



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

October 20, 2000

MEMORANDUM TO: John T. Greeves, Director
Division of Waste Management
Office of Nuclear Material Safety and Safeguards

FROM: Dwight D. Chamberlain, Director */LHowell for/*
Division of Nuclear Materials Safety

SUBJECT: QUARTERLY STATUS REPORT FOR TERMINATED LICENSE
PROGRAM (TEMPORARY INSTRUCTION 2800/026)

The purpose of this memorandum is to provide you with a status report of our review of formerly licensed sites. Our last status report was dated May 24, 2000. This memorandum is provided in accordance with Section 5 of Temporary Instruction 2800/026, Revision 2, "Followup Inspection of Formerly Licensed Sites Identified as Potentially Contaminated."

Attachment 1 summarizes the status of all licenses assigned to Region IV, including the former Region V files. Overall, 352 files have been referred to us for followup review. We have closed 209 (59.4 percent) of those files. We have transferred or attempted to transfer responsibility for 107 files (30.4 percent) to Agreement States. Therefore, 36 files (10.2 percent) currently remain open and under Region IV responsibility. Please note that all files reassigned to the Agreement States are listed as "open" in Attachment 1, pending future NRC verification that the states have actually reviewed and closed these files. Also, included in Attachment 1 is a list of all sites identified as contaminated.

Attachment 2 lists all open files under the jurisdiction of the NRC. On September 26, 2000, the Region submitted a letter to the USAF Radioisotope Committee requesting their assistance in obtaining information for eight terminated licenses that were associated with formerly licensed Air Force activities. These eight files will remain under Region IV responsibility pending the Air Force's response to our request for information. The sites/sealed source files that are lined out in the Attachment 2 tables are being recommended for final closure by this Memorandum.

Attachment 3 is an updated listing of problems or issues identified during the implementation of this project. Included in Attachment 3 is a list of files that remain missing. Region IV will continue to work with ORNL and NMSS to locate or recreate these seven missing files. Finally, the Region recommends the closure of 11 sealed source license files. Details of these recommendations are provided in Attachments 4-14 to this Memorandum.

CONTACT: Robert Evans, NMIB/DNMS/RIV
(817) 860-8234

Attachments: As Stated

bcc w/attachments:

- EWMerschoff
- LWCamper, NMSS/DWM/DCB
- LBell, NMSS/DWM/DCB
- JTBuckley, NMSS/DWM/DCB
- DMSollenberger, STP
- DDChamberlain
- DBSpitzberg
- LLHowell
- MRShafter
- RJEvans
- FCDB
- MIS System
- RIV File (5th Floor)

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To receive copy of document, indicate in box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

RIV:DNMS:FCDB	C:FCDB	D:DNMS
RJEvans	DBSpitzberg	DDChamberlain
/RA/	/LCarson for/	/LHowell for/
10/19/00	10/19/00	10/20/00

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ATTACHMENT 1

INPUT FOR QUARTERLY INFORMATION STATUS REPORT (QISR)

STATUS OF SITES IDENTIFIED BY ORNL

ORNL Score	Total	Sites Eliminated	NRC Sites Pending	Agreement State Sites Pending	*Sites Found Contaminated
> 300	46	41	2	3	6
>5-300	142	81	9	52	5
≤5	4	1	0	3	0
Total	192	123	11	58	11

*Refer to Page 2 for the list of sites identified with contamination.

STATUS OF LICENSES WITH SEALED SOURCES NOT ACCOUNTED FOR

ORNL Score	Total	Files Eliminated	NRC Files Pending	Agreement State Files Pending
> 300	2	0	1	1
>5-300	96	60	12	24
≤5	62	26	12	24
Total	160	86	25	49

List of Sites Identified With Contamination:

License No.	ORNL Score	Name	Location
SNM-00031	11902	Aerojet General Co.	San Ramon, CA
04-00580-07	7568	Isotope Specialty Products	Burbank, CA
04-00580-03	1493	Isotope Specialty Products	Burbank, CA
STB-00434	579	Marquardt	Hill AFB, UT
STB-00434	579	Marquardt	Ogden, UT
R-00183	313	Verdi Development Corp.	Los Angeles, CA
SUA-00208	281	International Mining Co.	Gas Hills, WY
SMB-00123	184	Dow Chemical	Freeport, TX
STB-00472	83	Standard Magnesium (Kaiser Aluminum Speciality Products)	Tulsa, OK
STB-00454	15	American Smelting & Refining Co.	Houston, TX
SMB-00268	13	Reynolds Metals	Bauxite, AR

ATTACHMENT 2

OPEN SITE FILES UNDER NRC JURISDICTION:

State	ORNL Score	License No.	Name	Location
AR	9	03-02814-01	Naval Ammo Depot	Shumaker
CA	207	04-00650-07	Univ. of California-Berkeley	Camp Parks Oakland Supply Center
CA	115	04-07177-02	McClellan Air Force Base	Sacramento
HI	37	53-12084-01	Hawaii Dept. Of Agriculture	Honolulu
ID	116	R-00230	Salmon River Uranium	North Fork
MT	134	R-00229	Sawyer Petroleum Co.	Glen
SD	16	R-00143	Mining Research Corp.	South Dakota & Colorado
TX	774	42-01864-01	Randolph AFB	Austin
UT	13	43-01316-04	U.S. Army	Dugway Proving Ground
WY	346	R-00207	Uranium Research Co.	Baggs
WY	281	P-04072	International Mining Co.	Gas Hills

OPEN SEALED SOURCE FILES UNDER NRC JURISDICTION:

State	ORNL Score	License No.	Name	Location
AK	27	50-23392-01	Gold Regions Consulting	Anchorage
AR	6	SNM-00578	VAMC-Little Rock	Little Rock
CA	44	04-06042-01	GSA Depot	Stockton
CA	31	SNM-01089	Lockheed Aircraft	Sunnyvale
CA	14	04-08699-01	McClelland AFB	Sacramento
CA	10	04-03141-01	Dept. of Navy	Concord
CA	4	04-01964-06	Lockheed Aircraft	Vandenberg AFB
CA	2	08-07749-02	Dept. of Interior	Point Loma
CA	2	04-01039-01	Naval Shipyard	San Francisco
CO	5	05-19046-01	Dept. of Interior	Canon City
CO	2	05-01399-04	USGS	Denver
CZ	28	51-05106-02	Gorgas Hospital	Balboa Heights, Canal Zone
HI	1886	SNM-00095	Penn. State University	Honolulu
HI	3	53-02551-01 04-00616-04	X-Ray Engineering	Honolulu
ID	1	11-01416-02	Eastern Idaho Const. Co.	Idaho Falls
MT	5	25-07596-02	City of Helena	Helena
MT	3	25-17576-01	Empire Sand & Gravel	Billings
MT	1	25-08686-01	Hoerner Waldorf Paper	Missoula
NM	41	SNM-00595	Hughes Aircraft	Sandia Labs

OPEN SEALED SOURCE FILES UNDER NRC JURISDICTION (continued):

State	ORNL Score	License No.	Name	Location
OK	38	35-08990-01	GO International	Oklahoma City
OK	25	SNM-00293	Wells Survey	Fulsa
OK	13	35-01122-02	Thayer X-Ray	Fulsa
OK	11	35-12135-01	Booth Perforators (Crown)	Oklahoma City
OK	9	SNM-01117	In-Val-Co	Fulsa
OK	2	35-02941-01	Pan American (AMOCO)	Fulsa
OK	2	35-02149-01	Elder & McNulty	Fulsa
OR	2	36-15526-01	Dept. of Interior, BLM	Salem
OR	2	36-14803-01	U.S. Army	Portland
TX	40	SNM-00701	NASA	Johnson Space Center
WA	225	46-15183-01	McChord AFB	
WY	11	49-14030-01	Minerals Exploration Co.	Casper
WY	9	SNM-00530	Sundance AFB	Sundance
WY	8	49-19334-01	Howard Donley Associates	Casper
WY	6	49-18219-01	AMOCO Pipeline	Ft. Laramie
WY	5	49-19015-01	CTL Thompson	Casper
WY	3	19-01398-26	Martin-Marietta	Sundance, Wyoming

ATTACHMENT 3

Site files that were assigned to Region IV but the files cannot be located in RIV:

LICENSE NO. (ORNL Score)	NAME	COMMENTS
SNM-00862 (3240)	General Atomics San Diego, CA	File was closed on 10/22/93
SUB-00143 (123)	Kerr McGee Oil Industries Golden, CO	File identified missing in 1993; previously assigned to RIII for followup review. Site review completed in April 1994.

Sealed source files that were assigned to Region IV but files cannot be located:

LICENSE NO. (ORNL Score)	NAME	COMMENTS
04-03141-01 (10)	Dept. of Navy Concord, CA	Assigned to Region II in ORNL's electronic database.
04-01039-01 (2)	Naval Shipyard San Francisco, CA	
05-01399-04 (2)	USGS Denver, CO	Region IV will attempt to recreate this file with licensee's support.
53-02551-01 (1886)	Penn. State University Honolulu, HI	
51-05106-02	Gorgas Hospital Canal Zone	

Files transferred from other Regions to Region IV for followup review:

LICENSE NO. (ORNL Score)	NAME	COMMENTS
20-01382-15 (217-site)	Laboratory for Electronics Houston, Texas	From Region I; file still open and in RIV's possession; RIV will transfer file to TX in near future
SUB-755 (24-site)	Allied Chemical Baton Rouge, LA	From Region I; Sent to LA for closeout in March 98
05-16016-01 (5-ss)	Stearns-Rogers Denver, CO	From Region I; file still open and in RIV's possession
31-00246-02 (110-site) (24-ss)	W. M. Kellogg Co. Houston, TX	From Region I; file closed and transferred to ORNL in October 94
31-00246-04 (3-ss)	W. M. Kellogg Co. Houston, TX	The -03 file was transferred from Region I but the -04 file is on the ORNL list; file not sent to TX for review; file still open and in RIV's possession
04-03365-03 (3-ss)	Lefiell Manufacturing Santa Fe Springs, CA	From Region I; file still open and in RIV's possession
04-07326-02 (2-ss)	Aerospace Corp. El Segundo, CA	From Region II; file closed in Feb. 97 and transferred to HQ in July 97
12-00920-01 (107-site)	International Harvester Phoenix, AZ	From Region III; file still open and in RIV's possession
SNM-154 (6865-site)	Spencer Chemical Co. Kansas City, MO	From Region III; file closed and transferred to ORNL in Oct. 94
34-00472-04 (1754-site)	Wright-Patterson AFB Ohio	From Region III; file closed and transferred to ORNL in Oct. 94
SUB-1288 (17-site)	Gulf Chemical and Metallurgical Co. Texas City, TX	From Region III; file closed and transferred to ORNL in Oct. 94
SUB-0215 (120-site)	APEX Smelting Co. Long Beach, CA	From Region III; file closed and transferred to HQ in July 97

Files transferred to Region IV from ORNL for followup review but the files are not listed in the current ORNL database (files are in Region IV's possession unless otherwise noted):

LICENSE NO. (ORNL Score)	NAME	COMMENTS
SUB-888 (11)	Defense Atomic Support Agency Albuquerque, NM	Site file closed May 96
30-03110-02 (343-site) (30-ss)	Kirtland AFB Albuquerque, NM	File closed in June 93; transferred to ORNL in Oct. 94
SNM-701 (40-ss)	NASA Houston, TX	File closed in October 00
SNM-585 SNM-270 (108-ss)	Great Lakes Carbon Co.	File closed but not documented in quarterly memo
SNM-932 (73-ss)	Frontier Perforators Pampa, TX	File closed but not documented in quarterly memo
SNM-418 (74-ss)	Lane Wells (Dresser) Houston, TX	File still open and will be transferred to TX in near future
50-02430-09 (15-ss)	Univ. of Alaska-Fairbanks Fairbanks, AK	File closed in August 95; transferred to HQ in July 97
50-02197-01 (11-ss)	State of Alaska Eagle River, AK	File closed in May 94; transferred to HQ in July 97
04-05241-08 (85-ss)	U.S. Nuclear Corp. Burbank, CA	File closed in Oct. 93; transferred to HQ in July 97
SNM-0213 (31-ss)	Univ. of California-Berkeley Berkeley, CA	File closed in Feb. 97; transferred to HQ in July 97
53-00017-01 (37-site)	Univ. of Hawaii Honolulu, HI	File closed in Feb. 97; transferred to HQ in July 97

Files listed in ORNL's electronic database as assigned to Region IV but the files are not listed in ORNL's most current hard copy database (Region IV does not have these files):

LICENSE NO. (ORNL Score)	NAME	COMMENTS
20-03095-02	Hanscom AFB Bedford, MA	Listed in ORNL's "Excellent" Quality Table
C-04481 (8)	Aerojet General Sacramento, CA	Listed in ORNL's "Excellent" Quality Table; closed by RV in January 96 and transferred to HQ in July 97
SUB-00905 (17)	Dawn Mining Co. Elko, NV	Listed in ORNL's "Excellent" Quality Table; closed by RV in January 96 and transferred to HQ in July 97
SNM-00867	Department of Highways State of Nevada	Listed in ORNL's "Excellent" Quality Table

ATTACHMENT 4

Final ORNL Score: 40

Docket No. 070-00763

License No. SNM-00701

Licensee Name: **NASA**

Site Name: NASA-Manned Spacecraft Center
(later known as Johnson Space Center)

Site Address: Buildings 31, 261, 263, & 265
Johnson Space Center
Houston, Texas 77058

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Special Nuclear Material License SNM-00701 was issued by the AEC to NASA on May 21, 1963, for possession of an 80-gram plutonium-beryllium (Pu-Be) neutron source. The license was amended during August 1966 to include 16.2 milligrams of plutonium-239 in the form of alpha check sources. Uranium-235 was added to the license during April 1971 and August 1972. Two grams of uranium-235 was authorized in loose form for research, and 3.6 grams of uranium-235 foil was authorized for use in a lunar probe experiment.

The docket file indicates that the licensee transferred the 80-gram Pu-Be source to an authorized recipient, and the plutonium check sources were transferred to a second NASA license. The 80-gram plutonium source was returned to the manufacturer, Monsanto Research Corporation during May 1973. This source was removed from the license during April 1975. The plutonium check sources were transferred to NRC License 42-09388-01 during November 1981. Records of these transfers were found in the SNM-00701 docket file. However, the docket file did not fully account for the 5.6 grams of uranium-235.

The NRC inspector recently located additional records that had not been reviewed by ORNL, including additional information about the uranium-235 possessed by NASA. In response to an AEC inquiry, and by letter dated January 16, 1975, NASA informed the NRC that the 3.6 grams of uranium-235 foil had been transferred to California Institute of Technology (California License 0314-59) and 2 grams of uranium-235 in loose form had been transferred to the University of California (AEC/NRC License 04-00650-01). The uranium-235 was formally removed from License SNM-00701 during May 1980.

Following transfer of the plutonium check sources to NRC License 42-09388-01, License SNM-00701 was terminated on November 17, 1981.

On May 18, 2000, an NRC inspector visited the Johnson Space Center. The inspector toured the facility with the radiation safety officer (RSO). The inspector toured the areas where radioactive material possessed under License SNM-00701 had been used. All buildings listed in SNM-00701 were still in use. Building 261 housed a bone densitometer. Building 265 did not contain any radioactive material. Finally, Building 263 contained the health physics laboratory and radioactive waste storage facility.

At the time of the onsite visit, the inspector also toured the areas (Building 31) where the uranium-235 had been used. During the tour, liquid samples containing uranium-235 were unexpectedly discovered. The RSO was not aware that these radioactive samples existed and committed to perform an immediate investigation of the situation.

By letter dated June 23, 2000, NASA informed the NRC of its preliminary investigative findings. The RSO determined that NASA still possessed 0.00761 microcuries of uranium-235 in seven containers. The material was procured in the early 1970's and was part of the 2 gram allotment authorized under License SNM-00701. At the time of the onsite visit, the inspector noted that the uranium-235 material could be possessed by NASA under its NRC License 42-09388-01 (Condition 6.C). Short-term corrective actions taken by the RSO included placing the material under controls associated with NASA's broadscope materials license.

In conclusion, **Region IV recommends the closure of this terminated special nuclear material license file.** The plutonium sources were properly transferred to other AEC/NRC licensees. The bulk of the uranium-235 was transferred to either a State of California or AEC/NRC license. Small quantities of uranium-235 remained at NASA, but the licensee was authorized to possess this material under its NRC broadscope license. Finally, any decommissioning that may be required because of past possession of the special nuclear material will be conducted under NASA's broadscope license.

ATTACHMENT 5

Final ORNL Site Score: 38

Docket No. 030-05927

License No. 35-08990-01

Licensee Name: **GO Jet Services** (1962-1970)
GO International, Inc. (1970-1976)

Site Address: P.O. Box 18797
900 N.W. 58th Street
Oklahoma City, Oklahoma 73118

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Byproduct Materials License 35-08990-01 was issued by the U.S. Atomic Energy Commission to GO Jet Services, Inc., (later known as GO International Inc.) on December 18, 1962, for possession of unsealed sources to be used during well logging operations. In subsequent amendments, the licensee also added various sealed sources for use in well logging operations. In a letter dated June 15, 1976, the licensee requested termination of its byproduct materials license. The license was terminated on September 8, 1976, by the NRC. The June 15, 1976, letter was not located in this docket file; therefore, the justification for the termination could not be determined.

Region IV inspectors searched five related docket files and interviewed one of two former company presidents to ascertain the whereabouts of the material possessed under this license. GO International was formed from a consolidation of several other companies, including GO Services, Inc. (Texas), GO Jet Services (Oklahoma), and GO Western (California). GO International also possessed radioactive material under AEC/NRC License 42-06458-02.

GO International merged into Gearhart-Owen Industries, Inc., during March 1977. GO Oil Well Services and GO Perforator Supplies also merged into Gearhart-Owen Industries during the 1970's. Gearhart-Owen Industries possessed radioactive materials under NRC Licenses 42-00831-01 and 42-06458-03 as well as State of Texas License 5-442. Gearhart-Owen was purchased by Halliburton in 1988. Gearhart-Owen and Welex merged into Halliburton Logging Services during January 1989. Halliburton Energy Services continues to possess radioactive material under NRC License 42-01068-07.

A former company president was interviewed by telephone. The president could not remember the specifics of the company's operations nor was he able to provide any additional written documentation, including a copy of the June 15, 1976, letter which was not located in any of the five docket files that were reviewed by the NRC inspectors.

On April 6, 2000, NRC inspectors located the main facility previously used by GO International Inc., in Oklahoma City. The facility was occupied by Red Mountain Production Company. A tour of the grounds and buildings revealed three down hole storage pipes in the rear corner of the property. Surveys conducted by the inspectors did not identify the presence of sealed sources or any other radioactive material.

In conclusion, Region IV recommends the closure of this terminated sealed source file. The radioactive material previously possessed under this license was most likely transferred to another NRC licensee, Gearhart-Owen Industries. This company subsequently merged into Halliburton. Although disposition records were not located, the material possessed under this terminated license has been regulated either by the NRC or an Agreement State. Finally, GO International's main office in Oklahoma City was inspected, and radioactive material was not identified at this location.

ATTACHMENT 6

Final ORNL Site Score: 27

Docket No. 030-21013

License No. 50-23392-01

Licensee Name: **Cold Regions Consulting Engineers, Inc.**

Site Name: Not Applicable

Site Address: 6541 DeBarr Road
Anchorage, Alaska 99504

Regional Contact: Emilio M. Garcia, Radiation Specialist
Fuel Cycle and Decommissioning Branch

Status Summary:

The NRC issued License 50-23392-01 on April 11, 1984, to Cold Regions Consulting Engineers, Inc. This license authorized Cold Regions Consulting Engineers, Inc., to possess and use cesium-137 and americium-241 sealed sources for use in Troxler Model 3400 series moisture density gauges to measure properties of construction materials. Cesium sources were limited to 9 millicuries per source and the americium sources were limited to 44 millicuries per source. The license also authorized the possession of americium-241 sealed sources not to exceed 330 millicuries per source for use in Troxler Model 3241 asphalt content gauges to measure the asphalt content of paving mixtures. The license was amended on June 20, 1985, to include, among other things, Dr. Arvind Phukan, as an authorized user.

An initial inspection was conducted on March 22, 1985. The inspection record indicates that Dr. Arvind Phukan was the president and owner of the company, and that he had been acting radiation safety officer (RSO) since April 1984, when the previous RSO left the company employment. This inspection record also notes that the licensee possessed a single Troxler Model 3411B density gauge, Serial Number 11064, containing 8 millicuries of cesium-137 and 40 millicuries of americium-241. This inspection was a subject of escalated action and multiple violations dealing with the use and transport of licensed material, including a violation having to do with the failure to conduct inventories. However, nowhere in this record is an asphalt gauge mentioned. A second inspection was conducted on June 12-13, 1986. The inspection record notes that the licensee only possessed one moisture density gauge, but it does not identify the model or serial number of the gauge. The 1986 inspection record does not mention an asphalt gauge. License 50-23392-01 expired on April 30, 1989. On May 30, 1989, the licensee contacted NRC about renewing their license. They were informed that they needed to apply for a new license since the previous license had expired. Multiple communications followed and on August 23, 1989, an inspector physically verified that the licensee still possessed licensed material, but it did not specify what material. On September 13, 1989, the licensee applied for a new license including a name change and requested authority to possess the same sources as in the previous license. In a letter dated March 8, 1990, from Dr. Phukan to NRC regarding their license application, Dr. Phukan states that they did not own a Troxler 3241 and did not intend to purchase one that year. The letter requests that all references to the use of a Troxler

Model 3241 gauge be removed from their license application. A new License 50-29002-01 was issued on March 13, 1990, to High, Phukan & Sorensen Consulting Engineers and the old license was retired. The new License 50-29002-01, only authorized possession of cesium and americium sources for used in a Troxler Model 3400 moisture density gauge. The sources possessed by Cold Regions Consulting Engineers in the Troxler Model 3411B moisture density gauge were transferred to the new company and possessed under the new license. In July 1993, High, Phukan & Sorensen Consulting Engineers transferred the Troxler Model 3411B density gauge, Serial Number 11064, and the associated cesium-137 and americium-241 sources to R & M Consultants, NRC License 50-19380-01. License 50-29002-01 was subsequently terminated on September 14, 1994.

On June 13, 2000, the inspector contacted Dr. Arvind Phukan and was informed by Dr. Phukan that Cold Regions Consulting Engineers never possessed an asphalt gauge. This information was reiterated in electronic mail messages sent by Dr. Phukan to the inspector on June 26 and August 8, 2000.

Based on the information reviewed, the inspector concludes that Cold Regions Consulting Engineers did not own or possess a Troxler Model 3241 asphalt content gauge and its associated americium-241 source and that the sources the licensee did possess were properly transferred to another licensee. **Region IV recommends the closure of this terminated sealed source file.**

ATTACHMENT 7

Final ORNL Score: 25

Docket No. 070-00237

License No. SNM-00293

Licensee Name: **Well Surveys, Inc./Dresser Research**
P.O. Box 2656
Tulsa, Oklahoma

Site Name: Radiochemical and Radiation Laboratory

Site Addresses: 624 East 4th Street (March 1959 - July 1961)
Tulsa, Oklahoma 74120

10700 East Independence Street (July 1961-May 1963)
Tulsa, Oklahoma 74116

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Special Nuclear Materials License SNM-00293 was issued by the AEC to Well Surveys, Inc., on March 31, 1959, for possession of sealed plutonium-beryllium neutron sources. The licensee used the material in well logging equipment and research activities. During July 1961, the company changed its name to Dresser Research and relocated from East 4th Street to East Independence Street. The license was terminated by the AEC on May 14, 1963.

Information provided in the docket file suggested that Well Surveys, Inc., possessed four 80-gram plutonium-beryllium sources under this license. Records obtained by the NRC inspector from other docket files indicate that the four sources were transferred to Lane-Wells Company of Houston, Texas. Lane-Wells was a division of Dresser Industries at that time. Two sources were transferred to Lane-Wells during March 1961 and the two remaining sources were transferred by April 1963.

Lane-Wells was authorized to possess special nuclear material under AEC License SNM-00418. The AEC amended this license on March 29, 1963, so Lane-Wells could accept the special nuclear material from Well Surveys, Inc. Lane-Wells and Pan Geo Atlas Corporation merged on July 1, 1968, to form Dresser Atlas, a division of Dresser Industries, Inc. All plutonium sources possessed by Lane-Wells/Dresser Industries were transferred from NRC License SNM-00418 to NRC License 42-02964-01 during 1985. License SNM-00418 was subsequently terminated by the NRC during May 1985.

Well Surveys, Inc., possessed radioactive material under AEC License Nos. 35-00161-01, -02, -03, -04, -05, C-5327 and Authorization No. 36131. These licenses were active between 1955-1963. License 35-00161-05 was included on the ORNL terminated site list for a followup review. On January 31, 1995, a Region IV inspector visited the facility at

624 East 4th Street, in part, because the material disposition and site decommissioning records were incomplete for this site. (Decommissioning records in this file were found to be adequate for the East Independence Street location.) The East 4th Street facility was owned by Seig-Nor at that time. Seig-Nor was a combination of R. H. Siegfried and Nordam companies. No radioactive material was identified inside or outside of the facility by the inspector. License 35-00161-05 was subsequently closed by Region IV on February 6, 1995.

On May 5, 2000, a Region IV inspector revisited the facility at 624 East 4th Street, in part, to determine if any new information about material disposition and site decommissioning records could be obtained. The East 4th Street facility was owned by the Nordam Company, an aeronautics firm. The inspector performed additional surveys around the facility. As before, no radioactive material was identified inside or outside of the facility by the inspector. No additional decommissioning information was obtained from Nordam during this second site visit.

Well Surveys, Inc., constructed a hot lab at the East Independence Street site around 1949. The lab was used to support the development of logging sources until 1954. Initial cleanup of the hot lab occurred during 1954. The licensee then used the hot lab for low-level radioactive tracer material research until June 1960. Century Geophysical leased the building from June 1961 until June 1962. The site was further decommissioned by Dresser Research between December 1962 and June 1963. The AEC performed a final survey of the site during June 1963.

Avco Corporation operated a manufacturing facility at the East Independence Street site from 1964-1976. During that time frame, Avco performed analyses of plutonium content of reactor fuels. This work was apparently conducted under AEC Licenses 35-09698-01 and -02. (The inspector noted that these docket files were not included on the ORNL terminated site list suggesting that the files contained adequate decommissioning and material disposition records.) Avco contracted with a third-party company to perform a final radiological survey during late 1976 to support the sale of the property. Selected areas were identified to have elevated radiological readings above background levels. Additional decommissioning work was performed and a final survey was performed during early 1977. The property was then transferred to CRC-Evans.

An NRC inspector performed a limited radiological survey of the East Independence Street site on August 14, 2000. In particular, the inspector tried to ascertain whether the property contained buried wastes. The inspector did not locate any buried waste pits, but the inspector observed what appeared to be the remains of several former sealed source storage wells. These wells were reputed to have been final surveyed by Avco during 1977. The inspector did not identify any radioactive material at the East Independence Street site during this site survey.

In conclusion, **Region IV recommends the closure of this terminated sealed source file.** The special nuclear material possessed under this license was transferred to another AEC licensee during 1963. Decommissioning records were located and added to the docket file for the East Independence Street site, although additional decommissioning records were not located for the East 4th Street site. NRC inspectors performed limited confirmatory surveys of the two sites, and no contamination was identified.

ATTACHMENT 8

Final ORNL Score: 13

Docket No. 030-90036

License No. 35-01122-02

Licensee Name: **Thayer X-Ray Service**

Site Name: Industrial Radiographic Department

Site Addresses: 4048 East 46th Street
Tulsa, Oklahoma 74135

8 South Lansing
Tulsa, Oklahoma

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Byproduct Materials License 35-01122-02 was issued by the AEC to Thayer X-Ray Service on August 7, 1957. This license allowed the company to possess cobalt-60, strontium-90, cesium-137, and iridium-192 in sealed source form for use in industrial radiography applications. The license expired on August 31, 1962.

During November 1962, the AEC denied the licensee's September 1962 request for license renewal based on the company's previous non-compliance with AEC requirements. The licensee apparently shipped all sources still in its possession to ORNL for disposal, to the manufacturer, or to other licensees during November-December 1962. Documentation of the final disposals/transfers was provided in the docket file. However, the ORNL reviewer concluded that the docket file contained inadequate disposition information for all sealed sources that the licensee possessed while the license was active between 1957-1962.

During April 2000, the NRC inspector visited the two addresses listed in the license. The first address (East 46th Street) was a house in a residential neighborhood, while the second address (South Lansing Street) no longer existed. The residence was not surveyed for radioactive material because there was no evidence that the licensee possessed leaking sealed sources. The second structure was previously demolished to allow for the construction of a freeway interchange (U.S. Highway 412 and Interstate I-244) in downtown Tulsa.

During June 2000, two former employees of the company were interviewed. One was a former radiographer and the other was a former radiographer/field supervisor. Neither individual was aware of any incident where licensed material had been improperly disposed. Both stated that the former radiation safety officer and company owner, W. W. Thayer, passed away several years ago.

Both individuals were aware of a rumor that an iridium-192 source had leaked and the contaminated material had been improperly disposed in the Arkansas River. That allegation was investigated by the AEC during January 1963, but the allegation was not substantiated. Based on the radiological half-life of iridium-192, this issue was not pursued by the NRC inspector.

In conclusion, **Region IV recommends closure of this terminated sealed source file.** One of two locations no longer existed. The second location was a residential house. The house was not surveyed because there was no evidence that any sealed source possessed by the licensee, other than perhaps an iridium-192 source had ever leaked. Disposition information was provided in the docket file for some sealed sources, but the remainder of the sources could not be accounted for. Additional records to supplement the docket file were not located. Two former employees were interviewed and neither were aware of any source being improperly disposed.

ATTACHMENT 9

Final ORNL Site Score: 11

Docket No. 030-05943

License No. 35-12135-01

Licensee Name: **Booth Perforators, Inc.**
7917 Duane Drive
Oklahoma City, Oklahoma 73132

Site Name: Same as above

Site Address: Same as above

Regional Contact: Robert Evans, P.E., Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Byproduct Materials License 35-12135-01 was issued by the U.S. Atomic Energy Commission to Crown Perforators, Inc., on February 24, 1967, for possession of Am-241 sealed sources to be used during well logging operations. On May 13, 1969, the license was amended to reflect the name change from Crown Perforators, Inc., to Booth Perforators, Inc. The license was terminated on July 12, 1972. Booth Perforators was sold during 1972, but the docket file did not mention the purchasing company's name. The company ceased to exist on January 29, 1974.

The ORNL review concluded that the documentation provided in the docket file was insufficient to determine the disposition of Am-241 sources possessed under this license. Between April-June 2000, NRC inspectors performed drive-by inspections of the last three addresses listed in the license. Two were residential houses while the third was a former gas station that had been demolished years ago. A search of the current Oklahoma City telephone book, the Internet, and corporate records on file with the Secretary of State's office failed to provide any additional information.

The licensee used at least one sealed source supplied by Gearhart-Owens. Gearhart-Owens was subsequently purchased by Halliburton. The licensee may have returned the source to Gearhart-Owens during the early 1970's. Otherwise, no additional information was obtained about this former licensee or the whereabouts of the sealed source(s).

In conclusion, Region IV recommends the closure of this terminated sealed source file.

ATTACHMENT 10

Final ORNL Score: 9

Docket No. 070-01179

License No. SNM-1117

Licensee Name: **IN-VAL-CO: A Division of Combustion Engineering**
P.O. Box 556
Tulsa, Oklahoma 74101

Site Name: IN-VAL-CO Laboratory

Site Addresses: 3102 Charles Page Blvd. (1958 - 1975)
Tulsa, Oklahoma 74120

1305 North Louisville Ave. (1975 - 1984)
Tulsa, Oklahoma 74115

Regional Contact: Louis C. Carson II, Health Physicist
Fuel Cycle and Decommissioning Branch

Status Summary:

Special Nuclear Material License SNM-1117 was issued by the AEC to IN-VAL-CO on March 4, 1969, for possession of sealed plutonium-beryllium (Pu-Be) neutron sources. The licensee planned to use the material in the manufacturing of boronometers and for use in research and testing. License SNM-1117 allowed IN-VAL-CO to possess 32 grams (1 curie) of Pu-Be sources. The Pu-Be sources were to be encased in high integrity, double walled containers.

Information found in the docket file suggested that IN-VAL-CO never possessed special nuclear material under this license. Memorandums to File dated October 1969 and January 1970 indicated that the routine inspections could not be conducted because the licensee did not possess any Pu-Be sources. A telecon notation by Mr. Robert Layfield of the AEC stated that as of March 24, 1971, IN-VAL-CO never received the Pu-Be sources. The inspectors held discussions with the former radiation safety officer (RSO) and vice president of sales (VP) which revealed that they did not recall if IN-VAL-CO ever received or worked with the Pu-Be sources. At the licensee's request dated February 10, 1971, License SNM-1117 was terminated on April 2, 1971.

IN-VAL-CO also possessed byproduct material (cesium-137, cobalt-60, and hydrogen-3) for testing, evaluation, and sealed source redistribution. Byproduct Materials License 35-00762-01 was issued to IN-VAL-CO during July 1956 and was terminated during June 1984. Records obtained from this second docket file indicate that IN-VAL-CO conducted operations at 122 North Madison from 1956-1958, 3102 Sand Springs Road (later Charles Page Blvd.) from 1958-1975, and 1305 North Louisville from 1975-1984.

Records obtained from the byproduct materials license docket file also indicated that the NRC became aware during December 1976 that the Charles Page Blvd. location was still

contaminated. The facility, specifically the vacated sealed source storage well was decontaminated by the licensee during early 1977. The NRC accepted the licensee's decontamination activities and closed the issue during July 1977.

The docket file for the byproduct materials license did not contain any decommissioning records for the 1305 North Louisville address. However, the licensee apparently possessed only sealed sources at this location and all remaining sealed sources were transferred to Kay Ray, Inc. (NRC License 12-11184-01) of Mount Prospect, IL, during early 1984. The NRC subsequently terminated License 35-00762-01 during June 1984.

According to IN-VAL-CO's former VP, the IN-VAL-CO gauge business was sold to Industrial Nucleonics of Ohio in 1984, which was relocated to Hutchinson, Kansas. Industrial Nucleonics changed its name to Accuray which was associated with K-Ray Incorporated, a Division of FMC. In 1986 or 1987, IN-VAL-CO sold its remaining gauge operations to a company called Smith Meter. All remaining IN-VAL-CO activities ceased between 1988-1990 according to the former IN-VAL-CO RSO.

Region IV inspectors visited the two facilities, in part, because the material disposition and site decommissioning records were incomplete for the site. NRC inspectors toured the two Tulsa, Oklahoma, locations to visually observe if the special nuclear material was present and to conduct radiation surveys with a microRoentgen meter to determine if any gamma-emitting radioactive material could be detected. The inspectors noted that the microRoentgen meter was not the optimum radiation detection device for finding Pu-Be neutron sources. The former RSO indicated that IN-VAL-CO kept most of their radioactive material together in the same location. Therefore, the inspectors concluded that the use of a microRoentgen meter was an effective method for conducting radiation surveys for the cesium-137 and cobalt-60 that was previously possessed under the byproduct materials license.

In May 2000, NRC Region IV inspectors toured the 3102 Charles Page building and adjacent property. The building had been completely gutted and refurbished in late 1999 and was being used as a warehouse. Radiation levels in the building and around the property were found to be 7-10 microRoentgen/hour ($\mu\text{R/hr}$) which was consistent with the natural background radiation levels in Tulsa, Oklahoma. The inspectors did not observe any objects or areas that appeared to contain radioactive material.

Although the special nuclear materials license had been terminated prior to IN-VAL-CO's move to the North Louisville site, the inspectors also toured and surveyed this second site, a large warehouse, on August 22, 2000. The inspectors performed the survey, in part, because the former RSO was not absolutely certain if all of the radioactive material had been removed from this site. According to the former RSO, this site had an underground storage facility that was 600 square feet in area with a 48 square foot storage well that previously contained radioactive material. About 1989, when IN-VAL-CO permanently ceased operations in Tulsa, the underground storage area was filled with concrete. Radiation levels in the building and around the property were found to be 7-10 $\mu\text{R/hr}$ which was consistent with the natural background radiation levels in Tulsa, Oklahoma. The inspectors did not observe any objects or areas that appeared to contain radioactive material.

In conclusion, **Region IV recommends the closure of this terminated sealed source file.** The NRC inspectors concluded that the licensee most likely did not possess special nuclear material under this license. Discussions with two former employees of IN-VAL-CO seemed to confirm the non-receipt of the special nuclear material. As a conservative measure, NRC inspectors performed limited confirmatory surveys of the two sites and no radioactive material was identified inside or outside of the facilities by the inspectors.

ATTACHMENT 11

Final ORNL Score: 5

Docket No. 030-15279

License No. 05-19046-01

Licensee Name: **Department of the Interior**
Bureau of Land Management
P.O. Box 311
Canon City, Colorado 81212

Site Name: Canon City District Office

Site Address: 3080 East Main Street
Canon City, Colorado 81212

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

On July 17, 1979, the NRC issued Byproduct Materials License 05-19046-01 to the Department of the Interior, Bureau of Land Management, Canon City District Office (BLMCC), for possession of cesium-137 and americium-241 sealed sources in Troxler Model 3400 series gauges for material density measurements. The license had an expiration date of August 31, 1984. This docket file was reviewed by Oak Ridge National Laboratory (ORNL), and ORNL subsequently concluded that the docket file had no information relative to disposition of any radioactive material possessed.

A search of NRC terminated license archives revealed that on November 9, 1984, the NRC had issued a second Byproduct Materials License (License 05-19046-02, Docket 030-22255) to the same licensee (BLMCC). Based on a review of records in this second docket file, Region IV conducted an initial inspection of licensed activities authorized under the original License (05-19046-01) on February 8, 1984. NRC inspection records indicated that BLMCC had possessed two different Troxler Model 3411-B moisture density gauges, each containing 8 millicurie cesium-137 and 50 millicurie Am-241:Be sealed sources. The inspection specified that one Troxler gauge had Serial Number 6480, while the second gauge had Serial Number 3060. In a letter dated September 20, 1984, the NRC notified the licensee that its (initial) license had expired and that no renewal license application had been filed with NRC. BLMCC subsequently submitted a renewal application to NRC dated October 4, 1984, and the second license (05-19046-02) was issued because the original license had already expired. (Note: issuance of the second license was likely accompanied by termination of the first license through a license amendment although no record of this was found in the docket file.)

Later, in a letter dated February 19, 1987, another NRC licensee (Department of Interior, Bureau of Land Management) in Grand Junction, Colorado, requested NRC to combine all activities authorized under three different materials licenses (05-16991-02, 05-19046-02, and 05-19620-01) in the State of Colorado under a single NRC license (05-19620-01). The

NRC subsequently issued an amendment dated March 12, 1987, terminating Byproduct Materials License 05-19046-02.

Information provided by BLMCC staff who were knowledgeable about past licensed activities indicated that a single gauge was possessed at that office and it was transferred to BLM's Grand Junction office although the exact date of transfer is unknown and no transfer record was found. BLM records specify that Troxler gauge, Serial Number 6480, was leak tested on multiple occasions by BLMCC and the results analyzed by a contractor on May 28 and December 9, 1985, and April 21, 1986. Test results for all leak assays showed no leakage of radioactive material. The civil engineer and current radiation safety officer (RSO) for the BLM Grand Junction office confirmed that the gauge was transferred to that office in approximately October 1986, and was possessed under NRC License 05-19620-01. As documented in a BLM shipping paper and other transfer records, the gauge was then shipped to the manufacturer (Troxler) as a trade-in for a new gauge on January 20, 1994.

Based on manufacturer records, Troxler gauge Serial Number 6480 was subsequently received by Troxler on January 24, 1994. However, the manufacturer was unable to locate any record for the second Troxler gauge with Serial Number 3060. This number, as documented in the inspection record, was apparently in error because a Troxler representative stated that Model 3411-B gauges were only manufactured with four digit serial numbers larger than 4000. The manufacturer then traced the 3060 number to a Cs-137 source (Serial Number 40-3060) contained in a Troxler Model 3401 gauge. On March 26, 1979, Troxler originally shipped the gauge to the Colorado Division of Highways (a Colorado State government entity), and the same Colorado agency returned it to the manufacturer for disposal on January 9, 1995. Although details regarding movement of this gauge are unknown, it may have been transferred to and possessed by BLMCC. In any case, the gauge was eventually transferred back to the manufacturer for disposal. No information was available for review concerning the results of any leak tests performed on this second gauge.

In conclusion, **Region IV recommends the closure of this terminated sealed source file.** The BLMCC office possessed one and possibly two portable density gauges. One gauge was transferred to a different NRC licensee (BLM Grand Junction) in 1986, and it was subsequently transferred to the manufacturer in 1994. The second gauge in question was transferred to the manufacturer for disposal in 1995. Sealed source leak test records reviewed for one of the gauges indicated no leakage of radioactive material.

ATTACHMENT 12

Final ORNL Scores: 3 (site), 2 (sealed source)

Docket No. 030-05911

License No. 35-02941-01

Licensee Name: **Pan American Petroleum Corporation**
4502 East 41st Street
Tulsa, Oklahoma 74135-2553

Site Name: The University of Oklahoma
Schusterman Health Sciences Center

Site Address: 4502 East 41st Street, Tulsa

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Byproduct Materials License 35-02941-01 was issued by the AEC to Pan American Petroleum on August 12, 1957. The license allowed the company to possess hydrogen-3 and cobalt-60 in sealed source form and hydrogen-3, carbon-14, cobalt-60, strontium-90, antimony-125, iodine-131, and mercury-203 in loose (unsealed) form. The licensee used this material to support research related to oil and gas exploration. The company changed names from Pan American Petroleum to Amoco Production Company during 1971.

The license expired on October 31, 1972. The docket file indicates that the licensee transferred almost all sources to either the manufacturer, a licensed disposal facility, or another licensee located in Tulsa. The disposal records for hydrogen-3 and carbon-14 were incomplete. The licensee was able to locate disposition records for the hydrogen-3 foils that were not provided in the original docket file. The hydrogen-3 in loose form was most likely disposed via injection into production wells and the sewer, while the carbon-14 was most likely disposed via the sewer.

About January 2000, BP Amoco sold the property to The University of Oklahoma. An NRC inspector toured portions of the facility during April and August 2000. The main research buildings were being extensively remodeled during the site visits. The inspector performed an independent radiological survey of the areas listed in the license where radioactive material was previously used or stored. No residual radioactive material was identified.

The facility apparently included two separate underground radioactive material storage sites. One storage location consisted of four wells and was situated near an outdoor electrical transformer adjacent to Building 6. The second site consisted of one well and was situated adjacent to Building 3. Decommissioning records were not located for these storage wells, although the licensee located an individual who claimed to have performed a decommissioning survey during 1995. The storage wells have since been filled and/or covered with concrete and/or asphalt.

The facility had three test boreholes in Building 5 that varied in depth from 120 to 1000 feet. The wells were cased wells that were installed during 1955 to support onsite testing of drilling equipment. The wells were plugged and abandoned during November 1997 prior to sale of the property from BP Amoco to The University of Oklahoma.

During 1981, Amoco attempted to obtain a property variance to install an outdoor, 3000-foot test well. Property neighbors objected to this proposal and the variance was subsequently denied by the Oklahoma Supreme Court in 1985. Amoco never constructed this well, in part, because of the public controversy surrounding the well.

The NRC inspector attempted to ascertain whether radioactive material was buried onsite or improperly disposed via any of the test boreholes. The inspector concluded that radioactive material most likely had not been disposed in either an onsite burial trench or test borehole. There was no reference to any such disposals in any document, and current and former employees were not aware of any incident where radioactive materials were either buried onsite or disposed via a test borehole.

Two other licenses had been issued to Amoco in Tulsa. License 35-02941-02 was issued in May 1976 for possession of a sealed cesium-137 source. This license was terminated in May 1986. License 35-02941-03 was issued in October 1978 for possession of an americium-241/beryllium sealed source. This license expired in October 1983. Disposition records were located in the respective docket files for these radioactive materials and these files were not identified by ORNL for a followup review.

In conclusion, **Region IV recommends the closure of this terminated site and sealed source file.** The docket file contained some disposition information, and additional information was provided to the NRC by BP Amoco. Decommissioning records were incomplete, however. The NRC performed a final site survey where radioactive material had been used or stored and no residual radioactive material was identified onsite. There was no evidence that radioactive material was inappropriately disposed of down a test borehole or buried onsite. In the unlikely event that such a downhole disposal was made, however, any radioactive material would have since been permanently encased in concrete.

ATTACHMENT 13

Final ORNL Site Score: 3

Docket No. None Specified (New License 030-20125)

License No. 25-17576-01

Licensee Name: **Empire Sand and Gravel Co. Inc.**
P.O. Box 1215 Mary Street
Billings, Montana 59103

Site Name: Empire Sand and Gravel Co., Inc.

Site Address: 1215 Mary Street, Billings, Montana

Regional Contact: Emilio M. Garcia, Radiation Specialist
Fuel Cycle and Decommissioning Branch

Status Summary:

The NRC issued License 25-17576-01 on July 29, 1977, to Empire Sand and Gravel Co., Inc. This license authorized Empire Sand and Gravel Co., Inc., to possess and use two 8 millicurie cesium-137 and two 40 millicurie americium-241 for use in Troxler Electronic Laboratories Model 3401 Compac or 3411 portable gauges to measure moisture density of materials. These sources were to be used only at the facilities of the licensee at Mary Street, Billings, Montana, and at temporary jobsites of the licensee throughout the State of Montana.

An NRC inspection conducted on April 14, 1981, found that the licensee possessed only one portable gauge with licensed material, a Troxler 3411 portable moisture density gauge, Serial Number 4752, containing 8.7 millicuries of cesium-137 and 40 millicuries of americium-241. The gauge was not available for inspection at that time. This license expired on July 31, 1982, and the licensee did not request renewal prior to the expiration.

On January 12, 1983, the NRC issued a Notice of Violation for possession of material requiring a specific license without a specific valid license. The licensee responded in a letter dated January 18, 1983, that the reason they had not applied for a renewal was that the individual who used to keep the license current had retired and had not informed anyone that the license needed to be renewed. The letter also stated that Empire Sand and Gravel Co., Inc. had applied for a new license.

A new License 25-17576-02 was issued in 1983. The record of the initial inspection of this new license which was conducted on July 9-11, 1984, states that the licensee possessed a Troxler Model 3411 gauge, but the record did not specify the serial number. The record of the next inspection conducted on April 20, 1989, indicated that now the licensee had a Troxler Model 3411B, Serial Number 13054 moisture/density gauge. This record indicates that the licensee had transferred licensed material to authorized recipients, but it does not specify whether the transfer or transfers were of a temporary nature, such as having the gauge calibrated, or of a permanent nature such as an exchange for a new gauge. The records maintained by the licensee do not go back to that time. The licensee's current operations

manager believes that the Model 3411 gauge was either upgraded or traded for a new gauge, but he is not sure. A Troxler representative contacted by the inspector stated that they do not have a record indicating that they had received the Model 3411, Serial Number 4752 gauge, but their records do not go back that far.

Conclusions:

1. The licensee only possessed one gauge, a Troxler 3411, Serial Number 4752, under License 25-17576-01.
2. License 25-17576-01 expired because of an oversight on the part of the licensee. They did not intend to terminate their license nor dispose of their licensed material.
3. The licensed material from License 25-17576-01 was transferred to License 25-17576-02.
4. As late as July 11, 1984, the licensee possessed a Troxler Model 3411 gauge under License 25-17576-02.
5. Most likely the Troxler Model 3411, Serial Number 4752, portable gauge was transferred to Troxler for an upgrade or a trade-in for Troxler Model 3411B, Serial Number 13054 gauge. As of July 14, 2000, gauge Serial Number 13054 was possessed by Empire Sand and Gravel.

Therefore, Region IV recommends the closure of this terminated sealed source file.

ATTACHMENT 14

Final ORNL Score: 2

Docket No. 030-90035

License No. 35-02149-01

Licensee Name: **Elder & McNulty, Inc.**
1527 East 4th Place
Tulsa, Oklahoma 74120

Site Name: Radiography Department

Site Address: 1527 East 4th Place, Tulsa

Regional Contact: Robert Evans, PE, CHP, Health Physicist
Nuclear Materials Inspection Branch

Status Summary:

Byproduct Material License 35-02149-01 was issued by the AEC to Elder & McNulty on March 7, 1957. The license allowed the company to possess cobalt-60 in sealed source form for use in industrial radiography applications. The license expired on March 31, 1958. The docket file indicates that the licensee transferred all sources to either licensed users, unlicensed users, or to Union Carbide Nuclear Company of Oak Ridge, Tennessee, during 1957.

Based on information provided in this docket file, the ORNL reviewer concluded that the fate of four 700-millicurie cobalt-60 sources was suspect because the sources were being transferred from a job in Spain to an unlicensed company located in Dallas, Texas, at the time the license was being considered for termination. The final disposition of these four sources was not clearly documented in the Elder & McNulty docket file. The docket file also notes that eight iridium-192 sources were improperly buried at a farm located near Jay, Oklahoma. These sources were not considered in the final ORNL score because of the short radiological half-life of iridium-192.

On April 28, 2000, an NRC inspector visited the site of the former Elder & McNulty radiography department. The inspector toured the facility with John Elder, son of one of the company founders. The inspector performed ambient gamma radiation measurements using a Victoreen Model 190 survey meter. No radioactive material was identified at the Tulsa location. Mr. Elder stated that he recalled that all sealed sources were stored in the company trucks and not in the building. Further, the property did not have either an above or below ground storage bunker.

After the onsite inspection, the inspector obtained records from NRC archives for Central X-Ray of Dallas, Texas. Central X-Ray was previously licensed by the AEC to possess iridium-192. This company temporarily possessed eight cobalt-60 sources from Elder & McNulty. Since Central X-Ray was not authorized to possess cobalt-60, the AEC ordered Central X-Ray to return the eight sources to Elder & McNulty. Records obtained from Central X-Ray's License 42-00082-02 docket file indicate that the eight sources, including the four that were previously used in Spain, were returned to Elder & McNulty during October 1957. Records in

the Central X-Ray file indicated that Elder & McNulty, in turn, transferred all remaining sources it possessed to Union Carbide during November 1957.

Although the transfer records did not document each and every source, the inspector concluded that the four cobalt-60 sources that were specifically identified in the ORNL review were most likely transferred to Union Carbide with all remaining sources during November 1957.

In conclusion, **Region IV recommends the closure of this terminated sealed source file.** The location of use that was listed in the AEC license was radiologically surveyed by an NRC inspector and no radioactive material was identified at the site. Records suggest that all remaining radioactive material possessed by Elder & McNulty was transferred to a different licensee during November 1957. Finally, the four sources that the ORNL reviewer could not account for were most likely returned to Union Carbide of Oak Ridge during November 1957.