

APPENDIX A

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

NRC Inspection Report: 30-12319/89-02

License: 35-17178-01

Docket: 30-12319

Licensee: Tulsa Gamma Ray, Inc.  
1127 South Lewis Avenue  
Tulsa, Oklahoma 74104

Inspection At: Tulsa Gamma Ray  
Tulsa, Oklahoma

Sun Refinery  
Tulsa, Oklahoma

Commercial Fabricators  
Pryor, Oklahoma

Inspector:

Linda L. Kasner  
Linda L. Kasner, Health Physicist, Nuclear  
Materials Inspection Section

11/9/89  
Date

Approved:

Charles L. Cain  
Charles L. Cain, Chief, Nuclear Materials  
Inspection Section

11/9/89  
Date

Inspection Summary

Inspection Conducted October 2-4, 1989 (Report 30-12319/89-02)

Areas Inspected: Routine, unannounced inspection of activities related to industrial radiography including observation of radiography activities at two temporary job sites. The inspector interviewed several of the licensee's employees and examined the licensee's equipment, material storage facility, and selected records and procedures related to the radiation safety program.

Results: Within this inspection, ten apparent violations were observed. Although the licensee had implemented corrective actions that had been effective in the correction and prevention of further recurrence of those violations noted in the previous inspection conducted on November 29 and 30, 1988, several apparent violations had occurred during this inspection period

that are related to the same program area. It was observed that there is a need for management to provide additional guidance and perform more detailed audits for those individuals who have been delegated responsibilities in the radiation safety program.

Within the areas inspected, the following apparent violations were identified:

- (1) Failure to perform adequate physical inventory of sealed sources. (Section 4)
- (2) Failure to conduct evaluations to determine occupational exposure of personnel. (Section 6)
- (3) Failure to obtain previous occupational radiation exposure information for individuals working in restricted areas. (Section 6)
- (4) Failure to fully complete a Form NRC-4 for personnel. (Section 6)
- (5) Failure to conduct a radiation survey of an exposure device during radiography activities. (Section 7)
- (6) Failure to post a high radiation area. (Section 7)
- (7) Failure to brace or block radioactive materials packages during transportation. (Section 8)
- (8) Failure to adequately complete package transportation labels. (Section 8)
- (9) Failure to adequately complete shipping papers. (Section 8)
- (10) Failure to properly placard vehicles. (Section 8)

DETAILS

1. Persons Contacted

\*James C. Moss, President  
\*Pete Moss, Vice President  
\*Jack Morris  
Jimmy Tyler, Radiographer  
Dan Potter, Radiographer  
Tony Pogue, Radiographer  
Carl Daniel, Radiographer  
Murray Deck, Assistant Radiographer  
Lloyd Brannam, Assistant Radiographer

\*Indicates those individuals present during the exit interview.

2. Followup on Previous Violations

(Closed) (30-12319/88-01) Violation of 10 CFR 34.25(b) - Failure to perform a leak test of a cobalt-60 sealed source within the required 6-month interval. The inspector reviewed leak test records during this inspection period and determined that leak tests had been performed at the proper intervals.

(Closed) (30-12319/88-01) Violation of 10 CFR 34.31(c) - Failure to maintain records of field inspections conducted for three radiographers. The inspector reviewed field inspection records and determined that all had been maintained as required.

(Closed) (30-12319/88-01) Violation of 10 CFR 71.5 (49 CFR 172.403) - Failure to label packages containing licensed material with "RADIOACTIVE YELLOW II" or "RADIOACTIVE YELLOW III" labels as required. The inspector observed that all packages used for transporting licensed material had the required radioactive labels.

(Closed) (30-12319/88-01) Violation of 10 CFR 71.5 (49 CFR 172.471[a]) - Failure to use the required overpack for a specific Type B package when transporting radioactive material. The inspector observed that Type B packages were transported in their required overpacks.

(Closed) (30-12319/88-01) Violation of 10 CFR 71.5 (49 CFR 173.475[i]) - Failure to perform surveys required to determine the transportation index (T.I.) of radioactive materials packages prior to transportation. The inspector observed that surveys were conducted to determine the appropriate T.I. prior to transporting packages containing licensed material.

(Closed) (30-12319/88-01) Violation of 10 CFR 71.5 (49 CFR 177.817[e]) - Failure to carry shipping papers in a location that is readily accessible to the driver or authorities when transporting radioactive materials. The

inspector observed that shipping papers were carried in an appropriate location within the vehicle while transporting licensed material.

(Open) (30-12319/88-01) Violation of 10 CFR 71.12 - Failure to (1) establish a quality assurance program approved by the Commission, (2) maintain copies of Certificates of Compliance for NRC-approved Type B packages routinely transported, and (3) register with NRC as a user of a Type B package. The inspector determined that the licensee had obtained a copy of the specific Certificate of Compliance, had submitted a quality assurance program for NRC review, and had requested registration as an authorized user of the specific Type B package. The licensee had not received notice of NRC approval of their proposed quality assurance program nor had they been listed as an authorized user of the Type B package as of the date of this inspection.

### 3. Licensee Program Overview

The licensee employs approximately 20 individuals who are authorized to conduct radiography under their materials license. The licensee conducts a training program for new employees, although the majority of these individuals have previously been trained or worked as industrial radiographers.

Radiographers are dispatched from the licensee's facility in Tulsa, Oklahoma, and the majority of the work is performed in the local area. They have also established an operation in Oklahoma City, Oklahoma. This location was recently inspected the results of which are documented in NRC Inspection Report 30-12319/89-01. The licensee has one office in Panama City, Florida, which is authorized to conduct radiography under a Florida materials license.

The major portion of the licensee's work involves the use and transportation of exposure devices containing iridium-192 sealed sources. The licensee performs many of their own calibrations, maintenance, and response checks and uses a local vendor for leak test analysis.

### 4. Authorized Materials, Uses, and Users

The licensee maintains one cobalt-60 sealed source (S.N. 2208), used in an Amersham Model 680 exposure device (S.N. 222), and several iridium-192 sealed sources which are used in Amersham Model 683 exposure devices. Amersham Model 750 source changers are on site as needed. The licensee generally returns and exchanges iridium-192 sealed sources at 6-month intervals. The inspector noted that licensed material was appropriately secured within the storage area and that the area was secured by combination lock when a radiographer was not in direct attendance.

The inspector reviewed the licensee's equipment maintenance program and noted that equipment checks were performed at the required quarterly intervals. The inspector reviewed records of these checks and noted that the last check had been performed on September 30, 1989. The licensee

expressed concern regarding the increased frequency of control cable housing damage observed on their Amersham Model 683 projectors. They believe the use of the Model 683 overpack to be a contributing factor because of the cable flexion required to fit the device into the overpack. The inspector noted that three Model 683 projectors (Serial Nos. 144, 185, and 63) did have control cable housing damage. The damage to two of the projectors was very minor, but the exterior cable housing on Projector No. 63 had been stripped a length of approximately 4 inches from the camera end and subsequently covered with tape. (The inspector subsequently discussed this problem with NMSS.) There did not appear to be any significant damage to the fittings connecting the cable to the projector. The inspector reviewed this with the licensee and noted that the inspection record for this projector, conducted 2 days earlier, indicated that control cables and fittings were in satisfactory condition. The inspector also noted that this projector had been used at a job site on the previous day and that the radiographer's records indicated that the equipment was in satisfactory condition. The inspector subsequently reviewed the maintenance program with licensee management. The inspector noted that although radiographic devices generally appeared to be in good condition, the equipment inspections should include attention to cables and fittings and that records should accurately reflect maintenance requirements and problem corrections.

The inspector reviewed sealed source inventory records and noted that material inventories were performed at the required intervals. Two discrepancies were noted during review of sealed source inventories and material receipt and transfer records. Two iridium-192 sealed sources (Serial Nos. 3031 and 3066) had not been documented on inventories dated June 30, 1989, and September 30, 1989, respectively. Source No. 3031 had been transferred to the manufacturer on September 21, 1989, and Source No. 3066 was still in the possession of the licensee. When this was discussed with the licensee, it was determined that these sources were not in use at the time that the inventories were conducted but were in source changers awaiting return to the manufacturer. The licensee indicated that although sources were usually returned promptly, occasionally they were held in storage for some period of time. These sources had never been included in the sealed source inventories. This is an apparent violation of 10 CFR 34.26 which requires that physical inventories account for all sealed sources received and possessed under the license.

The inspector noted that the licensee had an adequate number of survey instruments available and that two instruments usually were available to each radiography crew. The instruments were Victoreen Model 492s or Eberline instruments. The inspector reviewed meter calibration records and noted that the calibrations were conducted in accordance with approved procedures and at the required intervals.

One apparent violation was identified.

5. Authorized User Training

The inspector reviewed the training program with licensee management and several radiographers. Three individuals had completed the program within this inspection period. The inspector reviewed their files and noted that all had completed the required written examination, on-the-job training, and practical field examination prior to being authorized to conduct radiography independently. During interviews of several radiographers and assistants, the inspector noted that the licensee's training program appeared to be conducted in accordance with the procedures submitted in the license application. The inspector also reviewed the periodic safety meetings and their content with several radiographers who indicated that these meetings, conducted by licensee management, addressed safety significant issues that were pertinent to routine radiography as well as other business issues of interest to the employees.

No violations were identified.

6. Radiation Protection

The inspector noted that a sufficient number of pocket dosimeters (24 Victoreen and 8 Gamma Industry) were present and that each radiographer had a charger available in his darkroom. Records of dosimeter checks were reviewed, and the inspector noted that these were performed at the required frequency and in accordance with approved procedures.

Personnel dosimetry records were reviewed, and it was noted that quarterly exposures were generally in the 300-700 mrem range. The licensee used monthly film badges for personnel monitoring. During this review, it was noted that six radiographers, during the period from May 1989 through July 1989, had months where film badges had been damaged mechanically or thermally and could not be processed by the licensee's vendor. This was discussed with the licensee's representative who confirmed that no evaluation of radiation exposure during these periods had been performed. One of these individuals had terminated his employment, and the termination report, as well as his permanent history, had not been corrected to include this evaluation. The licensee's representative stated that the evaluations had not been performed because he was uncertain about the appropriate method in determining exposures for these individuals. This is an apparent violation of 10 CFR 20.201.

The inspector also reviewed the licensee's occupational exposure history files for several employees. It was noted that the licensee completed a separate Form NRC-5 equivalent for each badged employee. In reviewing these files, the inspector noted that the licensee had failed to obtain previous occupational radiation exposure information from two radiographers prior to assigning them work in restricted areas. Both individuals had received 25 percent or greater of the quarterly occupational exposure limits prescribed in 10 CFR Part 20 during their

first quarter employment. This was identified as a apparent violation of 10 CFR 20.201(b).

The inspector reviewed the licensee's use of the Form NRC-4. The licensee generally uses 1.25 rem as their quarterly occupational dose limit and did not have complete Form NRC-4s for each employee. The licensee's representative stated that they were reviewing employee files and completing the forms for those employees who did not currently have one on file. The inspector noted that one radiographer had exceeded the 1.25 rem quarterly occupational dose limit on more than one occasion. During a review of his Form NRC-4, it was noted that the form had not been signed by the individual. This was identified as an apparent violation of 10 CFR 20.102(b).

Three apparent violations were identified.

7. Surveys and Posting

The inspector performed radiation surveys of the licensee's storage vault, exposure devices, and the surrounding unrestricted area, and noted that radiation levels were within the limits prescribed by 10 CFR 34.21 and 20.105. The licensee has conducted periodic surveys of the storage vault, which is also used to conduct radiography, as well as those surveys required when performing radiography in this area. Records of these surveys were reviewed and appeared adequate.

Observation of activities at two field sites were included in this inspection. At one of these sites, the inspector observed that radiographers conducted appropriate surveys of the exposure device and adequately performed evaluations required to establish a restricted boundary around the work area. Additionally, a member of this crew performed surveys during exposures to verify that boundaries had been appropriately established. Both the "High Radiation" and "Radiation" areas were properly posted. The radiographers used roping to establish their restricted area, and it was observed that visual surveillance of the area was maintained.

At the second site, the inspector observed that work was being conducted on the rooftop of a building where several individuals were working. Although the radiographers had not restricted access to the roof, they had established a boundary on the rooftop to restrict entry to the immediate area where work was performed. Surveys performed by the inspector demonstrated that the "Radiation" area posting on the rooftop appeared adequate. The inspector observed that work was performed near the roof edge, with the source directed towards the ground. Although it was confirmed during exposures that radiation levels in the area adjacent to this building did not exceed the 2 mr/hour limit during the four exposures observed, the inspector reviewed with the radiographer the need to adequately evaluate and maintain visual surveillance of boundary areas while conducting radiography.

The inspector noted that the radiographer failed to conduct surveys of the exposure device and source guide tube after any of the four exposures observed at this site. The inspector verified, with a survey instrument, that the sealed source had been returned to its shielded position after each exposure. This was reviewed with the radiographer at the conclusion of the job. The radiographer stated that he usually performed surveys two or three times during each job, but as long as the device was operating without difficulty in cranking the source, he did not routinely perform a survey after each exposure. This was identified as an apparent violation of 10 CFR 34.43(b), which requires that a survey of the exposure device and source guide tube be conducted after each exposure.

The inspector also observed that the radiographer had failed to post the "High Radiation" area at this particular job site. The requirement to adequately post restricted areas was reviewed with the radiographer. This was identified as an apparent violation of 10 CFR 20.203.

#### 8. Transportation

The licensee routinely transports Amersham Model 683 exposure devices containing iridium-192 sealed sources. Occasionally, an Amersham Model 680 exposure device with a cobalt-60 sealed source is transported to a temporary job site. The majority of their transportation program has involved private carrier transport to and from temporary job sites. The licensee has routinely returned iridium-192 sealed sources in Amersham Model 750 source changers. These have been delivered to a common or contract carrier for return to the manufacturer. The inspector noted that the required special form certifications and Certificates of Compliance or performance test specifications were maintained for each type of sealed source and package possessed by the licensee.

The inspector reviewed the licensee's response to transportation violations identified during the previous inspection. The inspector noted that the licensee had submitted a transportation Q.A. program for review and had requested registration as an authorized user of the Model 683 device. They had not received correspondence regarding these items as of the date of this inspection. The licensee carried shipping papers in an appropriate location within the vehicle and used the required overpack. The inspector reviewed the procedure used to determine the transport index (T.I.) with several radiographers during this inspection and noted that surveys were being performed to determine the appropriate T.I.

During the two field site inspections, it was observed that the Model 683 overpack was placed in the darkroom of the vehicle for routine transport but that packages were not blocked or braced within the compartment. Further, on one field site inspection the inspector observed that the licensee's representatives had failed to secure the door at the rear of the vehicle and that it flew open several times during transport with the unsecured overpack inside. This was identified as an apparent violation of 49 CFR 177.842.

During field site inspections conducted on October 2, 1989, it was noted that although the Model 683 overpacks had been appropriately categorized and labeled with "RADIOACTIVE YELLOW II" stickers, the name of the radionuclide; content activity; and in one instance, the transportation index (T.I.) had not been entered on the package label. This was identified as an apparent violation of 49 CFR 172.403.

During a field inspection conducted on October 2, 1989, the inspector observed the licensee's representatives transporting packages containing radioactive material which had been labeled with "RADIOACTIVE YELLOW II" stickers in a vehicle which had "RADIOACTIVE" placards affixed to it. This was reviewed with the licensee's representative who confirmed that the placards were permanently affixed to the vehicle and that such packages were routinely transported in this vehicle. This was identified as an apparent violation of 49 CFR 172.502(a).

The inspector reviewed the licensee's shipping papers during field inspections and subsequently at the licensee's facility. The licensee has used a standard laminated form that contains the material name, package descriptions or identification, and hazardous material descriptions. The radiographer has filled in the content activity, package labeling category, and T.I. During one field inspection, it was noted that the shipping paper showed a T.I. of 1.8 for a package that had been categorized and labeled "RADIOACTIVE YELLOW II." This was reviewed with the licensee's representative and it was confirmed, by survey, that the package was properly labeled and that the correct T.I. was 0.5. The licensee's representative had forgotten to correct the shipping form for the specific package he was transporting. It was also noted that the package identification information did not correspond with the Model 683 package. This was subsequently reviewed at the licensee's facility, and it was determined that the package description on this standard form did not correspond to any package possessed by the licensee. This was identified as an apparent violation of 10 CFR 172.200.

9. Records and Reports

The inspector reviewed reports and documents submitted by the licensee to NRC during the previous inspection period. It was noted that employee terminating occupational dose reports and the annual dosimetry report had been submitted within the appropriate time frames.

10. Exit Meeting

The inspector met with licensee management at the conclusion of the inspection to review the findings as presented in this report. During this meeting, management expressed their concern regarding the number of apparent violations and stated that they had been unaware that some of the

items discussed during the previous inspection, although not cited as violations, had not been addressed by individuals within the organization. The inspector reviewed with management her concern that evaluations of personnel radiation exposure had not been completed in a timely fashion and that there appeared to be an apparent lack of attention to detail in the area of transportation. The licensee reviewed proposed changes to correct areas of noncompliance, including the reassignment of additional personnel to assist in the radiation safety program.

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APPENDIX B

PROPOSED ENFORCEMENT CONFERENCE AGENDA

Tulsa Gamma Ray, Inc.

November 20, 1989

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|---|----------------------------|
| I. INTRODUCTION AND PURPOSE OF MEETING    | A. B. BEACH                |
| II. NRC DISCUSSION OF APPARENT VIOLATIONS | C. L. CAIN<br>L. L. KASNER |
| III. LICENSEE COMMENTS AND RESPONSE       | J. C. MOSS                 |
| IV. ENFORCEMENT POLICY                    | G. F. SANBORN              |
| V. CLOSING COMMENTS                       | A. B. BEACH                |