

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-14052/85001(DRSS)

Docket No. 030-14052

License No. 12-18693-01

Category E(1)

Priority V

Licensee: Quality Assurance Testing
P. O. Box 415
LaFox, IL 60147

Facility: Quality Assurance Testing
1N111 Linlar Drive
LaFox, IL

Special Inspection Conducted: August 2 and 21, 1985

Enforcement Conference Conducted: September 9, 1985

Inspector: *James L. Lynch*
James L. Lynch
Radiation Specialist

9-23-85
Date

Reviewed By: *Darrel G. Wiedeman*
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9-23-85
Date

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9/25/85
Date

Special Inspection Summary

Inspection on August 2 and 21, 1985 (Report No. 030-14052/85001(DRSS))

Areas Inspected: This was an announced special safety inspection initiated by allegations received by telephone on June 20, 1985. An unannounced inspection was attempted on August 1, 1985, but was not performed because the responsible licensee representatives were not available for consultation. The special inspection included a review of Quality Assurance Testing's procedures and records, and interviews with licensee personnel.

Results: Three of the four allegations were substantiated and four violations were identified: (1) Use of licensed gauges by unauthorized, unsupervised individuals, License Condition No. 12 [Section 5b.]; (2) Failure to utilize dosimetry devices, License Condition No. 17 [Section 5c.]; (3) Leak tests not performed semiannually, License Condition No. 13 [Section 5c.]; and (4) Personnel monitoring records not maintained, 10 CFR 20.401 [Section 5c.].

DETAILS

1. Persons Contacted

*Jay Laudicina, President
Philip Osterland, Gauge Operator
Brian Sebastian, Gauge Operator
Dana Henry, Former Gauge Operator
Shula Dodson, Secretary

*Denotes individual present at the exit interview on August 2, 1985.

2. Summary of Licensed Activities

Quality Assurance Testing (QAT) was issued NRC License No. 12-18693-01 on April 25, 1979. The last license renewal (Amendment No. 02) is dated April 26, 1985. The license authorizes the use of cesium-137 and americium-241 sealed sources in gauges to measure moisture and density of soils and construction materials. Three gauges are presently owned by QAT.

3. Purpose of Inspection

This was an announced special safety inspection concerning allegations of (1) failure to make proper notification to the NRC of a field incident resulting in damage to a licensed gauge; (2) inadequate training to gauge users; (3) failure to provide dosimetry devices to persons handling licensed material; and (4) failure to properly secure licensed material during transport.

4. Incident Summary

On June 13, 1985, a Troxler 3411B moisture/density gauge owned by Quality Assurance Testing containing a 10 millicurie cesium-137 sealed source and a 50 millicurie americium-241 sealed source was accidentally run over and damaged by a pickup truck. The accident occurred at a job site at 790 Roman Drive, Elmhurst, Illinois. The gauge was undergoing a stability check on the reference standard block while the operator was standing approximately ten meters away from the gauge.

After the incident, the operator telephoned the QAT President, Mr. Jay Laudicina, for instructions. Mr. Laudicina told the operator to return the damaged gauge to the LaFox, Illinois facility. Mr. Laudicina stated that the operator was upset at this point, and that the individual admitted that a fear of the gauge was the reason for his distance from the device at the time of the accident. The operator was instructed to pick the gauge up and return it to the home office. Mr. Laudicina examined the gauge when it was brought to the facility and decided that the damage to the gauge was not significant and he had the operator take the device to the Troxler office in Lake Villa, Illinois for repair.

Upon arrival, the operator found the Troxler office to be closed and returned the gauge to the QAT facility. The next morning, another employee took it back to the Troxler office where it remained for repair.

Mr. Laudicina made the decision that the gauge was not damaged sufficiently to warrant emergency actions in the field as the result of information supplied to him by the operator. Upon visual examination of the gauges, he further determined that the gauge housing, where the source was located, had not been damaged, and thus he did not notify the NRC of the incident.

The gauge damage was discussed in a telephone conversation between Mr. Laudicina and the NRC inspector on August 7, 1984. Mr. Laudicina stated that the source rod had not been broken as the alleged had said, but was only bent. He insisted that the index rod was the broken part of the gauge, contrary to the claim of the alleged.

Mr. James Wandell, Troxler Branch Manager, stated that the gauge had a broken source rod and a bent index rod when it was received at his office and that the active end of the source rod was in the shielded position in the gauge. The NRC inspector determined through conversations with Mr. Laudicina that he had mistaken the index rod for the source rod during his examination of the damaged gauge. Mr. Wandell further stated that Troxler designs its source rods to break at the upper surface of the housing during a situation such as this incident. The source rod broke upon impact as designed (See attachment). Since the source rod was not extended into the ground at the time of impact, the source remained shielded. The gauge was repaired by Troxler and returned to QAT in July 1985. Leak tests and surveys performed on the gauge by Troxler indicated no source or shielding damage.

5. Specific Allegations and NRC Findings

- a. Allegation: The NRC was not notified of an incident involving a licensed nuclear gauge.

NRC Findings: Mr. Laudicina did not report the incident to the NRC or other authorities because he felt that the damage to the gauge was not significant. The operator had reported to Mr. Laudicina that the gauge rods were damaged but the housing was intact. Mr. Laudicina instructed the operator to pick up the damaged gauge and return it to the LaFox facility.

Based on the inspection and interviews of QAT personnel, the NRC inspector determined that no notifications were made to any authorities or the NRC.

In spite of having a damaged source rod, the licensee did not initiate the emergency actions specified in the license. The gauge manufacturer was not notified until the damaged unit was brought to the Troxler facility the next day. The operator did not rope off the area and

picked up the damaged gauge and returned it to the QAT facility. In having the operator handle and transport the gauge, the potential of a significant radiological exposure was not addressed. The individual handled the gauge without knowing whether source and/or shielding damage had occurred. No analysis was performed to determine if contamination (from a ruptured source) or elevated radiation levels (due to damaged shielding) were present after the accident.

The NRC does not consider the licensee's decision prudent by not reporting the incident or following emergency procedures as illustrated above. However, since the radioactive sources remained in the housing throughout the incident and no damage was incurred by the housing, the licensee's actions are considered acceptable.

The allegation was substantiated; however, no violations were identified.

- b. Allegation: Licensed gauges are used by individuals not properly trained in their use.

NRC Findings: License Condition No. 12 states that licensed material shall be used by, or under the supervision and in the physical presence of, individuals who have satisfactorily completed the device manufacturer's training program for gauge users.

At the time of the incident on June 13, 1985, the QAT employee at the job site had never attended a training class for gauge users. He stated that he received some "hands on" instruction in gauge operation but received little information concerning radiation safety.

The licensee's records were unclear as to the number of occasions that gauges were used by this operator. These records, in combination with estimates by the individual and the other two gauge operators, indicate that this operator used gauges on approximately six occasions during his one month employment at QAT.

Mr. Laudicina stated that he assumed that the individual had operated nuclear gauges under a competitor's (Testing Service Corporation) license because of statements made to him by the individual. Testing Service employed the individual but never authorized him to operate gauges unattended under the license, which Mr. Laudicina was not aware of.

In a telephone conversation with the NRC inspector, this operator appeared to be knowledgeable about nuclear gauges, but was not entirely familiar with radiation safety procedures, including gamma ray attenuation. This, coupled with his failure to remain close to the gauge (with a shielded source) at the time of the incident, indicates a need for radiation safety training and casts doubts about his qualifications to be a gauge operator.

According to Ms. Marlene Boyd of Troxler, none of the employees at QAT had received the Troxler training course until June 8, 1985. At that time, two of the three gauge operators at QAT attended the course. QAT first received Troxler gauges in 1979 and have used them exclusively since that time. Since operators did not attend the Troxler course until June 1985, the gauges have been used by individuals without the proper training for a period exceeding five years. The two individuals (Sebastian and Osterland) that took the course stated to the inspector that the instruction by Troxler provided them with a good understanding of procedures to follow in case of an emergency such as the one that occurred on June 13, 1985. Both individuals were quizzed on handling, operation and safety procedures by the NRC inspector. They appeared knowledgeable of information needed to maintain a sound, safe radiation program. Messrs. Laudicina and Sebastian did attend a training course in the late 1970's concerning the Soiltest, Inc. gauge which QAT owned at that time. Mr. Laudicina stated that he felt employees could safely handle and operate gauges without the Troxler course, if given instruction by persons at QAT with experience in their use.

The use of licensed material in moisture/density gauges by persons not having the required manufacturer's training course and not in the presence of authorized users constitutes a violation of License Condition No. 12.

The allegation was substantiated, one violation was identified.

- c. Allegation: Licensed gauges are used by individuals not provided with dosimetry devices.

NRC Findings: License Condition No. 17 (April 18, 1979 application) states that all individuals using licensed materials will wear film badges which are exchanged on a monthly basis.

The operator using the Troxler gauge on the day of the incident, stated that he was not assigned a film badge or other dosimetry device, although he had requested one. On that day and at least five other times during the month of June 1985 this employee operated gauges without the required dosimetry. The licensee's dosimetry records were unclear and, as such, it was not possible to accurately identify if other employees operated gauges without the required dosimetry.

The two current operators were witnessed wearing their film badges as required. The NRC inspector's review of film badge records indicated that other gauge operators employed at QAT also wore film badges. The operators that were interviewed stated that they wear their personal film badge whenever nuclear gauges are handled. According to Mr. Laudicina, the third individual did not because he had only been working at QAT for a short time (about one month). Mr. Laudicina stated that it took several weeks before a new badge could be received from the film badge vendor, Siemens Gammasonics.

Therefore, the employee was assigned to operate the gauge without any dosimetry because work needed to be done and the other operators were occupied with other projects.

Ms. Carolyn Cicero of Siemens stated that adding an individual to an established customer's film badge program takes less than one week to accomplish. Siemens could not specify if a badge had ever been ordered for the individual in question. The licensee did not have any extra badges on hand that could have been used temporarily.

The use of licensed gauges by an individual not assigned a film badge or other dosimetry device constitutes a violation of License Condition No. 17.

10 CFR 20.401(a) requires that licensees shall maintain records of individuals' exposures (i.e., film badge records).

10 CFR 20.401(c)(1) requires that these records be maintained until disposition is authorized by the Commission.

The licensee was unable to produce any film badge records during the inspection on August 2, 1985. Mr. Laudicina commented that records from 1979 to 1984 were probably lost in a July 1984 flood that damaged the facility and that the records from that point to the time of the inspection could not be located. The QAT operators that were interviewed stated that they remember seeing some reports, but did not know where they went after that time. Copies of records were subsequently ordered from Siemens and reviewed by the NRC inspector on August 21, 1985. No indication of radiation overexposures were noted.

The failure to maintain records of radiation exposures to employees constitutes a violation of 10 CFR 20.401.

License Condition No. 13 requires that sealed sources containing byproduct material be tested for leakage and/or contamination at intervals not to exceed six months.

QAT hires Troxler to perform analyses on wipe tests taken from gauges containing sealed sources of cesium-137 and americium-241. When QAT was unable to prove that leak tests were performed on two of their three gauges, Marlene Boyd of Troxler was requested to detail when the gauges were tested. Records from Troxler indicate that the 3411B gauge, S/N 9666 (received by QAT in June 1983) was leak tested in June 1983 and June 1984 only. The 3401B gauge, S/N 9726 (received in July 1983) was tested only in July 1983. Mr. Laudicina stated that he knew that the gauges needed testing, but assumed that the tests were performed when the gauges were calibrated every year.

The failure to perform six (6) month leak tests on sealed sources of byproduct material contained in gauges is a violation of License Condition No. 13.

The allegation was substantiated, three violations were identified.

- d. Allegation: Licensed gauges are not properly positioned in vehicles during transport.

NRC Findings: The alleged stated that Mr. Laudicina instructed a QAT employee to transport a licensed gauge in a pickup truck cab rather than secured to the truck bed at the rear of the vehicle. The reason behind this order, surmised the alleged, was that Mr. Laudicina was afraid of being fined by the police department for improperly transporting the gauge, as that particular vehicle did not have a means of securing the gauge in the rear cargo area.

Mr. Laudicina stated that he ordered an employee to relocate an unsecured gauge at the rear of the truck bed to a position in the bed near the cab, where it could be secured. He said that he did not want the gauge to accidentally bounce out of the truck during its transport. He felt that a secured gauge near the truck cab was more safe than an unsecured gauge at the rear.

According to the NRC inspector's calculations, if the gauge was situated in the front of the truck bed, the radiation exposure inside the cab would be well within regulatory limits for unrestricted areas due to attenuation by the truck body and the distance involved. Exposure from a gauge at the rear of the vehicle would be minimal. Messrs. Sebastian and Osterland were questioned regarding methods used by QAT to transport nuclear gauges. They stated that gauges are always transported in the rear of the vehicle (car trunk or truck rear bed) and blocked or braced. They also stated that they had never been instructed to transport gauges in truck cabs.

This issue is unresolved as conflicting stories were received from the alleged and the QAT employees. It appeared to the NRC inspector that gauges are transported properly.

The allegation was not substantiated, no violations were identified.

6. Exit Interview

An exit interview was held at the Quality Assurance Testing facility on August 2, 1985. Mr. Laudicina was present as the licensee representative. The allegations and apparent violations were discussed along with the NRC policy regarding possible escalated enforcement.

7. Enforcement Conference

An enforcement conference was held in the Region III Office on September 9, 1985. The meeting was attended by Mr. J. Landicina of Quality Assurance Testing. Mr. A. B. Davis and members of his staff represented the NRC Region III office. During the meeting the NRC enforcement policy and the proposed violations were discussed. Also discussed were the causes of the violations and the corrective actions taken as a result of the findings of the inspection. The licensee was informed that escalated enforcement action is being considered.

THE ROAD/READERS

THE 3400B SERIES SURFACE MOISTURE-DENSITY GAUGES

The 3400B Series is specifically designed to measure the moisture content and density of soils, soil-stone aggregates, cement and asphalt treated bases, and asphalt paving. With suitable calibration, it can also be used to measure these parameters of other materials having approximately the same range of density and/or moisture content.

The 3400B Series incorporates the latest state-of-the-art in solid-state semiconductor design to provide a high degree of accuracy and reliability. The nuclear geometry and radioactive source design are the culmination of some twenty years of Troxler research and experience in developing instruments of this type. In addition to laboratory work, user experience of approximately 5000 instruments aided in the

selection of the required design criteria and desirable end specifications.

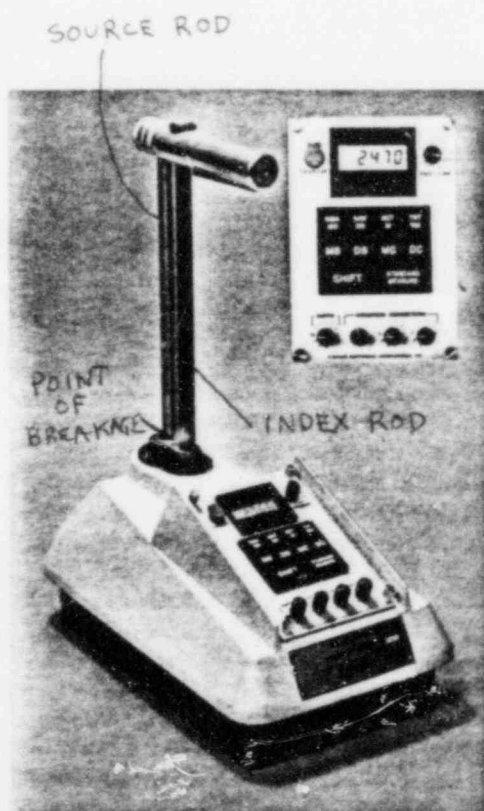
The 3400B Series features simultaneous moisture and density measurements in both the Backscatter and Direct Transmission test modes, greatly extended operation between battery recharges and increased battery life; liquid crystal display which allows increased readability in high ambient light conditions; greatly improved Backscatter performance, and simplified operation to reduce operator error.

The Model 3411B contains a micro computer which holds all calibration constants and algorithms necessary to compute and display directly, wet density, moisture, dry density, percent moisture, and percent compaction in either kilograms per cubic meter or pounds per cubic foot, as chosen by the operator. The Model 3411B eliminates

the error in wet density due to the presence of hydrogen in the measured sample. The error is created by the high mass attenuation coefficient of hydrogen. This correction has not been possible in earlier gauge models. The Model 3411B also provides a means of compensating the moisture measurement for hydrogen that is present in the measured material, and is not in the form of free water.

The Model 3401B offers the customer a quality instrument at a lower cost. A simple calculation must be made by the gauge operator and measurement results determined by the use of computer derived calibration tables. The Model 3401B can easily be converted into a Model 3411B by changing scaler modules.

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3411B



3401B