March 9, 2010

Dr. Jay F. Kunze
Reactor Administrator
Idaho State University
P.O. Box 8060
Pocatello, ID 83209-8060

SUBJECT: IDAHO STATE UNIVERSITY - NRC NON-ROUTINE INSPECTION REPORT NO. 50-284/2010-201

Dear Dr. Kunze:

During the period of February 23-24, 2010, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted a non-routine inspection at the Idaho State University AGN-201M Reactor Facility (Inspection Report No. 50-284/2010-201). The enclosed report presents the results of that inspection.

The inspection team examined specific issues relating to the Petition Review Board's (PRB) final recommendation for partial acceptance of a petition filed by Dr. Kevan Crawford (Agencywide Document Access and Management System (ADAMS), Accession No. ML0928004320). The inspectors reviewed selected procedures, records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified; no response to this letter is required.

In accordance with 10 CFR 2.390, a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of ADAMS. ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact Greg Schoenebeck at 301-415-6345 or by electronic mail at Greg.Schoenebeck@nrc.gov.

Sincerely,

/RA/
Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-284
License No. R-110

Enclosure:
As stated

cc: Kevan Crawford
cc: See next page

cc:

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Test, Research and Training
Reactor Newsletter
202 Nuclear Sciences Center
University of Florida
Gainesville, FL 32611

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The inspection team examined specific issues relating to the Petition Review Board's (PRB) final recommendation for partial acceptance of a petition filed by Dr. Kevan Crawford (Agencywide Document Access and Management System (ADAMS), Accession No. ML0928004320). The inspectors reviewed selected procedures, records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified; no response to this letter is required.

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Docket No. 50-284
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cc: Kevan Crawford
cc: See next page

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ADAMS Accession No: ML100321367 NRC-002

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No:	50-284
License No:	R-110
Report No:	50-284/2010-201
Licensee:	Idaho State University
Facility:	AGN-201M Reactor Facility
Location:	Pocatello, Idaho
Dates:	February 23-24, 2010
Inspectors:	Gregory Schoenebeck Craig Bassett
Approved by:	Johnny H. Eads, Jr., Chief Research and Test Reactors Oversight Branch Division of Policy and Rulemaking Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Idaho State University
Report No.: 50-284/2010-201

On June 26, 2009, Dr. Kevan Crawford submitted a petition "Enforcement Action Against NRC Non-power Reactor Licensee Idaho State University (R-110)" (Agencywide Document Access and Management System (ADAMS) Accession No. ML091870436), pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 2.206. Upon review and processing of the petition, the U. S. Nuclear Regulatory Commission (NRC) adhered to the internal protocol set forth in Management Directive (MD) 8.11, "Review Process for 10 CFR 2.206 Petitions." Furthermore, during the review process of the petition, Dr. Crawford addressed the Agency's Petition Review Board (PRB) through a transcribed conference call which requested further enforcement action which supplemented the initial June 26, 2009, petition letter (ADAMS Accession No. ML092650381).

In accordance with MD 8.11, the NRC's PRB convened to consider Dr. Crawford's requests for immediate effective orders. The PRB concluded that Dr. Crawford's petition and supplemental information provided met the criteria for review under 10 CFR 2.206, and would be accepted in part. Issues that were not accepted into the 2.206 petition process did not satisfy the criteria as specified in MD 8.11.

The following lists the four issues from Dr. Crawford's petition which the PRB accepted for review, pursuant to 10 CFR 2.206, and the associated observations made during the inspection:

1) Failure to conduct 10 CFR 50.59 safety review of the modification of the Controlled Access Area by the addition of an undocumented roof access for siphon breaker experiment implemented prior to 1991. The June 26, 2009, petition letter states this allowed random student access to the roof of the reactor room.

   - Although no 10 CFR 50.59 reviews were found covering the Siphon Breaker Experiment or the personnel roof access ladder and hatch, it was not apparent that such a review was needed for either.

   - The personnel roof access ladder and hatch was known to and discussed by the Reactor Safety Committee and documented in various licensee documents.

   - At the time the modification was in place, the licensee developed a procedure to restrict access to the Reactor Room to be in compliance with the Physical Security Plan.

2) Release of controlled by-product nuclear materials in containers not certified in accordance with 10 CFR 71 for transport of such materials on public roads and not labeled with the required labeling.

   - Radioactive material to be shipped from the reactor facility is transferred to the Technical Safety Office (TSO) and that office is responsible for completing the transfer or shipment.

- Shipments of radioactive material are verified to be in compliance with the regulations and, if needed, a consultant is used at the request of the TSO.

- No shipments of radioactive material from or produced in the reactor have been made in the past several years.

3) Failure to require the reactor operator conducting the startup procedures to wear protective clothing to routinely remove the activated startup channel detector from the reactor core. The June 26, 2009, letter states that this was cited and mishandled in the 93-1 Notice of Violation (NRC Inspection Report 50-284/93-01).

- Supporting information from the 1993 NRC-ISU Enforcement Conference provided is consistent with the 10 CFR 20 requirements for conducting reasonable surveys under the circumstances to evaluate the extent of radiation hazards that may be present.

- Currently, the licensee does not employ Experimental Procedure 21 (EP-21), “Auto Reactivity Control System Operation” and the equipment is not in service at the facility. The present handling of the startup channel detector is performed in accordance with the approved procedures.

- A review of contamination and radiation survey logs was performed and no issues were identified.

4) Routine unprotected handling of an unshielded neutron source (reactor start-up source) by licensed operators and uncontrolled access by untrained and unlicensed facility visitors to this neutron source, violating 10 CFR 20 as low as reasonably achievable requirements.

- Radiation surveys performed by TSO staff during reactor operations indicate consistent dose rates on the order of 0.4 millirem per hour at the reactor console.

- Contamination surveys, involving the leak check for the Ra-Be startup source indicate levels below the threshold for minimum detectable activity of the liquid scintillation counter.

- Handling of the Ra-Be startup source is conducted in accordance with the facility approved practices.

REPORT DETAILS

Summary of Facility Status

Idaho State University (ISU, the licensee's) Aerojet General Nucleonics-201M (AGN-201M) Reactor Facility, licensed to operate at a maximum steady-state thermal power of 5 Watts (W), continues to be operated in support of operator training, surveillance, and minor utilization. During the inspection, the reactor was not operated due to on-going maintenance on control systems.

1. Failure to conduct a Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59 safety review of the modification of the Controlled Access Area by the addition of an undocumented roof access for siphon breaker experiment implemented prior to 1991. The June 26, 2009, petition letter states this allowed random student access to the roof of the reactor room.

a. Inspection Scope

The inspectors reviewed the following to ascertain the status of the licensee's past and present 10 CFR 50.59 review process and the security implications of the installation of the personnel roof access and the Siphon Breaker Experiment:

- Memorandum from the Reactor Administrator to the Reactor Supervisor dated August 4, 1989
- Memorandum from the Reactor Supervisor to the Reactor Administrator dated August 17, 1989
- Selected 10 CFR 50.59 Reviews conducted from 1975 through the present
- Technical Specifications for the Idaho State University AGN-201M Reactor, revised and incorporated in the Facility Operating License No. R-110, through License Amendment No. 6 dated August 14, 2006
- Safety Analysis Report for the Idaho State University AGN-201M Nuclear Reactor, Revision (Rev.) 4, dated 1995 and updated January 2003
- Physical Security Plan for the Nuclear Facilities at Idaho State University AGN-201M Nuclear Reactor and Subcritical Assembly," Rev. 3, Reactor Safety Committee approval dated February 23, 1990
- Physical Security Plan for the Nuclear Facilities at Idaho State University AGN-201M Nuclear Reactor and Subcritical Assembly," Rev. 4, Reactor Safety Committee approval dated January 27, 2003
- Annual Reports for the Nuclear Facilities at Idaho State University AGN-201M Nuclear Reactor for the years from 1975 through 2008
- Selected data documented in Idaho State University AGN-201 Reactor Operations Logs for the period from 1987 through the present including:
  - "Check Out," Form, ROL-101, Rev. 2, dated October 1987, page 1
  - "Prestart Data," Form, ROL-101, Rev. 2, dated October 1987, page 2
  - "Operational Data," Form, ROL-101, Rev. 2, dated October 1987, page 3

  - "Check Out," Form, ROL-101, Rev. 3, dated April 26, 1994, page 1
  - "Prestart Data," Form, ROL-101, Rev. 3, dated April 26, 1994, page 2
  - "Operational Data," Form, ROL-101, Rev. 3, dated April 26, 1994, page 3
- Selected records documenting the minutes of the Idaho State University Reactor Safety Committee (RSC) for the years from 1975 through the present
- Sundry other facility records for the period from 1975 through the present

b. Observations and Findings

The inspectors reviewed numerous records dating from 1975 through the present and interviewed present and former licensee facility employees. From these records and interviews the inspectors ascertained that the Siphon Breaker Experiment (SBE) was an experiment that did not involve, and was not connected by any means to, the licensee's research and test reactor. Because of the height of the piping involved in the SBE, it was decided to place the experiment inside the Reactor Room. Some of the piping extended out of the roof of the Reactor Room (through a temporary penetration in the equipment hatch cover plate) while the bottom portion of the SBE rested in the Gamma Irradiation pit. This provided sufficient vertical space for the experiment to be conducted but also required people working on the experiment to access the Reactor Room.

No 10 CFR 50.59 review of the SBE was found among the records reviewed by the inspectors. However, upon reviewing the SBE as it was described, it was not apparent that a 10 CFR 50.59 review was required. Also, a review of recent licensee 10 CFR 50.59 reviews demonstrated that the licensee was aware of the process and that various operating and safety aspects of modifications to existing structures and/or equipment needed to be reviewed (and, if needed, approved by the RSC, or the NRC if applicable) prior to implementing the changes.

During the August 1989 timeframe, there were concerns about the security of the Reactor Room (Room 20) because of various people needing access to the area. These concerns were brought to the attention of the Reactor Supervisor. After a review of the practices and security arrangements for operation of the SBE, a temporary procedure was implemented to restrict access to the Reactor Room and to ensure that the experimenters' activities were in compliance with the Physical Security Plan.

The inspectors also reviewed numerous records dating from 1975 through the present and interviewed present and former licensee facility employees concerning the installation of the personnel roof access ladder and hatch. It was noted that the ladder and roof hatch were installed to provide a secondary means of escape from the Reactor Room in case of emergency.

Through records review, it was noted that during the meeting of the RSC in 1989 the installation of the emergency escape ladder in the Reactor Room or Reactor Laboratory (Lab) was discussed, as was the installation of a fire alarm and smoke detector. The personnel roof access hatch was also addressed in Rev. 3 and Rev. 4 of the Physical Security Plan for the facility dated February 23, 1990, and January 27, 2003, respectively. No 10 CFR 50.59 review of the roof access hatch was found among the records reviewed by the inspectors. As noted above, it was apparent that the licensee was aware of the 10 CFR 50.59 review process which required that various operating and safety aspects of modifications to existing structures and/or equipment needed to be reviewed prior to initiating the changes. As with the SBE, it was not evident that a 10 CFR 50.59 review was required.

c. Conclusions

Although no 10 CFR 50.59 reviews were found covering the Siphon Breaker Experiment or the personnel roof access ladder and hatch, it was not apparent that such a review was needed for either. The personnel roof access ladder and hatch was known to and discussed by the RSC and documented in various licensee documents. The licensee developed a procedure to restrict access to the Reactor Room to be in compliance with the Physical Security Plan.

2. Release of controlled by-product nuclear materials in containers not certified in accordance with 10 CFR 71 for transport of such materials on public roads and not labeled with the required labeling.

a. Inspection Scope

The inspectors reviewed the following to determine the status of the licensee's past and present shipping process:

- Technical Specifications for the Idaho State University AGN-201M Reactor, revised and incorporated in the Facility Operating License No. R-110, through License Amendment No. 6 dated August 14, 2006
- Safety Analysis Report for the Idaho State University AGN-201M Nuclear Reactor, Revision (Rev.) 4, dated 1995 and updated January 2003
- Annual Reports for the Nuclear Facilities at Idaho State University AGN-201M Nuclear Reactor for the years from 1975 through 2008
- Selected Records documenting the minutes of the Idaho State University Reactor Safety Committee (RSC) for the years from 1975 through the present
- ISU AGN-201 Reactor Isotope Production and Disposition Forms for the years from 1990 through the present
- Idaho State University Radiation Safety Policy Manual, Rev. 8, dated August 17, 2009, containing Chapter 16 entitled, "Transportation and Shipment of Radioactive Materials," and Chapter 17 entitled, "Radioactive Waste Management"

- Technical Safety Office (TSO) Radiation Procedures and Records (RPR) No. 14, "Shipment of Excepted Quantities of Radioisotopes," including the following forms/attachments:
  - RPR 14, ISU-1, "Request for Shipment of Radioactive Material"
  - RPR 14, ISU-2, "Classification of Shipment of Limited Quantity of Radioactive Material"
  - RPR 14, ISU-3, "Authorization to Transport Limited Quantity of Radioactive Material"
- TSO RPR 55, "Shipment of Radioactive Material," including the following forms/attachments:
  - RPR 55-1, "Checklist Radioactive Shipments"
  - RPR 55-2, "Radioactive Packaging Checklist"
  - RPR 55-3, "Exclusive Use Vehicle Survey and Driver's Instructions"
  - RPR 55-4, "Instructions to Carrier for Maintaining Control of Shipment by Exclusive Vehicle"
- TSO Radiation Procedures Manual, Procedure No. TSO-09-16-REV 0, "Radioactive Material Inventory," effective date June 18, 2009

b. Observations and Findings

The inspectors reviewed various records dating from 1975 through the present and interviewed present and former licensee facility employees. From these records and interviews the inspectors determined that radioactive materials produced in the reactor were (and are) typically used in the Reactor Room or the adjacent laboratory and then left in/returned to the Reactor Room for decay. On occasion radioactive material is transferred to other individuals or groups for use elsewhere. In the past, the NRC noted problems in this area as documented in IR No. 50-284/93-01, dated November 4, 1993. As a result, the licensee took various actions to correct the problems and deficiencies. One action was to revise and improve the record keeping system for tracking byproduct material. The record system and the forms used in tracking material were reviewed by the inspectors. The material had either been transferred to an authorized/licensed individual or company as required or it was held in the Reactor Room until it had decayed to background or near background activity levels. No problems were noted.

Another action the licensee took as a result of the problems in 1993 was to revise the procedures for shipping radioactive materials from the ISU campus. In reviewing the current shipping procedures used at ISU, it was noted that radioactive material to be shipped from the reactor facility is required to be transferred to the campus Technical Safety Office (TSO). A person from that office, designated as the ISU Certified Shipper, is responsible for ensuring that the material is shipped in accordance with the rules specified by the Department of Transportation (DOT) in 49 CFR 171 through 180. If assistance is needed, a certified shipper from the Idaho National Laboratory is called in for advice and consultation to ensure that all aspects of the regulations are met including (but not limited to): 1) completion of the appropriate shipping papers, 2) use and

marking of properly certified containers, 3) attachment of the proper labeling, and 4) use of appropriate placards for the transport vehicle as needed. It was also noted that the ISU Certified Shipper had received the required training within the last two years.

The inspectors also conferred with NRC inspectors from the Region IV office concerning their review of the radioactive material shipping program at ISU. The inspectors from Region IV indicated that they had reviewed the ISU program for receiving, handling, and shipping byproduct and source material. No problems had been noted during the last three inspections.

A review of the available records indicated that no shipments of radioactive material from or produced in the reactor have been made in the past several years.

c. Conclusions

Radioactive material to be shipped from the reactor facility is required to be transferred to the TSO and that office is responsible for completing the transfer or shipment. Shipments of radioactive material are verified to be in compliance with the regulations and, if needed, with the help of a consultant. No shipments of radioactive material from or produced in the reactor have been made in the past several years.

3. Failure to require the reactor operator conducting the startup procedures to wear protective clothing to routinely remove the activated startup channel detector from the reactor core. The June 26, 2009, letter states that this was cited and mishandled in the 93-1 NOV (NRC Inspection Report 50-284/93-01).

a. Inspection Scope

The inspectors reviewed the following to verify compliance with facility procedures and 10 CFR 20 requirements:

- ISU AGN-201 Operating Procedures No, 1 (OP-1), Rev. 3 dated 1994
- ISU AGN-201 Operating Procedures No, 2 (OP-2), Rev. 3 dated 1994
- ISU AGN-201 General Operating Rules (GOR), Rev.4 dated 1994
- ISU Radiation Safety Manual (RSM), Rev.3 dated 2000
- Technical Specifications for the Idaho State University AGN-201 M Reactor, Amendment 6, dated 2003
- Experimental Procedure No. 8 (EP-8), Rev. 1 dated 1979
- Contamination and Radiation Survey Records from 2008 to present

b. Observations and Findings

NRC Inspection Report (50-284/93-01) (ADAMS Accession No. ML100490079) addressed the Apparent Violation (50-284/9301-07), where the inspectors noted that a radiation detector was used in association with Experimental Procedure 21

(EP-21), “Auto Reactivity Control System Operation” and was placed in the thermal column of the reactor, but not surveyed when removed. The purpose of the survey would have been to determine if activation products presented a radiological hazard to persons handling the detector. At the time of incidence, 10 CFR 20.201 (b), “Surveys” was cited for an apparent violation for the licensee’s failure to make reasonable surveys under the circumstances to evaluate the extent of radiation hazards that may be present.

The 1993, Notice of Violation (NRC Inspection Report 50-284/93-01) contains Enclosure No. 4, “Idaho State University Presentation” which was conducted by the ISU reactor facility staff during the NRC-ISU Enforcement Conference held on October 8, 1993. After Experiment No.21 is completed the ion chamber is left in the thermal column until another experiment requires the thermal column to be altered, which at that time surveys would be taken to determine radiation levels which would be recorded in the operations log. Based on the supplemental information provided during the Enforcement Conference, no citation was issued for the apparent violation.

The inspectors interviewed facility staff and determined that EP-21 has not been employed since 1995, and equipment is presently not in service at the facility. The inspectors followed-up on the current protocol with regards to handling of the startup channel detector (Channel No. 1). By verification of the procedure and through interviews with facility staff, it was determined that when reactor power reached the target threshold (as stated in OP-1), an operator would depress an automated raise switch which would move the detector from an area of high flux, to an area of lower flux within the water tank. The Channel No.1 detector is not removed from the water tank where it would be reasonable to conduct radiological surveys. The Channel No. 1 detector is lowered back into its fixed position by extending a solenoid arm external to the water tank.

The inspectors reviewed contamination and radiation survey records as required by TS Section 4.4c, RSM Sections 6.3 and 7.2, and Radiation Safety Procedures (e.g., EP-8). The inspectors reviewed logs of reactor operating and shutdown conditions, interviewed TSO staff, and performed an independent radiation survey and determined that readings were consistent and comparable to those with the licensee.

c. Conclusions

Supporting information from the 1993 NRC-ISU Enforcement Conference provided is consistent with the 10 CFR 20 requirements for conducting reasonable surveys under the circumstances to evaluate the extent of radiation hazards that may be present. Currently, the licensee does not employ Experimental Procedure 21 (EP-21), “Auto Reactivity Control System Operation” and the equipment is not in service at the facility. The present handling of the startup channel detector is performed in accordance with procedure. A review of contamination and radiation survey logs was performed without issue.

4. Routine unprotected handling of an unshielded neutron source (reactor start-up source) by licensed operators and uncontrolled access by untrained and unlicensed facility visitors to this neutron source, violating 10 CFR 20 ALARA requirements.

a. Inspection Scope

The inspectors reviewed the following to verify compliance with facility procedures and 10 CFR 20 requirements:

- ISU AGN-201 Operating Procedures No, 1 (OP-1), Rev. 3 dated 1994
- ISU AGN-201 Operating Procedures No, 2 (OP-2), Rev. 3 dated 1994
- ISU AGN-201 General Operating Rules (GOR), Rev.4 dated 1994
- ISU Radiation Safety Manual (RSM), Rev.3 dated 2000
- Technical Specifications for the Idaho State University AGN-201 M Reactor, Amendment 6, dated 2003
- Experimental Procedure No. 8 (EP-8), Rev. 1 dated 1979
- Contamination and Radiation Survey Records from 2008 to present
- Source Leak Check, December and June 2009
- Safety Analysis Report, Idaho State University AGN-201 M Research Reactor, updated January 2003

b. Observations and Findings

During the inspection period the reactor was inoperable due to maintenance to control systems. The inspectors reviewed contamination and radiation survey records as required by TS Section 4.4c, RSM Sections 6.3 and 7.2, and Radiation Safety Procedures (e.g., EP-8). Additionally, the inspectors reviewed logs of reactor operating and shutdown conditions, interviewed TSO staff, and performed an independent radiation survey and determined that readings were consistent and comparable to those with the licensee. The last Reactor Full Power Survey was conducted on 7/21/2009, by ISU TSO staff and determined that the radiation level at the reactor console during 4 W reactor power was 0.4 mr/hr. Streaming radiation from the one inch diameter access hole or “glory hole” is shielded by 12 inch thick, high density baryte concrete blocks which reduce the radiation levels. The level of radiation on the unshielded side of the glory hole, streaming away from reactor console, was 70 mr/hr at a distance of 1 m.

The inspectors reviewed records for leak checks of the 10 mCi Ra-Be source which is used during reactor startup. The records indicated that recorded levels during analyses were below the threshold for minimum detectable activity of the liquid scintillation counter.

The inspectors interviewed facility staff and reviewed the reactor startup procedure, OP-1. The procedure provides guidance for the operator to insert the Ra-Be startup source into the Glory Hole, Thermal Column, or a Beam port as needed for startup, however the current procedure does not explicitly provide a step for startup source removal and storage. Reactor Operators are trained to

remove the startup source at the point which the nominal rod height has been established and power has stabilized. The startup source is removed by hand and is stored in a lead shielded storage receptacle, known as a “pig”, for subsequent use.

The procedure does not explicitly state a requirement for protective clothing as the startup source does not directly come in contact with the operator during handling; it is currently threaded onto the end of a 6 foot aluminum rod which facilitates placement into the reactor.

c. Conclusions

Radiation surveys performed by TSO staff during reactor operations indicate consistent dose rates on the order of 0.4 mr/hr at the reactor console. Contamination surveys, involving the leak check for the Ra-Be startup source indicate levels below the threshold for minimum detectable activity of the liquid scintillation counter. Handling of the Ra-Be startup source is conducted in accordance with the approved procedure.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Kunze	Reactor Manager
A. Mallicoat	Reactor Supervisor
R. Brey	Director, ISU HP Program, Radiation Safety Officer
R. Acha	TSO
E. Shelton	TSO

Other Personnel

M. Whiting	Maintenance

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 92701	Follow-up

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED
N/A

CLOSED
N/A

DISCUSSED
N/A

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
ADAMS	Agencywide Documents Access and Management System
AGN-201M	Aerojet General Nucleonics-201M
ALARA	As Low As Reasonably Achievable
DOT	Department of Transportation
EP	Experimental Plan
E-Plan	Emergency Plan
IFI	Inspector Follow-up Item
IP	Inspection Procedure
ISU	Idaho State University
LCO	Limiting Conditions for Operation
MOU	Memorandum of Understanding
MP	Maintenance Procedure
NCV	Non-Cited Violation
NRC	U. S. Nuclear Regulatory Commission

PARTIAL LIST OF ACRONYMS USED (cont)

OP	Operating Procedure
PFD	Pocatello Fire Department
Rev	Revision
RO	Reactor Operator
RS	Reactor Supervisor
RSC	Reactor Safety Committee
RSM	Radiation Safety Manual
SBE	Siphon Breaker Experiment
SP	Surveillance Procedure
SRO	Senior Reactor Operator
TS	Technical Specification
TSO	Technical Safety Office
W	Watt