

U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 30-11491/82-01
30-11492/82-01

Docket Nos. 30-11491
30-11492

License Nos. 06-16699-01
06-16699-02G Priority E Category IV

Licensee: Harrel, Incorporated
16 Fitch Street
East Norwalk, Connecticut 06855

Facility Name: Harrel, Inc.

Inspection At: 16 Fitch Street, E. Norwalk, Connecticut

Inspection Conducted: May 18, 1982

Inspector: J. McGinness, Radiation Specialist

9/29/82
date

Approved by: J. D. Kinneman, Chief, Materials Program
Section No. 1

9/29/82
date

Inspection Summary:

Inspection May 18, 1982 (Report Nos. 30-11491/82-01 and 30-11492/82-01)

Area Inspected: Special unannounced inspection to review allegations concerning distribution of gauges containing byproduct material, training, leak testing, possession limits and radiation detection instrumentation.

Results: Two violations were identified (manufacture and transfer of an unauthorized gauges, paragraph 3; possession of americium-241 in excess of license limits, paragraph 3.)

DETAILS

1. Persons Contacted

*Holton E. Harris, Radiation Safety Officer

*denotes individual present during exit interview

2. Background

Region I received a letter dated February 2, 1982 alleging that Harrel, Inc. was operating in violation of NRC regulations and the conditions of their license. Harrel manufactures and distributes industrial nuclear thickness gauges containing americium-241 to persons generally licensed in accordance with 10 CFR 32.51 and 10 CFR 31.5. An inspection to review these allegations was conducted on May 18, 1982.

3. I. Allegation

"Nucleonics Development Corporation (NDC) had requests from several customers to perform leak tests on nuclear thickness gauges they believed had been manufactured by NDC but, in fact, had been manufactured by Harrel, Incorporated. In addition, some customers stated they had not received the initial wipe test certificate and/or source strength."

Regulatory Requirement

Condition 5 of License No. 06-16699-02G requires that leak tests be performed on nuclear thickness gauges prior to distribution to persons generally licensed under 10 CFR 31.5 and again immediately after installation of the gauge. Further, 10 CFR 31.5(c) requires that any person who acquires or uses devices pursuant to 10 CFR 31.5(a) assure that the device is tested for leakage of radioactive material at no longer than six month intervals by a person holding a specific license pursuant to 10 CFR 30 and 32 or the equivalent from an Agreement State. In addition, 10 CFR 32.51(a) (3)(ii) requires that each device bear a durable, legible and clearly visible label which identifies the radioactive isotope and quantity of radioactivity.

Finding

A review of Harrel's leak test records showed that leak testing had been performed on all gauges prior to shipment from Harrel, Inc. to specific and generally licensed persons. A licensee representative pointed out that a second leak test was performed by Harrel, Inc. on those gauges following installation at the locations where the gauges were being acquired and used under a general license. The inspector observed that gauges at the

licensee's facility had labels identifying the source type, strength and serial number, as required. A licensee representative stated that the required label was affixed to each gauge prior to shipment. In addition, this label states that wipe tests must be conducted on the gauge every six months. Harrel, Inc. provides a wipe test service for persons using their gauge which includes a wipe test kit, instructions on how to perform the test and the address where the wipe should be sent for analysis.

No violations were identified.

II. Allegation

"Although the license didn't give them authority to sell their device until late 1981, there are plants with Harrel units that were purchased beginning in 1978."

Regulatory Requirement

The Commission requires that persons wishing to manufacture or initially transfer devices containing byproduct materials to persons generally licensed under 10 CFR 31.5 acquire a license from the Nuclear Regulatory Commission authorizing them to distribute their product in accordance with 10 CFR 30 and 10 CFR 32.51.

Finding

A review of Harrel's licenses and backup material shows Harrel, Inc. was issued Amendment 1 to License No. 06-16699-01 on September 26, 1976 which authorized them to design, construct, test and install three NDC gauges (Models RTA-41E, RTA-41F and FTG-41) as Harrel, Inc. Models' TG-201, TG-202 and TG-203. Subsequently, amendments two and three, dated January 31, 1978 and December 15, 1980, respectively, authorized Harrel, Inc. to design, construct, test, manufacture, and install four additional gauges - Models TG-601, TG-602, TG-603 and TG-604. License No. 06-16699-02G, issued on June 23, 1976, authorized them to distribute NDC nuclear thickness gauges (Models RTA-41E, RTA-41F, and FTG-41) as Harrel, Inc. models TG-201, TG-202, and TG-203 to persons generally licensed pursuant to 10 CFR 32.51. Amendment one to this license authorized them to also distribute Harrel's nuclear thickness gauge models TG-601, TG-602, TG-603 and TG-604 to persons generally licensed pursuant to 10 CFR 32.51.

Records indicated that Harrel has predominantly distributed and installed models TG-601 and TG-603. Records also showed that Harrel had distributed variations of these gauges to generally licensed persons. A licensee representative stated that the "A" series of each gauge was the standard design originally approved by the NRC. When customers made requests for special variations

to meet their specific needs, Harrel made modifications to the standard Model indicating these changes by advancing the alphabetical suffixes in the model number. Records indicated that nuclear thickness gauge Model TG-601 had four variations, A through D. All four models of this gauge contained 100 millicuries of americium-241, but there were differences in the shutter mechanism which shields the radiation ports. For example, the standard model has a flap-type shutter to shield the radiation port. Model TG-601B has a roller type shutter rather than the original flap shutter. Model TG-601C also has a flap-type shutter, but is interfaced with a digital readout display rather than the original rate meter, while TG-601D has a roller type shutter and the digital display. Gauge model TG-603 has variations A through E with similar differences in the shutter mechanisms and display systems. A licensee representative stated that Harrel, Inc. had distributed one nuclear thickness gauge model TG-606 to Accumeter in Marlborough, Massachusetts who are generally licensed pursuant to 10 CFR 31.5 during the third quarter of 1981. The licensee representative stated that he was unaware that the variations of design had to be submitted for approval by the NRC. The licensee representative also stated that the TG-606 was basically only two TG-603 probes interfaced into one electrical circuit and display board.

The finding that Harrel, Inc. manufactured and installed nuclear thickness gauges models TG-601 B-D, TG 603 B-E and TG-606 is a violation of Condition 9.A.3 of License No. 06-16699-01 and Condition 3 of License No. 06-16699-02G.

III Allegation

"Harrel sold their gauges through Albany Engineered Systems and Masland Carpets in Carlisle, Pa. bought a unit early in 1978 either through Albany Engineered Systems or directly from Harrel. I do not see either Albany Engineered Systems or Masland listed anywhere in Harrel's quarterly reports".

Regulatory Requirement

The Commission requires that no specific licensee transfer byproduct material except as authorized by 10 CFR 30.41 and 10 CFR 32.51. In addition, 10 CFR 32.5 requires that persons who distribute byproduct materials to persons generally licensed under 10 CFR 31.5 report quarterly to the NRC all transfers of devices containing radioactive source.

Finding

A licensee representative stated that the majority of their gauges were transferred to Albany Engineered Systems in Glens Falls, New York. Albany Engineered Systems hold a specific New York State License (GL 1432-2107) which authorizes them to distribute nuclear thickness gauges containing radioactive materials to persons generally licensed pursuant to Section 38.41, Table 3, Item (b) of Industrial Code Rule 38 or equivalent provisions of the regulations of the NRC or other Agreement States. This license specifically authorizes them to distribute various NDC and Harrel, Incorporated, gauges.

In a telephone call on May 17, 1982, a representative of Masland Carpet stated that they had three nuclear thickness gauges in their possession. He further stated all three gauges had been purchased from Albany Engineered Systems; the first gauge was a NDC gauge received in June 1976; two Harrel, Incorporated, gauges were received in February and April 1979.

Since Masland Carpets received their gauges from a New York State licensee with a specific distribution license, there is no requirement for Harrel, Inc., to report this transfer on their quarterly report. 10 CFR 32.52 requires that only those transfers made from Harrel, Inc., to persons generally licensed pursuant to 10 CFR 31.5 be reported to the NRC.

No violations were identified.

IV Allegation

"Harrel's RSO, Mr. Holton Harris, states in his resume to the NRC that three years of his background involved working with (NDC) gauges. Mr. Harris never received any training from (NDC), never visited (their) plant and, according to his resume, never handled sources, took a radiation profile, or received any background in radiation health physics. It appears his total training was a one day course at New England Nuclear. Allowing Mr. Harris to designate himself as an RSO does not seem to be consistent with the high standards that the NRC usually demands."

Regulatory Requirement

There is no specific regulatory requirement stating the amount of training that an individual must have prior to assuming the responsibilities of a Radiation Safety Officer. However, the NRC Materials Licensing Branch has guidelines as to the subjects that one should receive training in, according to the type of program that the individual will be responsible for.

Finding

A review of Mr. Harris's resume and discussions with him indicated that all information stated in his resume to the NRC was accurate. Mr. Harris confirmed he had worked indirectly with nuclear thickness gauges from 1968 - 1970. During this time, Harrel, Inc., was interfacing their computer and thickness control systems to NDC's nuclear thickness gauges. With respect to the one day course at New England Nuclear, discussions with a member of the Materials Licensing Branch indicated that the subjects covered were those required for an individual to assume the responsibilities of Radiation Safety Officer at this type of licensed operation. The course included instruction in the handling of sources during instrument fabrication, testing of the completed instrument for radiation and procedures for performing wipe tests. The subjects covered meet the NRC Materials Licensing Branch standards for this type of license. Therefore, Mr. Harris was authorized to be Radiation Safety Officer.

No violations were identified.

V. Allegation

"...Harrel's license limits them to have 1.5 Ci of Am-241 in their possession at any one time...Harrel took delivery of at least 5 Ci of Am-241 consisting of 50 x 100 mCi sources."

Regulatory Requirement

Condition 8.A of License No. 06-16699 -01 limits possession to no more than 1.5 curie of americium-241 at any time.

Finding

A licensee representative stated he was unaware of a 5 curie shipment of americium-241. The inspector determined from a review of radioactive materials receipt logs that during the second quarter of 1978, 31 americium-241 sources of 100 millicuries each were received by Harrel, Incorporated from Amersham-Searle. Shipments records indicated that only four 100 millicurie sources were transferred in finished nuclear thickness gauges during this period, leaving Harrel with at least 2.7 curies of americium-241 in their possession. No sources were received during the third quarter 1978, but 1.8 curies of americium-241 were distributed, bringing the licensee back into compliance with their possession limit of 1.5 curies at the time of the inspection.

The finding that the licensee exceeded their possession limit of 1.5 of Americium-241 is a violation of condition 8.A of License No. 06-16699-01.

VI. Allegation

"Referring to the radiation profile of the Harrel TG-604 probe, we note that at one foot the radiation is 18 mr/hr. We have been told by the State of California that one of their guidelines for issuance of a General License was that the radiation field at one foot from the radiation device could not exceed 5 mr/hr. Is the NRC more lenient than the State of California? Are different standards being used?"

Regulatory Requirement

The Commission does not have any specific requirements limiting the radiation field from a gauge at one foot to five milliroentgen per hour. The Commission uses an ANSI standard as part of their guidelines for review of such devices. This standard recommends that the radiation field at one foot surrounding the entire gauge to be limited to 5 milliroentgen per hour. However, reviews are performed of the radiation profile submitted with each gauge containing radioactive materials prior to approval by the Commission of that gauge for manufacture and distribution. This review takes into account the way in which the gauge will be used and how this might affect personnel exposures.

Finding

The radiation profile of Harrel, Inc.'s nuclear thickness gauge Model TG-604 shows that the radiation field at one foot from the gauge is 18 milliroentgen per hour only directly in front of the unshielded americium-241 source. When the americium-241 source is shielded the radiation levels are reduced to natural background levels to either side of the nuclear thickness probe (Attachment 1). It is highly unlikely that an individual would be working directly in front of the unshielded probe where the 18 milliroentgen per hour radiation level exists at one foot due to the permanent mounting and positioning of the probe. The NRC Materials Certification and Procedures Branch has approved this device for manufacture and distribution.

No violations of the Commissions rules and regulations or license conditions were identified.

VII. Allegation

"...according to their application, their only stated radiation monitor is a Victoreen 470 Ion Chamber. How do you take reliable readings at 2 inches from the source? How reliable are these readings overall?"

Regulatory Requirement

The Commission requires that a licensee have adequate radiation detection equipment.

Findings

A licensee representative stated that Harrel's radiation detection equipment presently includes several Nuclear Accessories Minimonitor II-Model 05-571, which are used to detect radiation levels around the gauges and an Eberline pulse rate meter and alpha scintillation probe for counting wipe tests of the americium-241 sealed sources. Harrel has a Victoreen 470 ion chamber, but it has not been used for approximately the past three years.

The licensee representative stated that the Victoreen 470 chamber was used to determine the radiation profiles of the gauges submitted to the NRC for review and approval, including the TG-604 gauge. The radiation profile was determined with the source in the shielded and unshielded positions by taking radiation measurements at the points indicated in Attachment 1. The readings obtained are most accurate where the radiation levels are highest (directly in front of the unshielded radiation port). The Victoreen 470 ion chamber has a fairly large detection chamber with the active detection region several centimeters from the end window. This would make it difficult to use this instrument for surface measurements. However, it should be capable of reasonably accurate measurements at two inches. Although this ionization chamber is not the most sensitive detection instrument and will not accurately measure radiation levels less than 0.1 milliroentgen per hour, it is adequate to assure that excessive or abnormal radiation levels are not present.

The inspector was unable to make independent measurements of a Model TG-604 gauge as none were available at the licensee's facility. The licensee representative stated that Harrel, Incorporated had not yet sold this particular gauge to any customer.

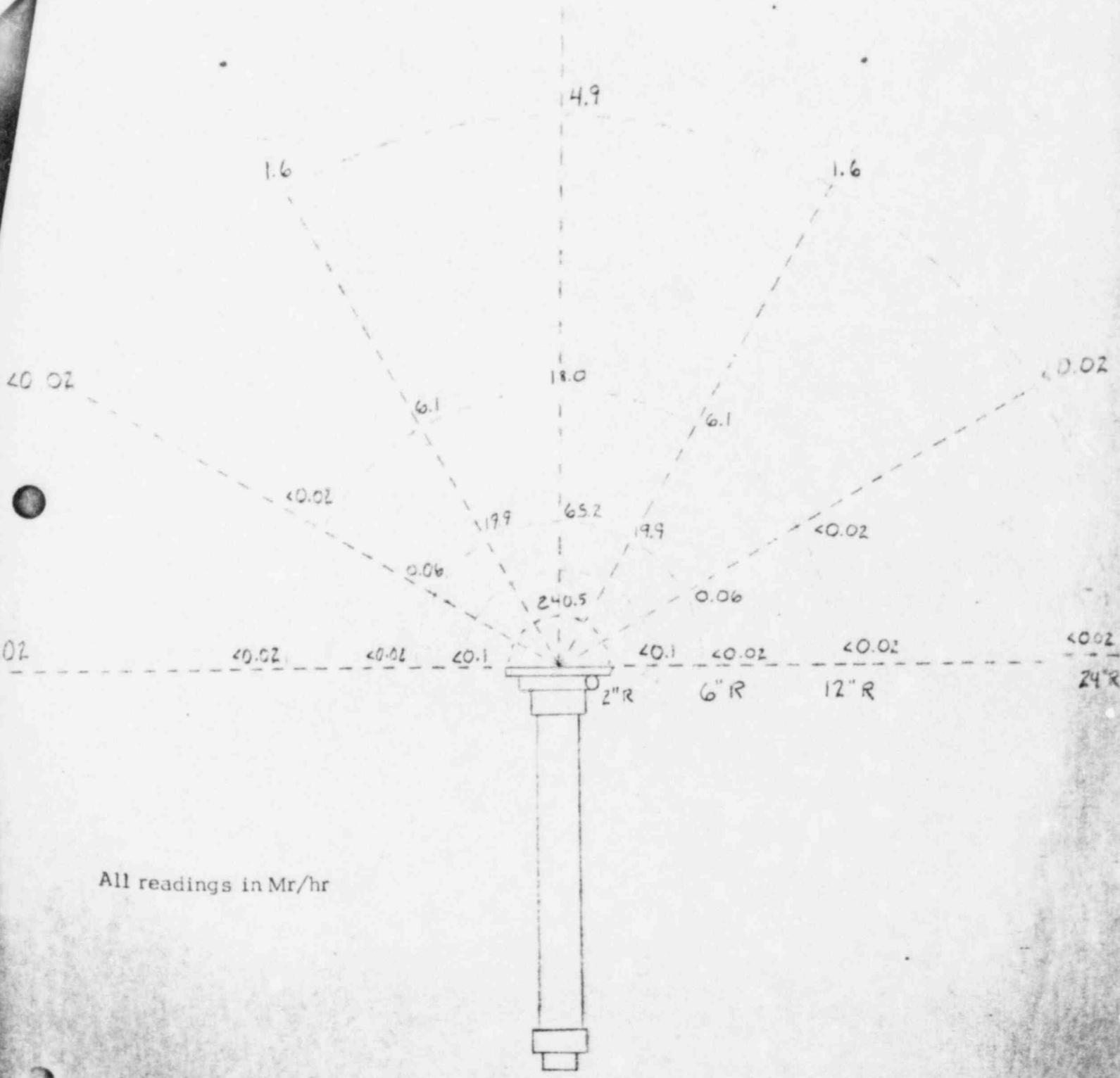
No violations were identified.

4. Exit Interview

The inspector met with the licensee representatives and summarized the scope and findings of the inspection conducted on May 18, 1982.

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Less than 0.2 Mr/hr at 2" radius directly in front with shutter closed.
Less than 0.1 Mr/hr at 2" radius anywhere to rear of probe.



All readings in Mr/hr

PROFILE OF RADIATION FROM HARREL TG-604 THICKNESS PROBE