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February 11, 2010

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Mail stop: 12D03
Washington, DC 20555-0001

REFERENCE: Docket 50-407
The University of Utah – TRIGA Research Reactor (UUTR)
License No. R-126

SUBJECT 1): **Copy of the markedup current TS: only the Chapter 6.0 titled ADMINISTRATIVE CONTROLS (the rest of the TS document was not changed and is the same as the one submitted as part of the SAR documentation dated Jun 2009)**

The University of Utah TRIGA research reactor (UUTR) is submitting the clarification in administrative controls, especially clarifying the organizational chart shown as Figure 6.1, Pg. 26 in the current TS Chapter 14, Chapter 6.0. The organizational chart is redrawn to more clearly show the organization and management, lines of communication and lines of responsibilities and reporting. This is designed to be in full compliance with the ANSI/ANS 15.1-2007, ANSI/ANS 15.4-2007 and NUREG 1537 Part 1 & 2. The wording of the textual part of the Chapter 6.0 was revised as markedup, and in compliance with the ANSI/ANS 15.1-2007, ANSI/ANS 15.4-2007. According to our line of communication and reporting, the Chair of the Reactor Safety Committee and the Associate VP for Research, have approved the clarifications provided in the markedup document.

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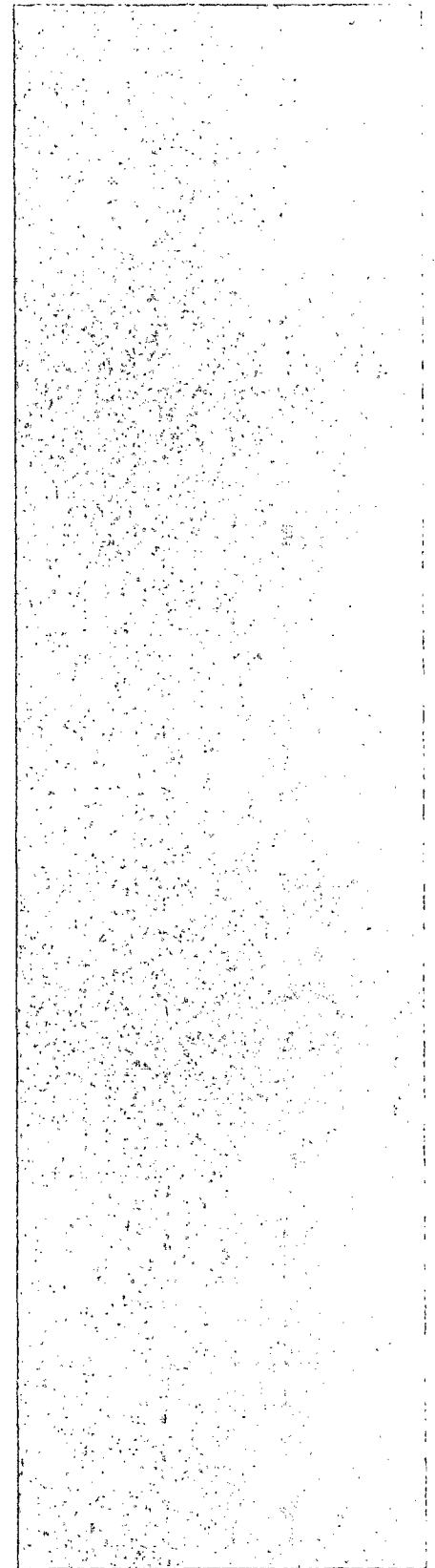
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Chapter 14

Technical Specifications

Note: changes from the current TS are highlighted, crossed-out and in red text
Only Chapter 6 is revised: HIGHLIGHTED, CROSSED-OUT, ADD IN RED TEXT / under the Amendment 7.
This Document therefore contains ONLY Chapter 6.

FACILITY LICENSE R-126
TECHNICAL SPECIFICATIONS
AND BASES
FOR THE UNIVERSITY OF UTAH
TRIGA REACTOR
DOCKET 50-407



**TECHNICAL SPECIFICATIONS AND BASES FOR THE UNIVERSITY OF UTAH
TRIGA NUCLEAR REACTOR**

This document constitutes the Technical Specifications for the Facility License No. R-126 and supersedes all prior Technical Specifications. Included in these Technical Specifications are the "Basis" to support information the selection and significance of the specification. The bases are included for information purposes only. They are not part of the technical Specifications, and they do not constitute limitations or requirements to which the licensee must adhere. Furthermore, the dimensions, measurements and other numeric values given in these specifications may differ slightly from actual values because of normal construction and manufacturing tolerances, or normal degree of accuracy of the instrumentation.

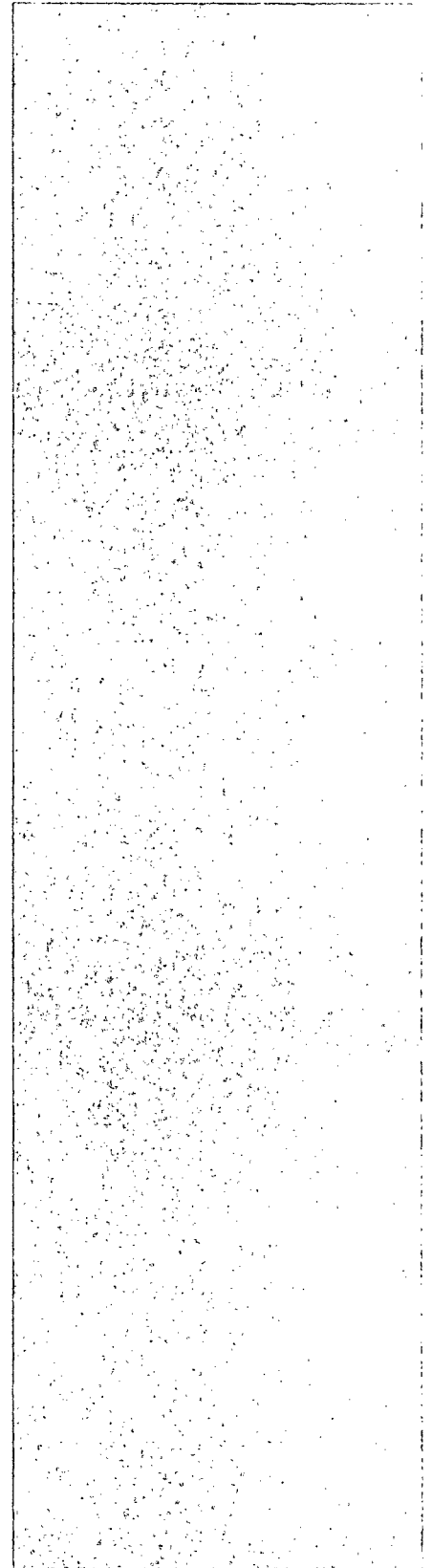


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Comment [tj1]: This Document contains ONLY the pages of the revised Chapter 6.0

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6.0 ADMINISTRATIVE CONTROLS

6.1 Responsibility

~~The facility shall be under the direct control of a licensed Senior Reactor Operator (SRO) designated by the Reactor Supervisor (RS) who is also a licensed Senior Reactor Operator. The SRO shall be responsible to the RS for the overall facility operation including the safe operation and maintenance of the facility and associated equipment. The SRO shall also be responsible for ensuring that all operations are conducted in a safe manner and within the limits prescribed by the facility license, federal and state regulations, and requirements of the Reactor Safety Committee.~~

Comment [tj2]: Main titles and subtitles are changed to follow the ANSI/ANS 15.1-2007 and NUREG 1537 Part 1 & 2 standards.

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Comment [tj3]: Moved below under 6.1.2

6.2 Organization

6.1 Organization

6.1.1 Structure

- ~~1) (1) The reactor facility shall be~~ **The UUTR is** an integral part of the Nuclear Engineering Laboratory **Nuclear Engineering Facilities (NEF)** of the University of Utah. The organization of the facility management and operation shall be as shown in Figure 6.1. The responsibilities and authority of each member of the operating staff shall be defined in writing.
- 2) **As indicated in Fig. 6.1, the Reactor Safety Committee shall report to Level 1. Radiation safety personnel shall report to Level 2. Additional description of levels follows:**
 - a. **Level 1: Individual responsible for the reactor facility's licenses, i.e., the Associate Vice President for Research in the Office of Vice President for Research; The Vice President for Research will assign which of the Associate Vice Presidents for Research will be the responsible Level 1 individual.**
 - b. **Level 2: Individual responsible for reactor facility operation, i.e., the facility director shall be the Director of the Utah Nuclear Engineering Program, who shall also be the Director of the Nuclear Engineering Facilities (NEF) of the University of Utah.**
 - c. **Level 3: Individual responsible for day-to-day operation or shift shall be the reactor supervisor (RS). This person shall be a senior reactor operator (SRO).**

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d. ~~Level 4. Operating staff shall be senior reactor operators, reactor operators, and trainees.~~

3) ~~Transition plan shall be defined as follows:~~

a. ~~In the absence of the Level 2 individual [sabbatical leave, sudden leave]: Level 1 shall have the authority to automatically appoint the RS as an interim reactor administrator (RA) with direct access to Level 1 and communication to U.S.N.R.C; Radiation safety personnel shall report to RA unless Level 1 decides differently.~~

b. ~~In the absence of the Level 3 individual [sabbatical leave, sudden leave]: Level 2 shall have the authority to automatically appoint a new RS who shall be a most senior Level 4 individual (SRO).~~

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~~(2) When the reactor is not secured, the minimum staff shall consist of~~

~~(a) Reactor Operator (RO) at the controls (may be the SRO or RS);~~

~~(b) Senior Reactor Operator (SRO) on call but not necessarily on site;~~

~~(c) Another person present at the facility complex who is able to carry out prescribed written instructions;~~

Comment [tj5]: Clarified under 6.1.2:

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6.1.2 Responsibility

~~The facility shall be under the direct control of a licensed Senior Reactor Operator (SRO) designated by the Reactor Supervisor (RS) who is also a licensed Senior Reactor Operator. The SRO shall be responsible to the RS for the overall facility operation including the safe operation and maintenance of the facility and associated equipment. The SRO shall also be responsible for ensuring that all operations are conducted in a safe manner and within the limits prescribed by the facility license, federal and state regulations, and requirements of the Reactor Safety Committee.~~

Comment [tj6]: This original text clarified as 6.1.2:

~~Responsibility for the safe operation of the reactor facility shall be with the chain of command established in Fig. 6.1 following ANSI/ANS 15.1-2007:~~

~~1) Individuals at the various management levels, in addition to having responsibility for the policies and operation of the reactor facility, shall be responsible for safeguarding the public and facility personnel from undue radiation exposures and for adhering to all requirements of the operating license or charter and technical specifications.~~

~~2) In all instances, responsibilities of one level may be assumed by designated alternates or by higher levels, conditional upon appropriate qualifications.~~

~~3) The reactor facility shall be under the direct control of a licensed Senior Reactor Operator (SRO) designated by the Reactor Supervisor (RS) who is also a licensed Senior Reactor Operator. The SRO shall be responsible to the RS for the overall~~

~~facility operation including the safe operation and maintenance of the facility and associated equipment. The SRO shall also be responsible for ensuring that all operations are conducted in a safe manner and within the limits prescribed by the facility license, federal and state regulations, and requirements of the Reactor Safety Committee.~~

6.3 Facility Staff Qualifications

~~Each member of the facility staff shall meet or exceed the minimum qualifications of ANS 15.4 "Standard for the Selection and Training of Personnel for Research Reactors" for comparable positions.~~

6.1.3 Staffing

- 1) ~~When the reactor is not secured, the minimum staff shall consist of:~~
 - a. ~~A licensed reactor operator in the control room, e.g., Reactor Operator (RO) (may be the SRO or RS).~~
 - b. ~~A designated Senior Reactor Operator (SRO) on call but not necessarily on site.~~
 - c. ~~Another person present at the facility complex who is able to carry out prescribed written instructions.~~
- 2) ~~A list of reactor facility personnel by name and telephone number shall be readily available in the control room for use by the operator. Level 1/2The list shall include:~~
 - a. ~~management personnel.~~
 - b. ~~radiation safety personnel.~~
 - c. ~~other operations personnel.~~
- 3) ~~Events requiring the presence at the facility of the senior reactor operator are:~~
 - a. ~~initial startup and approach to power.~~
 - b. ~~all fuel or control-rod relocations within the reactor core region.~~
 - c. ~~relocation of any experiment with reactivity worth greater than one dollar.~~
 - d. ~~recovery from unplanned or unscheduled shutdown or significant power reduction.~~

6.4 Training

~~The Reactor Supervisor shall be responsible for the facility's Requalification Training Program and Operator Training Program.~~

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Comment [tj9]: Clarified as 6.1.4

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6.1.4 Selection and Training of Personnel

The selection, training, and requalification of operations personnel shall meet or exceed the requirements of American National Standard "Selection and Training of Personnel for Research Reactors," ANSI OANS-15.4-1988 ~R1999, Sections 4 through 7.

The Reactor Supervisor shall be responsible for the facility's Requalification Training Program and Operator Training Program.

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6.5 Reactor Safety Committee

6.5.1 Function

Comment [tj10]: Replaced with 6.2 and 6.2.1

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6.2 Reactor Safety Committee

6.2.1 Function

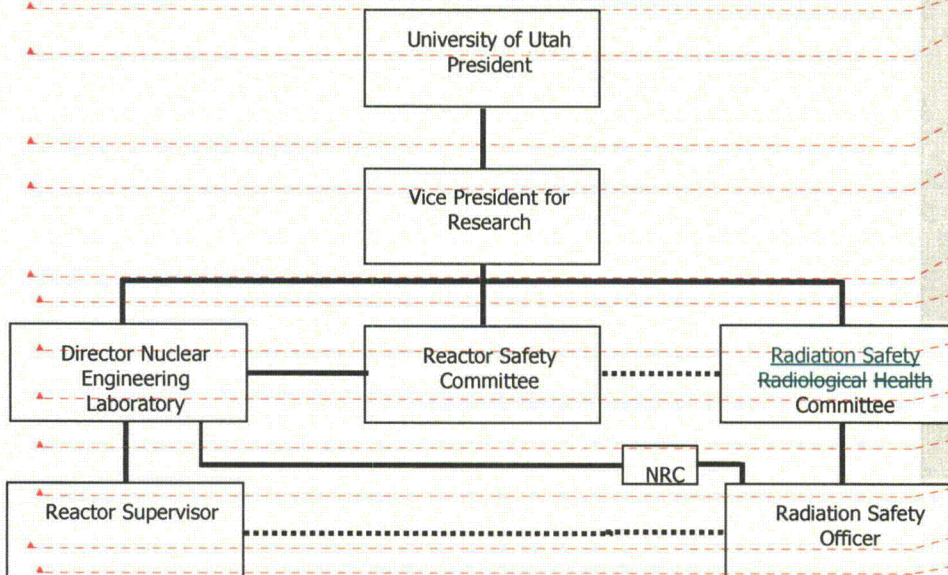
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The RSC The Reactor Safety Committee (RSC) shall function to provide an independent review and audit of the facility's activities including:

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- (1) reactor operations
- (2) radiological safety



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Reactor Operators

— Line of Responsibility

..... Line of Communication

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Figure 6.1

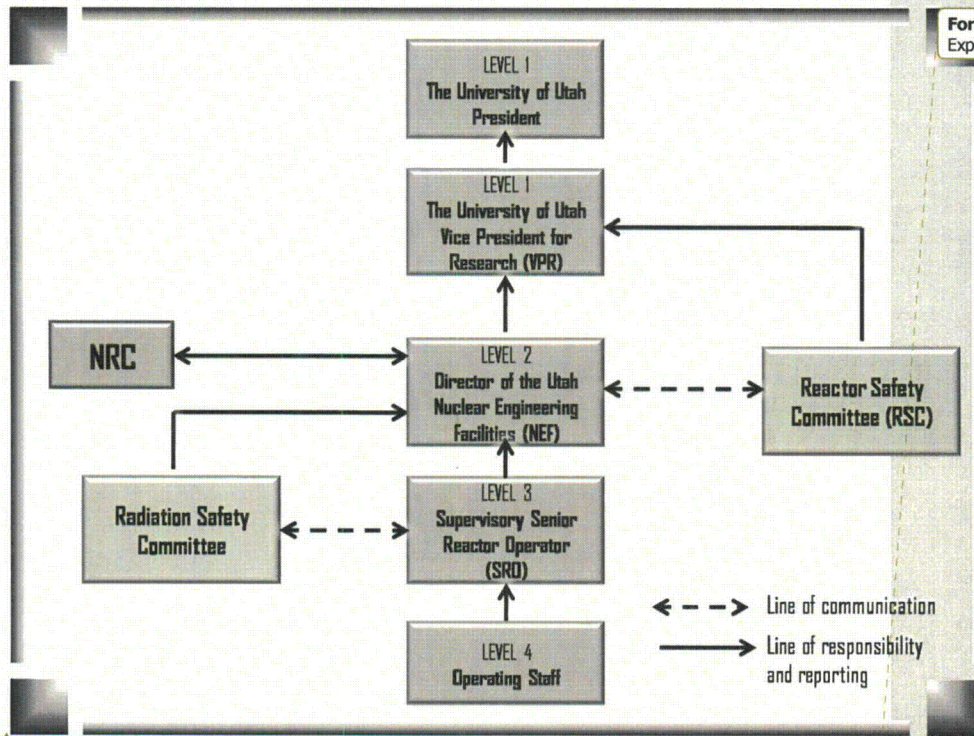
University of Utah Administrative Organization for Nuclear Reactor Operations

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Comment [tj11]: This figure is replaced with the new one that clarifies lines of responsibility and lines of communication

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Figure 6.1
University of Utah Administrative Organization for Nuclear Reactor Operations [Clarified - December 2009; in compliance with ANSI/ANS 15.1-2007]

Comment [tj12]: Clarified Organizational Chart

- 3) general safety
- 4) testing and experiments
- 5) licensing and reports
- 6) quality assurance

6.5.2 Composition and Qualifications

6.2.2 Composition and Qualifications

The RSC shall be composed of at least five members knowledgeable in fields that relate to nuclear reactor safety. ~~The members shall collectively represent a broad spectrum of expertise in the appropriate reactor technology.~~

The members of the committee shall include the Reactor Supervisor and faculty and staff members designated to serve on the committee. The University's Radiation Safety Officer shall be an ex officio member of the ~~committee~~ RSC.

~~Members and alternates shall be appointed by and report to Level 1 management. Individuals may be either from within or outside the operating organization (univ. Qualified and approved alternates may serve in the absence of regular members.~~

6.5.3 Operation

6.2.3 Operation

The Reactor Safety Committee shall operate in accordance with a written charter, including provisions for

(1) meeting frequency: ~~the full committee shall meet at least semiannually and a subcommittee thereof shall meet at least quarterly~~ not less than once per calendar year and more frequently as circumstances warrant, consistent with effective monitoring of facility activities

(2) ~~voting rules~~

(3) ~~quorums: chairman or his designate and two members~~

2) voting and quorums: a quorum shall be made up of the chairman or his designate and voting members such that at least half of the voting body is represented, and where the Level 2 facility director and anyone who reports directly to him/her (such as Level 3 and Level 4 personnel) does not constitute a voting majority

(34) ~~method of submission and content of presentations to the committee use of subcommittees~~

(45) review, approval, and dissemination of minutes in timely manner

6.5.4 Reviews

6.2.4 Review Function

The responsibilities of the RSC or designed Subcommittee(s) thereof shall include, but is not limited to the following:

(1) review and approval of all new experiments utilizing the reactor facility

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Comment [tj14]: Replaced with 6.2.3

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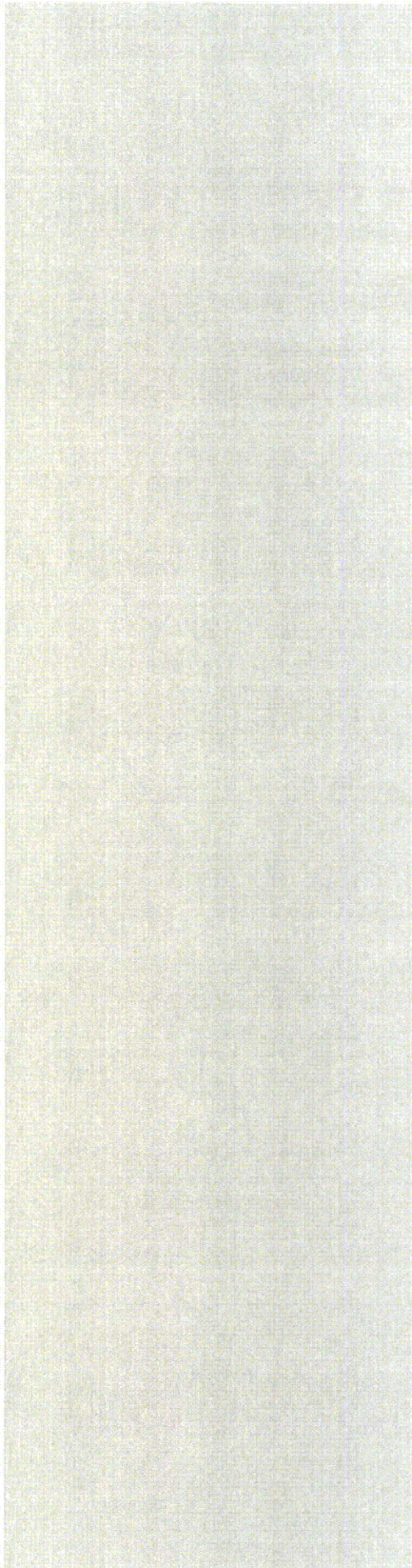
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Comment [tj16]: Replaced with 6.2.4

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- (2) review and approval of all proposed changes to the facility license by amendment, and to the Technical Specifications
- (3) review of the operation and operational records of the facility
- (4) review of significant operating abnormalities or deviations from normal and expected performance of facility equipment that affect nuclear safety.
- (5) review of approval of all determinations of whether a proposed change, test, or experiment would constitute a change in the Technical Specifications or on unreviewed safety questions as defined by 10 CFR 50.59.



- (6) review of reportable occurrences and the reports filed with the Commissions for said occurrences
- (7) review and approval of all standard operating procedures and changes thereto
- (8) biennial review of all standard procedures, the facility emergency plan, and the facility security plan.

A written report or minutes of the findings and recommendations of the review group shall be submitted to Level 1 and the review and audit group members in a timely manner after the review has been completed.

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6.5.5 Audits

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6.2.5 Audits

Comment [tj17]: Replaced with 6.2.5

The RSC or a subcommittee thereof shall audit reactor operations semiannually, but at intervals not to exceed 8 months. The semiannual audit shall include at least the following:

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- (1) review of the reactor operating records
- (2) inspection of the reactor operating areas
- (3) review of unusual or abnormal vents
- (4) radiation exposures at the facility and adjacent environs

6.5.6 Records

Comment [tj18]: Replaced with 6.2.6

6.2.6 Records

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The activities of the RSC shall be documented by the committee and the RSC shall maintain a file of the minutes of all meetings.

6.3 Radiation Safety

Comment [tj19]: Added

The Radiation Safety Office of the University of Utah shall be assigned responsibility for implementing the radiation protection program at the reactor using the guidelines of American National Standard "Radiation Protection at Research Reactor Facilities," ANSI/ANS-15.11-1993 (R2004). The Radiation Safety Officer shall report to Level 2 [Fig. 6.1].

6.5 Experiments Review and Approval

Approved experiments shall be carried out in accordance with established and approved procedures as described in 6.4.

Comment [tj20]: Added as 6.5

6.6 Quality Assurance

Comment [tj21]: Becomes 6.9

6.9 Quality Assurance

In accordance with Regulatory Guide 2.5 and ANSI 402, "Quality Assurance Program Requirements for Research Reactors," Section 2.17, the facility shall not be required to prepare quality assurance documentation for the as-built facility. Quality assurance (QA) requirements will still be limited to those specified in Section 2.17 as follows:

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"All replacements, modifications, and changes to systems having a safety related function shall be subjected to a QA review. Insofar as possible, the replacement, modification, or change shall be documented as meeting the requirements of the original system or component and have equal or better performance or reliability."

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"The required audit function shall be performed as specified in Section 6.5.5."

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6.7 Action To Be Taken in the Event a Safety Limit is Exceeded

Comment [tj22]: Becomes 6.6

6.6 Required Actions

6.6.1 Action To Be Taken in the Event a Safety Limit is Exceeded

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In the event a safety limit is exceeded:

- (1) The reactor shall be shut down and reactor operation shall not be resumed until authorized by the U.S. Nuclear Regulatory Commission (~~NRC~~) (U.S.N.R.C.).

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(2) An immediate report of the occurrence shall be made to ~~Level 2 and to the~~ Chairman of the Reactor Safety Committee, and reports shall be made to the ~~NRC in accordance with Section 6.10~~ U.S.N.R.C in accordance with Section 6.7 of these specifications.

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(3) A report shall be prepared that shall include an analysis of the causes and extent of possible resultant damage, efficacy of corrective action, and recommendations for measures to prevent or reduce the probability of recurrence. This report shall be submitted to the Reactor Safety Committee for review and then submitted to the ~~NRC~~ U.S.N.R.C when authorization is sought to resume operation of the reactor.

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(4) A report shall be made to the ~~U.S.N.R.CNRC~~ in accordance with Section ~~6.106.7~~ of these specifications.

6.8 Operating Procedures

6.4 Operating Procedures

Written operating procedures shall be adequate to ensure the safety of operation of the reactor, but shall not preclude the use of independent judgment and action should the situation require such. Operating procedures shall be in effect for the following items:

- (1) performing irradiations and experiments
- (2) startup, operation, and shutdown of the reactor
- (3) emergency situations including provisions for building evacuation, earthquake, radiation emergencies, fire or explosion, personal injury, civil disorder, and bomb threat
- (4) core changes and fuel movement
- (5) control element removal and replacement
- (6) performing preventive maintenance and calibration tests on the reactor and associated equipment
- (7) power equipment

Substantive changes to the above procedures shall be made only with the approval of the Reactor Supervisor. Temporary changes to the procedures that do not change their original intent may be made by a licensed SRO. All such changes shall be documented and subsequently reviewed by the Reactor Safety Committee.

Comment [tj23]: Becomes 6.4

6.9 Facility Operating Records

6.8 Facility Operating Records

Comment [tj24]: Becomes 6.8

In addition to the requirements of applicable regulations, and in no way substituting for those requirements, records and logs shall be prepared for at least the following items and retained for a period of at least 5 years for items (1) through (6) and indefinitely for items (7) through (11).

- (1) normal reactor operation
- (2) principal maintenance activities
- (3) abnormal occurrences
- (4) equipment and component surveillance activities required by the Technical Specifications
- (5) experiments performed with the reactor
- (6) gaseous and liquid radioactive effluents released to the environs
- (7) offsite inventories and transfers
- (8) fuel inventories and transfers
- (9) facility radiation and contamination surveys
- (10) radiation exposures for all personnel
- (11) updated, corrected, and as-built drawings of the facility

6.10 Reporting Requirements

6.7 Reports

In addition to the requirements of applicable regulations, and in no way substituting for those requirements, reports shall be made to the ~~NRC-U.S.N.R.C.~~ IS as follows:

- (1) A report within 24 hours by telephone ~~and telegraph~~ to the ~~Regional Administrator~~ Project Manager, Region IV, U.S.N.R.C., of
 - (a) any accidental release of radioactivity above permissible limits in unrestricted areas whether or not the release resulted in property damage, personal injury, or exposure;
 - (b) any violation of the safety limit;
 - (c) any reportable occurrence as defined in Section 1.1, "Reportable Occurrence," of these specifications.
- (2) A report within 10 days in writing to the Document Control Center, U.S.N.R.C., Washington, D.C., with a copy to the ~~Regional Administrator, Region IV U.S.N.R.C. Operations, of~~
 - (a) any accidental release or radioactivity above permissible limits in unrestricted areas whether or not the release resulted in property damage, personal injury, or exposure. The written report (and, to the extent possible, the preliminary telephone or telegraph report) shall describe, analyze, and evaluate safety implications, and outline the corrective measures taken or planned to prevent recurrence of the event.

Comment [tj25]: Becomes 6.7

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- (b) any violation of safety limit,
 - (c) any reportable occurrence as defined in Section 1.1, "Reportable Occurrence," of these specifications.
- (3) A report within 30 days in writing to the Document Control Center, U.S.N.R.C., Washington, D.C. with a copy to the ~~Regional Administrator, Region IV~~ U.S.N.R.C. Operations, of
- (a) any significant variation of measured values from a corresponding predicted or previously measured value of safety connected operating characteristics occurring during operation of the reactor,
 - (b) any significant change in the transient or accident analysis is described in the Safety Analysis Report,
 - (c) any significant changes in facility organization,
 - (d) any observed inadequacies in the implementation of administrative or procedural controls.
- (4) A report within 60 days after completion of startup testing of the reactor (in writing to the Director, Office of Nuclear Reactor Regulation, USNRC, Washington, D.C. 20555) upon receipt of a new facility license or an amendment to the license authorizing an increase in reactor power level describing the measured values of the operating conditions including:
- (a) an evaluation of facility performance to date in comparison with design predictions and specifications,
 - (b) a reassessment of the safety analysis submitted with the license application in light of measured operating characteristics when such measurements indicate that there may be substantial variance from prior analysis.
- (5) An annual report within 60 days following the 30th of June of each year (in writing) to the Document Control Center, U.S.N.R.C., Washington, D.C. with a copy to the ~~Regional Administrator, Region IV~~ U.S.N.R.C. Operations, providing the following information:
- (a) a brief narrative summary of (i) operating experience (including experiments performed), (ii) changes in facility design, performance characteristics, and operating procedures related to reactor safety and occurring during the reporting period, and (iii) results of surveillance tests and inspections:
 - (b) tabulation of the energy output (in Megawatt-days) of the reactor, hours reactor was critical and the cumulative total energy output since initial criticality;
 - (c) the number of emergency shutdowns and inadvertent scrams, including reasons for them;

- (d) discussion of the major maintenance operations performed during the period, including the effect, if any, on the safety of the operation of the reactor and the reasons for any corrective maintenance required;
- (e) a brief description, including a summary of the safety evaluations of changes in the facility or in procedures and of tests and experiments carried out pursuant to 10 CFR 50.59;
- (f) a summary of the nature, and amount of radioactive effluents released or discharged to the environs beyond the effective control of the licensee as measured at or before the point of such release or discharge:

Liquid Waste (summarized on a monthly basis)

- (i) radioactivity discharged during the reporting period
 - total estimated quantity of radioactivity released (in curies) an estimation of the specific activity for each detectable radionuclide present if the specific activity of the released material after dilution is greater than $1 \times 10^{-7} \mu\text{Ci/cc}$.
 - summary of the total release (in curies) of each nuclide determined just above for the reporting period based on representative isotopic analysis,
 - estimated average concentration of the released radioactive material at the point of release for the reporting period in terms of $\mu\text{Ci/cc}$ and fraction of the applicable MPE DAC or Effluent concentration
- (ii) total volume (in gallons) of effluent water (including dilutant) released during each period of release.

Gaseous Waste (summarized on a monthly basis)

- (i) radioactivity discharged during the reporting period (in curies)
 - total estimated quantity of radioactivity released (in curies) determined by an appropriate sampling and counting method,
 - total estimated quantity of argon-41 released (in curies) during the reporting period based on data from an appropriate monitoring system.

- estimated average atmospheric diluted concentration of argon-41 released during the reporting period in terms of $\mu\text{Ci}/\text{cc}$ and fraction of the applicable MPC-DAC value.
- total estimated quantity of radioactivity in particulate form with half-lives greater than 8 days (in curies) released during the reporting period as determined by an appropriate particulate monitoring system.
- average concentration of radioactive particulates with half-lives greater than 8 days released in $\mu\text{Ci}/\text{cc}$ during the reporting period, and
- an estimate of the average concentration of other significant radionuclides present in the gaseous waste discharge in terms of $\mu\text{Ci}/\text{cc}$ and fraction of the applicable MPC-DAC-value for the reporting period if the estimated release is greater than 20% of the applicable MPC-DAC.

Solid Waste (summarized on an annual basis)

- (i) total amount of solid waste packaged (in cubic feet),
 - (ii) total activity in solid waste (in curies),
 - (iii) the dates of shipment and disposition (if shipped off site).
- (g) An annual summary of the radiation exposure received by facility personnel and visitors in terms of the average radiation exposure per individual and greater exposure per individual and greater exposure per individual in the two groups. Each significant exposure in excess of the limits of 10 CFR 20 should be reported, including the time and data of the exposure as well as the circumstances that led up to the exposure.
- (h) An annual summary of the radiation levels of contamination observed during routine surveys performed at the facility in terms of the average and highest levels.
- (i) An annual summary of any environmental surveys performed outside the facility.