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**Office of Finance and Operations**

April 10, 2008

To: U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop O-5 C12
Washington, DC 20555-0001

RE: WPI RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION OF MARCH 11, 2008

WORCESTER POLYTECHNIC INSTITUTE REACTOR
DOCKET NO. 50-134

The following questions and answers represent WPI's response to your NRC letter of 3-11-08 pertaining to WPI's POL application. Each question is re-typed verbatim from the 3-11-08 letter:

Q 1. During review of your replacement technical specification (TS) pages, the NRC staff noticed changes that appear to be typographical errors that occurred when the replacement pages were retyped. For example, the page numbering of the TS pages does not match the table of contents and in the definition of "Cold, Clean, Critical Condition" the "F" appears to have been dropped after "75°." Other examples appear to exist in the replacement TS pages. Please review and submit replacement pages if needed to ensure they reflect the changes you want to make.

A 1. Some of the "typos" resulted from an inadvertant use of a previous version of the TS document, and this problem has been corrected by basing all proposed changes on TS authority file 9-12-88. The specific typos mentioned in Q1, regarding correcting the page numbers in the Table of Contents, and correcting 75°F in the TS 1.0 definition of "Cold, Clean, Critical Condition" have been corrected. The revised and corrected TS's are attached, in agreement with item-5 of your original RAI letter of 10-22-07 requesting that replacement TS pages be provided.

Q 2. Your answer to question 6 of our request for additional information dated October 22, 2007 (RAI) stated that the list of positions in the definition of "Readily on Call" is consistent with the positions that can serve as emergency director per the facility emergency plan (EP). While this is consistent with your letter of August 13, 2007, "Reply to a Notice of Violation," your EP and proposed definition of readily on call are inconsistent. Please address.

A 2. **TS 1.0 Definition, Readily Available on Call:** This TS definition appears to have evolved from a definition of availability unconnected to an individual's functionality, to a definition that now appears to be solely related to an EP function. WPI recognizes the confusion that this may cause, as the term "Readily Available on Call" may be used in differing contexts within multiple plans and procedures. Therefore, WPI proposes that this TS definition be limited to defining the



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concept of availability, with functionality (and Title) being specified whenever "Readily Available on Call" is referenced in a plan, procedure or other governing document. For example, in the case of WPI's Emergency Preparedness Plan, section 3.1.1 defines who may serve as Emergency Director. As such, WPI proposes the following definition of "Readily Available on Call" to mean an individual on duty within a reasonable driving time (1/2 hr) from the reactor building that can be contacted to fulfill duties as specified in the implementing plans and procedures.

The previous references in this definition to specific individuals, such as the licensed senior operator or licensed operators, have been deleted, to make the definition independent of an individual's EP function.

Q 3. The proposed wording for the safety limit on water level states that the minimum depth of water above the top of the end box of the core fuel elements in the reactor pool shall be 10 ft. However, you state that all fuel has been removed from the reactor core and placed in storage. The proposed safety limit appears to be inconsistent with the fuel in storage. Please discuss.

A 3. **TS 2.1 Safety Limits, Water Level:** Because WPI's fuel will never again be placed into the reactor core, the word "core" is deleted from this safety limit. This requires a minimum water depth of 10 feet above the top of the end box of the fuel elements, regardless of their location in storage. It is WPI's intent to maintain the existing pool water level requirements, even though the fuel is no longer in the core. This prior safety limit was appropriate for fuel in all possible configurations in the pool, i.e. fuel in the core or in the storage racks, thus a continued use of this minimum water level will provide an equivalent or better level of safety. By maintaining this water level limit, the need for analysis of alternate water levels, and the need to change procedures, level indicators and alarm set points can be avoided.

**TS 2.1 Safety Limits, Criticality, Shutdown Margin, Magnet Release and Blade Drop Times, Maximum Excess Reactivity, Control Blade Withdrawal, Startup Source Requirement, and Temperature and Void Coefficients:** These safety limits were deleted since each is inconsistent with WPI's shut down mode.

**TS 2.1 Safety Limits, Water Temperature:** The phrase "when fuel is in the pool" has been added to this limit, because water temperature contol is less critical once the fuel has been shipped from WPI. In the old TS, the second sentence that began "During critical operation of the reactor..." has been deleted since the reactor will not be operated.

**TS 2.2 General Operating Limitations, and TS 2.3 Experiments:** These two TS's have been deleted since they pertain to operation of the reactor, and WPI's reactor will not be operated.

Q 4. Your answer to question 8 of the RAI states that requirements for pool water purity and surveillance will be maintained during possession of the facility. However, your proposed wording of TS 3.1 (semiannual requirement) only requires measurements and calibrations of equipment as long as fuel is present in the pool. This appears to be an inconsistency. Please discuss.

A 4. **TS 3.1 Frequency of Surveillance, Semiannually:** The phrase "during possession of the facility" has been added to this section to make it clear that maintenance of the pool water purity and its surveillance will be required as long as WPI possesses the facility, even if the fuel has been removed.

In this Semiannually section we also deleted previous items 1, 2, 4, and 5, since each pertains to an operating reactor, and WPI's reactor will not operate again. Old (3) was renumbered to (1).

**TS 3.1 Frequency of Surveillance, Daily:** This section was deleted since it pertains to each day's critical operation of the reactor, which is inconsistent with WPI's inactive reactor.

**TS 3.1 Frequency of Surveillance, Annually:** This section was deleted since it pertains to removal of the fuel from the core to the storage racks to obtain blade drop and magnet release times, which pertain to an active reactor, inconsistent with WPI's shutdown reactor status.

**TS 3.2 Action to Be Taken:** We deleted the phrase "reactor startup proceeds" and replaced it with "being placed back in service", to reflect the fact that reactor startup shall not proceed, while maintaining the requirement to recheck an instrument after its maintenance or recalibration.

Q 5. It appears that you have made changes to TS 3.3, the section on portable monitors, which are not discussed in your application. Please discuss and justify all changes you are proposing. It also appears that there may be some typographical errors in this section. Please review and correct if necessary.

A 5. **TS 3.3 Radiation Detection:** Several of the apparent changes may have resulted by inadvertantly incorporating text from a wrong TS version, this problem has now been remedied.

**TS 3.3 Radiation Detection, Area Monitors:** In response to Q10 of your 10-22-07 letter, at the end of the paragraph we added the sentence "Area monitors shall be calibrated on a semi-annual basis".

**TS 3.3 Radiation Detection, Portable Monitors:** In the first sentence, the phrase "reactor operation" was deleted, to reflect the fact that WPI's reactor will not operate again. This phrase was replaced with "fuel handling or other operations involving or potentially involving sources of radiation" to recognize that radiation hazards still exist in the facility in shut down mode. This revision was deemed prudent because with the cessation of reactor operations, the TS requirement for having backup portable radiation detection equipment available would become moot, even though potential radiation hazards still exist in the facility. Thus, revising the TS requirement as indicated will extend the requirement for maintaining backup radiation detection equipment throughout the POL period. This justification was discussed in WPI's response letter of November 19, 2007.

**TS 4.2 Restricted Area and Exclusion Area:** As pointed out in your RAI letter of 10-22-07, item-11, the citation to 10 CFR 20.105 no longer exists, thus we have updated this citation to be 10 CFR 20.1301.

Q 6. It appears that you have made changes to TS 4.4, including eliminating part of the TS, which are not discussed in your application. Please discuss and justify all changes you are proposing.

A 6. **TS 4.4 Reactor Core, Fuel Elements:** The last sentence of this paragraph "A maximum of 28 standard fuel elements may be installed in the core" was replaced with the sentence "No fuel elements may be installed in the core", to reflect the fact that WPI's reactor will not operate again. The remainder of the fuel element description was retained to provide a description of the fuel that will be possessed and stored during the POL period.

The old paragraph that begins "Not more than two experimental fuel elements with sixteen removable fuel plates...." was deleted since it pertains to installation of the elements into the core which can not happen in WPI's shut down mode.

**TS 4.5 Reactor Safety and Control Systems:** This entire TS including Table 4.1 was deleted since it pertains to reactor operation, which is inconsistent with WPI's shut down mode.

**TS 5.1 Facility Administrator:** In this paragraph, the phrase "operation of the reactor facility" has been replaced with "maintaining the facility in a safe configuration", to reflect the fact that the reactor will not operate again, while recognizing that radiation safety is still very important. The phrase "Dean of Faculty" was replaced with "Provost" to refect WPI's current administration.

Q 7. The proposed wording for part of TS 5.2 given in your answer to question 14 and the wording in your replacement TS pages are different. Please discuss. Your proposed changes to TS 5.2 would remove the requirement that the Committee review and approve all proposed modifications affecting reactor safety, as well as general and specific types of experiments and procedures. Please justify this change.

A 7. **TS 5.2 Radiation, Health, and Safeguards Committee:** In this paragraph, first sentence, the phrase "and document" was added to ensure the records for modifications affecting safety are prepared. The phrase "as well as general and specific typed of experiments" has been deleted to reflect the fact that no experiments will be performed, thus the need for WPI's RHSC to oversee such experiments is eliminated. The phrase "including determination of unreviewed safety questions" has been removed, because in amendments to 10 CFR 50.59 the NRC eliminated this terminology from the regulation, as pointed out in Q14 in your 10-22-07 letter. The phrase "President or Vice President" has been replaced with "Provost" to refect WPI's current administration.

Q 8. In your proposed changes to TS 5.6, you have proposed dropping the requirement to keep certain records. These records could be useful in the development of your decommissioning plan (e.g., operating records can be used to determine activation of components). Also, these records may be needed to show compliance with regulatory requirements. Please elaborate further on why the requirement to keep these records can be eliminated.

A 8. **TS 5.6 Operating Records:** In the first sentence, we added the phrase "generated and" in front of "kept" to reflect which reports will be newly generated during WPI's POL period. We propose dropping old items 1, 3, 5, and 7, since each of these items pertains to reactor operation, emergency shutdowns, experiments, or incore irradiations, none of which apply to a shut down reactor for newly generated reports. Old items 2, 4, and 6 have been renumbered. To ensure that old records generated while the reactor was operating are kept to facilitate decommissioning, the following sentence was added at the end of section 5.6 "Old records pertaining to operation of the reactor, including power levels, emergency shutdowns, inadvertant scrams, experiments, and incore irradiations, shall be kept for purposes of decommissioning".

Q 9. It appears that you have proposed changes to TS 5.7 that are not discussed in your application. Please discuss and justify all changes that you are proposing.

A 9. **TS 5.7 Reports (1):** In the first sentence, we propose deleting the phrase "operation of the reactor" since WPI's reactor will not operate, and replace with "safe storage of the facility" in accordance with WPI's ongoing concern for a shut down reactor. In the first sentence we also

propose exchanging the word "nuclear" for "safety" to reflect WPI's ongoing concern for radiation safety.

**TS 5.7 Reports (1), (2), (3):** In 3 places in TS 5.7, we update the old Division of Reactor Projects-III, IV, V & Special Projects (DRSP) to the Division of Waste Management and Environmental Protection (DWMEP) as requested in NRC letter 10-22-07, item-15.

**TS 5.7 Reports (2):** we replaced the phrase "disclosed by operation of the reactor" with "of conditions", to remove any references to an operational reactor, while retaining WPI's requirement to report to the Director substantial variance from conditions set forth in the SAR or TS's. Without these changes, items (1) and (2) would become moot due to the permanent cessation of reactor operations.

**TS 5.8 Annual Operating Reports:** In item-1 we replaced the phrase "operating experience" with the word "issues", to reflect the fact that no operating experience will occur in our shut down mode, while retaining the requirement to report on safety issues in WPI's Annual Report.

Item-1 (e): 10 CFR 50.59 (a) no longer exists, as pointed out in NRC letter 10-22-07, item-16, so this citation was replaced with 10 CFR 50.59 (d)(2) .

Item-1 (f): we removed the word "operating" in front of staff to reflect the shut down mode of the reactor. We also replaced the phrase "Health Physisict" with "SRO, RSO, ARSO" to reflect WPI's current facility staff.

Old Item (2) Power Generation and Old Item (3) Shutdowns were deleted since they pertain to an operating reactor.

Old Items (4), (5) and (6) were renumbered to items (2), (3), and (4).

Old Item (5) 10 CFR 50.59 (a) no longer exists, as pointed out in NRC letter 10-22-07, item-16, so this citation was replaced with 10 CFR 50.59 (d)(2) .

Q 10. Your application of August 13, 2007, contained proposed changes to TS 5.9. Your proposed TS pages do not contain your proposed changes. Please address.

A 10. **TS 5.9 Fuel Storage:** In the third paragraph beginning "All fuel element transfers..., we deleted the phrase "to or from the reactor core" to be consistent with WPI's fuel remaining in a storage position. We also replaced the phrase "licensed operator" with "RSO" to be consistent with WPI's existing staff.

**TS 5.10 Initial Startup of Altered Core Configuration:** We deleted this TS since it pertains to reactor startup, inconsistent with WPI's shut down mode.

We certify under penalty of perjury that the foregoing is true and correct to the best of our knowledge. Executed on March 31, 2008.

Sincerely,

David S. Adams
WPI RSO

Michael J. Curley
Reactor Director
University Compliance Officer
Finance and Operations

Reviewed and approved by an officer of WPI, as indicated by the signature below:

Jeffrey Solomon
Executive Vice President

Attachment: Revised and corrected Technical Specifications (TSs).

cc:
Alexander Adams Jr.
U.S. Nuclear Regulatory Commission
Mail Stop O12-D1
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Attachment A

# APPENDIX A

TO LICENSE NO. R-61

TECHNICAL SPECIFICATIONS FOR THE

WORCESTER POLYTECHNIC INSTITUTE REACTOR

Revised April 10, 2008

DOCKET NO. 50-134

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The actual values of dimensions, measurements, and other numerical values may differ from values given in these specifications to the extent of normal construction and manufacturing tolerances, or normal accuracy of instrumentation.

## 1.0 DEFINITIONS

Cold, Clean, Critical Condition: Since xenon and samarium effects are negligible for this reactor in its normal operations, the term cold, clean, critical shall refer to the condition of the reactor core when it is at the normal ambient water temperature of 70° to 75°F and free of any experiments that could affect reactivity.

Critical Reactor Operation: Critical reactor operation shall refer to any situation when more than 12 fuel elements are loaded in the core and any control blade is withdrawn more than 6 in.

Experiment: An experiment shall mean any apparatus, device, or material installed in the core or in external experimental facilities that is not a normal part of those facilities.

Movable Experiment: A movable experiment is one that may be inserted, removed, or manipulated while the reactor is critical.

Operable: An instrument or channel is operable when the instrument or channel will be operational once it is energized.

Operational: An instrument or channel is operational when that instrument or channel is installed, energized, and in all other respects performing the monitoring and safety functions for which it was intended.

Reactor Operation: Reactor operation shall be any condition wherein either the reactor key is inserted into the console lock or the reactor is not in a shutdown condition.

Reactor Safety System: The reactor safety system is that combination of control channels and associated circuitry that forms the automatic protective system for the reactor or provides information that requires manual protective action to be initiated.

Reactor Scram: Reactor scram shall be the rapid insertion of the three control blades into the core by either of the following methods:

(1) Relay (slow) scram: Reactor relay scram (slow scram) shall be instigated by the relay scram circuits which control current inputs for the trip amplifier. Interruption of this current shall de-energize the scram magnets.

(2) Electronic (fast) scram: Reactor electronic scram (fast scram) shall be caused by the application of sufficient negative bias in the trip amplifier to terminate current to the scram magnets.

Readily Available on Call: Readily available on call shall mean an individual on duty within a reasonable driving time (1/2 hr) from the reactor building, that can be contacted to fulfill duties as specified in the implementing plans and procedures.

Reportable Occurrence: A reportable occurrence is any of the following conditions:

(1) a safety system setting less conservative than the limiting setting established in the Technical Specifications

(2) operation in violation of a limiting condition for operation established in the Technical Specifications

(3) a safety system component malfunction or other component or system malfunction that during operation could, or threatens to, make the safety system incapable of performing its intended safety functions

(4) release of fission products from a failed fuel element

(5) an uncontrolled or unplanned release of radioactive material from the restricted area of the facility

(6) an uncontrolled or unplanned release of radioactive material that results in concentrations of radioactive materials within the restricted area in excess of the limits specified in Appendix B, Table 1 of 10 CFR 20

(7) an uncontrolled or unanticipated change in reactivity in excess of 0.5% $\Delta k/k$

(8) conditions arising from natural or man-made events that affect or threaten to affect the safe operation of the facility

(9) an observed inadequacy in the implementation of administrative or procedural controls such that the inadequacy causes or threatens to cause the existence or development of an unsafe condition in connection with the operation of the facility

Shutdown Condition:

The reactor shall be deemed to be in the shutdown condition if no control or regulating blade is withdrawn from its fully inserted position or if there are less than 12 fuel elements loaded on the grid plate.

## 2.0 SAFETY LIMITS AND OPERATING RESTRICTIONS

### 2.1 Safety Limits

Radiation Alarms: Upon indication of radiation levels in excess of 50 mrems/hr (20 mrems/hr for fuel storage) area monitors shall actuate audible evacuation alarms in the reactor room and in the second and third floor areas above the reactor pool.

Radiation Levels: The maximum radiation levels 1 m above the pool surface and at the surface of the concrete shield, when the beam port and thermal column are closed, shall be less than 50 mrems/hr.

Water Level: The minimum depth of water above the top of the end box of the fuel elements in the reactor pool shall be 10 ft.

Water Purity: Corrective action shall be taken promptly if the following limits for the pool water are not met.

(1) pH less than 8.0 and greater than 6.0
(2) resistivity greater than $5 \times 10^{-5}$ ohm-cm
(3) pool water activity less than $10^{-5}$ uCi/ml

Water Temperature: The maximum bulk water temperature of the reactor pool shall be 110°F and the minimum shall be 40°F, when fuel is in the pool.

## 3.0 SURVEILLANCE REQUIREMENTS

### 3.1 Frequency of Surveillance

Quarterly: The area radiation monitoring systems and the pool water level switch shall be checked and ensured to be operational quarterly.

Semiannually: At least semiannually, during possession of the facility, a reactor inspection shall be performed consisting of

(1) Pool water pH shall be measured and conductivity and pH devices shall be calibrated.

### 3.2 Action to be Taken

If maintenance or recalibration is required for any of the items, it shall be performed and the instrument shall be rechecked before being placed back in service.

### 3.3 Radiation Detection

Area Monitors: Area radiation sensors capable of detecting gamma radiation in the range of 0.1 to 100 mrems/hr shall be installed near the beam port, demineralizer, thermal column door, fuel storage area, and less than 1 m above the core pool surface. Upon indication of radiation levels in excess of 50 mrems/hr (20 mrems/hr for fuel storage) these monitors shall actuate audible alarms in the reactor room and in the second and third floor areas above the reactor pool. Area monitors shall be calibrated on a semi-annual basis.

Portable area monitors capable of detecting gamma radiation in the range of 0.10 to 50 mRems/hr may temporarily replace fixed area monitors described above provided that the required alarms are operational.

Portable Monitors: During fuel handling or other operations involving or potentially involving sources of radiation, operable portable survey instruments shall be readily available to the reactor operator for measuring beta-gamma exposure rates in the range 1.0 mrems/hr to 50 rems/hr, and fast plus thermal neutron dose rates from 0.04 to 1,000 mrems/hr. One or more portable survey instruments for measuring beta-gamma exposure rates in the range 10 mrems/hr to 50 rems/hr will be kept available to the reactor staff in an external location (normally the security office) to facilitate obtaining radiation readings if a reactor radiation alarm should be activated.

## 4.0 SITE AND DESIGN FEATURES

### 4.1 Site

The reactor and associated equipment is housed in the Washburn Laboratories located between West Street and Boynton Street on the campus of Worcester Polytechnic Institute in Worcester, Massachusetts.

### 4.2 Restricted Area and Exclusion Area

The reactor room shall constitute a restricted area as defined in 10 CFR 20 and shall be controlled by partitions and normally locked doors. In addition, two small areas, one each on the second and third floors of Washburn Laboratories, directly above the reactor control drives, shall become restricted areas whenever the radiation levels in any of the rooms exceed those specified in 10 CFR 20.1301. The exclusion areas, as defined in 10 CFR 100, shall consist of the reactor room and the areas above the reactors.

### 4.3 Reactor Building and Ventilation System

The reactor shall be housed in a closed room that is designed to restrict leakage. The ventilation system shall provide at least two changes of air per hour in the reactor room whenever the reactor is operating.

### 4.4 Reactor Core

Fuel Elements: Standard fuel elements shall be flat plate type consisting of uranium-aluminum alloy clad with aluminum. The width and depth of each fuel element shall be 3 in. x 3 in. Each element shall have an active length of 24 in. There shall be a maximum of 10 g of U-235 in each fuel plate and not more than 170 g of U-235 in any fuel element. The fuel shall be enriched to less than 20% U-235. Standard fuel elements have 18 fuel plates, each plate 1.52 mm thick with a clad thickness of 0.381 mm on each side. No fuel elements may be installed in the core.

## 5.0 ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

### 5.1 Facility Administrator

The Director of the Nuclear Reactor Facilities shall have full responsibility for maintaining the facility in a safe configuration. The Director shall report to the Provost and shall be responsible to the Radiation, Health, and Safeguards Committee for conformance to the facility license provisions and all local and NRC safety regulations. The Director also shall be responsible for proper maintenance of such records and operating practices as the Committee may deem necessary for the safe storage of the facility.

### 5.2 Radiation, Health, and Safeguards Committee

A Radiation, Health, and Safeguards Committee shall review, approve and document all proposed modifications affecting reactor safety, pursuant to 10 CFR 50.59. This committee also shall conduct, at least quarterly, reviews of operations, equipment performance, records, and procedures. The Committee shall establish written procedures regarding review methods, quorums, and subcommittees, and it shall maintain written records of its activities. The members of the Committee shall be appointed by the Provost of Worcester Polytechnic Institute (WPI) and a majority shall be WPI faculty members.

### 5.3 Radiological Safety Officer

A Radiological Safety Officer shall be appointed to serve on the Radiation, Health, and Safeguards Committee and to review and approve all proposed procedures and experiments concerning radiological safety. The Radiological Safety Officer shall advise the Director of the Nuclear Reactor Facilities of rules, regulations, and procedures relating to radiological safety and shall routinely conduct radiation surveys.

### 5.4 Fire Protection

The licensee shall provide heat or ionization-type smoke detectors, which will alarm when there is a fire in the reactor room. At least two such detectors shall be operable at all times.

### 5.5 Procedures

Detailed written procedures shall be provided for all normal operations of the reactor, supporting facilities, maintenance operations, radiation protection, experiments, and emergency plans and operations. These procedures shall be approved by the Radiation, Health, and Safeguards Committee before they are implemented.

Temporary procedures that do not change the intent of the initial approval procedures may be authorized by two members of the facility staff at least one of whom shall be a licensed senior operator. Such procedures shall be subsequently reviewed by the Radiation, Health, and Safeguards Committee.

5.6 Operating Records

In addition to records required elsewhere in the license application, the following records shall be generated and kept of

(1) maximum radioactivity released or discharged into the air or water beyond the effective control of the licensee as measured at or before the point of such release or discharge

(2) maintenance operations involving substitution or replacement of reactor equipment or components

(3) tests and measurements performed pursuant to the Technical Specifications

Old records pertaining to operation of the reactor, including power levels, emergency shutdowns, inadvertant scrams, experiments, and incore irradiations, shall be kept for purposes of decommissioning.

5.7 Reports

In addition to reports otherwise required under this license and applicable regulations

(1) The licensee shall inform the Commission of any incident or condition relating to the safe storage of the facility that prevented or could have prevented a safety system from performing its safety function as described in the Technical Specifications. For each such occurrence, WPI shall promptly notify, by telephone or telegraph, the Administrator or the appropriate NRC Regional Office listed in Appendix D of 10 CFR 20 and shall submit within 10 days a report in writing to the Director, Division of Waste Management and Environmental Protection (DWMEP), with a copy to the Regional Office.

(2) The licensee shall report to the Director, DWMEP, in writing within 30 days, any observed occurrence of substantial variance of conditions from performance specifications contained in the Safety Analysis Report or the Technical Specifications.

(3) The licensee report to the Director, DWMEP, in writing within 30 days, any occurrence of significant changes in transient or accident analysis as described in the SAR.

## 5.8 Annual Operating Reports

A report covering the previous year shall be submitted to the Administrator of the appropriate Regional Office not later than March 31 of each year. It shall include

(1) Operations Summary: a summary of issues having safety significance occurring during the reporting period, including

- (a) changes in facility design
- (b) performance characteristics (e.g., equipment and fuel performance)
- (c) changes in operating procedures that relate to the safety of facility operations
- (d) any abnormal results of surveillance tests and inspections required by these Technical Specifications
- (e) a brief summary of those changes, tests, and experiments that did not require authorization from the Commission pursuant to 10 CFR 50.59 (d)(2)
- (f) changes in the plant staff serving in the positions of Reactor Facility Director, SRO, RSO, ARSO, or Radiation, Health, and Safety Committee members

(2) Maintenance: a discussion of corrective maintenance (excluding preventative maintenance) performed during the reporting period on safety related systems and components

(3) Changes, Tests, and Experiments: a brief description and a summary of the safety evaluation for those changes, tests, and experiments that were carried out without prior Commission approval, pursuant to the requirements of 10 CFR 50.59 (d)(2)

(4) Radioactive Effluents Releases: a statement of the quantities of radioactive effluents released from the plant

## 5.9 Fuel Storage

Two fuel storage racks are located on opposite sides of the reactor pool. Each rack shall be designed to contain not more than 18 fuel elements. When the reactor contains a critical mass, all additional fuel elements not in the core shall be locked in place except as authorized by the licensed senior operator in charge.

A fuel element shall not be stored outside of the reactor pool unless it produces radiation dose levels of less than 100 mrems/hr at the storage container surface. Storage containers of fuel elements shall be locked closed when unattended.

All fuel element transfers shall be conducted by a staff of not less than three persons, which shall include a licensed senior operator in charge and a RSO. Staff members will continuously monitor the operations using appropriate radiation monitoring and core nuclear instrumentation.