ENCLOSURE 2

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	030-20360
License:	50-23204-01
Report:	030-20360/96-01
Licensee:	Shannon & Wilson, Inc.
Facility:	Fairbanks Facility
Location:	Fairbanks, Alaska
Dates:	September 18 through November 5, 1996
Inspector:	E. M. Garcia, Senior Radiation Specialist
Approved by:	L. L. Howell, Chief Nuclear Materials Inspection and Fuel Cycle/Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplemental Inspection Information

EXECUTIVE SUMMARY

Shannon & Wilson, Inc.
Fairbanks, Alaska
NRC Inspection Report 030-20360/96-01

This routine inspection identified two apparent violations, two violations which are cited in a Notice of Violation issued concurrently with this report, and one non-cited violation (NCV). Shannon & Wilson, Inc., is licensed to use cesium-137 and americium-241 sources in moisture density gauges to measure the properties of construction materials. The licensee had five gauges and 10 individuals designated as gauge operators.

Radiation Protection Program

- An individual employed by the licensee whose assigned duties did not include handling radioactive materials appeared to have received a dose of approximately 0.228 rem between January and September 1996, a dose exceeding the annual dose limit of 0.1 rem for members of the public as specified in 10 CFR 1301(a)(1) (Section 1).

- The licensee had apparently not conducted surveys of radiation levels in unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public as required by 10 CFR 20.1302(a) (Section 1).

- The licensee had failed to maintain and post current copies of the regulations in Parts 19, 20, and 21, and Section 206 of the Energy Reorganization Act of 1974 (Section 2).

- During the NRC site visit, the licensee initiated corrective actions to address the preliminary findings of the inspection (Section 1).

- Other aspects of the radiation safety program appeared to be satisfactory. Dosimetry was available and used, posting of caution signs and labeling appeared as required, and personnel exposures were well within limits (Section 1).

Recordkeeping for Decommissioning

- An NCV was identified involving a failure to maintain information important to the safe and effective decommissioning of the facility in a single location as required by 10 CFR 30.35(g) (Section 3).

Report Details

1 RADIATION PROTECTION (87100, 83822)

1.1 Scope of Inspection

On September 18 and 19, 1996, the inspector conducted independent measurements, observed radiation safety practices, and discussed the radiation protection program with the radiation safety officer (RSO) and a gauge operator. The inspector also reviewed available records and observed the transport and use of a gauge in the field.

1.2 Observations and Findings

On September 18, 1996, the inspector accompanied the laboratory supervisor, also a gauge operator, during field use of a gauge. The gauge operator wore an appropriate personal monitoring device and demonstrated good radiation safety practices. The gauge was properly secured to the vehicle when transported to and from the field location. The shipping container was locked, properly labeled and marked, and a properly completed shipping paper was located in the cab of the vehicle.

Personnel dosimetry services had been provided by Siemens Medical Systems, Inc., a vendor approved by the National Voluntary Laboratory Accreditation Program. Badges had been exchanged quarterly. The inspector reviewed personnel dosimetry records from December 5, 1994, to June 30, 1996. The maximum recorded total effective dose equivalent (TEDE) for 1995 was 110 millirem (mrem). The maximum recorded TEDE for the period from January 1 to June 30, 1996, was 30 mrem. Both values are in compliance with the occupational dose limits in 10 CFR 20.1201.

The licensee had maintained a list of authorized gauge users, and all had received the required radiation safety and hazardous material training.

The inspector conducted a confirmatory radiation survey around the gauge storage area, both inside and outside the building. The survey identified a dose rate of 0.2 mrem/hour at the location where the supervisor of the hydrology division normally sits. (The chair was in its usual position at the supervisor's desk.) This individual had not used the gauges and was not trained as a radiation worker. Surveys performed outside the gauge storage area identified a contact dose rate of 0.6 mrem/hour. This reading was obtained on an outside wall near the building parking lot. These values were confirmed by a representative of the licensee using a survey instrument maintained by the licensee. (NOTE: The licensee is not required to maintain a survey instrument at its facility; however, the licensee did have an instrument available which was last calibrated on August 24, 1993.) The dose rates identified by the inspector were attributed to two gauges that were taken out of service and placed in temporary storage in a secured area designated for this purpose. The licensee's RSO stated that the gauges had been stored in the same location since November 1995.

The supervisor of the hydrology division stated that he had often worked 6 days a week and had spent up to 10 hours a day at his desk. He stated that an average of 6 hours per day and 5 days per week was a good estimate of the time he spent at his desk. The hydrology supervisor stated that this estimate would also account for any absences. He further noted that his desk had been at this location since January 1995. (As noted above, the gauges had only been stored without use in the designated storage location since November 1995.)

Based on information obtained during the surveys and interviews with personnel, the inspector calculated that from January 1 to September 18, 1996, the hydrology supervisor had received a dose of approximately 228 mrem (6 hrs/day X 5 days/week X 38 weeks X 0.2 mrem/hr = 228 mrem). The inspector reviewed this finding with the RSO who was not previously aware of the radiation levels at the hydrology supervisor's chair or at the outside wall of the building. As noted above, the supervisor of the hydrology division was not assigned duties involving exposure to radiation or radioactive materials and had not been trained as a radiation worker. He also was not aware of the radiation dose rate at his chair. Based on discussions with the RSO and the supervisor, it appeared that the licensee was previously unaware that the supervisor was being exposed to radiation while working at his assigned work station.

The inspector noted to the RSO that 10 CFR Part 20 prescribes limits for doses received by occupational workers and members of the public and also requires that licensees evaluate both. The inspector also noted that 10 CFR Part 20 defines what may be considered an occupational or public dose. 10 CFR 20.1003 defines *occupational dose* as the dose received by an individual in the course of employment in which the individual's assigned duties involved exposure to radiation and/or radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. *Public dose* means the dose received by a member of the public from exposure to radiation and/or radioactive material released by a licensee, or to any other source of radiation under the control of the license. Both an occupational and public dose exclude any dose received from background radiation, from any medical administration the individual has received, or from voluntary participation in medical research programs. In addition, a public dose excludes any radiation dose received as an occupational dose. A *member of the public* is defined as any individual except when that individual is receiving an occupational dose.

In reviewing this finding, it was noted that the licensee was unaware that the hydrology supervisor was being exposed to radiation. The licensee had not determined that his assigned work location involved any exposure to radiation and had not performed an evaluation of nor monitored the individual's exposure to radiation. Likewise, the individual was not trained or assigned to use radioactive materials in the course of his employment. Considering these facts, the NRC determined that the dose received by this individual was a public dose.

10 CFR 20.1301(a)(1) requires that each licensee conduct operations so that the total effective dose equivalent to individual members of the public from the licensed

operation does not exceed 0.1 rem (1 millisievert) in a year, exclusive from dose contributions from background radiation, any medical administration the individual has received, voluntary participation in medical research programs, and the licensee's disposal of radioactive material into sanitary sewerage in accordance with 10 CFR 20.2003. The licensee's failure to limit the annual dose received by the supervisor of the hydrology division, who is an individual member of the public, to 0.1 rem TEDE was identified as an apparent violation of 10 CFR 20.1301(a)(1) (030-20360/9601-01).

The licensee took immediate corrective action during the inspection to relocate and shield the gauges such that radiation levels in controlled and unrestricted areas were negligible.

10 CFR 20.1302(a) requires, in part, that each licensee make or cause to be made, as appropriate, surveys of radiation levels in unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public. The licensee had not conducted surveys of radiation levels in unrestricted and controlled areas to demonstrate compliance with the dose limits for individual members of the public as required by 10 CFR 20.1302(a) after two portable gauges were placed in a storage area in November 1995. As a result, the licensee did not realize that radiation levels in adjacent controlled and unrestricted areas exceeded applicable limits. This matter was identified as an apparent violation (030-20360/9601-02).

1.3 Conclusions

The licensee appeared to have an adequate radiation protection program with respect to training and qualification of gauge operators and transportation and use of the gauges. However, two apparent violations were identified relating to a failure to adequately evaluate radiation levels near a storage area after two gauges were relocated to the area for storage. As a result of this failure, the licensee was not aware that radiation levels exceeded allowable limits and a member of the public (licensee employee) received a dose in excess of the applicable limit.

2 POSTING AND LABELING (87100)

2.1 Scope of Inspection

The inspector toured the licensee's Fairbanks facility and discussed posting and labeling with the RSO.

2.2 Observations and Findings

The licensee had current copies of NRC Form-3, "Notice to Workers" posted in areas frequented by gauge users. The radioactive materials storage area was properly posted to indicate the presence of radioactive materials. However, during tours of the facility and based on discussions with licensee personnel, the inspector

noted that the licensee had not posted and did not have current copies of Parts 19, 20, and 21, and Section 206 of the Energy Reorganization Act of 1974.

10 CFR 19.11 requires, in part, that each licensee post current copies of the regulations in Parts 19 and 20. If posting is not practicable, the licensee may post a notice which describes the documents and states where they may be examined. 10 CFR 21.6. requires, in part, that each individual, partnership, corporation, dedicating entity, or other entity subject to the regulations in Part 21 post current copies of the regulations in Part 21 and Section 206 of the Energy Reorganization Act of 1974. If posting is not practicable, the licensee may post a notice which describes the documents and states where they may be examined. The licensee's failure to post 10 CFR Parts 19, 20, and 21 and Section 206 of the Energy Reorganization Act were identified as violations of 10 CFR 19.11 and 21.6 (030-20360/9601-03 and 9601-04, respectively).

2.3 Conclusions

Although the licensee had adequately posted an NRC Form-3, the licensee had not maintained and posted current copies of 10 CFR Parts 19, 20 and 21, or Section 206 of the Energy Reorganization Act of 1974.

3 RECORDKEEPING FOR DECOMMISSIONING (87100)

3.1 Scope of Inspection

The inspector discussed the requirements for recordkeeping for decommissioning with the RSO.

3.2 Observations and Findings

The inspector asked the RSO if the licensee maintained a file of information important to the safe and effective decommissioning of the facility in an identified location as required by 10 CFR 30.35(g). The RSO was not aware of this requirement and could not locate a file of the information. After some discussion the RSO agreed to establish the required file. This failure constitutes a violation of minor significance and is being treated as an NCV consistent with Section IV of the NRC Enforcement Policy (030-20360/9601-05).

3.3 Conclusions

The licensee was unfamiliar with the record keeping requirements for decommissioning but instituted corrective action after the inspector explained the regulation.

4 EXIT MEETING SUMMARY

On September 19, 1996, at the conclusion of the site visit, the inspector conducted a preliminary exit briefing with licensee representatives. A telephonic exit briefing was subsequently conducted on November 5, 1996, with licensee management. The inspector presented the apparent violations and non-cited violation. The NRC Enforcement Policy was discussed by the Chief, Nuclear Materials Inspection and Fuel Cycle/Decommissioning Branch.

The licensee acknowledged the findings presented and stated that they had initiated extensive corrective actions to address the problems identified. The company senior vice-president stated that it was his intention to be and remain in full compliance with all NRC regulations.

The inspector asked the licensee whether any material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT
SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Shannon & Wilson, Inc.

Rohn D. Abbott, Senior Vice President
James Aldrich, Senior Associate and Supervisor of Hydrology
Windfield Beach, Associate
Randall K. Fletcher, Laboratory Supervisor and Radiation Safety Officer

INSPECTION PROCEDURES USED

IP 83822: Radiation Protection
IP 86740: Inspection of Transportation Activities
IP 87100: Appendix E, Industrial/Academic/Research Inspection Field Notes

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

030-20360/9601-01	APV	Failure to limit the annual dose to a member of the public.
030-20360/9601-02	APV	Failure to make surveys to demonstrate compliance with the dose limits for individual members of the public.
030-20360/9601-03	VIO	Failure to post current copies of 10 CFR Parts 19 and 20.
030-20360/9601-04	VIO	Failure to post current copies of 10 CFR Part 21 and Section 206 of the Energy Reorganization Act of 1974.
030-20360/9601-04	NCV	Failure to maintain information important to decommissioning.

LIST OF ACRONYMS USED

APV	Apparent Violation
IP	Inspection Procedure
MREM	millirem
NCV	non-cited violation
NRC	Nuclear Regulatory Commission
RSO	radiation safety officer
TEDE	total effective dose equivalent
VIO	violation