

Concern 1 Assigned To: NMSBB

OI Action: No

OI Report:

Alleger believes the licensee burned boxed up radioactive material while the plant was operating. The current workers are concerned about the burned radioactive material.

Action	Branch	Assigned	Planned	Completed
1 Initial ARB Meeting NMSBB to provide closure memo	ACES	09/10/2008	10/10/2008	09/22/2008
2 Staff Review	NMSB B	09/11/2008		09/12/2008
3 Closure Memo	NMSB B	09/22/2008	10/22/2008	12/05/2008
4 File Closed	ACES			12/05/2008

ARB DISPOSITION RECORD		Allegation Number: RIV-2008-A-0123	
Facility Name: Kerr McGee-Cimarron		Docket Number: 070-0925	
Responsible Division: DMNS		ARB Date: 09/22/2008	
Received Date 09/10/2008	30 Days 10/10/2008	150 Days 02/07/2009	180 Days 03/09/2009
Purpose of the ARB: Initial			
Basis for Another ARB:			
REFERRAL			
Does Allegor Object to Referral <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A			
If any of the following factors apply, an allegation shall not be referred to the licensee.			
<input type="checkbox"/> Information cannot be released in sufficient detail to the licensee without compromising the identity of the allegor of confidential source. <input type="checkbox"/> The licensee could compromise an investigation or inspection because of knowledge gained from the referral. <input type="checkbox"/> The allegation is made against the licensee's management or those parties who would normally receive and address the allegation. <input type="checkbox"/> The basis of the allegation is information received from a Federal or State agency that does not approve of the information being released in a referral.			
ARB PARTICIPANTS			
Chairman:			
CCain	RTorres	VEverett	CMaier
KFuller	(b)(7)(C)	HFreeman	LBerger
BSpitzberg			

Concern	1	Discipline	Reactor Department Code
		Health Physics	N/A
Responsible Branch:	NMSBB	OI Case Number:	
Concern Description:			
Allegor believes the licensee burned boxed up radioactive material while the plant was operating. The current workers are concerned about the burned radioactive material.			
Regulatory Requirement:			
10 CFR 20.1201 occupational dose limits for adults OR 10 CFR 20.1301 dose limits for individual members of the public			
Safety Significance -	Normal		
Basis:			
Check if question is applicable to the concern.			
<input checked="" type="checkbox"/> Is it a declaration, statement, or assertion of impropriety or inadequacy? <input checked="" type="checkbox"/> Is the impropriety or inadequacy associated with NRC regulated activities? <input checked="" type="checkbox"/> Is the validity of the issue unknown?			
If all of the above statements are checked, the Issue is an allegation.			

Action	Assigned Branch	Assigned Date	Planned Date
Closure Memo	NMSBB	09/22/2008	
Comments:	Based on decommissioning activities		
Additional Comments			

From: Randy Erickson
Sent: Wednesday, September 10, 2008 11:37 AM
To: R4ALLEGATION Resource
Cc: Harry Freeman; Judith Walker
Subject: FW: Allegation-related material

A potential allegation from Oklahoma. Please review and enter into the allegation system if appropriate.

Randy

From: Broderick, Mike [mailto:Mike.Broderick@deq.ok.gov]
Sent: Wednesday, September 10, 2008 11:19 AM
To: Randy Erickson; Linda McLean
Subject: Allegation-related material

As per phone conversation with Randy Erickson this day, this is the report received from DEQ's complaint hotline. The complaint is anonymous, and we have no further information. I believe this qualifies as an allegation.

Mike Broderick
 Program Manager
 Oklahoma DEQ
 Radiation Management Section

Corrected New Email Address: Mike.Broderick@deq.ok.gov
 Please verify your address book listing for me

From: Kerze, Keri
Sent: Wednesday, September 10, 2008 11:04 AM
To: Broderick, Mike
Subject: RE: Complaint # 64675 In Crescent

OK ,sorry about the wait Mike. Here ya go. (P.S...Copy and paste is wonderful!!!)

CP: Anonymous

Nature: CP states the Kerr-McGee plant burned various materials in cardboard boxes, some of which allegedly contained radioactive materials. This occurred when the old plant was in operation. The buildings are now being dismantled and the workers are concerned about the burned radioactive material.

Location: Crescent - Kerr-McGee: Hwy 74 just south of the Cimarron River

Keri Kerze

*Oklahoma Department of Environmental Quality
 Environmental Complaints & Local Services*

From: Broderick, Mike
Sent: Wednesday, September 10, 2008 9:43 AM
To: Kerze, Keri

Subject: RE: Complaint # 64675 in Crescent

I don't have access, if you can cut and paste or (hopefully not have to do this) retype, I'd appreciate it!

Mike Broderick

Program Manager
Oklahoma DEQ
Radiation Management Section

Corrected New Email Address: Mike.Broderick@deq.ok.gov

Please verify your address book listing for me

From: Kerze, Keri

Sent: Wednesday, September 10, 2008 9:25 AM

To: Broderick, Mike

Subject: RE: Complaint # 64675 in Crescent

No, it is in the CMS database and I am unaware of a way to attach those type of records. Do you have access to the CMS database? If not I can retype the information for you in an email.

Keri Kerze

*Oklahoma Department of Environmental Quality
Environmental Complaints & Local Services*

From: Broderick, Mike

Sent: Wednesday, September 10, 2008 9:05 AM

To: Kerze, Keri

Subject: RE: Complaint # 64675 in Crescent

Is there an attachment?

Mike Broderick

Program Manager
Oklahoma DEQ
Radiation Management Section

Corrected New Email Address: Mike.Broderick@deq.ok.gov

Please verify your address book listing for me

From: Kerze, Keri

Sent: Wednesday, September 10, 2008 9:03 AM

To: Broderick, Mike

Subject: Complaint # 64675 in Crescent

This is the possible burned radioactive material complaint at Kerr-McGee.

Keri Kerze

R4ALLEGATION Resource

From: Robert Evans
Sent: Friday, December 05, 2008 11:31 AM
To: R4ALLEGATION Resource
Cc: Jack Whitten
Subject: Electronic copies of Allegations ~~SENSITIVE ALLEGATION MATERIAL~~
Attachments: Allegation RIV-2008-A-0132 Resolution of Concerns.doc; Allegation RIV-2008-A-0037 Resolution of Concerns.doc; Allegation RIV-2008-A-0123 Resolution of Concerns.doc

For you viewing pleasure....


Electronic copies of the hard copies that were hand delivered earlier today



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

December 2, 2008

TO: Harry Freeman, Senior Allegations Coordinator
Judith Walker, Allegations Coordinator
Allegation Coordination and Enforcement Staff

FROM: Jack E. Whitten, Chief 
Nuclear Materials Safety Branch B
Division of Nuclear Materials Safety

SUBJECT: REVIEW OF ALLEGATION RIV-2008-A-0123

The Division of Nuclear Materials Safety, Nuclear Materials Safety Branch B, was requested to review and close Allegation RIV-2008-A-0123. This allegation involves the apparent burning of potentially radioactive material at the Kerr-McGee Cimarron facility. The allegation was received anonymously through the State of Oklahoma. On September 22, 2008, the Allegation Review Board elected to close this allegation, in part, due to ongoing decommissioning activities at the site and due to a lack of specificity with the alleged activities. The Division of Nuclear Materials Safety, Nuclear Materials Safety Branch B, was requested to document the closure of this allegation.

An inspector from Nuclear Materials Safety Branch B conducted a followup review of the concern through a docket file records review. The docket file contains information about the use of an incinerator at the site. The records indicate that the incinerator was used for non-radioactive trash only. The incinerator was dismantled in 1992, the ash of the incinerator was radiologically sampled at the time, and the area was subsequently reclaimed as part of the decommissioning process.

In summary, there was no evidence identified in the docket file indicating that radioactive material was ever burned at the site. Therefore, based on this docket file review, the allegation was not substantiated.

Enclosure: Resolution of Concern

On September 10, 2008, the State of Oklahoma received an anonymous allegation regarding Kerr-McGee Cimarron. The allegation was forwarded to NRC Region IV because the Cimarron site is regulated by the NRC. Based on a docket file review, the allegation was not substantiated because there is no record that the licensee ever burned radioactive material at the site. The docket file for Kerr-McGee Cimarron is No. 070-00925, License No. SNM-928.

Concern

A concerned individual stated that the Kerr-McGee Cimarron plant burned various materials in cardboard boxes, some of which allegedly contained radioactive materials. This occurred when the old plant was in operation. The buildings are now being dismantled and the workers are concerned about the burned radioactive material.

Resolution

1. An inspector from the Division of Nuclear Materials Safety, Nuclear Materials Safety Branch B conducted a docket file review to identify records of previous burn activities at the Cimarron site. The inspector identified records related to the operation, dismantlement, and radiological sampling of a former site incinerator.
2. The records indicate that Cimarron operated between 1966 and 1975. The plant's two main processes (Mixed Oxide Fuel Fabrication Plant and Uranium Plant) were permanently shut down by 1976. The licensee operated a trash incinerator while the site was in operation. The incinerator was utilized to incinerate non-radioactive waste materials released from restricted areas during site operations.
3. Based on documents submitted to the NRC during 1994-1995, the incinerator was dismantled during 1992. The ash was sampled at that time. The sample results indicated slightly elevated concentrations of uranium. The elevated uranium was attributed to the concentration of materials caused by incineration. A 1995 licensee document indicated that no further remediation of the area was necessary, and the area would be included in a future final status survey report.
4. The U.S. Atomic Energy Commission (AEC) or the NRC has routinely inspected the site since 1966. More recently, the NRC has been monitoring the decommissioning of the site. Records of equipment releases have been reviewed as part of the routine inspection process. More recently, the NRC staff has been monitoring the decommissioning of the site. Most surface reclamation activities have been completed, and current decommissioning activities involve the cleanup of the groundwater.
5. In summary, there is no documented evidence that the licensee improperly burned radioactive material at the site. The licensee did burn non-radiological material that had been released from radiologically restricted areas, but AEC and NRC oversight supposedly ensured that the licensee's free-release program had been properly implemented. This allegation was not substantiated based on the information provided in the docket file.

bcc w/enclosure (via ADAMS e-mail distribution):

ATHowell
JEWhitten
LMGersey
RJEvans

SUNSI Review Completed: RJE ADAMS: ☐ Yes ☒ No Initials: RJE
☐ Publicly Available ☒ Non-Publicly Available ☒ Sensitive ☐ Non-Sensitive

DOCUMENT NAME: S:\DNMS\NMSB-B\RJE\RIV-2008-A-0123 Resolution of Concerns.doc

RIV:DNMS:NMSB-B	C:NMSB-B	
RJEvans	JEWhitten	
<i>RJE w and</i>	<i>JEWhitten for</i>	
12/01/08	12/02/08	

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

**RADIOLOGICAL CHARACTERIZATION REPORT
FOR
CIMARRON CORPORATION'S FORMER
NUCLEAR FUEL FABRICATION FACILITY
CRESCENT, OKLAHOMA**

**License Number: SNM-928
Docket Number: 70-0925**

**PREPARED FOR:
KERR-MCGEE CORPORATION
OKLAHOMA CITY, OKLAHOMA**

Prepared by:

**Chase Environmental Group, Inc.
An affiliated company of Grant Environmental**

GRANT
ENVIRONMENTAL

October, 19

1994

9.0 Burial Area #3 and Drainage Area

9.1 Burial Area #3

This area was originally constructed for disposal of non-radioactive solid waste materials. However, the 1990 soil sampling program and gamma survey completed within this area indicated that radioactive waste materials may be present in this buried waste. The initial 1990 survey led to a more in-depth characterization of the area, removal of radioactive waste materials, and the need for final characterization of this area in the future.

A. Characterization Data:

This area was included in the Micro-R survey of the entire 1,100-acre site conducted in 1979 and is shown on Drawing No. 79PRSBUR-0. This drawing is included as an attachment to Section 6.0. The soil sampling that was performed in 1990 on a 10m x 10m grid included Burial Area #3. This sampling was performed to a depth of 4 ft. The results of the sampling, shown on Drawings No. 90PRB3SS-0 through 90PRB3SS-4, indicates five samples exceeding the Option #1 guideline value of 30 pCi/g total uranium. In March, 1992, a 5m x 5m grid was established for this area and additional soil samples were collected (this included grid intersects not previously sampled) at depths from 0 to 6 ft. The soil samples were analyzed for total uranium, and the results were placed on Drawings No. 92PRB3SS-1 through 92PRB3SS-6. This second round of sampling resulted in several additional areas where soil uranium concentrations exceeded the Option #1 limit of 30 pCi/g total uranium. A random soil sampling program consisting of 30 samples was conducted in this area to supplement the existing data. This round of sampling also showed soil samples exceeding the Option #1 limit.

B. Remediation:

The soil sampling that had been completed prior to April, 1992 indicated several areas requiring remediation. Remediation of this area began in April, 1992, with radioactive waste materials found in drums of resin and on several pieces of scrap metal. These items were removed, packaged and transported off site to a licensed LLRW disposal facility. Approximately 100 ft³ of LLRW was disposed of off site containing total uranium concentrations in the range of 1,500 pCi/g to 6,000 pCi/g. A limited volume of Option #2

material may be present in this area and will be removed once approval for on-site disposal is received. When remediation is completed, a final survey of this area will be conducted.

C. Environmental Data:

Monitoring Well #1311 is located in the vicinity of Burial Ground #3. This well is sampled annually and is discussed in greater detail in Section 12.0.

9.2 Drainage Area between the New Lined Sanitary Lagoon and the Incinerator/ Burial Area #3:

This drainage area receives surface runoff from Burial Area #3, the clean trash incinerator area, the on-site road, and the New Sanitary Lagoon berm. These areas are considered to be affected areas. The southern portion of this area was included in the 10m x 10m grid soil sampling program performed in 1990. The sample results are shown on Drawings No. 90PRB3SS-0 through 90PRB3SS-4. One soil sample in this area measuring 46 pCi/g total uranium exceeded the Option #1 limit. A final survey of this drainage area will be performed once the surrounding areas have been remediated.

A. Concrete Data:

Cimarron personnel began the decontamination and removal of concrete rubble from pads and building floors within the restricted area in 1986. All concrete removed from the restricted areas was surveyed to ensure that release limits were met. Prior to 1989, all concrete rubble was surveyed for alpha only. Concrete removed after 1989 was released based upon surveys conducted for both alpha and beta/gamma. In 1993, Cimarron utilized a gas proportional beta/gamma survey instrument to perform verification surveys on various pieces of concrete previously released by alpha survey alone. The result of this survey was that several pieces of concrete were located in this drainage area which had fixed contamination exceeding 15,000 dpm/100 cm² (beta/gamma). This drainage area may contain concrete rubble which exceeds the free release limit for beta/gamma. The concrete was placed in the drainage areas as rip rap to prevent on-site erosion.

B. Environmental Data:

Environmental surface water sampling location #1206 has shown elevated levels of radioactivity in the past. This sampling point is located within this drainage area. Gross alpha concentrations at this surface water sampling location ranged from 11 pCi/L in 1992 to 330 pCi/L in 1988. The gross alpha concentration in 1993 was 126 pCi/L, and can be attributed to elevated concentrations of uranium. Gross beta concentrations at this surface water sampling location ranged from less than detectable (20 pCi/L) in 1987, 1992 and 1993 to 2,600 pCi/L in 1980. Gross beta concentrations have decreased to less than detectable levels since 1988. Total uranium concentrations at this surface water sampling location were elevated in 1993 at 0.093 mg/L (135 pCi/L based on 2.7 weight percent enrichment). Sample results ranged from less than 0.005 mg/L in 1992 to 0.106 mg/L (155 pCi/L) in 1988. Sample results are below the Table 2, Column 2 effluent concentrations listed in Appendix B of 10 CFR 20.

9.3 Incinerator (Clean Trash)

This incinerator was utilized for the incineration of nonradioactive materials released from restricted areas during site operations. It was located just east of the New Sanitary Lagoon. Due to significant concentration of materials caused by incineration, uranium concentrations slightly above background levels were present in the ash. The ash materials were surveyed, and if required, placed in drums and shipped off site to a commercial LLRW disposal facility in 1992. The incinerator was dismantled in 1992. Five soil samples were taken from beneath the incinerator and counted on site. The highest sample result was 13.07 pCi/g total uranium.

CIMARRON CORPORATION

P.O. BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

April 19, 1995

Mr. Michael F. Weber, Chief
Low-Level Waste and Decommissioning Projects Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Re: Docket No. 70-925
License No. SNM-928
Decommissioning Plan

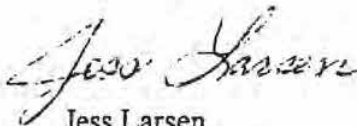
Dear Mr. Weber:

In accordance with requirements for the decommissioning of licensed nuclear materials processing sites, Cimarron Corporation submits four (4) copies of the **Decommissioning Plan for Cimarron Corporation's Former Nuclear Fuel Fabrication Facility, April 1995.**

Cimarron Corporation believes that the decommissioning of the Cimarron site is greater than 95% complete and that all remaining site work can be completed by the middle of 1996. However, this schedule is dependent upon expeditious NRC approval of documents submitted by Cimarron Corporation and any subsequent NRC confirmatory sampling requirements. Cimarron Corporation respectfully requests that the NRC complete the review and approval of this Decommissioning Plan by May 31, 1995. Cimarron Corporation is committed to working closely with the NRC to attain these required approvals.

Should you have any questions or comments concerning this plan, please contact Joe Kegin at 405/282-6722 or me at 405/270-2288.

Sincerely,



Jess Larsen
Vice-President
Cimarron Corporation

Enclosures as stated

Characterization Report, page 13-1.) The areas under stockpiles 3 and 4 will be characterized once these piles are disposed.

The area west of Building #1 includes the facility parking lot. The characterization work conducted in 1990 showed that soil samples taken from the parking lot were within the guideline value for BTP Option #1 material. No remediation is required for this area. This area will be included in the final status survey report.

- Burial Area #2 and North Field - This area was utilized in the 1970's for the disposal of industrial solid waste generated on site. During an investigation of this area in 1990, contaminated materials were found in this burial area. Decontamination and decommissioning of this area are discussed in detail in Section 8.0 of the Characterization Report. Remediation of this area began in 1991, with the removal of BTP Option #2 material. Several small areas in the North Field contain Option #2 material that is currently being removed. The final status survey for this area is currently in progress and is being performed in accordance with the criteria discussed in Section 1.4.
- Burial Area #3 - This area was originally constructed for disposal of non-radioactive solid waste materials. However, the 1990 soil sampling program and gamma survey completed for this area indicated that radioactive waste materials may be present in the buried waste. The initial 1990 survey led to a characterization of the area and the subsequent remediation of this area. Decontamination and decommissioning of this area are discussed in detail in Section 9.0 of the Characterization Report. Portions of Burial Area #3 are still being remediated. A final status survey of this area will be conducted when remediation is complete.
- Trash Incinerator - This incinerator was utilized to incinerate non-radioactive waste materials released from restricted areas during site operations. The incinerator was located just east of the New Sanitary Lagoon. Due to the concentration of residual materials resulting from incineration, uranium concentrations above background levels were present in the ash. The incinerator was dismantled in 1992. Ash materials were surveyed, and if required, placed in drums and shipped off-site to a commercial LLRW disposal facility. No further remediation is required for this area. This area will be included in the final status survey report.
- East & West Sanitary Lagoon - These ponds received all liquid process waste from the Uranium Plant from 1966 through 1970. Decontamination and decommissioning of this area is discussed in

Harry Freeman

From: Linda Gersey
Sent: Friday, September 12, 2008 9:06 AM
To: R4ALLEGATION Resource
Subject: ~~**SENSITIVE ALLEGATION MATERIAL**~~ ARB Disposition Record for RIV-2008-A-0123
Attachments: RIV-2008-A-0123 Concerns List.xml

ACES:

Please see the attached form for subject allegation.

Linda

Linda M. Gersey, Health Physicist
NRC Region IV
Nuclear Materials Safety Branch B
(817) 860-8299
Linda.Gersey@nrc.gov

ARB DISPOSITION RECORD		Allegation Number: RIV-2008 -A-0123	
Facility Name: Kerr McGee-Cimarron		Docket Number: 070-0925	
Responsible Division: DMNS		ARB Date: 09/29/2008	
Received Date 09/10/2008	30 Days 10/10/2008	150 Days 02/07/2009	180 Days 03/09/2009
Purpose of the ARB: Initial			
Basis for Another ARB:			
REFERRAL			
Does Allegor Object to Referral <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A			
If any of the following factors apply, an allegation shall not be referred to the licensee.			
<input type="checkbox"/> Information cannot be released in sufficient detail to the licensee without compromising the identity of the allegor of confidential source. <input type="checkbox"/> The licensee could compromise an investigation or inspection because of knowledge gained from the referral. <input type="checkbox"/> The allegation is made against the licensee's management or those parties who would normally receive and address the allegation. <input type="checkbox"/> The basis of the allegation is information received from a Federal or State agency that does not approve of the information being released in a referral.			
ARB PARTICIPANTS			
Chairman:			

Concern 1	Discipline Health Physics	Reactor Department Code N/A
Responsible Branch: NMSBB	OI Case Number:	
Concern Description: Allegor believes the licensee burned boxed up radioactive material while the plant was operating. The current workers are concerned about the burned radioactive material.		
Regulatory Requirement: 10 CFR 20.1201 occupational dose limits for adults OR 10 CFR 20.1301 dose limits for individual members of the public		
Safety Significance - Normal		
Basis:		
Check if question is applicable to the concern.		
<input checked="" type="checkbox"/> Is it a declaration, statement, or assertion of impropriety or inadequacy? <input checked="" type="checkbox"/> Is the impropriety or inadequacy associated with NRC regulated activities? <input checked="" type="checkbox"/> Is the validity of the issue unknown?		
If all of the above statements are checked, the issue is an allegation.		
Action	Assigned Branch	Assigned Date Planned Date

Refer to Licensee

NMSBB

Comments: The allegor provide no specific information, except to imply that the current workers may be concerned about radioactive residue from alleged burning of radioactive material.

Additional Comments



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

September 11, 2008

MEMORANDUM TO: Jack E. Whitten, Chief, Nuclear Materials Safety Branch B
FROM: Judith Walker, Allegation Coordinator *JW*
SUBJECT: REVIEW OF ALLEGATION MATERIAL RIV-2008-A-0123

ACES has received the attached material related to Kerr-McGee. **This allegation is scheduled to be discussed at the September 29, 2008, ARB. Please review the material by September 18, 2008 for the following:**

- Determine what each of the individual's concerns are, whether they are NRC regulated activities or not. Provide a brief statement of the concern. It is not necessary to include all of the background information.
- List each concern on a copy of the file "ARB Disposition Record" located at `r:\aces\forms\allegation forms\ARB Disposition Record.xml`.
- List possible regulatory requirements (i.e., 10 CFR 26, etc.) that may apply to the concern if known.
- Under significance, provide a follow-up priority (i.e., high - immediate action required, or normal - routine follow-up).
- Provide a recommendation for disposition (i.e., OI investigation, inspection, referral to licensee, or none). List this under "action."
- List the branch you believe that should be responsible for the action.
- Provide a planned completion date, if known.

An electronic copy of the ARB Disposition Record should be sent to R4ALLEGATIONResource. This form must be received by 1:00 p.m. on Wednesday for inclusion in the following Monday's ARB. Should you have any questions, please call me. Please document your time as follows:

Indirect Charges

A10304 Support for Allegations (Reactors)
A10191 Support for Allegations (Materials)

Direct Inspection Activities

AF Allegation Follow-up
BJ2 Allegation Prep/Doc
AFT Allegation Travel

Attachments: As Stated

cc w/attachment: Allegation File



UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INVESTIGATIONS FIELD OFFICE, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

January 12, 2001

MEMORANDUM TO: Ellis W. Merschoff, Regional Administrator
Region IV

FROM:

(b)(7)(C)

Office of Investigations Field Office, Region IV

SUBJECT: SPENCER CHEMICAL/JAYHAWK WORKS: DELIBERATE
FAILURE TO PROPERLY DISPOSE OF URANIUM WASTE
(CASE NO. 4-2000-057)

Attached, for whatever action you deem appropriate, is the Office of Investigations (OI) Report of Investigation concerning the above matter.

This report is forwarded to the action office for information purposes. Since the action office has the responsibility for advising alleged of the status and disposition of allegations, they are authorized upon receipt of the Report of Investigation to advise the alleged that the investigation has been completed. After the NRC and/or other concerned Federal agencies have taken whatever action they deem appropriate, the action office will notify the alleged that his/her allegations were either substantiated, partially substantiated, or not substantiated and may, if required, furnish the alleged with a copy of the OI Report of Investigation after appropriate proprietary, privacy, and confidential source information has been deleted. Any additional information provided the alleged will be dispositioned through the Director, OI, and will be furnished on a case-by-case basis.

Please ensure that any internal office distribution of this report is controlled and limited only to those with a need to know and that they are aware of the sensitivity of its contents.

Attachment:
Report w/exhibits

cc w/attachment:
R. Borchardt, OE

cc w/report:
L. Chandler, OGC
W. Kane, NMSS

Title: SPENCER CHEMICAL/JAYHAWK WORKS:

DELIBERATE FAILURE TO PROPERLY DISPOSE OF URANIUM WASTE

Licensee:

SPENCER CHEMICAL/JAYHAWK WORKS
Pittsburgh, Kansas

Docket No.: N/A

Reported by:

Case No.: 4-2000-057

Report Date: January 12, 2001

Control Office: OI:RIV

Status: CLOSED

Reviewed and Approved by:

(b)(7)(C)

Office of Investigations
Field Office, Region IV

(b)(7)(C)

Field Office, Region IV

WARNING

~~DO NOT DISSEMINATE, PLACE IN THE PUBLIC DOCUMENT ROOM, OR
DISCUSS THE CONTENTS OF THIS REPORT OF INVESTIGATION OUTSIDE
NRC WITHOUT AUTHORITY OF THE APPROVING OFFICIAL OF THIS
REPORT. UNAUTHORIZED DISCLOSURE MAY RESULT IN ADVERSE
ADMINISTRATIVE ACTION AND/OR CRIMINAL PROSECUTION.~~

SYNOPSIS

This investigation was initiated on October 13, 2000, by the Nuclear Regulatory Commission (NRC), Office of Investigations, Region IV, to determine if Spencer Chemical Company, Jayhawk Works, a former Atomic Energy Commission licensee, Pittsburg, Kansas, deliberately failed to properly dispose of Uranium waste.

Based on the evidence developed during this investigation, the allegation that Spencer Chemical Company, Jayhawk Works, deliberately failed to properly dispose of Uranium waste was not substantiated.

~~NOT FOR PUBLIC DISCLOSURE WITHOUT APPROVAL OF FIELD OFFICE~~
~~DIRECTOR, OFFICE OF INVESTIGATIONS, REGION IV~~

Case No. 4-2000-057

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~~DIRECTOR, OFFICE OF INVESTIGATIONS, REGION IV~~

Case No. 4-2000-057

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~~DIRECTOR, OFFICE OF INVESTIGATIONS, REGION IV~~

Case No. 4-2000-057

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Case No. 4-2000-057

DETAILS OF INVESTIGATION

Allegation

Deliberate Failure to Properly Dispose of Uranium Waste

Applicable Regulations

10 CFR 20.1403: Criteria For License Termination Under Restricted Conditions (2000 Edition)

10 CFR 20.2001: General Requirements (2000 Edition)

Purpose of Investigation

This investigation was initiated on October 13, 2000, by the Nuclear Regulatory Commission (NRC), Office of Investigations (OI), Region IV (RIV), to determine if Spencer Chemical Company (Spencer), Jayhawk Works, a former Atomic Energy Commission licensee, Pittsburg, Kansas, deliberately failed to properly dispose of Uranium waste (Exhibit 1).

Background

On September 28, 2000, Vic COOPER, Chief Radwaste Control Program and State Liaison Officer, Kansas Department of Health and Environment (KDHE), Topeka, Kansas, sent a newspaper article from the Kansas Morning Sun, Pittsburg, Kansas, via facsimile, to Vivian CAMPBELL, State Agreement Officer, NRC:RIV, reporting an allegation that nuclear fuels [NFI] may be buried at the former Spencer Jayhawk site, located in southeast Kansas (Exhibit 2).

According to the newspaper, Gerald ECKHARDT, Emergency Management Director, Cherokee County, Kansas, related that former employees of the Jayhawk plant told him nuclear fuels were buried on the property in the 1940s. ECKHARDT said he has known about the buried hazardous materials for the last 10-12 years, but since any nuclear fuels projects at the plant were under federal government jurisdiction, they did not fall within his authority. According to Robert ELDER, Environmental Geologist, KDHE, the Jayhawk site was inspected by the state 10 years ago and nothing was found to indicate nuclear wastes were buried on the property. ELDER said KDHE talked to a number of former employees and former

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DIRECTOR, OFFICE OF INVESTIGATIONS, REGION IV~~

Case No. 4-2000-057

residents of the area but did not substantiate any concerns. He said KDHE representatives drilled thousands of test wells in the area where the former employees said a building which supposedly housed nuclear fuels had been in the 1940s. According to the article, the U.S. Department of Energy included the Cherokee County chemical plant on a list of 577 sites that may have been involved in the U.S. governments's nuclear weapons program. The site was listed as Spencer Chemical Company, Jayhawk Works, the name of the location when it was owned by Spencer. Jayhawk Fine Chemicals, which is now owned by Laporte PLC, said it had no involvement with the site when it was owned by Spencer and was unaware of the site's inclusion on the list.

According to ECKHARDT, KDHE did not know where to look for the contamination, and he discounted KDHE's inspection efforts. ECKHARDT said the former employees, whom he refused to identify, told him the nuclear fuels were buried in two separate locations. ECKHARDT said in addition to the possibility of groundwater contamination, he was concerned about the material falling into the hands of some terrorist group.

ELDER, who serves as the KDHE project manager for the Jayhawk site, said the agency had received about 15 anonymous and signed complaints, including several from ECKHARDT, about possible contamination at the location, but KDHE had been unable to verify any of the information. ELDER said that because of the long history of chemical testing and manufacturing at the location, KDHE had been involved in the long-term monitoring of soil and water quality at the Jayhawk plant. He related that in 1999 some soil samples showed the soil to be contaminated with dioxin, PCBs, and other chemical compounds which were excavated from the location and hauled to a hazardous waste landfill in Oklahoma.

On October 12, 2000, the RIV Allegation Review Board discussed the issues identified in the Morning Sun article and requested OI:RIV interview ECKHARDT, and the Division of Nuclear Materials Safety, Fuel Cycle Decommissioning Branch, review NRC and KDHE archived files on the Jayhawk site.

Review of KDHE Files

On October 25, 2000, the Reporting Agent and Robert EVANS, Radiation Specialist, Nuclear Materials Inspection Branch, Division of Nuclear Materials Safety, met with KDHE officials

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and reviewed KDHE records involving Spencer's Jayhawk plant (Exhibit 3). Records indicated that Spencer was first licensed by the Atomic Energy Commission (AEC) in 1958 and held one license for a pilot plant and one for a production plant. They were involved in a research project attempting to fabricate fuel for nuclear reactors using enriched Uranium. Spencer apparently ceased operations and disposed of all radioactive material by May 1961. Spencer's production license expired on September 30, 1962, and their pilot plant license was terminated by the AEC on December 28, 1964. Contaminated building material was burned and buried as part of the decommissioning process. The AEC performed a final survey to support the license termination and a closeout inspection in April 1964.

In 1981 Gulf Oil bought the Jayhawk plant. They submitted soil samples to KDHE in August 1981, and radioactive material [residual Uranium-235] was found in at least two buildings. The State of Kansas issued Gulf Oil a license to possess contaminated material in September 1982. Between September and November 1982, Gulf Oil decontaminated the site by wash down with acids and shipped contaminated material for disposal to Ramp Industries in Colorado. In June 1983 Gulf Oil submitted a license termination request, and on June 23, 1983, KDHE terminated Gulf Oil's license.

On September 29, 1992, Wesley HOLLEY, former Inspector, NRC:RIV, accompanied by Harold SPIKER [deceased], then Chief, Bureau of Environmental Health Services, KDHE, and Pamela K. CHAFFEE, Environmental Geologist, Bureau of Environmental Remediation, KDHE, conducted a "walk over" survey of the Jayhawk site and identified no NRC-regulated radioactive material. The NRC subsequently recommended removal of the site from Oak Ridge National Laboratory's list of potentially contaminated sites.

CHAFFEE explained that KDHE had entered into an agreement with the Environmental Protection Agency to perform investigations of selected contaminated sites in Kansas, including the Spencer Jayhawk plant. A preliminary assessment in 1990 determined that significant chemical and hazardous material contamination of ground water, surface water runoff and soil existed. As part of KDHE's sampling and analysis of chemical and other hazardous waste at the site in 1993, they sampled monitoring well 7D for radiological analysis. This analysis of gross alpha and Radium-226 found levels to be typical of ground water in

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~~DIRECTOR, OFFICE OF INVESTIGATIONS, REGION IV~~

Mississippi aquifers in the area of the site. In addition, a sample of drainage water discharging into the Spring River was analyzed for inorganics and radiological waste. Although the sample was found to contain high concentrations of nitrate and manganese, the levels of gross alpha and Radium-226 were found to be below applicable drinking water standards. CHAFFEE provided parts of KDHE's August 1993 report outlining these findings (Exhibit 7). CHAFFEE was unaware of any additional radiological analyses performed by KDHE, other than a sample taken from a former trash dump area by HOLLEY on September 29, 1992. This sample was analyzed by KDHE, and radioactivity was determined to be from natural sources (Exhibit 6).

Interview of Alleger (Gerald ECKHARDT) (Exhibit 4)

On October 26, 2000, ECKHARDT was interviewed by OI:RIV and EVANS, accompanied by Justin SPENCE, Radiation Control Inspector, KDHE. As part of his job, ECKHARDT said he monitors hazardous material in Cherokee County and handles concerns related to the Jayhawk Plant, such as spills or evacuations. ECKHARDT said the site, previously owned by Spencer and Gulf, was now owned by Chevron and La Porte.

ECKHARDT said he wanted someone to check on radioactivity at the Jayhawk site and determine if there was anything to be concerned about, so he could be honest with people who asked him about it. He admitted, "I don't know as there's a problem. This is what I would like to find out...we need some testing done to find out what is-if it is still active" (Exhibit 4, p. 6). ECKHARDT said his main concern was to determine what, if any, nuclear material was buried on the site, its current strength, ensure terrorists could not get the material, clean up the site, and "put it to bed" (Exhibit 4, p. 11).

ECKHARDT said Mr. WILES [NFI], who buried the material was dead, but he [ECKHARDT] had talked to a man who put in seven test wells on the property, under "someone's direction," after the burial site was completed. ECKHARDT said this individual refused to talk with the NRC or to allow him [ECKHARDT] to provide his name to the NRC. ECKHARDT said Bill THORNTON, Inspector, KDHE, told him KDHE was aware of the wells but knew nothing about them and never tested the wells.

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ECKHARDT referred to an aerial photo of the Jayhawk plant and said most of KDHE's testing had been performed east of 85th Street, but no testing had been done in the cleared area where the test wells were, which he believed was the location of the burial site. ECKHARDT initially said people told him they buried waste there from the fuels lab building in 1965, but he later admitted no one actually told him they had dumped any nuclear material and he knew of no one with firsthand knowledge of where the material was buried. ECKHARDT admitted he based his belief that the material was buried west of the runway on the fact that that was where the test wells were and the man who put in the test wells told him that was where the material was buried.

ECKHARDT said KDHE took core samples for radioactivity from the area where the plant had been and not where ECKHARDT believed the nuclear material was buried. ECKHARDT said he did not believe the area by the road was the burn and burial site, despite KDHE's assertions, because the man who put in the test wells told him the material was put in holes and burned "right where the test wells are" (Exhibit 4, p. 41). ECKHARDT said he had received some records from KDHE but they did not show the existence of any radioactive material. However, KDHE tests did detect some chemical waste that they later hauled to a landfill in Oklahoma.

ECKHARDT said he understood some water baffles were burned and buried in the area opposite the first site but on the east side of the county road, across the parking lot from Building 31. ECKHARDT admitted this information was based solely on hearsay from people who told him "something" showed on Geiger counters.

ECKHARDT admitted everything he had told the NRC was based on hearsay and rumors, except for the man who put in the test wells. ECKHARDT said so many people had come to him with the same rumor that he believed someone should look into it and see if it was true. ECKHARDT said he wanted somebody to test the cleared area and determine if there was anything dangerous or "hot" there, and if there was, he wanted it taken care of and removed. If there was nothing there, he wanted to be able to tell people he saw the tests run and there was nothing hazardous there. He said he did not trust KDHE to perform testing properly because they "sneaked in" before, did not test in the right area, went back, and wrote a report. ECKHARDT said no one from KDHE had ever asked him where the material was buried or asked for his assistance, and they did not seem to want to work with the County.

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Documentation Review

KDHE Memorandum from Jim COOK [NFI] to CHAFFEE, dated August 7, 1990 (Exhibit 5)

This memo references samples obtained in April 1990 which identified chemicals and other hazardous wastes that exceeded established limits.

KDHE Memorandum from SPIKER, dated August 5, 1993, and attached Letter from NRC, dated November 24, 1992 (Exhibit 6)

This memo references a site visit to the Jayhawk plant by SPIKER, CHAFFEE, and HOLLEY on September 29, 1992. SPIKER noted that no radioactivity above background was detected at any area or facility surveyed except for a pile of catalyst material. A sample of this material was collected and analyzed by the KDHE Radiation Laboratory, which concluded that the sample contained small quantities of naturally occurring Uranium and Radium-226. KDHE concluded the material did not present a hazard in its present location and configuration and required no further action by Allco Chemical Corporation, the owner of the land at that time. According to the letter from the NRC, the NRC concluded that "no measurements or observations indicated or suggested that any portion of the site is contaminated by NRC-regulated radioactive material." The NRC further concluded that the Jayhawk site appeared to have been adequately decontaminated and recommended that the site be removed from the Oak Ridge National Laboratory's list of potentially contaminated sites.

Screening Site Inspections at the Jayhawk Plant by KDHE, dated August 1993 (Exhibit 7)

In 1993 KDHE sampled monitoring well 7D for radiological analysis and found levels of gross alpha and Radium-226 to be typical of ground water in Mississippi aquifers in the area of the site. In addition, analysis of a sample of drainage water discharging into the Spring River found high concentrations of nitrate and manganese, but the levels of gross alpha and Radium-226 were found to be below applicable drinking water standards.

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Jayhawk Site Visit

The Reporting Agent, EVANS, and SPENCE, accompanied by ECKHARDT, visited the Jayhawk site on October 26, 2000. EVANS performed a visual and radiological survey of the area containing the test wells identified by ECKHARDT. EVANS found no evidence of radioactive material or a burial pit, although the surface was covered with craters, perhaps the result of detonation of ammonium nitrate explosives. No measurement above background was observed by EVANS during the site tour. Nine monitoring wells were observed on the property, most just outside the Jayhawk Fine Chemical property line. No evidence was uncovered to indicate the wells were installed as a result of radioactive material in the area.

Coordination with NRC Staff

Following the interview of ECKHARDT, discussion with KDHE, the Jayhawk site tour, and review of ECKHARDT's transcript of interview, EVANS prepared a memorandum to Russ WISE, Senior Allegations Coordinator, NRC:RIV, with attached Site Status Report (Exhibit 8). EVANS noted there was no evidence that an undocumented burial pit containing radioactive material existed at the Spencer Jayhawk site; his inspection identified no violations of NRC requirements; and he concluded the allegation was not substantiated.

Agent's Analysis or Analysis of Evidence

During OI:RIV's interview with ECKHARDT, he made no allegations of wrongdoing. He admitted he had no firsthand knowledge that radioactive material was buried at an undocumented location on the Jayhawk site. In fact, the thrust of ECKHARDT's statement was that he wanted to know what, if anything, was buried at the site and put the matter "to bed." ECKHARDT admitted everything he told OI:RIV was hearsay and based on rumor. However, he said he had heard these rumors from many different sources and thus believed there must be some truth to them. He requested that the NRC survey the area cited by him west of the county road, and this was performed by EVANS who found no radioactivity above background levels. ECKHARDT also requested that additional sampling be conducted of this area so he could use the results to allay the concerns of local residents if the tests revealed no radioactivity.

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Conclusions

Based on the evidence developed during this investigation, the allegation that Spencer Chemical, Jayhawk Works, deliberately failed to properly dispose of Uranium waste was not substantiated.

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Case No. 4-2000-057

LIST OF EXHIBITS

<u>Exhibit</u> <u>No.</u>	<u>Description</u>
1	Investigation Status Record, dated October 13, 2000.
2	Kansas <u>Morning Sun</u> Articles, dated September 22 and 27, 2000.
3	Review of KDHE Records, dated October 25, 2000.
4	Transcript of Interview with ECKHARDT, dated October 26, 2000.
5	KDHE Memorandum from COOK to CHAFFEE, dated August 7, 1990.
6	KDHE Memorandum from SPIKER, dated August 5, 1993, with attached Letter from NRC, dated November 24, 1992.
7	Screening Site Inspections at the Jayhawk Plant by KDHE, dated August 1993.
8	Memo from EVANS to WISE, with attached Site Status Report, dated December 6, 2000.

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Case No. 4-2000-057

AUG 19 1982

Docket No. 40-2136

License No. R-218

Note to: Files

The Spencer Chemical Company's Jay Hawk Plant in Baxter Springs, Kansas was surveyed by Gulf Oil Chemicals during August 1981 and found to be free of contamination. See letter (copy enclosed) of June 4, 1982 from Mr. McCormack, plant manager to Mr. Cain transmitting results of the survey. In addition, the Jay Hawk Plant possessed license no. SNM-154, which was terminated on December 12, 1964 following a close out survey.

Original Signed By:
W. T. Crow

W. T. Crow, Section Leader
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: ~~See~~ letter dated
June 4, 1982

DISTRIBUTION:

Docket File 40-2136

NMSS R/F

FCUP R/F

WTCrow

GHBidinger

KKodali

Region IV

OFFICE	FCUP <i>KK</i>	FCUP <i>GHB</i>	FCUP <i>WTC</i>			
SURNAME	KKodali	GHBidinger	WTCrow			
DATE	8/17/82	8/17/82	8/18/82			

FROM L. D. Purcell

AT Jayhawk

IN REPLY
REFER TO

TO Dr. L. Max Scott

AT Harnmarville

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")

Sample #	Depth	G. C. Reading	Observation
1-A	2.5'	.02 hole	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

RADIATION SURVEY

Natural Uranium and Natural Thorium
Advanced Materials Plant 1 Building

DATE OF SURVEY: August 10, 1981

SURVEY INSTRUMENTS: Eberline Model PRM-5-3 Efficiency: 10%
Eberline Model PAC-1SAGA Efficiency: 10%
Tracor Northern TN-1705 Detector 3" x 3" NaI
Limit of Detection, 2 gms natural uranium or
natural thorium at 1 foot
with 100-second count time

SURVEY REGIMEN:

Alpha Survey: All surfaces where uranium or thorium dust or solutions could have deposited were surveyed by placing alpha detector in contact with the surface. Approximately 50 surveys were made.

Gamma Survey: All surfaces, floor cracks, and water drains were surveyed by placing the detector in contact with the surface. Measurement time was 100 seconds. Approximately 20 surveys were made.

RESULTS:

Alpha: No measurement above background of 50-100 counts per minute.

Gamma: No measurement above gamma background of ~ 7500 counts per 100 seconds in the 175 - 200 KeV and 200 - 250 KeV regions.

The 186 KeV from ^{235}U and the 240 KeV from ^{212}Pb were used to measure natural uranium and natural thorium, respectively.

CONCLUSIONS:

1. With the above described instrumentation, no uranium or thorium was detected.
2. The amount of uranium or thorium which would not have been detected by the above regimen does not present any hazard. This building can be considered contamination-free.

L. Max Scott, Ph.D., C.H.P.

ANALYSIS OF SOIL SAMPLES

INSTRUMENTATION:

Canberra Model 8180

Detector: EG&G ORTEC 8000 Series Coaxial Ce(Li)
Model Number GLI-20215

Limit of Detection: 40 μ g of natural uranium or 115 μ g
natural thorium for 4000-second
counting time.

RESULTS:

All soil samples weighed in excess of 50 grams (description of sample site attached). No sample counted different than background. Based on limit of detection and sample size, the amount of material present, if any, is less than 0.8 micrograms, or 0.5 pCi uranium per gram of soil, and 0.8 micrograms, or 0.2 pCi thorium per gram of soil.

CONCLUSIONS:

1. Uranium or thorium concentrations, if present, do not constitute a personnel exposure potential.
2. Maximum uranium level of .5 pCi per gram of soil is 20 times less than the burial limit for natural uranium proposed by the Nuclear Regulatory Commission (Federal Register Vol. 46, p. 52061, October 23, 1981).
3. Maximum thorium level of .5 pCi per gram of soil is 50 times less than the burial limit for natural thorium proposed by the Nuclear Regulatory Commission (Federal Register Vol. 46, p. 52061, October 23, 1981).

L. Max Scott, Ph.D., C.H.P

RADIATION SURVEY

Natural Uranium and Natural Thorium
Foundation Pressure Vessel Test Laboratory

DATE OF SURVEY: August 10, 1981

SURVEY INSTRUMENTS: Tracor Northern TN-1705 Detector 3" x 3" NaI
Limit of Detection, 2 gms natural uranium or
natural thorium at 1 foot
with 100-second count time

RESULTS:

No measurement above background of ~ 7500 counts per 100 seconds in the 175-200 KeV and 200-250 KeV regions.

The 186 KeV from ^{235}U and the 240 KeV from ^{212}Pb were used to measure natural uranium and natural thorium, respectively.

CONCLUSIONS:

1. With the above instrumentation, no uranium or thorium was detected.
2. The amount of uranium or thorium which would not be detected by the above regimen does not present any hazard. This building can be considered free of natural uranium and natural thorium.

L. Max Scott, Ph.D., C.H.P.

Gulf Oil Chemicals Company

INDUSTRIAL AND SPECIALTY CHEMICALS DIVISION

JAYHAWK PLANT

G. M. McCormack
PLANT MANAGER

P. O. Box 6200 B
Pittsburg, Kansas 66762

June 4, 1982

Attention: Mr. C. L. Cain, Radiation Specialist
United States Nuclear Regulatory Commission.
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

Dear Mr. Cain:

The following is in response to your request dated May 12, 1982. During the 1950's, Spencer Chemical Company possessed a license to process natural uranium and thorium. It is unclear at this time how much, or even if, natural uranium or thorium was processed. It is known that all processing of radioactive material was confined to two buildings - the Advanced Materials plant/building and the pressure vessel test laboratory. The pressure vessel test laboratory, which was primarily a wood structure, was dismantled; the wood was burned; and the ashes buried. The stainless steel floor and partial walls in the Advanced Materials plant/building were removed.

Radiation surveys were conducted at both building sites in August, 1981. In addition, the area, where the ashes were buried, was core drilled and samples analyzed for natural uranium and thorium. Attached are the results of these surveys. It is our judgment that there are no detectable amounts of natural uranium or natural thorium at either building site.

Yours truly,

GULF OIL CHEMICALS COMPANY

G. M. McCormack
Plant Manager

GMM:as

Attachments

cc: Dr. R. M. Villiger - Overland Park
L. Max Scott - Harmarville
C. L. Richards - Houston
H. E. Runion - Harmarville
H. T. Miller - Pittsburgh



A DIVISION OF GULF OIL CORPORATION

TXW 910-740-1260 GALENA, KANSAS
TELEPHONE 316-783-1321

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	
4-A	6'	.02 Area	Clay only
4-B	8'	.02 hole	burnt metal at 4'
4-C	10'	.02 MTL.	material
5-A	4'	.01 area	some unburnt material
5-B	5'	.02 hole	no sign of
5-C	6'	.02 MTL.	at 4 1/2 to 6'
6-A	2.5'	.03 area	burnt mtl. at
6-B	4'	.03 hole	about 2 1/2' to
6-C	6'	.025 MTL.	about 4' then clay
7-41	4'	.03 area	
7-A	6'	.03 area	metal at 4' H ₂ O
7-B	8'	.04 hole	at 5.03 G. C. reading
7-C	10'	.04 MTL.	clay at 6'
8-A	4'	.02 area	clay only no
8-B	5'	.02 hole	sign of material
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.

L. Max Scott
Soil Samples
10-14-31
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



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 19 1982

Docket No. 40-2136
License No. R-218

Note to: Files

The Spencer Chemical Company's Jay Hawk Plant in Baxter Springs, Kansas was surveyed by Gulf Oil Chemicals during August 1981 and found to be free of contamination. See letter (copy enclosed) of June 4, 1982 from Mr. McCormack, plant manager to Mr. Cain transmitting results of the survey. In addition, the Jay Hawk Plant possessed license no. SNM-154, which was terminated on December 12, 1964 following a close out survey.

W. T. Crow
W. T. Crow, Section Leader
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: ~~See~~ letter dated
June 4, 1982



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 19 1982

Docket No. 40-2136
License No. R-218

Note to: Files

The Spencer Chemical Company site at Merriam, Kansas was surveyed by the State of Kansas on June 17, 1980, and found to be free of contamination. See the inspection report of June 16, 1982, by Mr. Harold R. Borchert, Kansas Department of Health and Environment, concerning this subject (copy enclosed).

W. T. Crow

W. T. Crow, Section Leader
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: Inspection Report No.
26-B134-01

State of Kansas . . . John Carlin, Governor

DEPARTMENT OF HEALTH AND ENVIRONMENT

Joseph F. Harkins, Secretary

Forbes Field
Topeka, Kansas 66620
913-862-8360



June 16, 1982

Charles L. Cain
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX , 76012

Dear Mr. Cain:

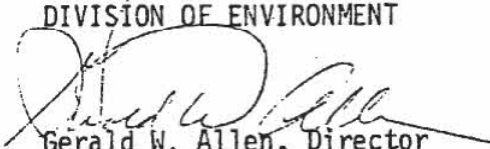
Enclosed as per your telephone call on June 14, 1982 please find
the following:

one copy of inspection report for Gulf Oil Chemicals Co. -
dated June 17, 1980 - #26-B134-01.

If we can be of further assistance, please do not hesitate to contact
this office.

Sincerely,

DIVISION OF ENVIRONMENT


Gerald W. Allen, Director
Bureau of Radiation Control

GWA:p²a
Enclosure

INSPECTION REPORT

A. GENERAL INFORMATION:

1. Name And Address:

Gulf Oil Chemicals Company
9009 West 67th Street
Merriam, Kansas 66207

3. License Number: 26-B134-01

Amended: 30 amendments

Expires: January 31, 1982

2. Location Of Operations:

Same as above

4. Date Of Inspection: June 17, 1980

Inspected By: *HRB 9-18-80*
Harold R. Borchert

Accompanied By: John McGrath (U.S. NRC)

5. Names And Titles Of Individuals Interviewed And Observed In Radiation Operations:

J. R. Riden, Ph.D. Radiation Safety Officer

6. Type Of Inspection:

a. ☐ Scheduled Unannounced; ☐ Scheduled Announced
☐ Unscheduled Unannounced; ☒ Unscheduled Announced

b. ☐ Special, Other; ☐ Investigation
Include Comment For b.

7. Previous Inspection(s):

April 8, 1976
August 21, 1973
April 14, 1972
December 15, 1970
February 16, 1970
February 9, 1968

8. Items Of Noncompliance On Last Previous Inspection:

a) Surveys were not being conducted at quarterly intervals as stated in Gulf's "Protection Procedures" for use of Radioisotopes "No. 5KCC" and referenced under Condition 11.

9. Items Of Noncompliance On This Inspection:

None

10. Indications Of Incidents Or Accidents:

None

11. Unusual Conditions In License Or Amendments:

None

12. Priority: () Recommended; (III) Previous

→ 13. Recommendation For Follow-Up Or Reinspection:

This license is being terminated therefore no follow-up or reinspection

14. RH-26 Short Form: () Used; (X) Not Used

15. Requirement Letter Was: (X) Sent; () Not Sent

Letter Dated: September 3, 1980 (Recommendation)

Addressed To: Mr. E. L. Stevens, V.P.

Copies To: Dr. J. R. Riden, R.S.O.

16. Names And Titles Of Individuals With Whom Results Were Discussed - Exit Interview:

Dr. J. R. Riden, R.S.O. and Mr. E. L. Stevens, V.P.

There were no items of noncompliance observed during this inspection.

→ The following recommendations were suggested.

- a. The fences around the radioactive plots should be taken down.
- b. The soil in plot N should be dugout and disposed of as waste. Samples should be collected and analyzed to indicate the quantity of residual radioactive material left in the plot.
- c. The liquid scintillation counters containing Cesium 137 should be transferred to facilities authorized to possess these radioactive materials.

B. ADMINISTRATION:

1. Chain-Of-Command:

E. L. Stevens - Vice President in charge of operations

J. R. Riden, Ph.D., Radiation Safety Officer
Researchers

2. RSO:

J. R. Riden, Ph.D.

3. Purchasing:

Radioactive materials were purchased as needed. A P.O. is issued by the purchasing department to cover the material.

4. Radiation Safety Committee:

E. L. Stevens, Vice President in charge of operations
J. R. Riden, Ph.D. R.S.D. (In Charge of Research for Crop Protection Group)
R. S. Schroeder, Researcher
Lyle Kallenbach, Chairman
J. L. Rutter, Researcher
Gaylin Nickell, Research

The radiation safety committee met on a quarterly basis to review and approve proposals and to review the survey reports.

C. OPERATIONS; SCOPE OF PROGRAM:

1. Type Of Operation:

This was a rather large research facility that used tracers in the development of herbicides and pesticides.

2. Isotopes Used:

Carbon 14
Cesium 137

A copy of the licenses inventory dated February 14, 1980 is attached as Attachment A.

3. Physical Plant:

The physical plant consisted of numerous large buildings where various research projects were conducted in their respective laboratories. The licensee had fenced plots outside of one of the laboratories for use of radiolabeled compounds for field trials.

The licensee had a greenhouse set up for the use of small quantities of radio-nuclides for controlled studies of soil degradation studies. This was a constant environment room.

4. Equipment:

a. Operating:

There was no equipment operating since the licensee was in the process of removing the equipment because the facilities were being closed.

b. Survey:

There was no survey equipment observed on this inspection.

c. Handling:

There was no special handling equipment observed during this inspection.

d. Protection:

The licensee indicated that trays were available for use by the researchers.

e. Calibration:

Not applicable

f. Leak Testing:

Not applicable

D. POSTING, LABELING, WARNING SIGNALS, DESIGNATED AREAS:

➤ 1. Types Of Areas Found:

The laboratory areas were surveyed by the inspector using a Victoreen Thyac II with a thin-end window G.M. Detector. The areas were also surveyed for removable contamination by swipe survey. The results are attached as attachment E-1 and E-2.

2. Posting:

Dr. Riden indicated that the signs had recently been removed from the laboratories.

3. RH-3:

This was not noted on this inspection.

4. Posting Part 10; Notices, Instructions And Reports To Workers; Inspections:

This was not reviewed on this inspection.

5. Security:

The radioactive materials being disposed were packed in drums. The drums were stored in an isolated area which was fenced and locked.

6. Labeling:

The drums were labeled with "C-RAM" and the fence was also labeled with "C-RAM".

E. PERSONNEL:

1. Users:

R. S. Schroeder - Section Supervisor
W. T. Curless - Sr. Research Chemist
L. R. Kallenbach - Sr. Research Chemist
G. L. Nickell - Research Chemist
J. P. McManus - Research Chemist

G. E. Bach - Research Technician
W. J. Asbell - Research Technician
R. L. Arnett - Laboratory Technician
R. K. Barthalomew - Laboratory Technician
P. E. Erlandson - Laboratory Technician
J. C. Davis - Technician
Ann Rice - Technician
J. R. Bagley - Technician
S. P. Hensley - Technician
J. R. Dire - Temporary Technician
T. D. Norden - Temporary Technician

2. Training:

The users usually had a college degree in chemistry or biology - some had M.S. degrees and most of the Senior Researchers had Ph.D. Degrees. Those that did not have a college degree had on-the-job training and all had to review the company's Radiation Procedures in the Safety Manual.

3. Supervisor:

The Senior Researchers

4. Level Of Exposure:

The licensees records indicated that there had been no significant exposure to any of the employees.

5. Monitoring Devices Used:

None

6. RH-4, 5: () Used; () Not Used; () Equivalent

Not Applicable

F. SURVEY PROGRAM:

1. Surveys:

The licensee had records available to indicate that periodic surveys had been performed in the laboratories. The licensee had an Internal Radiation Safety Program Audit performed on October 31, 1979 by Radiation Health Physics, Medical and Health Resources Division, Gulf Science and Technology Company. Dr. Max Scott is in charge of GST HPS. The licensee performed a final swipe test survey of their facilities on June 12, 1980 and some areas were found to have minor contamination. These areas were washed and resurveyed and found to be free of contamination.

Copies of the above documents are attached as attachments B and C

2. Leak Tests:

The licensee had taken the leak tests and sent them to GSC Hammersville, Pennsylvania for analysis.

G. WASTE DISPOSAL:

1. Method:

a. Released To Sanitary Sewer:

None

b. Solid Waste Disposal:

The licensee sent 12 drums of waste (both liquid and solid) to NSSI on January 18, 1979. The licensee had 15-55 gal. drums (13 Solid and 2 Liquid Scint Vials) waiting for shipment on the date of the inspection.

2. Procedures:

The material was packaged in accordance with the procedures specified by NSSI.

H. TRANSPORTATION:

1. Shipper (Preparation For Shipment):

a. Packaging:

The waste was packaged in U. S. DOT 7A containers - which were sealed when the drum was full.

b. Labeling:

The drums were labeled with "C-RAM" and a transport index label Yellow II.

c. Paper:

The shipping papers contained the name of the nuclide, the quantity, the number of drums, the radioactive class (I) and the Transport Class (IV). The shipment sent on January 18, 1979, was sent via Lee Way Motor Freight. A copy of NSSI Radioactive Shipment Record for January 18, 1979 is attached as attachment D.

2. Carrying (Transport By Licensee):

a. Placarding:

Not Applicable

b. Packaging:

Not Applicable

c. Labeling:

Not Applicable

d. Paper:

Not Applicable

I. DOCUMENTATION:

1. License:

The licensee had a copy of the radioactive materials license.

2. Regulations:

The licensee had a current copy of the KRPR's.

3. Emergency Instructions:

The licensee had a copy of the operating and emergency procedures available.

4. Personnel Monitoring:

Not applicable

5. Waste Disposal:

The licensee had records available to indicate that radioactive materials had been disposed. The licensee also transferred material to other licensees.

1. 300 μ Ci of C-14 was transferred to applied agricultural Research Incorporated - Lake County Florida - under Florida License #1186-1(A79).
2. Ni-63 source transferred to Jayhawk plant on 4-29-80 under Kansas License 22-P229-01 amendment #6.
3. Ni-63 source transferred to GST - Hammersville, Pennsylvania under NRC License #37-00136-12.
4. Ni-63 received and disposed on January 14, 1977 by HPS GST.
5. 2-Ba-133 sources sent to GST - Hammersville, Pennsylvania on 6-11-80.
6. 236 μ Ci C-14 sent to Velsicol-Chicago, Illinois on 3-19-80.

7. Disposal:

3-9-80 -	10,892.45 μ Ci	Carbon 14
3-17-80 -	8,167.7 μ Ci	Carbon 14
3-18-80 -	1,004.0 μ Ci	Carbon 14
3-20-80 -	469 μ Ci	Carbon 14
4-9-80 -	300 μ Ci	Carbon 14
Total -	20,933.15 μ Ci	

8. Used 5 x 1.0 mCi C-14 Ring - UL phthalic anhydride on May 23, 1979 and on July 18, 1979 outdoor metabolism study.

6. Inventory:

The licensee had copies of inventory records since June 22, 1978. They also had the index cards covering all the radioactive material used by Gulf. The li-

censee had two 40 μ Ci cesium sources external standards a) Gulf 766 (S-1-A Serial #1660003000031 in a LS-100 model 1660 and b) Gulf 858(S-2-A).

The following information was included on the inventory record:

- Nuclide and activity
- Date inventoried
- Activity removed
- Activity left
- Chemical compound
- User - name
- User - division
- Proposed use
- Supplier
- Location and Disposition
- Date of disposal

7. Leak Test Records:

The licenses leak test records indicated that the sources were leak tested every six months. The dates of the leak tests were 12-8-76, 6-7-77, 12-5-77, 3-14-78, 8-31-78, 4-10-79, 10-12-79, and 4-9-80.

8. Calibration:

Not applicable

9. Report To Employees:

Not applicable

10. Incidents, Accidents, Lost Sources:

There were no indications of any incidents, accidents or lost sources observed on this inspection.

11. Overexposures:

Not applicable

12. Leaking Sources:

There were no indications of any leaking sources observed on this inspection.

13. Procedures:

- a. The internal audit by Henry T. Miller, Ph.D., C.H.P. - Dir. of Radiation Health Physics GST recommended:
 - 1) Inventory done at regular frequencies
 - 2) Secure waste drums against unauthorized removal.
 - 3) Need to perform surveys for contamination of the Labs.
- b. The Radiation Safety Program Audits of 10-30-78 and 10-31-79 reviewed the following major areas:
 - 1) Posting of notices to workers
 - 2) Caution Signs, Labels, Signals and Controls
 - 3) Training and Instructions to workers

- 4) Personnel Monitoring
- 5) Notification and Reports to individuals
- 6) Leak Tests
- 7) Records of Reports and Surveys
- 8) Procedures for Picking up, Receiving and Opening Packages
- 9) Emergency procedures

Reviewed By: 

Date: Sept 18, 1980

ATTACHMENT E-1

<u>Sample No.</u>	<u>Room and Location</u>	<u>Activity pC/wipe</u>	<u>D/m-wipe² (100 cm²)</u>
Room 122			
1	Hood	0.45	0.999
2	Bench Top-Middle	1.20	2.66
3	Floor by Sink	2.18	4.84
4	Bench Top Left End	2.43	5.40
5	Hood	0	0
Room 124			
31	Storage Cabinet	183.7	407.81
32	Refrigerator	1113	2,470.86
6	Bench Top Right Side	7.62	16.92
7	Bench Top Left Side	8.73	19.38
8	Waste can	119.12	264.45
9	Floor	4.78	10.62
Room 126			
10	Bench Top Left	2.31	5.13
11	Hood	3.67	8.15
Room 128			
12	Bench Top	0.58	1.29
13	Hood Front	2.93	6.51
Room 130			
14	Hood Front	36.9	81.92
15	Bench Top Left Side	0.33	0.73
16	Bench Top Right Side	0.83	1.84
Room 138			
17	Bench Top Right Side	3.91	8.68
18	Bench Top Left Side	0.21	0.47
19	Bench Top Left End by Window	3.80	8.44
20	Hood	3.05	6.77
Room 144			
21	Hood	3.42	7.59
22	Hood	4.41	9.79
23	Bench-Across from Hood	3.05	6.77
24	Bench Right Side of Hood	3.54	7.86
Room 244 <u>Synthesis Lab.</u>			
25	Hood - Right Side	7.74	17.18
26	Hood - Right Side	46.39	102.99
27	Floor	1.44	3.20
28	Floor	1.32	2.93
29	Bench by Window	1.94	4.31
30	Bench Across from Hood	3.91	8.68

<u>Sample No.</u>	<u>Soil Sample</u>	<u>pCi/g</u>	<u>μCi/g</u>
1	Plot N - 3 feet square flaged area	1140	1.14×10^{-3}
2	Plot N outside of flaged area	35	3.5×10^{-5}
3	Plot P	54	5.4×10^{-5}
*4	Plot N - Perimeter	31	3.1×10^{-5}
*5	Plot N Bottom	21	2.1×10^{-5}

*These two samples were taken after the contaminated soil was barreled for disposal.

AUG 19 1982

Docket No. 40-2136
License No. R-218

Note to: Files

The Spencer Chemical Company site at Merriam, Kansas was surveyed by the State of Kansas on June 17, 1980, and found to be free of contamination. See the inspection report of June 16, 1982, by Mr. Harold R. Borchert, Kansas Department of Health and Environment, concerning this subject (copy enclosed).

Original Signed By:
W. T. Crow

W. T. Crow, Section Leader
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Enclosure: Inspection Report No.
26-B134-01

DISTRIBUTION:

Docket File 40-2136
NMSS R/F
FCUP R/F
WTCrow
GHBidinger
KKodali
Region IV

8/17/82

OFFICE	FCUP <i>WTC</i>	FCUP <i>GHB</i>	FCUP <i>WTC</i>			
SURNAME	KKodali	GHBidinger	WTCrow			
DATE	8/17/82	8/17/82	8/18/82			

DLR:CGW

40-2136

70-146

40-1478

70-340

OCT 12 1960

Spencer Chemical Company
Dwight Building
Kansas City 5, Missouri

Attention: Mr. Harold Lambertus, General Manager,
Nuclear Fuels Department

Gentlemen:

This refers to the inspection conducted on March 30, 31, and April 1, 1960, of your activities authorized under AEC Source Material License Nos. C-4352 and S-218; and Special Nuclear Material License Nos. SM-154 and SNM-329.

We note that containers in which licensed material was stored in the storage building adjacent to Plant No. 2, in the vault next to Engineering Building No. 793, and in Room 16 of the Research and Development Laboratory were not labeled as required by the AEC's "Standards for Protection Against Radiation," Part 20, Title 10, Code of Federal Regulations, Section 20.203(f)(1), (f)(2) and (f)(4), "Caution signs, labels and signals."

The labeling deficiencies were brought to your attention by the inspector and you stated that corrective action would be taken. Should you have any questions about this matter, please feel free to write us. Labeling will be reviewed during the next inspection of your facilities.

We appreciate the cooperation given the AEC representative.

Very truly yours,

bcc: Compliance Division, HQ
Inspection Division, ALOO
Public Document Room

Lyall Johnson,
Assistant Director for Facilities
and Materials Licensing
Division of Licensing and Regulation

Enclosure

Signed CONCURRENCE COPY IN FILE 40-2136

OFFICE	DLR:RSB CGW:irm:LRR	DLR:LB LJohnson				
SURNAME	<i>CGW</i>	<i>LJohnson</i>				
DATE	10-11-60	10/12/60				

Office Memorandum • UNITED STATES GOVERNMENT

TO : Harold L. Price, Director, Division of
Licensing and Regulation, AEC Washington

DATE: APR 26 1960

FROM : Vincent C. Vespe, Director *Vincent C. Vespe*
Licensee Inspection Division, ALO

40-2136

SUBJECT: COMPLIANCE INSPECTION REPORT: SPENCER CHEMICAL COMPANY,
KANSAS CITY, MISSOURI; 10 CFR 40, LICENSE NOS. R-218, C-4352;
10 CFR 70, LICENSE NOS. SNM-154, SNM-329; ALO INSPECTION NO. 544

40-1478

SYMBOL: PL:RMN (2131)

70-146

70-340

Enclosed is an inspection report on an announced reinspection of the subject licensee. The only item of noncompliance disclosed by this inspection was that the licensee had not labeled several of the uranium storage containers. This item of noncompliance was discussed with Mr. George Chenoweth, Superintendent, Nuclear Fuels Section, and Mr. Harold Lambertus, General Manager, Nuclear Fuels Department. They indicated that corrective action would be taken.

We believe that the combination of technical proficiency and administrative procedures and practices of the Spencer Organization were greatly improved since the last visit. We believe that adequate precautions are being taken to minimize the risk of hazards to the health and safety of the public. Because of the difference in location between management and operating personnel and in view of the presence of both technical people and operating people at the Jayhawk Plant, a more lucid definition and assignment of specific responsibility for all health and safety problems and criticality in particular is desirable. Mr. Lambertus agreed with this, in principle, and stated that this suggestion was being implemented. Although we were happy to see a separate technical organization with responsibility for appraisal of criticality considerations, it was observed that the experience and qualifications of personnel were somewhat limited in this field. We suggested to Spencer that they might wish to consider routine and independent audits by qualified consultants. This suggestion was received favorably. Finally, we observed, especially in reference to the Oak Ridge and Los Alamos incidents, that the presence of non-safe geometry vessels in Plant No. 2 required substantial justification (see paragraph 26 of the report details). We recognize, with Spencer,

(continued)

the economic incentive for use of such vessels, especially for non-routine operations. Nevertheless, we asked whether and how penetrating an evaluation of this circumstance had been made. We were assured that detail procedures were prepared and reviewed before such an operation would take place and that it would be accomplished only with knowledgeable people. We were not shown examples of such detail procedures at the Jayhawk Plant, because the question of proprietary information was referred to the Kansas City Office. At this office, we did see examples of detail process instructions, listing each step in a particular operation. The desirability of requiring the licensee to use only all-safe geometry vessels in Plant No. 2 should be considered by DLR.

It was noted during the inspection that the storage areas in Plant No. 2 were identified as to type of uranium (normal and enriched); however, the material placed in these areas is subject only to administrative control. At the time of the inspection, these areas did not contain enriched material. Some of the enriched material containers in the storage vault were not provided with physical barricades such as bird cages to separate the materials. The areas within the various storage rooms were also not marked or identified as to the type and concentration of material that can be stored at specified locations. We recommend that DLR require the licensee to physically separate all enriched material during storage and to identify the area as to the amount and type of material that can be stored in each specified location.

A follow-up inspection is not planned.

Enclosure:

ALO Inspection Report No. 544

cc: Marvin M. Mann, Asst. Dir. for Comp.,
Div. of Insp., AEC Washington, w/encl.

THE ENCLOSED REPORT CONTAINS SPENCER CHEMICAL COMPANY

~~BUSINESS CONFIDENTIAL~~
~~INFORMATION~~

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT NO. 544

1. Name and address of licensee Spencer Chemical Company Dwight Building Kansas City 5, Missouri Attn: Mr. Harold Lambertus, General Manager, Nuclear Fuels Department		2. Date of inspection March 30, 31, and April 1, 1960	
		3. Type of inspection Reinspection	
		4. 10 CFR Part(s) applicable 20, 40, and 70	
5. License number(s), issue and expiration dates, scope and conditions (including amendments)			
C-4352 (IIB-III)	July 28, 1959	October 31, 1960	Amendment No. 2
R-218 (IIB-III)	March 12, 1959	March 31, 1960	Amendment No. 1
SNM-154 (IIIA-D)	February 19, 1959	April 1, 1960	As amended
SNM-329 (IIIA-D)	October 1, 1959	September 30, 1962	

6. Inspection findings (and items of noncompliance)

The licensee's current program involves the processing of low and high enriched uranium materials in facilities as described in their applications. General procedures and operating rules to insure criticality safety are being used as described in the licenses. Written radiological health and safety procedures have been established and area radiation alarm systems have been installed in the plant facilities. Records are maintained on accountability of licensed materials, personnel exposures, radiation surveys, urinalysis, medical examinations, and waste disposal. The licensee's facilities were found to be posted in accordance with the requirements of 10 CFR 20. The only item of noncompliance noted during the inspection is as follows:

License Nos. C-4352, R-218, SNM-329, SNM-154

- (A)(2) P
1. 20.203 (f) (1) and (f) (4) - in that several of the storage containers in the storage building adjacent to Plant No. 2, in the storage vault and in the Research and Development Laboratories were not labeled to indicate the presence of radioactive materials and the quantities of material stored therein. These containers held quantities of material greater than that specified in 20.203 (f) (1). (See paragraphs 27, 28, and 29 of the report details.)

7. Date of last previous inspection January 20, 1959 (Initial)	8. Is "Company Confidential" information contained in this report? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> (Specify page(s) and paragraph(s)) Mr. Harold Lambertus, General Manager of the Nuclear Fuels Department requested that the entire report be considered as
DISTRIBUTION: "COMPANY CONFIDENTIAL"	
1 - Asst. Dir. for Comp., Div. of Insp., AEC Wash. 1 - Dir., Div. of Lic. & Reg., AEC Wash. 1 - Lic. Insp. Div., ALO	Approved by: <i>[Signature]</i> Roland M. Nelson Vincent C. Vespe Albuquerque (Operations Office) April 26, 1960 (Date report prepared)
BUSINESS CONFIDENTIAL INFORMATION	

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

16-72824-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

Continuation Sheet 1
Spencer Chemical Company
Kansas City, Missouri

March 30, 31, & April 1, 1960

Inspection History

9. An initial assist inspection of Spencer Chemical Company's Jayhawk Works at Pittsburg, Kansas, License Nos. C-3571, R-218, and SNM-154, was made by the ALO Licensee Inspection Division on August 28, 1958. The inspection report was forwarded to Oak Ridge Operations on September 23, 1958, since the licensee's home office was in their geographical area.

An initial inspection of Spencer's Jayhawk Works, License Nos. C-3571, R-218, and SNM-154, was conducted on January 20, 1959 by the Oak Ridge Inspection Division. Visits were also made to the Spencer Chemical Company's offices in Kansas City, Missouri on January 19, and 21, 1959 to discuss administrative control and inspection findings. The ALO assist inspection report was forwarded to Washington with the ORO inspection report. We have no correspondence in our file on the action that DLR took on this inspection report.

General

10. An announced reinspection of the facilities of Spencer Chemical Company at their Jayhawk Plant near Pittsburg, Kansas, was conducted on March 30, and 31, 1960 in order to determine the degree of compliance of the licensee with the rules and regulations pertaining to License Nos. C-4353, R-218, SNM-154, and SNM-329. The results of this inspection were discussed with the appropriate and responsible administrative personnel at Spencer's Kansas City offices on April 1, 1960.
11. Dr. Peter A. Morris, Division of Inspection, Headquarters, and Mr. Vince Walker, Division of Inspection, IOO, reviewed the critically control aspects at the Jayhawk Works on March 31, 1960. These activities are conducted under License Nos. SNM-154 and SNM-329. Their findings, observations, and conclusions are included as part of this report. Dr. Morris and Mr. Walker discussed their findings with Mr. Harold Lambertus, General Manager Nuclear Fuels Department at Kansas City, Missouri, on April 1, 1960.
12. Mr. Lee Hayes and Mr. Don Keno, of the Kansas State Health Department, accompanied the inspector on March 30, 31, and April 1, 1960.
- Mr. George Chomoweth, Superintendent, Nuclear Fuels Section, and Mr. Don Rhodes, Technical Supervisor, were interviewed at the Jayhawk Plant and Mr. Harold Lambertus, General Manager, Nuclear Fuels Department, Dr. W. M. Leaders, Technical Director, and Mr. Norman Greenlee, Process Engineer, were interviewed at Spencer's Kansas City office. Mr. George Chomoweth reports to Mr. H. Lambertus, who reports directly to the Vice-President of the Industrial Chemical Division.

Organization and Program

13. The Spencer Chemical Company has general offices in Kansas City, Missouri. The Jayhawk Plant is one of six of the company's plants located in various sections of the country. The Jayhawk Plant is located in Kansas, approximately 23 miles south of Pittsburg, Kansas and 17 miles east of Joplin, Missouri. The organization in the Kansas City office has been significantly changed since the previous inspection. Mr. L. H. Landrum has been replaced by Mr. Harold Lambertus as General Manager of the Nuclear Fuels Department. Dr. W. M. Leaders has been employed as Technical Director in the Nuclear Fuels Department and reports directly to Mr. Lambertus. Mr. Norman Greenlee, Process Engineer, reports to Mr. Leaders and is responsible for all matters involving AEC licenses and the health and safety aspects of the Nuclear Fuels Department, including critically hazards. Mr. Greenlee visits the Jayhawk Plant about once a month.

The technical staff at the Jayhawk Plant, including Mr. D. E. Rhodes, Technical Supervisor, report directly to Dr. Leaders except for purely administrative matters, which are referred to Mr. G. E. Chomoweth, Superintendent Nuclear Fuels Section. The technical staff includes Mr. Rhodes and four experimental and analytical supervisors.

~~BUSINESS CONFIDENTIAL~~
~~INFORMATION~~

Continuation Sheet 2
Spencer Chemical Company
Kansas City, Missouri

March 30, 31, & April 1, 1960

The operating staff of the Nuclear Fuels Section at the Jayhawk Plant report directly to Mr. Chenoweth, Superintendent, who reports directly to Mr. Lambertus. The operating staff includes Mr. Chenoweth, seven operating supervisors and 19 hourly personnel. Mr. Chenoweth is responsible to the Nuclear Fuels Department for general scheduling, accountability, and health and safety of the Nuclear Fuels Section. He is responsible to the Manager of the Jayhawk Works for administrative, union relations and salary matters in order to insure uniformity of plant operations.

14. The facilities being used at the Jayhawk Plant for licensed material includes Plant No. 1, for processing up to fully enriched material. Plant No. 2 is a newly constructed facility and is used for processing up to 5% enriched uranium in the form of ceramic UO_2 , carbides, and green salts. Small orders of enriched uranium are also processed on a production basis through the research laboratory. Approximately 75% of the source and special nuclear material processed by the licensee is accountable to the AEC and is held under AEC accountability station SCC which is administered by the AEC's San Francisco Operations Office. The chemical laboratory is used for chemical analysis of all plant process samples and the storage vault in Building 703 is used for storage of licensed material.

15. The licensee has recently appointed Mr. J. M. Wood to the position of Health and Safety Supervisor. Mr. Wood will be responsible for the Health physics aspect of the licensed material program, including accountability. The licensee continues to employ Dr. R. Mesler of the University of Kansas for technical evaluations of the critical aspects of their special nuclear program. However, Dr. Mesler seldom visits the Jayhawk Plant for visual observation of the facilities.

Records

16. The licensee provides R. M. Landauer film badges to 40 people. These badges are processed on a monthly basis. The film badge results dating from January, 1959 through February, 1960 were reviewed by the inspector. The maximum monthly exposure during this period was 590 mr and the maximum 13-week exposure was 685 mr.

Mr. Chenoweth stated that they will use Indium foil film badges on about April 1, 1960. These film badges will be provided to all personnel working with or around enriched material. Film badges will also be strategically placed around the plant facilities.

17. The licensee also provides a monthly urinalysis service to 6 employees. This service is provided by National Spectrographic Lab, Hialeah, Florida. The urinalysis results from January, 1959 through February, 1960 were reviewed by the inspector. The average urinalysis results were 0.004 micrograms per milliliter and the maximum result was 0.025 micrograms per milliliter.

The employees are also given periodic physical examinations, which include X-rays, blood counts, and general urinalysis. The blood counts include red and white counts and hemoglobin; the urinalysis includes specific gravity, sugar, albumin, and PH. These records are maintained by the Plant Safety Supervisor.

18. Mr. Chenoweth has performed radiation and contamination surveys every one to three weeks during operation of the different plant facilities. The surveys were made to determine compliance with 20.101, 20.102, and 20.208. The radiation survey results dating from January, 1959 through February, 1960 were reviewed. The maximum reading, for example, during the processing of 1.5% enriched material through Plant No. 2 was 7 mr/hr. The contamination or smear sample results revealed from 26 to 512 counts per minute of surface contamination in the various facilities. The licensee does not have any counting equipment at the Jayhawk Works, therefore, it is necessary to send the smear samples to Kansas City for counting. Mr. Chenoweth stated that the plant facilities or areas are decontaminated when they become visually contaminated with uranium compounds. It was pointed out to Mr. Chenoweth that areas visually contaminated with uranium compounds are usually above the maximum permissible concentration for air activity. During our visit to the Kansas office, Mr. Lambertus stated that they were in the process of purchasing counting equipment for installation at the Jayhawk Works. This equipment will be used to determine the activity of the smear samples and air samples.

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19. The licensee has taken periodic air samples inside of the various plant facilities during operations. The licensee is using 5×10^{-11} microcuries per milliliter as the maximum permissible concentration limit within the facilities. Air sample results dating from January, 1959 to February, 1960 were reviewed by the Inspector. Many of the air sample results exceeded 5×10^{-11} microcuries per milliliter and the maximum air sample results was 7.2×10^{-10} microcuries per milliliter. Mr. Chasoweth stated that all of the employees wear respirators during any operation which may result in a potential dust hazard. He stated that all of the employees in the areas where the high air samples were obtained, were wearing respirators. The licensee has also obtained several stack effluent air samples. These samples did not exceed the limits specified in 20.103. Mr. Chasoweth stated that all air samples are sent to the Kansas City Research Center for counting. The air samples are taken with a portable Splex air sample with a calibrated air flow. The samples are taken at various points within the facilities where airborne radioactivity is likely to occur.

Waste Disposal

20. All liquid waste material, including radioactive waste, is discharged into a non-evaporating settling pond which is located directly behind the Jayhawk Plant. This pond is within the licensee's perimeter fence and is considered a restricted area. Since the plant effluent is acidified, it is unlikely that the uranium compounds will settle out in the basin. The uranium is discharged as uranyl nitrate. The settling pond has an estimated flow of 6-million gallons per day and discharges into Spring's River, an unrestricted stream adjacent to Jayhawk Plant property.

The licensee has taken weekly water samples at one mile upstream and three miles downstream from the Jayhawk Plant and at the outlet of the settling pond where the effluent stream enters the unrestricted area. These weekly water samples are composited and a periodic chemical analysis is made by the Kansas State Health Department. The licensee also collects a monthly silt sample from the bottom of the settling pond. A periodic chemical analysis is also made on this sample by the Kansas Health Department. The Health Department has made one chemical analysis on the composite water and silt samples during 1959 and two during 1960. These samples were analyzed for both alpha and beta radiation. The water samples were recorded as micro-microcuries per liter and the silt sample was recorded as micro-microcuries per gram. The maximum concentration at the outlet of the settling pond on April 21, 1959 was 36.7 micro-microcuries per liter; the maximum one mile upstream from the Jayhawk plant was 52.3 micro-microcuries per liter; and the maximum three miles downstream was 59.2 micro-microcuries per liter. The maximum concentration on February 22, 1960 at the outlet of the settling pond was 9.1 micro-microcuries per liter; one mile upstream was 6.5 micro-microcuries per liter; and three miles downstream was 15.8 micro-microcuries per liter. The maximum silt samples of the settling pond on April 21, 1959 was 206 micro-microcuries per gram; the maximum on February 22, 1960 was 101 micro-microcuries per gram. The licensee did not exceed the concentration of radioactive material in unrestricted areas as required by 20.103.

MPC = 7000 ucc/liter
According to the licensee's accountability ledger, the accountable and unaccountable losses of uranium compounds from January, 1959 to February, 1960 totaled 46,221.21 grams. The Uranium-235 losses totaled 695.69 grams. Mr. Chasoweth stated that the material was lost during process operations and was discharged through the settling pond. He stated that the total process losses were about 0.5% of the total material processed.

Procurement and Accountability

21. The licensee processes only Uranium Hexafluoride and scrap reject materials. The material is procured only by Mr. Greenlee through the Kansas City office. Spencer Chemical also processes accountability station material, which is administered by San Francisco Operations Office. Mr. Chasoweth stated that they have processed fuel material for General Electric Company at Vallejos, California, and for the AON reactor at Idaho Falls. The licensee has established accountability folders for each licensee, contractor, and supplier. These folders include all receipts and transfer forms and an accountability ledger for each company. The accountability ledger includes information on the lot number, quantity of material received, percent enrichment, dates received, recoverable waste, analytical samples, waste disposed and the amount shipped. Mr. Chasoweth also

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maintaining a daily journal, in which he logs all receipts and transfer information in order to insure that this information is recorded in the individual accountability ledgers. Mr. Cawsoneth maintains a complete accountability ledger on all of the Spencer-owned material including depleted uranium, enriched uranium, and Thorium. All accountable and unaccountable losses have been recorded in the accountability ledgers. A physical inventory of all material possessed by Spencer Chemical is performed each month. If the inventory does not agree with the accountability ledger, a thorough search is made for the material. If they are unable to locate the material, the amount of material is entered in the appropriate ledger as an unaccountable loss. These physical monthly inventories also help to insure that the licensee does not exceed his possession limit.

The inventory as of March 26, 1960 is as follows:

Spencer Material

<u>Type of Material</u>	<u>Grams of Uranium</u>
Depleted Uranium	616,136
Normal Uranium	2,025,282
Natural Thorium	131,673

Licensee Material

Enriched Uranium - 2.2%	91,938
Enriched Uranium - 2.6%	284,718
Enriched Uranium - 3.24%	99,127
Enriched Uranium - 93%	8,318

Section Bisle Material

Enriched Uranium - 4.3%	74,974
Enriched Uranium - 19%	2,088
Enriched Uranium - 93%	903.33

Radiation Safety Procedures

22. The licensee has established several radiation safety procedures for the instruction of their personnel in the use and handling of the material and in the event of a critically accident. The procedure entitled "Health and Safety in Handling Uranium" and dated February 19, 1958 contains general radiation safety instructions in the use and handling depleted, normal, and enriched uranium compounds. The procedures entitled, "Interim Emergency Procedure in the Event of a Criticality Alarm or Accident in Nuclear Fuels Plant No. 1 or the Research Building" and "Interim Emergency Procedures in the Event of Critically Alarm or Accidents in Nuclear Fuels Plant No. 2" contain detailed instructions on evacuation of the plant facility in the event of a nuclear accident, notification of civil authorities, decontamination of personnel and decontamination of contaminated areas. The licensee has also established a procedure entitled, "Fire Fighting Procedures" and dated January 8, 1960. This procedure contains general instructions on fire fighting of normal uranium fires and instructions in the event of a critically accident. All of the process operators and the fire fighting personnel have received copies of these emergency procedures. The licensee has also established isodose curves at 100, 200, 300, and 1,000 feet from the facility where a nuclear excursion could occur.

23. Nuclear Measurements Gamma Alarm Systems, Model GA-2, have been installed in all the nuclear plant facilities. The Research and Development Building and Plant No. 1 have been equipped with one chamber and two horns within the building and one siren on the roof of each of the buildings; the storage vault in Building 703 has one chamber and bell within the building and an audible horn on the roof of the building; and Plant No. 2 has one chamber and five horns within the building; one horn in the lunchroom and one audible siren on the roof of the facility. The alarm systems are connected

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to separate power systems from the process equipment. In the event of a nuclear excursion, the radiation alarm will shut down all process equipment except the overhead lights. A master switch is also located next to the administration building which can be used to shut down process equipment except the overhead lights. A master switch is also located next to the administration building which can be used to shut down all process equipment and exhaust fans for all of the facilities. All of the alarm systems have been pre-set to activate the alarms at 6 mr/hr. Mr. Chenoweth stated that the alarm systems are checked each hour by the operators to assure that they are operable. This check is a visual inspection of the alarm to insure that the green light is "on".

24. At the time of the inspection, the licensee possessed three Sears Roebuck "Tower" survey meters, Model 6159, and one Nuclear-Chicago survey meter, Model 2612.

Facilities and Criticality Control

25. The status of Plant No. 1 was substantially unchanged from the time of the inspection made in January, 1959. However, the plant was not in operation at the time of the visit. Mr. Chenoweth stated that Plant No. 1 was used only infrequently to process small batches of material and for processing clean-up material from Plant No. 2. The facility is equipped to process fully enriched material by physical modification of the equipment. It was noted during the inspection that the blender has been removed from Plant No. 1 and is now located in Plant No. 2. About 10 pounds of normal uranium and about 20 pounds of depleted uranium was stored in the facility.

26. Plant No. 2 has been operating 24 hours a day for seven days a week since start-up of the facility in July, 1959. This facility was in an operable condition at the time of the inspection; however, they were not actually processing uranium-oxide. The construction of the facility was observed to be in compliance with the license application. With few exceptions, all vessels in the building were of "safe" dimensions for processing material of less than 10% Uranium-235. The exceptions were tank R-5 (Spencer drawing No. 1-2600-802) which is used for dissolution of scrap material or other solids and three other vessels of roughly 55-gallon capacity, which are not normally connected to the process system. Stainless steel drip pans are provided under practically all process equipment and solution tanks. Spills would probably be observed soon after they occurred since operating personnel are present on a 24-hour basis. The vessel and pipe spacings were observed to be in accordance with plans. The general cleanliness and housekeeping of this facility were observed to be adequate since there was no accumulation of dirt, rags, or miscellaneous equipment. The entire wall behind the solvent extraction columns was lined with stainless steel plates. The solvent extraction equipment is cleaned up between each different batch of material. Isotopic analysis of the material received is obtained from the shipper. The licensee will probably perform their own isotopic analysis when they receive their counting equipment at the Jayhawk Plant. The micro-mill is completely enclosed by metal walls and ceiling. The air from the room is exhausted through absolute air filters. The uranium-oxide is transferred from the micro-mill to the blender by means of 5-gallon cans or buckets. The blender is purged with dry Nitrogen before each blend in order to insure a dry atmosphere. All of the hydrolysis columns, extraction columns, dissolution tanks, furnace, blender, and other equipment were posted as required by 20.203 (e) (1). All of the entrances to Plant No. 2 were posted as specified by 20.203 (e) (1).

The three storage areas on the process area floors were clearly identified with ropes and signs. The material was stored in 5-gallon buckets within the areas. The buckets are placed within the areas subject only to administrative controls. At the time of the inspection, the two normal uranium storage areas contained an estimated 3,700 pounds of uranium. The depleted uranium storage area contained an estimated 500 pounds of the uranium. All of the 5-gallon cans were labeled as required by 20.203 (f) (1) and (f) (4).

27. A small storage building which is located adjacent to Plant No. 2, is also used for storage of enriched, (normal) and depleted uranium. A small lunchroom is located to the rear of the building which is used by the operators of Plant No. 2. At the time of the inspection, this building contained an estimated 300 pounds of enriched uranium, 250 pounds of normal uranium, and 250 pounds of depleted uranium. This material was stored in 18 containers which were not labeled as required by 20.203 (d) (1).

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28. The walk-in storage vault is located next to and abutting the 703 Engineering Building. Mr. Chomoweth and Mr. Rhodes are the only individuals who know the combination to this vault. The storage vault is used basically for storage of enriched material. The vault is equipped with a steam radiator, an automatic sprinkling system, and one small floor drain. It was pointed out to both Mr. Chomoweth and Mr. Lambertus, by Dr. Morris, that it was not a good practice to have a steam radiator and a sprinkling system within the storage vault. Mr. Chomoweth and Mr. Lambertus agreed with Dr. Morris and stated that the systems would probably be removed. At the time of the inspection, the room contained an estimated five pounds of 93% enriched uranium, 4 pounds of 19% enrichment, 25 pounds of 10% enrichment, 100 pounds normal uranium, and 150 pounds of 19% Thorium. Most of the containers were not labeled as required by 20.203 (f) (1) and (2) (4). However, the storage vault door was posted as specified by 20.203 (e) (1). The materials were stored in 5-gallon cans, polyethylene bottles and receptacles, depending on the form and the amount. There were some bird cages available for enriched material, and there was one filling cabinet located in the storage vault. Provisions for physical separations of the fuel containers, other than the bird cages and the filling cabinet, such as shelves, racks, and cupboards, were not available.

29. The Research and Development Laboratory, including the process equipment, are recent additions to the plant facilities and are still in the development stage. These facilities are used for pilot plant operations and research activities. These facilities will be used for small scale experimental work and for small scale production equipment. In general, it was noted that safe geometry prevails throughout all process equipment including furnaces and storage facilities. The exhaust fume hoods were equipped with absolute filters. The laboratory facilities are operated 24 hours a day for 5 days a week by four supervisors and four operators. The operators must have the approval of the supervisor before any material is moved within the facility. A route or disposition sheet accompanied each batch or lot of material as it is processed through the facility. An inventory notebook is also maintained so that the supervisor can determine the amount of material and exact location of the material at any time. The experimental recovery system was located in exhaust hoods in Room 6. Mr. Rhodes stated that they have experienced about a 0.2% total process loss.

The majority of the material was stored in Room 16 of the Research and Development Laboratory. Mr. Chomoweth estimated that the room contained approximately 100 pounds of normal uranium, 300 pounds of depleted uranium, and 60 pounds of Thorium. About 300 other metal and glass containers were located on wooden shelving along the north and east wall of the room. Most of the containers in the room were not labeled as required by 20.203 (f) (1) and (2) (4). Thirty-two of the containers held greater than 1.6 pounds of contained uranium. It was also noted that a large number of samples of depleted and normal uranium, in one form or another, were present in several of the other laboratory rooms. The samples ranged in weight from a few grams to several pounds. All of the doors to the Research and Development Laboratory were posted as required by 20.203 (e) (1).

30. In general, the process equipment in Spencer's Plant No. 2 and Research and Development Laboratories conform with that described in their applications. General procedures and operating rules to insure critically safety are used as described in the license. The prevention of accidental criticality is also achieved through a combination of standard methods, such as "safe" geometry, dilution and concentration control, batch size control, and administrative control. These techniques and their applications, as described in the licensee's applications, were observed to be in effect.

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File by

Office Memorandum • UNITED STATES GOVERNMENT

TO : Mr. Price, Director
Division of Licensing and Regulation
Washington, D.C.

DATE: March 23, 1958

FROM : S. A. Sapardie, Manager
Safelidge Operations Office

SUBJECT: COMPLIANCE INSPECTION REPORTS, LICENSE NOS. SNM-154, C-3571 AND R-218,
SPENCER CHEMICAL COMPANY, KANSAS CITY, MISSOURI

SYNOPSIS: N/A

Submitted herewith are compliance inspection reports on special nuclear and source material programs, being conducted under the subject licenses, by the Spencer Chemical Company in their Safelidge Plant near Pittsburg, Kansas.

Forwarded also is an ALOO assist inspection report on the subject licensed programs with their transmittal memorandum, dated 9-2-58.

No items of noncompliance are reported for the programs being conducted under License Nos. C-3571 and R-218.

Two items of noncompliance are reported for the program being conducted under SNM-154 as follows:

Item 8 of the license:

- (1) The Licensee has made substantial changes in the administrative organization and other key personnel from that originally approved in the Licensee's application of September 15, 1958. These changes have not been reported to the ALR. (See paragraph 13 of the report details).
- (2) There were two deviations in equipment from plans submitted as part of applications:
 - (a) Changes made by the Licensee in the separation sections of the pulse column are not in conformance with the changes approved in the Licensee's application of May 16, 1958.
 - (b) Insulating material several inches thick is present around a 6 inch process vessel, serving as a reflector. (See paragraph 15 of the report details).

The above items of noncompliance were discussed with Mr. L. H. Landrum, Manager of the Nuclear Fuel Department and Mr. J. E. Shenoy,

March 23, 1959

Superintendent of the Licensee's Jayhawk Plant, Pittsburg, Kansas, both of whom stated that the changes would be reported to the DLR.

At the present time, with the current design of equipment, the current organization and procedures, and with the current inventory of low enrichment material, it appeared that operations of the Spencer Chemical Company in the licensed programs present an acceptable risk from criticality and radiological health and safety. However when operations begin with a larger inventory of material, and particularly highly enriched material, there are a number of areas wherein operational safety could and should be improved. These include changes in the design of the equipment, procedures and possible changes in organization.

The current dimensions of some of the process equipment are clearly unsafe for use with highly enriched material. The lack of formal, detailed procedures for process operations, material transfers and criticality control is considered a serious deficiency if and when highly enriched material is processed. The Licensee's organization is avowedly kept small to minimize expense. This results in a general lack of trained and experienced personnel to evaluate criticality and health physics problems, which further results in inadequate training and indoctrination of supervision and operators in these aspects of plant operation.

Criticality considerations in the Licensee's application procedures include several stipulations that certain valves in the system shall be operated only by supervision or an analyst. Since this control is established at points where criticality considerations are very important it would seem advisable to secure such valves by locking, or other means, against use by anyone but those authorized. There are several operating functions in which criticality control in the program is dependent on the vigilance of the operator which could be improved by requiring that the operator obtain supervision's signature on a process sheet as approval for such functions. Safety procedures for cleaning up spills or overflow to control vessels (traps, pans, etc.) should include the requirement that supervision be present to approve vessels, tubes and methods used for recovery of the material. Level alarms should be installed on vessels that are dependent on periodic visual checks such as overflow through the condensate line of the evaporator to a vessel that must be visually checked to determine solution level.

There is a notable absence of plant safety procedures, posted or distributed to personnel, to be followed in the event of fire, explosion (hydrogen) or any incident that could involve the release of hazardous amounts of radioactivity.

In view of the above, and the general impression of unfamiliarity on the part of Spencer personnel with the technical aspects of criticality control and health physics evaluations, it is believed that the DLR should make a thorough review of the equipment and plans for operation of the Spencer plant before operations begin with highly enriched material. Until such time as there is staff assistance on the location

H. L. Price

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March 23, 1959

able to advise on pertinent matters every effort should be made to fully assure that license conditions are clearly specified and that no deviations be allowed without DLR approval. We consider the present operation marginal.

No follow-up inspection is planned.

Leo Dubinski
for S. R. Sapirie

Enclosure:

Inspection Report as Listed (1)

cc: M. M. Mann, Assistant Director for Compliance,
Division of Inspection, Washington, w/encl.

Vincent C. Vespe, Acting Director, Licensee Inspection
Division, Albuquerque Operations, w/encl.

UNITED STATES ATOMIC ENERGY COMMISSION
COMPLIANCE INSPECTION REPORT

1. Name and address of licensee Spencer Chemical Company Dwight Building Kansas City 5, Missouri Attention: Mr. L. H. Landrum, Director Nuclear Fuels	2. Date of inspection January 20, 1959
	3. Type of inspection Initial
	4. 10 CFR Part(s) applicable 20 and 40

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

License No.	Date	Expiration	Scope and Conditions
R-216	1-20-58	2-1-59	Scope: Up to 10 kilograms normal thorium oxide - uranium oxide mixture for use in the process research.

6. Inspection findings (and items of noncompliance)

The licensed program is being conducted in adequate facilities with acceptable radiological health and safety controls for the current program. Records are kept for accountability of licensed material. Records have been kept of waste disposals. Radiation surveys have been made and records kept of the survey findings. A record has been kept of R. S. Landauer's monthly film readings. Records are kept of monthly urinalysis results from Nuclear Science and Engineering Corporation. The Licensee's facilities were found to be posted in accordance with 10 CFR 20.

No items of noncompliance were observed or otherwise noted during the course of this inspection.

7. Date of last previous inspection August 28, 1958 (Assist inspection by AL00)	8. Is "Company Confidential" information contained in this report? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Specify page(s) and paragraph(s))
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DISTRIBUTION:

Division of Inspection
Washington, D.C. (1)

Division of Licensing & Regulation
Washington, D.C. (1)

Approved by:

William M. Peary
William M. Peary
(Inspector)

Leo Dubinski
Leo Dubinski
Oak Ridge Operations Office
(Operations Office)

March 12, 1959

(Date report prepared)

Additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

16-75314-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

DETAILS

I. GENERAL INFORMATION

9. On January 20, 1959, an initial inspection was made of the special nuclear and source material programs being conducted, under License Nos. SNM-154, C-3571 and R-218, by the Spencer Chemical Company in their Jayhawk Plant near Pittsburg, Kansas. Visits were made to the Spencer Chemical Company's offices in Kansas City, Missouri on January 19 and January 21 and the inspection of the Jayhawk Plant facilities was made on January 20, 1959. Spencer's Kansas City offices were initially visited to discuss administrative controls exercised by the Kansas City office over the licensed programs at the Jayhawk Plant. The second visit was made to the Kansas City office on January 21, to discuss the inspection findings at the Jayhawk Plant with the appropriate and responsible administrative personnel.
10. On August 28, 1958, the Licensee Inspection Division, Albuquerque Operations Office made an assist inspection of the activities being conducted under License Nos. C-3571, R-218 and SNM-154, in the Spencer Chemical Company's Jayhawk Plant at Pittsburg, Kansas. A copy of the Albuquerque covering memorandum and inspection report will be transmitted at the time this report is submitted to Washington headquarters.
11. Dr. Peter A. Morris, Division of Inspection, Headquarters, and Mr. J. T. Sutherland, Inspection Division, OROO, accompanied W. W. Peery, Inspection Division, OROO, on the visits of the 19th and 20th while only Mr. Sutherland accompanied Mr. Peery on the visit of the 21st. Dr. Morris' primary purpose in the visits was the evaluation of the criticality aspects of the programs being conducted under SNM-154 and his findings, observations and conclusions are included as an integral part of this report.
12. Licensee personnel interviewed at Spencer's Kansas City offices included Mr. H. R. Dinges, Vice President, Industrial Chemicals Division, Mr. L. H. Landrum, Manager of the Nuclear Fuels Department and Mr. Gordon Crowe of the same Department. Mr. Crowe reports to Mr. Landrum, who reports to Mr. Dinges. Persons contacted at the Jayhawk Plant included Mr. G. E. Chenoweth, Superintendent; Mr. R. Jopp, Assistant Superintendent in charge of the nuclear fuels plant operations and maintenance; Mr. E. G. Marhofer, Supervisor of the laboratory; Mr. F. L. Turbett, experimentalist; and Mr. J. E. Smith, Safety Director. Messrs. Jopp, Marhofer and Turbett report to Mr. Chenoweth who reports to Mr. Landrum.

II. ORGANIZATION

13. The individuals interviewed and their corresponding capacities reflect some changes in personnel and their assigned responsibility from that submitted in the Licensee's application dated September 15, 1957, and a part of the Licensee's application bearing the title "Health and Safety in Handling Uranium", dated February 19, 1958. Mr. L. G. Stevenson was previously responsible for many of Mr. Chenoweth's current duties including responsibility for over-all radiological health and

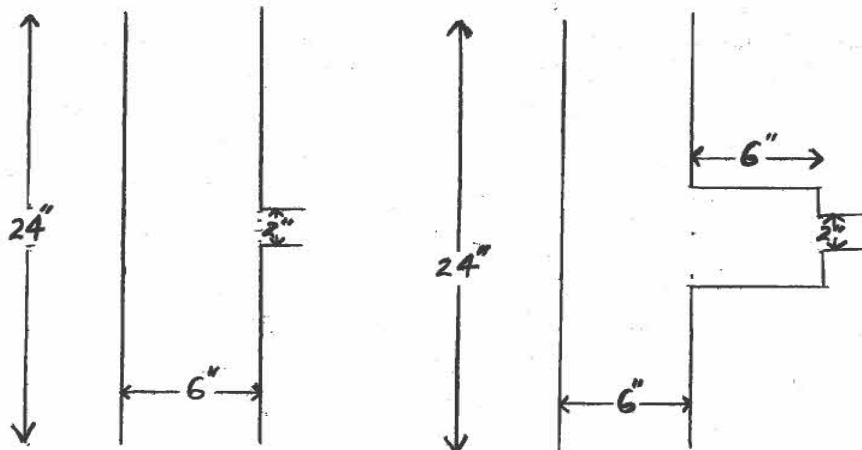
complete inventory of all licensed material. Mr. Jopp has assumed Mr. Stevenson's duties as supervisor of the pilot plant operation. The above personnel changes resulted from an organizational change about the beginning of 1959. Prior to this time, responsibility for the licensed program was assigned to the Research & Development Division which has as its director, Dr. N. C. Robertson. Personnel of the R & D Division conducted the program as described in the application. Responsibility for the program has now been assigned to the Nuclear Fuel Department which was created within the Industrial Chemicals Division. Only a part of the personnel previously associated with the licensed program were transferred to the new department. Mr. Landrum, Manager of the Department, has a small staff in the Kansas City office and Mr. Chenoweth, Superintendent of the Jayhawk Plant, licensed activities, has a staff of 12 to 18 operators of whom 6 to 8 are salaried. Mr. Jopp supervises the operation of the pilot plant and has four shift foremen and operators who report to him.

The Company relies on Dr. R. Mesler for technical evaluation of criticality aspects of their special nuclear material program. Dr. Mesler is a professor of Chemical Engineering at the University of Kansas, Lawrence, Kansas. Dr. Mesler's background includes the Oak Ridge School of Reactor Technology, 1951 - 1952, Ph.D., University of Michigan, 1955, Project Engineer for the Ford Nuclear Reactor and Assistant Professor of Nuclear Engineering, University of Michigan, 1955 - 1957.

III. FACILITIES

14. The Spencer Chemical Company has general offices in Kansas City, Missouri with the Jayhawk Plant being one of six Company plants located in various sections of the country. The Jayhawk Plant is located in Kansas approximately 25 miles south of Pittsburg, Kansas and about 20 miles west of Joplin, Missouri. The facilities being used at the Jayhawk Plant for the licensed programs include the pilot plant process contained in Building 709, a separate analytical laboratory and a storage vault separately located in Building 703. Limited quality control work is being done in a building which has been designated as the facility in which the Licensee plans to install process equipment of essentially the same design as that currently in use in the pilot plant. Processing would be more on a production scale in the larger building. Facilities for conducting the quality control tests consist of a heliarc welding unit, a small nonflammable box in which samples are fused and a funneled duct and blower to exhaust fumes to the outside atmosphere. The area is posted and entry is somewhat restricted by placement of cabinets and other equipment to form a perimeter to the area. A facility separate from the pilot plant is provided for clothing changes prior to entering and after leaving the pilot plant. Coveralls are furnished to pilot plant personnel and laundry equipment is available in the building. A lunch room is also provided in the change room area.
15. The process equipment in Spencer's pilot plant largely conforms to that described in their application of May 16, 1958, with exceptions noted as follows:
 - a. The separation sections at the top of the two pulse columns instead of being cylinders of 6 inch I.D. by 2 feet in length are actually 6 inch I.D. by 2 feet sections with tees of similar I.D. and approximately 6 inch length. (See diagram below)

(1) As indicated on application (2) Actual Installation



The 2" pipe leading away from the column does not tie directly into the 24" section but rather into the 6" tee on the side of the section.

- b. Insulating material several inches thick is present around a 6 inch process vessel (evaporator EP-16), forming a reflector. From the back-up material there is no indication that insulating material is specified for the evaporator although this may be a type item generally understood where heat is involved.

16. Radiation survey instrumentation consists of the following:

- 3 Sears Roebuck "Tower", model 6159 GM survey meters.
- 1 Nuclear-Chicago model 2612 GM survey meter.

Two of the "Tower" survey meters were randomly tested for reaction to a radiation source and found to be responsive. These instruments are not suitable for surveying for α radiation.

- 17. Storage facilities consist of a concrete vault, approximately 14 x 20 ft., which is equipped with a steel combination lock door. The section of Building 703 in which the vault is located is empty at the present time. The vault is provided with a floor drain, exhaust fan, and has a steam radiator mounted on one wall. No provisions for physical separation of SNM containers other than bird cages (such as shelves, racks or cupboards) are available in the vault.
- 18. Spencer Chemical Company has submitted plans of its proposed radiation alarm system to the Division of Licensing and Regulation for approval as required by 10 CFR 70.24. The application was dated December 19, 1958, and requested that all of the plans be considered Company Confidential. The Division of Licensing and Regulation requested in a letter to the Licensee, dated January 19, 1959, that Spencer withdraw or re-phrase

their request so that parts of the proposal would not be unnecessarily classified Company Confidential. It is noted that the Licensee's application was not submitted within the 30 day period stipulated in 10 CFR 70.24.

IV. PROCESS DESCRIPTION AND PURPOSE

19. The purpose of the Licensee's pilot plant is to process several types of starting uranium bearing materials for use in the fuel cycle of nuclear energy. The purified uranium compounds from the process may be used in research and development and/or actual core material for nuclear reactors. Purification is done principally by solvent extraction and the process is designed to produce primarily UO_2 from UF_6 or scrap. Further compounding of Spencer's purified materials by the ultimate consumer may be necessary since it is the policy of Spencer not to compete with their customers in manufacturing uranium containing products for specialized uses. The pilot plant was originally designed to process uranium of any enrichment in accordance with the license approval received for their application dated September 15, 1957. The current program at Jayhawk is being conducted in process equipment modified in accordance with licensed approval received for their application dated May 16, 1958. This last approval was granted for processing only materials containing up to 5% enrichment. The process equipment must be physically modified for enrichments up to 10% and further modified so that the equipment originally approved in the September 15, 1957, application is used for enrichments $> 10\%$.
20. Changes in the enrichment of materials being processed are said to require approval of the department manager, before execution. The differences noted in process equipment from that approved under the license were brought to the attention of Messrs. Landrum and Chenoweth. They were informed that the Division of Inspection would probably recommend to the Division of Licensing and Regulation that an amendment be required to SNM-154 before operations are permitted with highly enriched material. It was explained that an amendment to the license approving the equipment that differs from that presently approved should particularly be sought. Messrs. Landrum and Chenoweth were also advised that the Licensee should always consult the Division of Licensing and Regulation when there is any doubt whether an amendment to their license is required or whether changes in equipment or procedures should be reported, before such changes are made. Both men concurred with these proposals and indicated that such a procedure would be followed in the future.
21. At the time of the visit the plant was in operation, processing natural uranium, according to procedures described in the license application, to produce UO_2 powder. The Licensee had on-hand scrap UO_2 pellets, enriched to 1.5% of U-235 which are scheduled to be processed within about one week. There are no plans to process material with enrichments greater than 5% in the near future, however, it is planned that material of higher enrichment will be processed at some time in the future and the process equipment presumably will be modified to conform with that approved in the license. Mr. Chenoweth indicated that it is expected that the present processing facility will be moved to the larger building by about mid-summer of 1959, at which time a larger inventory of special nuclear material will be desired. It is planned that all licensed

material will be confined to this building. This arrangement is desirable because it increases the control of the licensed material in the Jayhawk Plant which is also engaged in the production of agricultural chemicals.

V. CRITICALITY CONTROL PROCEDURES

22. General procedures and operating rules to insure criticality safety are used, as described in the license. Check list procedures are not in use, however, log book and data sheets are used for control of the process. Samples are taken and analyzed routinely each shift as a control measure. Non-routine samples are also taken when it is deemed necessary. Generally, criticality control is obtained by maintaining "ever-safe" geometry and mass limitations. The analytical samples are used in part to determine mass by establishing solution concentration before transfer to a vessel whose geometry is not "ever-safe". Safe geometry is frequently dependent on administrative control. Isotopic assay of materials received and shipped is not currently done at the Jayhawk Plant. Information on assay of highly enriched material in the past has been obtained from the shipper, however, they are considering plans for doing isotopic analysis of highly enriched material to be done at the Jayhawk Plant. Stainless steel catch pans are provided under practically all vessels in the process and criticality safe catch pans are provided under all vessels that present potential spills of unsafe volumes of up to highly enriched materials. Spills would probably be observed soon after they occur since operating personnel are present on a 24-hour basis. The Licensee's process equipment contains the inherent possibility of leakage from vessel to jacket and vice-versa thus creating a possible criticality hazard. Control of this hazard is the responsibility of the operators diligent observance of pressure differential changes and visual changes in volumes of associated vessels. Some of the tanks in the process are not criticality safe, these are primarily storage tanks and the valves leading to these tanks are said to be controlled by supervision and analysts who are responsible for determining that U-235 concentrations are below approved amounts before transfer of the solutions to the unsafe tanks. Overflow of solution from the evaporator (EP-16) to water storage tanks (T-11) could result in a criticality hazard. An overflow container has been installed to prevent this, however, this control is dependent on an operator's visual check of the container at 30 minute intervals. Control of mass safe limits in process furnaces is dependent on visual determination by operators that 15% of furnace tube capacity is not exceeded and that no greater than accepted amounts of uranium throughput exists. The control of all the foregoing possible criticality hazards are largely dependent on the diligence of direct plant supervision and operators.
23. Administrative personnel are responsible for modifying the process equipment to meet the licensed approved specifications for materials of a particular enrichment. Administrative personnel are also responsible for assuring that only material of single isotopic analysis will be used in the system at one time. It was noted that the Licensee's nuclear material storage vault is also used for storing Company documents in filing cabinets, and is, therefore, accessible to personnel outside the Nuclear Fuels Department. It was pointed out to Mr. Chenoweth that the Division of Licensing and Regulation would probably expect that access to the vault be limited to personnel in the Nuclear Fuels Department who are responsible for the material stored there and also desire that there be limited access to the vault before approving an increased SNM inventory in an expanded program.

VI. QUALITY CONTROL AND PROCESS CONTROL SAMPLE ANALYSIS

24. The fusing of U O₂ samples is done to determine the sintering qualities of this product. Small samples of approximately one gram are fused with heat from a heliarc unit. The samples are placed in graphite crucibles and fired with the heliarc inside a small non-flammable box. Shaded glass is used by the technician to view the process through a small opening in the top of the box.
25. Colorimetric analysis of samples are made in the laboratory to determine uranium content. Mr. Marhofer is responsible for control of these samples in the laboratory. Samples from various points in the process are analyzed in this laboratory as an integral part of process control both from the standpoint of quality and criticality considerations.
26. The license requires that blending of material be done in a dry atmosphere. In the past this was done by purging the blends with nitrogen before each blending. The material from the dry box to blender is conveyed in closed containers. Since the inspection we have been informed that the blender now has a direct connection with the dry box to utilize the same dry gas for control of moisture. Mr. Chenoweth stated that a moisture analysis is made daily on the oxide powders and the results have consistently indicated a moisture content of 0.1 to 0.2% by weight.
27. Spectrographic analysis of samples from the Licensee's program is being made at Rockhurst College, Kansas City, Missouri under SNM-257 issued to the College on October 21, 1958. This program was inspected on January 22, 1959, and the inspection findings are contained in a separate report dated February 5, 1959. This report contained one item of non-compliance with 10 CFR 20.401(c) in that the Licensee had not maintained records of surveys as required by this section of the regulations. The issuance of SNM-257 corrected one item of noncompliance cited in Item 6 of Form AEC-417 submitted with ALOO report dated 7-11-58 and included as attachment A of this report.

VII. ACCOUNTABILITY

28. Complete and systematic records are kept of materials received and transferred in the Licensee's program. Mr. Chenoweth is responsible for keeping such records. A separate record is kept of each shipment of material from receipt, during processing and through transfer of Spencer's finished product. Special nuclear materials inventory from July 30, 1958, to December 31, 1958, reflects the following:

	<u>Uranium Compounds</u>	<u>U-235 Content</u>
Total Receipts	644,695 grams	14,083 grams
Shipments	<u>448,865</u> 195,820	<u>11,601</u> 2,482
Losses	<u>2,734</u>	<u>116</u>
On Hand	193,096	2,366
Previous Inventory	<u>3,458</u>	<u>594</u>
Total On-Hand	196,554	2,960

Of the total on-hand SNM, 196,069 grams are scrap UO_2 pellets of 1.5% enrichment from the Commonwealth Edison Company. Only small amounts of normal material to 2268 grams have been transferred under License No. R-218. Small amounts of material remaining on-hand from receipts under C-3571 are said to be covered now under License No. C-4352 and future orders of similar materials will be made under the new license. License No. C-3571 expired September 1, 1958, and R-218 expired February 1, 1959. The approaching expiration of R-218 was called to the attention of Mr. Chenoweth. The Inspection Division, OROO, did not receive a copy of License No. C-4352 and back-up material until February 19, 1959. In a letter, dated September 8, 1958, the Division of Licensing and Regulation authorized receipt by the Licensee, prior to June 30, 1959, of 227 kg of normal uranium as UF_6 for use under License No. C-3571. The date of the authorization letter and the final authorized delivery date in the letter are both after the expiration date of the license. A complete audit of the Licensee's material receipts and transfer records was not made, however, the manner in which such records are being kept indicates that an accurate accounting can be made at any time. The Licensee establishes eligibility to receive before transfers of licensed material are made to the recipient.

VIII. WASTE DISPOSALS

29. The uranium content of waste tanks is determined before the tank is discharged to the settling basin and/or the effluent stream from the plant which flows into an unrestricted stream adjacent to the Spencer Jayhawk Plant property. The settling basin has a water flow of about 950,000 gallons/hr. which gives a considerable dilution factor. A record is kept of the analytical results of samples taken of wastes discharged to the settling basin and thence to the Jayhawk waste treatment plant. The record of waste tank analysis shows a discharge of uranium to the settling basin of solutions containing to .6 grams/liter and other sample results indicate that discharge to the settling basin has averaged approximately .05 grams/liter. During the month of November 1958, a representative total of 767 grams of uranium was discharged to the settling basin at the above rate of approximately .05 grams/liter. With the above amounts of material diluted by the settling basin water flow and the over-all plant effluent results in a concentration of less than 7×10^{-6} $\mu\text{c/ml}$ (specified in 10 CFR 20.103 as the MPC). The g/liter units used above are operational procedure limits, but sufficient records in $\mu\text{c/ml}$ units are kept to meet the requirements of Part 20. Records were not available of results of analysis of samples taken at the point of discharge of waste stream from the uranium facility to the unrestricted area but any measurements at this point should be even less than discussed above because of additional dilution. However, Mr. Chenoweth and Mr. Smith, Safety Director, stated that the State of Kansas Health Department has counted such samples for them and reported no radioactivity greater than permissible levels of 10 CFR 20. The Kansas Health Department informed them that a study of the natural radioactive content of the stream adjacent to and up-stream from the Jayhawk Plant should be made for more accurate determinations of the activity being contributed to the stream by the Jayhawk Plant. These were random "grab" samples, and no routine, constant sampling method is in use at this point in the plant effluent. Messrs. Smith and Chenoweth indicated that any

available past sample results and future results on such samples will be kept. A record of the sample counts on settling basin water and silt from 11-5-58 to 12-9-58 shows gross beta and gamma levels of $.6 \times 10^{-9}$ to 13×10^{-9} $\mu\text{C}/\text{ml}$. Mr. Smith stated that these samples were also counted by the Kansas State Health Department. These are also "grab" type samples. This present method of sampling is adequate since samples taken of wastes prior to discharge to the pond have not shown levels greater than MPC for discharge to unrestricted areas, for the processing currently being done. However, if an increase is seen in the uranium content of waste tank samples, constant sampling of the effluent would be necessary for adequate evaluation of waste disposals to unrestricted areas.

IX. RADIOLOGICAL SAFETY PROCEDURES

30. Written radiological health and safety procedures were submitted as a part of the application, however, these are mostly explanations and descriptions of material and not specific detailed safety rules for the program. Pilot plant personnel are verbally instructed to laundry coveralls daily, however, no routine monitoring of clothing has been ordered by written procedure. The plant operating procedures could more nearly be considered safety procedures, however, neither has been distributed or discussed with personnel to assure complete familiarity and no periodic sessions are held to impress, remind, or instruct personnel in radiological health and safety or to re-emphasize the importance of adherence to established procedures designed to control criticality hazards. Mr. Chenoweth stated that to his knowledge personnel have not been expressly given an explanation of the nature of an accidental criticality excursion and the scope of the potential hazard.

X. RADIATION SURVEYS AND PERSONNEL MONITORING

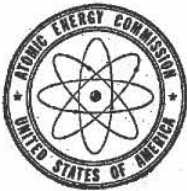
31. Records kept of radiation survey findings indicate relatively low alpha and beta contamination. Levels of the order of 300 - 400 d/m alpha activity and readings on smears with GMSM of .02 to .09 mr/hr. beta have been detected. A record has been kept of routine readings taken in the plant area with GMSM w/ thin window tube. These readings range from natural background to 4 mr/hr. with most readings between background and .5 mr/hr. Mr. Smith stated that corrective action is requested for any readings observed to be as much as 1 mr/hr. Establishment of the above survey records may be considered corrective action for the survey record deficiency reported as an item of noncompliance in ALCO report of 9-11-58 and included as Attachment A of this report.
32. Available sample results covering the period from 9-4-58 to 12-1-58 show levels of air activity for alpha and beta ranging from 1.01×10^{-13} to 2.2×10^{-13} $\mu\text{C}/\text{ml}$. These air samples are randomly taken with a portable sampler of the filter paper disc type with a calibrated air flow. Samples have been taken at some points in system where airborne radioactivity is likely to occur, however, Mr. Chenoweth stated that samples had not been taken at the blender or at least he knew of no sample results from that location. Mr. Chenoweth agreed that air samples at the blender location, during blending, appeared desirable and that such sampling would be done. It was pointed out to Mr. Chenoweth that additional and routine air sampling procedures would make a more complete evaluation of the air contamination status of the Jayhawk processing plant possible. Air sampling of the sintering process was also discussed.

Mr. Chenoweth agreed that such sampling was needed and would be initiated.

33. Personnel in the Licensee's program are monitored with a monthly film badge service furnished by R. S. Landauer Company, Park Forest, Illinois. Records are kept of the Landauer reports as well as a cumulative record of each individual's radiation dose. Records from August 1958, to December 1958, show no monthly exposures >45 mrem gamma or 115 mrem beta except for one individual. The Landauer report of October 1958, indicated that J. D. Rogers received a dose of 35 mrem gamma and 880 beta. The monthly Landauer report for December 1958, showed that Rogers received a dose of 475 mrem gamma and 7450 beta. Mr. Chenoweth stated that it is the consensus of the responsible Spencer personnel that Rogers received the above doses as a result of work with the heliarc unit which is used for fusing the uranium oxide samples to test the sintering qualities of the material. Rogers received the higher film readings on each occasion after working with the sintering process. Spencer supervision theorize that the exposures were possibly caused by low energy rays from the heliarc welder (presumably low energy x-rays). It appears doubtful that these are true beta readings. However, similar readings were not seen on the film of another man who directly assisted Rogers in the sintering tests. This difference may be due to the position of the two film badges relative to the source of low energy rays. Procedure dictates that film badges will not be taken out of the plant area. Mr. Chenoweth stated that potential non-occupational causes of the film readings, such as medical x-ray, are being investigated. Controlled film monitoring of the heliarc is planned with assistance from Landauer in evaluating the results. Mr. Chenoweth was informed that the incident was reportable under 10 CFR 20.403(c). Mr. Chenoweth stated that the incident would be reported as required but that it is planned to include in the report as much information as the investigation of the incident reveals, within the 30 day reporting limit. Mr. Chenoweth further stated that shielding will be placed around the sintering process if the need is indicated by the controlled film monitoring.
34. The Licensee is provided with a monthly urinalysis service from the Nuclear Science and Engineering Corporation, Pittsburgh, Pennsylvania. The results reported since the inspection of the program by ALOO were not found to be significantly different with an average of approximately .006 mg/l reported.

XI. POSTING

35. The Licensee's facilities were found to be posted in accordance with the requirements of 10 CFR 20.203(e)(1) & (2), and (f)(1) & (2). The analytical laboratory was not posted, however, at the time of this visit posting was not required for this area. Posting requirements for the laboratory were discussed with Mr. Chenoweth as an aid in meeting future posting needs in this facility. The above posting findings may be considered as constituting adequate corrective action for the items of non-compliance with 10 CFR 20.203 as reported in Item 6, Form AEC-417 of the ALOO report dated 9-11-58.



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

IN REPLY REFER TO:

AD-2136
LRL:ND

SOURCE MATERIAL LICENSE

License No. **A-213**
~~Amendment # 1~~

Dated **MAR 12 1958**

Spencer Chemical Company
Dwight Building
Kansas City 5, Missouri

Attention: Mr. H. R. Ringos

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to **ten (10) kilograms of normal thorium oxide-uranium oxide mixture and one thousand kilograms of thorium oxide during the term of this license for research and development work. This license extends to your daybook works.**

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

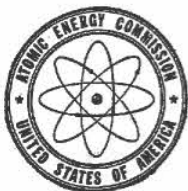
This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire **March 31, 1960.**

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation



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

IN REPLY REFER TO:

40-2136
LRL:MD

SOURCE MATERIAL LICENSE

License No. **40-2136**
Amendment # 1
Dated: **MAR 12 1959**

Sponcer Chemical Company
Delight Building
Kansas City 5, Missouri

Attention: Mr. R. H. Dinges

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to **ten (10) kilograms of natural thorium oxide-radium oxide mixture and one thousand kilograms of thorium oxide during the term of this license for research and development work. This license extends to your Jayhawk Works.**

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire **March 31, 1960.**

CC: Docket Officer
Document Room
S/H
Insp. w/c letter 3/3/59

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation

RECEIVED

MAR 23 1959



Spencer Chemical Company

DWIGHT BUILDING

Kansas City 5, Missouri

H. R. DINGES
VICE PRESIDENT
INDUSTRIAL CHEMICAL DIVISION

March 3, 1959

DOCKET NO. 40-2136

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

Dear Mr. Delaney:

We hereby request that our Source Material License No. R-218 be amended. This license presently authorizes Spencer Chemical Company to receive possession of, and title to, at the Jayhawk Works located between Pittsburg, Kansas and Joplin, Missouri, up to 10 kilograms of normal thorium oxide-uranium oxide mixture.

In the course of our research, development, and engineering for the advancement of nuclear fuels technology, and in the conduct of business with other Atomic Energy Commission licensees, we have need for the following amendments to our License No. R-218:

- (a) Increase amount of normal thorium oxide-uranium oxide from 10 to 100 kilograms, and
- (b) In addition, authorize Spencer Chemical Company to receive possession of and title to 1000 kilograms of thorium oxide.

Sincerely,

H. R. Dinges

HRD:el





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

IN REPLY REFER TO:

40-2136
LRL:HD

Spencer Chemical Company
Eight Building
Kansas City 5, Missouri

Attention: Mr. L. H. Landrum, Director
Nuclear Fuels

SOURCE MATERIAL LICENSE

License No. 2-218

Dated: JAN 28 1959

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to, at the above stated location, up to ten (10) kilograms of normal thorium oxide - uranium oxide mixture for use in process research.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

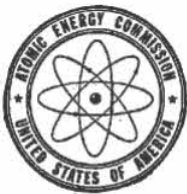
Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire January 31, 1960.

Encl:
10 CFR 20 & 40

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation



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

IN REPLY REFER TO:

14-2133
124-10

Spencer Chemical Company
Delmar Building
Kansas City 3, Missouri

Attention: Mr. E. H. Landrum, Director
Nuclear Fuels

SOURCE MATERIAL LICENSE

License No. **12-213**

Dated: JAN 28 1959

Certification

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to, at the above stated location, up to ten (10) kilograms of normal thorium oxide - uranium oxide mixture for use in process research.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire **January 31, 1960.**

Encls:
20 CFR 20 & 40

FOR THE ATOMIC ENERGY COMMISSION

CC: Pocket Officer
Document Room
S/H
M.M. Mann, Insp.

J. C. Delaney
Chief, Nuclear Materials Section
Licensing Branch
Division of Licensing & Regulation

Dictator

Approved

SPENCER

CKET NO. 40-2136

Spencer Chemical Company

DWIGHT BUILDING

Kansas City 5, Missouri

Nuclear Fuels Department

January 22, 1959

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

Dear Mr. Delaney:

We hereby request renewal of Spencer Chemical Company Source Material License R-218 which is scheduled to expire February 1, 1959. We request the same provisions on the renewal that are authorized on the present license, namely that we are licensed to receive possession of and title to up to 10 kilograms normal thorium oxide-uranium oxide mixture for use in process research.

Sincerely,

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

LHL:el



DOCKET NO. ^{supp.} 40-2136

Spencer Chemical Company

Dwight Building
Kansas City 5, Missouri

Copy For

December 19, 1957

Mr. Lyall Johnson, Chief
Licensing Branch
Division of Civilian Application
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. Johnson:

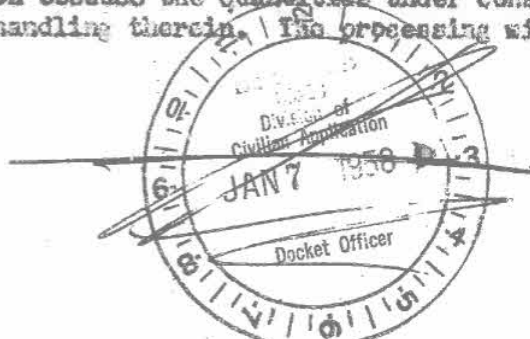
In carrying on our work of processing UF_6 to UO_2 or in recovering uranium values from scrap, we have a need to conduct studies on small lots of various types of material. For example, we need to examine representative samples of scrap to determine anticipated recovery costs. We request that our license application for handling special nuclear material, dated September 15, 1957, be amended to permit handling of these small lots containing less than 1 kg of uranium 235; also, a license to process and conduct studies on thorium in amounts up to 10 kg is requested.

Specifically, we have an immediate need to handle the following:

- (1) Uranium containing 2% $U-235$. We understand this material is a slurry of uranium oxide, grinding oil and various contaminants resulting from grinding UO_2 pellets.
- (2) A ThO_2-UO_2 mixture consisting of natural uranium. We understand this material has been used in a pumping loop.

Our aim in examining each of these materials will be to study the processing necessary to recovering the uranium and thorium values in order that we might provide cost estimates on this. We expect the processing steps to include dissolution of valuable materials, purification by required solids separation, for example filtration and solvent extraction, precipitation and/or reduction or oxidation to the required product.

The processing studies involved will be conducted apart from the equipment described in our reference application because the quantities under consideration will be less than suitable for handling therein. The processing will be



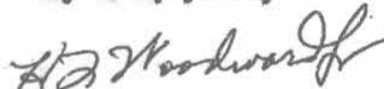
Mr. Lyall Johnson
USABC

- 2 -

December 19, 1957

essentially batch type operation in which container sizes up to 4 liters are used. Only one batch containing no more than 1 pound of U-235 will be in process at one time, and interaction of these materials with other materials will be prevented by maintaining a distance of at least 10 feet between possible interacting materials. In storage, where interaction is possible, "bird cages", as described in our main application, will be used.

Very truly yours,



H. P. Woodward, Jr.
Acting General Manager
Research and Development

Subscribed in my presence and sworn to before
me by the affiant above named this 22 day
of December 1957


Notary Public

My Commission Expires July 10, 1961

LHL:el



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON 25, D. C.

IN REPLY REFER TO:
Docket No. 40-2136
LAR:FGS

Spencer Chemical Company
Bright Building
Kansas City 5, Missouri

Attention: Mr. H. F. Woodward, Jr.
Acting General Manager
Research and Development

SOURCE MATERIAL LICENSE

License No. S-218

Dated: JAN 20 1958

Gentlemen:

Pursuant to the Atomic Energy Act of 1954 and Section 40.21 of the Code of Federal Regulations, Title 10 - Atomic Energy, Chapter 1, Part 40 - Control of Source Material, you are hereby licensed to receive possession of and title to up to 10 kilograms normal thorium oxide - uranium oxide mixture for use in the process research.

You are further licensed to transfer and deliver possession of and title to refined source material to any person licensed by the Atomic Energy Commission, within the limits of his license.

As a condition of this license, you are required to maintain records of your inventories, receipts and transfers of refined source material.

This license is subject to all the provisions of the Atomic Energy Act of 1954 now or hereafter in effect and to all valid rules and regulations of the U. S. Atomic Energy Commission, including 10 CFR 20, "Standards For Protection Against Radiation."

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954.

This license shall expire February 1, 1959.

DISTRIBUTION:

Formal Docket file
Suppl. Docket file
Document Room file
M. M. Mann, INS, w/cy of appl.
State Health Rep.

FOR THE ATOMIC ENERGY COMMISSION

J. C. Delaney
Chief, Materials Section
Licensing Branch
~~Division of Civilian Application~~
Division of Licensing and Regulation

dictated *phs*

APPROVED *gcp*

40-2136
Formal

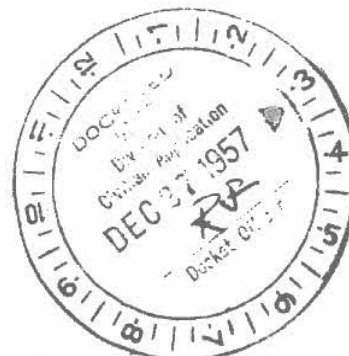
Spencer Chemical Company

DWIGHT BUILDING

Kansas City 5, Missouri

December 19, 1957

Mr. Lyall Johnson, Chief
Licensing Branch
Division of Civilian Application
U. S. Atomic Energy Commission
Washington 25, D. C.



Dear Mr. Johnson:

In carrying on our work of processing UF_6 to UO_2 or in recovering uranium values from scrap, we have a need to conduct studies on small lots of various types of material. For example, we need to examine representative samples of scrap to determine anticipated recovery costs. We request that our license application for handling special nuclear material, dated September 15, 1957, be amended to permit handling of these small lots containing less than 1 Kg of uranium 235; also, a license to process and conduct studies on thorium in amounts up to 10 Kg is requested.

Specifically, we have an immediate need to handle the following:

- (1) Uranium containing 2½% U-235. We understand this material is a slurry of uranium oxide, grinding oil and various contaminants resulting from grinding UO_2 pellets.
- (2) A ThO_2-UO_3 mixture consisting of natural uranium. We understand this material has been used in a pumping loop.

Our aim in examining each of these materials will be to study the processing necessary to recovering the uranium and thorium values in order that we might provide cost estimates on this. We expect the processing steps to include dissolution of valuable materials, purification by required solids separation, for example filtration and solvent extraction, precipitation and/or reduction or oxidation to the required product.

The processing studies involved will be conducted apart from the equipment described in our reference application because the quantities under consideration will be less than suitable for handling therein. The processing will be

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essentially batch type operation in which container sizes up to 4 liters are used. Only one batch containing no more than 1 pound of U-235 will be in process at one time, and interaction of these materials with other materials will be prevented by maintaining a distance of at least 10 feet between possible interacting materials. In storage, where interaction is possible, "bird cages", as described in our main application, will be used.

Very truly yours,



H. F. Woodward, Jr.
Acting General Manager
Research and Development

Subscribed in my presence and sworn to before
me by the affiant above named this 22 day
of December 1957


Notary Public

My Commission Expires July 10, 1961

LHL:el

