

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-05081/90001(DRSS)

Docket No. 030-05081

License No. 24-02261-03

Priority II

Category E1A

Licensee: McDonnell Douglas Corporation  
P.O. Box 516  
St. Louis, MO 63166

Inspection Conducted: November 7, 1990

Inspector: *Evelyn R. Matson*  
Evelyn R. Matson  
Radiation Specialist

11-20-90  
Date

Approved By: *Roy J. Caniano*  
Roy J. Caniano, Chief  
Nuclear Materials Safety  
Section 2

11-20-90  
Date

Inspection Summary

Inspection on November 7, 1990 (Report No. 030-05081/90001(DRSS))

Areas Inspected: This routine, unannounced safety inspection included a review of the licensee's organization; internal audits; scope of program; training; radiological protection procedures; facilities; instrumentation; ordering, receipt and transfer; personnel radiation protection; leak tests; waste disposal; posting and labeling; transportation; notifications and reports; and independent measurements.

Results: Of the areas inspected, no apparent violations of NRC requirements were identified.

## DETAILS

### 1. Persons Contacted

\*Michael J. Dwyer, CIH, Director, Occupational Safety, Health, and Environment

\*Debra J. Hillman, Radiation Safety Officer

Michael Bien, RSO designee

Eric Dennison, Authorized User

\*Present at the exit meeting on November 7, 1990.

### 2. Inspection History

This license was last inspected on February 3 and 4, 1987, and no violations were observed.

### 3. Organization

The Radiation Safety Department employs 2 full time staff with two additional positions currently vacant and is a subdivision of Occupational Safety and Health Services. Michael J. Dwyer, Director of Occupational Safety, Health, and Environment oversees these services. This department is part of the Human Resource Division, Darrell Waters, Vice President. All are under the McDonnell Aircraft Company which is owned by McDonnell Douglas Corporation (MDC).

MDC has established a Radiation Safety Committee (RSC). The committee provides scientific review and approval of all uses of licensed material and oversees implementation of the safety requirements for the possession, use and administration of radioactive materials. The RSC also reviews and approves users based on their training and experience with radioactive materials. Whenever possible, the RSC has one primary user receive, store and handle radioactive material for other researchers. This allows for greater control over safety and compliance aspects.

A review of records revealed that the RSC met more often than quarterly and included reviews of new experiment requests. The membership is as described in the license with the exception that one member has left. The RSO stated that a amendment has been filed to make changes in the membership and quorum and that the changes will not be implemented until the amendment is approved by the NRC.

No violations of NRC requirements were identified.

### 4. Scope of Program

McDonnell Douglas Corporation maintains a broad scope research and development program. Current possession and use involves one self-contained irradiator (Gammacell) containing 6339 curies of

cobalt-60 which is used to irradiate mostly electronic components, one J. L. Shepherd instrument calibrator containing 1.2 curies of cesium-137, generally licensed source material (depleted uranium penetrators and thorium less than 15 pounds), neutron irradiated electronic components, and other small quantities of various radionuclides which are maintained in secured storage in the storage vault. The storage vault is a room designated for storage and use of radioactive material and it has floor wells for shielded storage. The licensee has contracted Chem-Nuclear Systems, Inc., to decontaminate one of the storage wells. The well is contaminated with fixed unknown radionuclides. It is located in a restricted area and currently is not used. The licensee has notified NRC Region III of the decontamination plans.

Currently less than 6 persons are approved by the RSC to use or store radioactive materials. The one primary user is responsible for the Gammacell, the Shepherd calibrator, the storage vault and is responsible for receiving, handling and storing radioactive material for all other users. Refer to Attachment A for a copy of the RSO's third quarter inventory record.

Currently no liquid or volatile radioactive materials are used which could result in a contamination or airborne hazard. Therefore, the licensee has not implemented air sampling or bioassays at this time.

Many small quantities possessed by MDC are generally licensed items such as smoke detectors, exit signs, static eliminators, fixed gauges, gas chromatographs, source material, etc.

The quantities, types, use and location of radioactive material are as authorized by this license.

No violations of NRC requirements were identified.

#### 5. Internal Audits

The RSC conducts a review of the entire radiation safety program once each year. The audit involves members visiting authorized users, and reviewing records. The inspector reviewed the results of the 1990 audit and determined that minor deficiencies were noted and actions were taken to resolve them. The RSO maintains a list of items that require actions to complete and is responsible for resolving each.

In addition to the annual audit, the RSO or her designee performs quarterly audits of the J. L. Shepherd calibrator, monthly audits of the Gammacell and of the storage vault. A review of the audit records revealed the audits are thorough and deficiencies are found and resolved on a timely basis. In addition, the RSO coordinates and oversees a quarterly inventory of radioactive material.

6. Training

The RSC, with the assistance of the RSO, reviews the training and experience of each applicant authorized user. The primary user was required to attend a 40 hour, off site, radiation safety training school, and has had over one year of experience and extensive on-the-job training by the Radiation Safety Staff. Each user of the Gammacell is also required to have 40 hours of training and several days of on-the-job training before being approved.

Licensee representatives stated and a review of training records confirmed that the Radiation Safety Staff conducted training lectures to assure each person involved with radioactive material received training once each year. The training is specifically tailored to the needs of each group or category of employees. Generally, training covered general radiation concepts and definitions, employee rights, license requirements and NRC regulations. Persons trained included Gammacell operators, maintenance workers, Radiation Safety Staff, generally licensed device users, receiving dock personnel, and authorized users. Personnel interviewed during the inspection appeared to be knowledgeable about radiation safety procedures.

No violations of NRC requirements were identified.

7. Radiological Protection Procedures

Licensee representatives stated and the inspector observed that radioactive material is stored in restricted areas and that the areas are maintained locked when they are not attended. On the day of the inspection, the inspector observed that the Gammacell room, the Shepherd irradiator room and device, the storage vault room and the storage wells were locked.

The inspector observed that areas where radioactive materials are used and stored are clean, neat, free of food items and the accumulation of flammable materials. Shielding, tongs, gloves, and appropriate survey instruments are available for use.

The J. L. Shepherd calibration laboratory is classified as a High Radiation Area and is equipped with entry interlocks and audible alarms as required by 10 CFR Part 20.203. These interlocks and alarms are tested for proper operation each day the calibrator is used. In addition, they are tested once each month by a member of the Radiation Safety Staff. The interlocks and alarms were tested during the inspection and appear to be working correctly.

No violations of NRC requirements were identified.

8. Facilities

The inspector toured the licensee's facility and determined that they are as described in the license application and appear adequate for the safe use of radioactive materials.

No violations of NRC requirements were identified.

9. Instrumentation

The licensee has an adequate assortment of portable GM survey instruments, ion chambers, and alpha scintillators. In addition, a liquid scintillation counter and gamma counter are available. Calibrations are performed by the licensee annually and in accordance with the procedures described in the license. This determination was made based on a review of calibration records and a demonstration by the primary authorized user (who performs all calibrations) on how instruments are calibrated.

No violations of NRC requirements were identified.

10. Receipt and Transfer of Radioactive Material

Packages containing radioactive material are received by the primary authorized user who surveys them on receipt and stores them as appropriate. A sampling of receipt records and surveys was reviewed and the results were adequate.

Transfers of radioactive materials are made under the approval of the RSO. A sampling review of records and statements made by the RSO showed that packages containing radioactive materials are prepared, packaged, labelled and shipped in accordance with NRC and Department of Transportation regulations.

No violations of NRC requirements were identified.

11. Personnel Radiation Protection

a. External

Whole body film badges are issued to and worn by the Radiation Safety Staff and other personnel who have routine access to restricted areas. Ring badges are worn by the Radiation Safety Staff and the primary authorized user. The badges are exchanged and processed monthly. The RSC and RSO perform a quarterly ALARA review. A sampling of film badge results were reviewed by the inspector. No exposures in excess of 10 CFR Part 20 limits were observed. The RSO stated that no over exposures have occurred.

Ambient radiation surveys are performed once each month for the Gammacell. Area monitors (i.e., film badges) are used to measure the monthly accumulated dose rates around this device. Surveys are also performed monthly for the J. L. Shepherd calibrator and the vault room. In addition, during the RSO's quarterly audit, confirmatory surveys are performed. A sampling review of the records showed that radiation levels in restricted areas are maintained low and levels in adjacent unrestricted areas are in accordance with 10 CFR 20.201.

b. Internal

Currently, all radioactive materials possessed and used are non-volatile and non-dispersible, therefore, the potential for internal exposure of individuals to airborne radioactive material is negligible. The licensee is not currently performing any air sampling or bioassays.

No violations of NRC requirements were identified.

12. Leak Tests

A sampling review was performed of leak test results for sealed sources. The inspector determined that leak tests are performed at six month intervals by an approved vendor and that the results showed no leakage.

No violations of NRC requirements were identified.

13. Radioactive Waste Disposal

The RSD stated that no radioactive material is disposed of into the sanitary sewerage system.

The last disposal of radioactive materials was made in December 1988 to a waste broker. The shipment consisted of various dry waste. The inspector reviewed the waste manifest shipment certification form and found no discrepancies or violations.

No violations of NRC requirements were identified.

14. Independent Measurements

Radiation measurements were made by the NRC inspector using a Xetex Model 3C<sup>-B</sup> survey meter calibrated on May 5, 1990. Areas surveyed included the Gammacell, J. L. Shepherd calibrator, and storage vault. Adjacent unrestricted areas were surveyed as well. Radiation levels in restricted and unrestricted areas were found to be well below 10 CFR Part 20 limits.

No violations of NRC requirements were identified.

15. Posting and Labeling

An inspection of various areas in the licensee's facility showed that restricted areas and storage areas were posted with appropriate caution signs as required. In addition, NRC-3 forms "Notice to Employees" were posted as required by 10 CFR 19.11.

No violations of NRC requirements were identified.

16. Transportation

A sampling review of shipping papers revealed the licensee prepares packages of radioactive material in accordance with Department of Transportation regulations.

No violations of NRC requirements were identified.

17. Notifications and Reports

A review of film badge records revealed that no overexposures to personnel occurred. Licensee representatives stated that no incidents, loss or theft of radioactive material occurred during the inspection period. Therefore, no notifications or reports were required during this inspection period.

No violations of NRC requirements were identified.

18. Exit Meeting

At the conclusion of the inspection on November 7, 1990, the inspector met with those individuals identified in Section 1 of this report. The meeting included a summary of the areas inspected, the results of the inspection, the NRC enforcement policy, and the forthcoming letter transmitting the results of the inspection and the inspection report. The licensee agreed that the information discussed during the inspection was not proprietary in nature. No written materials were left with the licensee.

## Attachment

RSO QUARTERLY INVENTORY AND POSSESSION LIMIT RECORD  
1 October 1990

1. Quarter: First  Second  Third  Fourth   
Year: 1984  1985  1986  1987  1988  1989  1990
2. List users that had material in that quarter shown above, as well as total receipts, losses, transfers, disposals, and quantities on hand:

Name	Radionuclide	Prior Balance	Total Receipts	Total Losses (Decay, etc)	Total In Storage	Total Disposed	Total Balance On Hand
E. Dennison	1.2 Ci Cs <sup>137</sup>	1.2	-	-	1.2	0	1.2 C
	Co <sup>60</sup> Gammacell	6,555	-	216(Dec)	6,339	0	6,339 Ci
	Cobalt-60	0.461	-	0.015(Dec)	0.446	0	0.446 mCi <i>Storage</i>
	Am-241	34.0	-	-	34.0	0	34.0 mCi <i>Storage</i>
	Uranium-238 (a)	0.25	0	-	0.25	0	0.25 lbs <i>Storage</i>
	Thorium Nitrate(b)	100	0	-	100	0	100 gm
	Radium-226 (c)	300	0	-	300	0	300 uCi
	Byproduct Matl.(d)	0	2	0	0	2	0 uCi <i>erratic</i>
Byproduct Matl.(e)	0	2	0	0	2	0 uCi <i>erratic</i>	
D. Chapman	Radium-226 (c)	200	0	-	200	0	200 uCi
R. Kohl	Thorium Oxide	1.08	-	-	1.08	0	1.08 lbs
	ThF <sub>4</sub> <i>in storage</i>	2.58	-	-	2.58	0	2.58 lbs
L. Jenkins	Polonium-210(f) <i>generally unused</i>	320	0	-	320	0	320 mCi
RSO	Polonium-210 (Wet Etch Bench)	<1.0	0.0	-	<1.0	0	<1.0 mCi

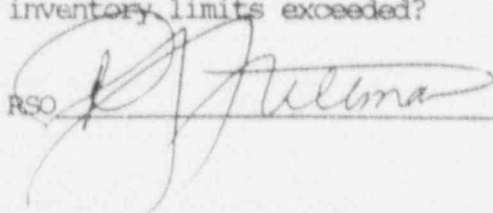
- (a) Container of Uranium-238 found in B.110 storage cabinet on 09 May 90.  
(b) Container of Thorium nitrate found in Bldg 102, Analytic Lab on 21 Jun 90.  
(c) Two (2) Alphatron gauges (100 uCi each) in Space Lab in use; three (3) Alphatron gauges in Vault Room.  
(d) Neutron activated material: Na24, Mn54 and Au198 received from SNL 15 Aug 90 and shipped to SNL 16 Aug 90.  
(e) Neutron activated material: Sc46, Mn54, Co58 and Au198 received from SNL 10 Sep 90 and shipped to SNL 20 Sep 90.  
(f) Thirty-two (32) NRD Model P2021/P2021CR ionizers (10 mCi each) were in use as of 27 Sep 90.

3. Compare receipts and balances on hand with license possession limits and authorized user possession limits.

Were there any instances of quantities in excess of limits?  no  yes

4. Are financial assurance inventory limits exceeded?   yes

RSO


Date 2 Nov 90

DJH90049