U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No.	030-05985/93-001
Docket No.	030-05985
License No.	37-00276-25
Licensee:	Professional Service Industries, Inc. Pittsburgh Testing Laboratory Division 850 Poplar Street Pittsburgh, Pennsylvania 15220
Facility Name:	Pittsburgh Testing Laboratory Division
Inspection at:	Medusa Concrete Company, Route 18, Wampum, Pennsylvania and the Licensee's Office at 850 Poplar Street, Pittsburgh, Pennsylvania
Inspection Conducted:	February 1 and 2, 1993

Inspector: Francis M. Costello — 2/4/93
Duncan White, Health Physicist — date

Approved by: Francis M. Costello — 2/4/93
Francis M. Costello, Chief — date
Industrial Applications Section

Inspection Summary: Special, announced inspection conducted on February 1 and 2, 1993 (Report No. 030-05985/93-001).

Areas Inspected: Radiation safety organization; notification of incident; radiographic field operations at the Medusa Concrete Company; training and audits; transportation; and instrumentation, equipment and devices.

Results: Five apparent violations were identified: Failure of radiographer to notify Radiation Safety Officer of unauthorized entry into restricted area (paragraph 3); failure to maintain direct surveillance of radiographic operations (paragraph 4); failure to post radiation and high radiation areas (paragraph 4); failure to include required information on shipping papers (paragraph 6); and failure to properly mark the shipping container (paragraph 6).

DETAILS

1. Persons Contacted

* John Thornton - Radiation Safety Director
* Robert Barthelemy - Radiation Safety Officer, Pittsburgh Division
Terry Klammer - Radiographer
Michael Coleman - Radiographer's Assistant
Edward Sklenchar - Machinist, Medusa Concrete Company
Joseph Doutt - Maintenance Foreman, Medusa Concrete Company
Frank Ferrucci - Union Safety Representative, Medusa Concrete Company
Joseph Ford - Environmental-Safety Engineer, Medusa Concrete Company

* indicates those present during exit interview

2. Radiation Safety Organization

Professional Services Industries, Inc. (PSI), has its corporate administrative offices in Lombard, Illinois, where it maintains a full-time Radiation Safety Director and Assistant Radiation Safety Director. The Radiation Safety Director reports to Michael Kesselmayer, the Administrative Coordinator, who in turn, reports to Murray Savage, the Executive Manager, who reports to the Chief Executive Officer, James E. Ahlberg. There are six locations listed on the PSI license as locations where the licensee maintains offices, including the Pittsburgh, Pennsylvania, office. The Radiation Safety Officer (RSO) and Assistant Radiation Safety Officer (ARSO) at the Pittsburgh office report to the Radiation Safety Director. PSI currently has six radiographers (including the RSO and ARSO) and two radiographer's assistants at the Pittsburgh office. Day-to-day management of licensed activities at this Division is the responsibility of Pittsburgh Testing Laboratory's RSO. John Thornton is currently PSI's corporate Radiation Safety Director. He replaced David Price who left the company in May 1992. The current RSO at the Pittsburgh facility is Robert Barthelemy.

3. Notification of Incident

At approximately 3:45 p.m. on January 27, 1993, Region I received a telephone call from the licensee's Radiation Safety Director that two employees from the Medusa Concrete Company walked through the radiation and high radiation areas during radiographic operation at the Medusa plant off Route 18 in Wampum, Pennsylvania on January 17, 1993. The licensee had been hired by Fuller Company, a general contractor repairing a finishing mill at the Medusa facility. The Radiation Safety Director had been contacted on January 26, 1993 by the Pittsburgh Division's Radiation Safety Officer who had been notified of the incident by the Medusa safety

engineer the morning of January 26, 1993. One of the individuals who entered the high radiation area on January 17, 1993, initially reported the incident to the Medusa safety engineer on January 20, 1993.

Condition 25 of license 37-000276-25 requires that the NRC license material be used in accordance with the licensee's application dated March 21, 1986. Section 13.2 of the Operating and Emergency Procedures included with this application requires that the Radiation Safety Officer or the Assistant Radiation Safety Officer be immediately notified of an unauthorized entry into a restricted area.

Failure of the radiographer to notify immediately the Pittsburgh Division's Radiation Safety Officer or Assistant Radiation Officer of an unauthorized entry into a restricted area is an apparent violation of Condition 18 of NRC License No. 37-00276-25.

Region I requested that the licensee submit a written report of the incident and provide an estimation of the radiation dose received by the two Medusa employees. This report was received by Region I on January 30, 1993 and is included as Attachment 1 to this report.

4. Radiographic Field Operations at the Medusa Concrete Company

The inspectors interviewed the radiographer involved in the incident as well as the individuals who entered the restricted area. The following is a summary of the incident provided to the inspector.

On January 17, 1993, the licensee was conducting radiographic operations at the No.2 finish mill at the Medusa facility utilizing a 42-curie cobalt-60 source. The weld was being radiographed (panoramic exposure) using an uncollimated source located in the center of the eight-foot diameter mill in order to expose film positioned along the entire outer circumference. The radiographer had planned to take two shots with a total exposure time of 50 minutes. The steel walls of the mill were 2.5 inches thick. The weld being radiographed was located nine feet from the end of the vessel which was uncovered at the time. A graded cat-walk permitted access to within two feet of the vessel along its long axis and complete access at the end. The exposure device was located on the cat-walk along the vessel in order to run the guide tube through a hatch located on the side of the vessel. This hatch, at the time of the exposure, was rotated into a position such that the radiographer could reach it from the cat-walk. A second hatch, also opened, was located directly opposite from the hatch used by the radiographer. The hatch was located approximately three feet from the weld and approximately twelve feet from the open end of the vessel. The exposure device was located another two to three feet away from the hatch or approximately fourteen feet down the cat-walk from the open end of the vessel.

There were four access points unto the second level cat-walk around the No. 2 finish mill. Two of the access points were stairs connecting the first and second levels located near the rear of the building adjacent to an overhead door and personnel door. The third access point was stairs connecting the third and second levels located within 15 feet of the open end of the vessel. The fourth access point into the area was through a machine room located at the end of the cat-walk. The machine room connected the cat-walk near the No. 2 finishing mill to remainder of the second level.

The mill was one of several mills located on the second level in the building. On January 17, 1993, Medusa employees were performing maintenance on the second level on another mill. A machinist and the maintenance foreman walked towards the No. 2 finishing mill to locate tools and dial indicators. They gained access to the cat-walk through the machine room and proceeded down the cat-walk towards the end of the mill being radiographed. The two individuals told the inspector that they did not see anyone nor did they realize that radiographic operations were on-going. The radiographer told the inspector that he had not posted this access to the cat-walk because he initially maintained surveillance of the restricted area. He also told the inspector that five minutes after the source was exposed, he left the second level and waited outside the building near the open overhead door and that the source was in the exposed position for approximately 20 minutes without the radiographer present on the second level.

The two individuals proceeded along the cat-walk, stepping over the exposure device and stopped at the weld for approximately 20 to 25 seconds. The dose rate at this location was approximately three rem per hour. At this point, the individuals were approximately six feet from the exposed source which was shielded by 2.5 inches of steel. The individuals went to the front of the vessel, approximately nine feet from the source which was not shielded, where they stopped for another 20 to 25 seconds. The dose rate at this location was approximately 7.5 rem per hour. They went to an opening in the outer wall of the building used for access of large pieces of equipment by crane. The individuals then returned to the front of the vessel for another 10 to 15 seconds and went down to the first level and out of the building. When the individuals left the building, they were seen by the radiographer who then returned into the building and cranked the source back into the shielded position in the exposure device.

The failure of the radiographer to maintain direct surveillance of the radiographic operation to protect against unauthorized entry into a high radiation area is an apparent violation of 10 CFR 34.41.

The inspector determined that the individuals spent approximately two minutes on the second level in the vicinity of the weld and on the landing in front of the open end of

the vessel. Based on the time spent at each location near the vessel, the inspector calculated that the individuals probably each received a whole body dose of 110 to 150 millirems.

The radiographer told the inspector that a high radiation area sign was posted on the exposure device and on the front of the vessel open to the landing approximately 20 inches off the ground ("knee-high"). The two individuals who entered the high radiation area told the inspector that they did not see any radiation or high radiation signs on the second level. They told the inspector that the only signs or ropes they saw were on the first floor.

Failure to conspicuously post the radiation and high radiation areas is an apparent violation of 10 CFR 20.203(b) and 20.203(c).

5. Training and Audits

The inspector reviewed training records and quarterly audits for the radiographer and radiographer's assistant. The radiographer was initially approved to perform industrial radiography on April 19, 1979. He most recently received refresher training and successfully passed a written examination on March 5, 1992. The inspector determined that the radiographer was audited by the Radiation and Assistant Radiation Officers six times in 1992 and 1993. The most recent audit of the radiographer was conducted on January 6, 1993. The radiographer's assistant received eight hours of training from the Assistant Radiation Safety Officer on January 12, 1993. He successfully passed a written and field examination on January 15, 1993.

The licensee's corporate Radiation Safety Director and Assistant Radiation Safety Director conducted an audit of the Pittsburgh office on November 5, 1992. The audit included a review of records as well as the examination of equipment and storage areas. The Radiation Safety Officer told the inspector that a written response is not required to verify correction of deficiencies identified in the corporate audit. The inspector selected a few deficiencies noted in the report and verified that corrective action had been taken by the Pittsburgh staff.

No safety concerns were identified.

6. Transportation

The inspector reviewed the licensee's shipping papers and examined the shipping container used to transport licensed material. The shipping papers used by the licensee are pre-printed with most information. The information particular to the exposure device is entered each day by the radiographer. The radiographer had completed the shipping papers for January 17, 1993; however, the inspector noted

that the shipping papers did not state that the quantity of radioactive material was a reportable quantity (RQ).

The Gamma Industries Gammatron 100 exposure device also serves as a Type B shipping container. During normal transport, the device is stored inside the laboratory portion of the truck. The inspector noted that the device contained a source with an activity of 42 curies of Co-60. Shipping containers holding more than 10 curies of Co-60 are required to be labeled as a reportable quantity (RQ).

Failure to comply with appropriate Department of Transportation regulations is an apparent violation of 10 CFR 71.5(a). Specifically, (1) the failure to include the RQ on the shipping papers is an apparent violation of 49 CFR 172.203(a)(2); and (2) the failure to mark the shipping container with RQ is an apparent violation of 49 CFR 173.324(b).

The inspector determined that the licensee was in compliance with 10 CFR 71.12. The licensee has a current Certificate of Compliance (No. 71-9127) on file for the Gammatron 100 exposure device. The Certificate of Compliance is issued to Amersham Corporation and expires on October 31, 1994. The licensee also has an approved quality assurance program for the transport of Type B containers. The licensee's program has been issued Docket No. 71-0440 with an expiration date of August 31, 1996.

7. Instrumentation, Equipment, and Devices

The exposure device utilized at the Medusa Concrete Company was a Gamma Industries Gammatron 100, serial number 53. The source was a Gamma Industries model A-5-A, serial number 2079. The sealed source was last tested for leakage on December 11, 1992. The inspector confirmed that the source had been tested for leakage at six-month intervals in 1992 and 1991. The device was inspected on January 17, 1993 as required by 10 CFR 34.28(a). Quarterly inspection and maintenance of the exposure device used at the Medusa facility was performed as required by 10 CFR 34.28(b).

The survey instruments used at the Medusa facility were Jordan Nuclear Model AGB 500, serial numbers 4374 and 4028, last calibrated by the licensee on October 20, 1992 and December 21, 1992, respectively.

The radiographer and radiographer's assistant were issued personnel monitoring devices as required by 10 CFR 34.33. The pocket dosimeters, serial numbers 8020113 and 7680C, were last calibrated as required by 10 CFR 34.33(b) on January 13, 1993 and March 30, 1992, respectively. Readings for pocket dosimeters were recorded as required by 10 CFR 34.33(b). Alarming ratemeters, serial numbers 6215

and 6224, were calibrated by the licensee on December 22 and 23, 1993, respectively. A NVLAP-approved dosimetry processor supplies the licensee's film badges.

No safety concerns were identified with the licensee's equipment.

8. Exit Interview

The inspection findings were discussed with the licensee representatives identified in Section 1 of this report at the licensee's Pittsburgh office on February 2, 1993.

ATTACHMENT 1

NRC Inspection Report No. 030-05985/93-001

PSI Report to NRC dated January 28, 1993

Professional Service Industries, Inc.
Corporate Office

January 28, 1993

U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, Pennsylvania 19406

Attention: Mr. Duncan White

Re: USNRC License No. 37-00276-25

Dear Mr. White:

In accordance with our telephone conversation of January 27, 1993, this letter is provided as a written report of the events that occurred during radiographic operations conducted on 1/17/93 at the Medusa Cement Company. The following summary is based on an investigation into the events, including interviews with the PSI employees involved and representatives of the Medusa Cement Company.

On 1/26/93, notification was received at PSI's Corporate office, Radiation Safety Department, of entrance into a high radiation area by two (2) unauthorized individuals during radiographic operations at the Medusa Cement Company facility (located at 2001 Portland Park, Wampum, PA). According to the PSI radiographer on the job, a "panoramic" radiograph was taken of an overhead vessel ("ball mill") using a Gamma Industries model Gammatron 100 exposure device containing 42 curies of cobalt-60. A "catwalk" is located adjacent to the 12-13 foot diameter vessel, and, according to the radiographer, "Caution - High Radiation Area" signs were placed on the opening of the vessel and on the handle of the radiographic exposure device (on the catwalk). The radiographer also indicated that "Caution - Radiation Area" signs were posted at "all main walkways" to the catwalk and on ropes in the area below the vessel. The foreman of the welding company (Steel City Fab.) notified the PSI radiographer that all employees were out of the area, at which time the PSI radiographer exposed the radiographic source and retreated to the restricted area boundary outside of the facility (see attached diagram). The radiographer reported that he moved to the restricted area boundary outside the building because the dust in the facility was practically unbearable.

The radiographer indicated that during the exposure, two individuals (employees of the Medusa Cement Company) entered the restricted area from the end of the building away from the vessel (again, see attached diagram). The PSI radiographer and assistant radiographer noticed the individuals as they exited the building on the ground floor near the restricted area boundary. The radiographer reportedly confronted both individuals to determine why they were in

510 East 22nd Street • Lombard, IL 60148 • Phone: 708/691-1490 • Fax: 708/691-1587

the area, where they had been and how long (approximately) they had been in the area.

According to the radiographer, the two individuals indicated that they had walked through the area looking for misplaced tools. The two individuals further indicated that the entire time they were in the area was approximately 2 to 2½ minutes. Upon further investigation it was determined that the individuals traversed the catwalk and entered the high radiation area toward the south end of the building where the vessel is located. The Safety Officer for Medusa Cement has indicated the two individuals stepped over the radiographic exposure device (which was posted with a high radiation area sign) to gain access to the high radiation area.

The source was exposed inside the vessel, which is constructed of 2½ inch thick steel. According to the individuals' statement at the time, they did not walk around to the open end of the vessel. (Apparently, the individuals were <u>not</u> directly exposed to the source as previously reported.)

Based on "worst case scenario" calculations, assuming the individuals were as close to the source as possible (10 feet) and in direct exposure (near open end of vessel) for the entire 2½ minute period, it is estimated their radiation exposure would have been .256 rem (2.56 mSv).

A written report of an estimation of the radiation exposure will be provided to the two individuals. A radiation safety meeting will be held with radiographic personnel with emphasis on maintenance of constant surveillance of high radiation areas and restriction of unauthorized personnel from restricted areas. PSI is currently considering appropriate action to be taken with the radiographer in question (training documentation attached, for review).

Should you have any questions or if I may be of assistance, please do not hesitate to contact me at 708/691-1490 (x 320).

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

John T. Thornton
Radiation Safety Director

JTT/

Attachments

cc: R. Barthelemy - Pittsburgh
J. Holleran - Pittsburgh
File

Professional Service Industries, Inc.

SHIPPING PAPER FOR HAZARDOUS MATERIALS (For Ground Transportation Only)

(See instructions on reverse side)

This is to certify that the herein-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

NATURE AND QUANTITY OF DANGEROUS GOODS

Proper Shipping Name and Radionuclide	I.D. Number	Activity, Form and Packaging Certification	Yellow II or Yellow III	Transport Index	Type A or Type B
Radioactive Material, Special Form, NOS Iridium 192 ☐ Cobalt 60 ☒ (Check one)	UN-2974	42 curies Special Form USA D.O.T. 9127 B(U) (See Instructions)	Radioactive Yellow II	1.5	Type B

REPORT OF RADIOACTIVE MATERIAL MAINTENANCE INSPECTION, LOCATION SURVEYS AND TRANSPORTATION

Removed 1-17-93 (Date) 7 AM (Time) Returned 1-17-93 (Date) 6:30 PM (Time)

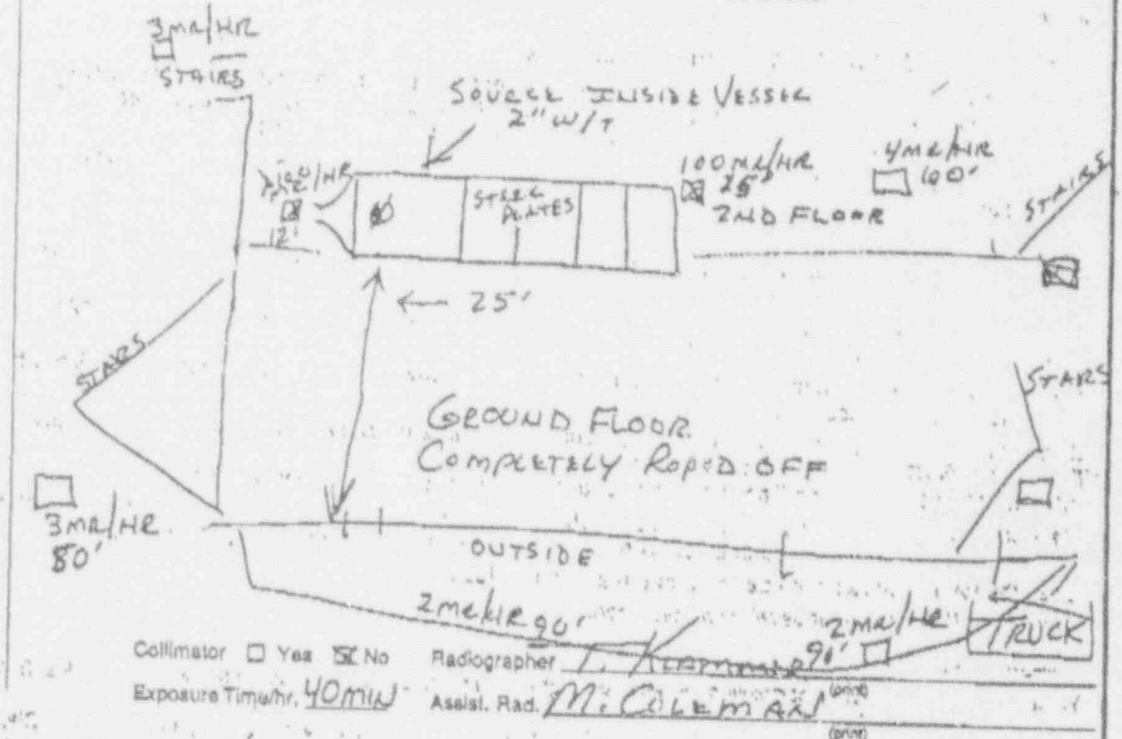
Client: FULLER
Order No.:
Survey Instrument: Make: RADECTOR
Exposure Device: Make: GAMMA
Isotope: ☒ Cobalt: ☐ Iridium SN: 2079

Location: MADUSA CEMENT WAMPUM PA
Type of Radiographic Job: RT MILL BALL
SN(s): 4374 4028
Model: TREN
Activity: 42 ci
Calibrated On: 11-2-92
SN: 53
Leak Tested On: 12-11-92

Maintenance Inspection
Check if OK:
- ☒ Device Housing
- ☒ Safety Plugs
- ☒ Lock Housing
- ☒ Source Tube
- ☒ Control Cable
- ☒ Corrosion Check
- ☒ Connectors
- ☐ Rotating Mechanism
- ☒ Device Locked
- ☒ Device ID
- ☒ Radioactive Labels
- ☐ Alarm System (if used)

Survey Readings:
Device Out 2.5 mR/hr max
Vehicle 4.5 mR/hr max
Passenger Compartment 4.5 mR/hr max
Device In 2.5 mR/hr max
Storage Area 4.5 mR/hr max

Sketch and Survey of Restricted Area
Show the source as ⊕. Show HRA as ☒ and RA as ☐ with locations, radiation readings and distances from source.



Collimator ☐ Yes ☒ No Radiographer T. Kammer
Exposure Time/hr. 40 MIN Asstst. Rad. M. Coleman (print)

REMARKS: R/A 6215, 6224

Distribution:
White—Lombard Radiation Records / Yellow—Division File
Pink—Vehicle / Gold—Storage Removal Area

I, [signature], certify that the above information is true and correct.

Division RSO

PSI 8-900-121

This will Certify that

TERRY KLAMMER

has passed Radiological Safety Orientation Questionnaire

and has been assigned designation Radiographer

This card valid only on work performed for Pittsburgh Testing Laboratory

Pittsburgh Testing Laboratory

April 19, 1979 — E. L. Andresky

Dated — E. L. Andresky, RSC

PITTSBURGH TESTING LABORATORY
ESTABLISHED 1861
850 POPLAR STREET, PITTSBURGH, PA. 15220

AREA CODE 412 TELEPHONE 922-4000

PLEASE REPLY TO
P. O. BOX [illegible]
PITTSBURGH, PA. 1523[illegible]

Date: April 10, 1979

To: Pittsburgh X-Ray

From: W. H. Levelius

Re: Approval Request for ☒ Radiographer

☐ Assistant Radiographer

Name: TERRY KLANNER

Subject approval is ☒ is not ☐ granted for the following reasons:

☐ Acknowledgement form not submitted (See Directive #2)

☐ RR-10 Training Report not submitted

☐ AEC-4 Form not submitted

☐ Required minimum hours of training not accomplished

☐ Oral Examination not received

☐ Examination not received

☐ Did not pass examination

☒ Other - Passed Examination with a Score of 86%

WHLevelius:glh

cc: E. Andresky