" and Part 10 of the Kansas Radiation Protection Regulations, "Notices, Instructions and Reports to Workers; Inspections".

AIR SAMPLING RESULTS

Downwind air sampling was conducted on the day prior to cleanup, for 164 minutes during cleanup, and the day subsequent to the cleanup. Sampling rate was 10 cfm. The filters were counted in an Eberline SAC-4 which has an efficiency for alpha of 38%. All air sample filter counts were equal to the background count rate. Assuming twice background to be the limit of sensitivity, the uranium air concentration was less than 9.3×10^{-14} Ci/m³.

L. Max Scott
October 22, 1982

STATE OF KANSAS
RADIOACTIVE MATERIALS LICENSE

Supplementary Sheet

License Number 26-C229-02

12. Except as specifically provided otherwise by this license, the licensee shall possess and use the radioactive material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in the following documents:
- (a) The application dated September 7, 1982, signed by Gregory M. McCormack, with attachments.
13. Upon completion of licensed operations, the licensee shall perform a comprehensive radiation survey of the facility. A written report of the results of this survey shall be submitted to the Department for review and shall include:
- (a) Name and location of the facility at which licensed operations were performed.
- (b) Date the licensed operations were completed and the date(s) the final radiation survey was performed.
- (c) Radiation levels and levels of radioactive materials remaining in the facility after licensed operations have been completed.
14. Any decision by the Department to approve the release of the facility for unrestricted use and/or termination of this license will be based on a determination that the required final survey report and a confirmatory survey performed by the Department indicates that radiation levels and residual radioactive materials have been reduced to levels which are as low as reasonably achievable.

SEP 29 1982

Date _____

FOR THE STATE DEPARTMENT OF HEALTH
& ENVIRONMENT

By _____



22-69-4M

Gerald W. Allen, Director
Bureau of Radiation Control

MEMORANDUM

August 30, 1982

TO: Investigation/Gulf Oil Chemicals Co. Files
FROM: Harold L. Spiker
SUBJECT: Pre-licensing Investigation/Inspection at Gulf Oil Chemicals
Co. Jayhawk Plant.

In response to several telephone inquiries by L. Max Scott, Corporate Director of Radiation Health Physics for Gulf Oil Chemical Co., and receipt of a draft license application for enriched uranium ($\approx 1.5\%$ U-235) at the Company's Jayhawk Plant southeast of Crestline, Kansas, the author conducted an investigation/inspection at the aforementioned facility on August 3, 1982.

The facility originally consisted of an advanced materials building and a pressure vessel testing laboratory which was built and used by Spencer Chemical Company in the 1950's. All processing and use of radioactive materials at the site was confined to these two structures under an A.E.C. license for development of a uranium enrichment process. When the project was completed the steel floor and partial walls of the advanced materials building were removed and the remainder of the wooden structure demolished, hauled to a disposal site on the Company's property, burned, and buried. The wooden structure of the pressure vessel testing laboratory was also demolished, hauled to the disposal site, burned, and buried. The reinforced concrete remains of the pressure vessel testing laboratory were apparently decontaminated with nitric acid solution and considered acceptable for unrestricted use by the A.E.C. and Spencer Chemical Co.

In addition to the inspector, other individuals present at the site during the inspection included:

- . L. Max Scott, Corporate Director of Health Physics
- . Glenn E. Tolle, Manager-Technical Dept.
- . Ralph Jopp, Manager-Specialty Chemicals

A survey of the remaining reinforced concrete structure was conducted by the inspector for gross alpha surface contamination, using an Eberline PAC-3G instrument. Swipe samples were taken to determine removability and character of the contamination. A diagram of the structure is attached as Attachment A. Surface readings in cpm and corresponding locations are indicated in Attachment A as well as locations where swipes were taken. Low level contamination (<100 cpm) was found in several areas of the structure, most notably on the outsides of the walls of the rooms and on the base of what was once a blast wall. Only the most significant areas of contamination found are indicated on Attachment A. No readings

82-25

above background were obtained during a survey with a Thyac II with $1\frac{1}{4}$ " X $1\frac{1}{2}$ " NaI scintillation detector. In most instances, detectable contamination was also visible as a yellow discoloration on the concrete. The contamination was removable with swipes. See attached Radiation Laboratory swipe analysis reports.

During the inspection, Mr. Scott and Mr. Tolle attempted to remove the contamination from a small area of the concrete blast wall base using nitric acid. A significant reduction in the detectable surface contamination was observed (after drying), indicating that washing with an acid solution may be an effective method for removing or reducing the remaining contamination.

Several pictures of the structure were taken and are attached as Attachment B.

Because of the extensive survey already conducted at the disposal/burn site by Mr. Scott, including core sampling, (see license file for report) a survey was not conducted at that location by the inspector.

A close-out meeting was held at the conclusion of the investigation/ inspection. In addition to the inspector, those present at the meeting were:

- . G.M. McCormack, Plant Manager
- . L. Max Scott
- . Glenn E. Tolle

Based upon the preliminary results of the inspection, the following suggestions/ recommendations were made:

1. Based upon the survey conducted by the inspector, the estimates of total remaining U-235 contamination at the site which was included in the draft license application, appears to be too high. It was suggested that these estimates be re-evaluated.
2. Rather than demolishing, removing and disposing of the concrete blast wall base, it was suggested that decontamination be attempted in areas of the structure where significant surface contamination remains and that contamination be reduced to levels which are as low as reasonably achievable.
3. It was recommended that Gulf Oil Chemical Co. proceed with submitting an application for a Kansas Radioactive Materials License based upon the revised estimate of total remaining contamination and including the proposed decontamination procedures to be used as well as the required health and safety precautions.

Mr. Scott indicated that he would telephone the office to discuss the application before actually submitting it. It was also indicated that the application and related correspondence would be submitted through Mr. McCormack.

HLS:kaa56S



State of Kansas . . . John Carlin, Governor

DEPARTMENT OF HEALTH AND ENVIRONMENT

Joseph F. Harkins, Secretary

Forbes Field
Topeka, Kansas 66620
913-862-9360



August 26, 1982

G.M. McCormack
Gulf Oil Chemicals Company
Jayhawk Plant
P.O. Box 6200B
Pittsburg, KS 66762

Dear Mr. McCormack:

While reviewing your application for a Kansas Radioactive Materials License, I noticed that it had not been signed or dated. As per our telephone conversation this morning, I am returning it to you for signature.

The review of your request will continue upon receipt of a signed application.

Sincerely,

DIVISION OF ENVIRONMENT

Harold L. Spiker, Chief
Surveillance & Emergency Planning Section
Bureau of Radiation Control

HLS:p²a
Enclosures

Calculations

Possession limit requested by Gulf = 9.5 gm U-235

Gulf reported an enrichment of 1.5% U-235 by weight.

ie. .015 gm U-235/gm U-238

$$\frac{9.5 \text{ gm U-235}}{.015 \text{ gm U-235/gm U-238}} = 633 \text{ gm U-238}$$

$$\text{Total uranium} = 633 \text{ gm U-238} + 9.5 \text{ gm U-235} = 642.5 \text{ gm}$$

* Write license for 645 gm uranium enriched to 1.5% U-235

Estimated total gross α activity at site = 11.6 μCi

" " U-235 at site = 1.16 μCi

Radiation Laboratory results indicate $\approx 10\%$ of gross α activity is U-235

$$\text{S.A. U-235} = 2.14 \mu\text{Ci/gm}$$

$$\text{S.A. U-238} = .333 \mu\text{Ci/gm}$$

$$\frac{1.16 \mu\text{Ci U-235}}{2.14 \mu\text{Ci/gm}} = 0.54 \text{ gm U-235}$$

Assuming all of the remaining gross α activity is U-238,

$$\frac{10.44 \mu\text{Ci U-238}}{.333 \mu\text{Ci/gm}} = 31.3 \text{ gm U-238}$$

Total uranium ~~is~~ 32 gm

$$\frac{.54 \text{ gm U-235}}{31.3 \text{ gm U-238}} \times 100 = 1.7\% \quad , \text{ which is in agreement with the } 1.5\% \text{ reported by Gulf.}$$

DRAFT

Form RH-1

STATE OF KANSAS

DEPARTMENT OF HEALTH AND ENVIRONMENT

APPLICATION FOR RADIOACTIVE MATERIAL LICENSE

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<p>1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc.)</p> <p>Gulf Oil Corporation Jayhawk Chemical Plant</p>	<p>(b) STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED. (If different from 1 (a).)</p> <p>Same</p>
<p>2. DEPARTMENT TO USE RADIOACTIVE MATERIAL.</p> <p>Maintenance</p>	<p>3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)</p> <p>Current license 22-B229-01</p>
<p>4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of radioactive materials. Give training and experience in Items 8 and 9.)</p> <p>M. Scott Corporate Director of Radiation Health Physics</p>	<p>5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as Items 8 and 9).</p>
<p>6. (a) RADIOACTIVE MATERIAL. (Elements and mass number of each).</p> <p>Enriched Uranium ~ 1.5% ²³⁵U</p> <div data-bbox="324 1323 633 1428" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>RECEIVED</p> </div> <p style="text-align: center;">JUL 27 1962</p> <p style="text-align: center;">BUREAU OF RADIATION CONTROL</p>	<p>(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM QUANTITY OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)</p> <p>Contaminated Concrete Less than 50 grams of enriched uranium (see attached)</p>
<p>7. DESCRIBE PURPOSE FOR WHICH RADIOACTIVE MATERIAL WILL BE USED. If radioactive material is in the form of sealed sources, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)</p> <p>Possess, decontaminate and dispose</p>	

(Continued on reverse side)