

July 7, 2000

Dr. Wade J. Richards, Facility Director
University of California, Davis
McClellan Nuclear Radiation Center
5335 Price Avenue
McClellan Air Force Base
Sacramento, CA 95652-2504

SUBJECT: NRC INSPECTION REPORT NO. 50-607/00-201

Dear Dr. Richards:

On February 7-11, 2000, the United States Nuclear Regulatory Commission (NRC) conducted an announced inspection of the McClellan Nuclear Radiation Center Research Reactor. The enclosed report presents the results of that inspection.

Various aspects of your reactor operation and safeguards programs were inspected, including selective examinations of procedures and representative records, interviews with personnel, and observations of the facility.

Based on the results of this inspection, no safety concern or noncompliance with NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," 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 NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Your cooperation is appreciated. Should you have any questions concerning this inspection, please contact Mr. Stephen Holmes at 301-415-8583.

Sincerely,

/RA/

Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-607

Enclosure: NRC Inspection Report No. 50-607/00-202

cc w/enclosure: Please see next page

McClellan AFB TRIGA Reactor

Docket No. 50-607

cc:

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

Mr. Kevin Smith
Vice Chancellor
University of California - Davis
One Shields Avenue
Davis, CA 95616-8558

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

Docket No: 50-607

Report No: 50-607/00-202

Licensee: University of California, Davis

Facility: McClellan Nuclear Radiation Center

Location: McClellan Air Force Base
Sacramento, California

Dates: February 7-11, 2000

Inspector: Stephen W. Holmes, Reactor Inspector

Approved by: Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of selected aspects of the following: Organizational Structure and Functions, Experiments, Operations, Fuel Handling, Procedures, Operator Requalification, Review and Audit, Surveillance, Maintenance, Design Control , and Security Programs since the last NRC inspection in these areas.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS

The operations organizational structure and functions were consistent with Technical Specifications (TS) requirements for current shift operations.

EXPERIMENTS

Licensee control and performance of experiments met TS and regulatory requirements.

OPERATIONS

Operational activities were consistent with applicable requirements.

FUEL HANDLING

Fuel handling activities and documentation were as required by TS and facility procedures. No safety concerns were identified.

PROCEDURES

Facility procedures and use satisfied TS requirements. Reactor operating records and logs were being maintained as required by TS.

OPERATOR REQUALIFICATION

The Requalification program was being acceptably implemented. TS and NRC-approved Requalification plan requirements were met.

REVIEW AND AUDIT

The review and audit program satisfied TS requirements.

SURVEILLANCE

The licensee's program for surveillance and limiting conditions for operation (LCO) confirmations satisfied TS requirements.

MAINTENANCE

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements. Facility condition was well maintained for its intended function and use.

DESIGN CONTROL

The licensee's design change procedures were in place and were implemented as required.

SECURITY

Security facilities, equipment, and procedures satisfied the Physical Protection Plan (PPP) requirements.

REPORT DETAILS

Summary of Plant Status

Reactor operations were continuing with one shift a day. Activities included neutron radiography, operator training, experimental irradiations, and TS inspections and surveillances. No safety concerns were noted.

1. **ORGANIZATIONAL STRUCTURE AND FUNCTION**

a. Inspection Scope (39745)

The inspector reviewed selected aspects of:

- operations organization and staffing
- qualifications
- management responsibilities
- administrative controls

b. Observations and Findings

The operations organizational structure had not functionally changed since the last inspection. Operators included the Facility Director, the Operations Supervisor, and a number of Senior Reactor Operators (SRO) and Reactor Operators. The reactor staff satisfied the training and experience required by the TS. Operation logs and records confirmed that shift staffing met the duty and on-call personnel requirements. Review of records verified that management responsibilities were administered as required by TS and applicable procedures.

Since the last inspection, control of the McClellan Nuclear Radiation Center had been transferred to the University of California, Davis (UCD). Science Applications International Corporation had been contracted by UCD to run the facility under the supervision of the facility director, Dr. Wade Richards, now a faculty member of UCD.

c. Conclusions

The operations organizational structure and functions were consistent with TS requirements for current shift operations.

2. **EXPERIMENTS**

a. Inspection Scope (Inspection Procedure 69005)

The inspector reviewed selected aspects of:

- experimental program requirements
- procedures
- logs and records
- approved reactor experiments

- Nuclear Safety Committee (NSC) minutes
- experimental administrative controls and precautions
- an experimental neutron radiographic run

b. Observations and Findings

Experiments were pre-screened/reviewed and approved by the Experimental Review Board or referred to the NSC as required. Review of the experiment procedures and reactor log books, interviews with staff, and observation verified that experiments were constrained as required by the TS and experiment authorization. Experiments were also installed, performed, and removed as outlined in the experiment authorization and procedures. The NSC review of experiments ensured evaluation for unreviewed safety questions or TS changes.

The inspector observed the setup, dry run, and full dress run of the experiment and confirmed that it was performed as required.

c. Conclusions

Control and performance of experiments met TS and applicable requirements.

3. **REVIEW AND AUDIT**

a. Inspection Scope (40745)

The inspector reviewed selected aspects of:

- NSC minutes
- safety review records
- audit records
- responses to safety reviews and audits
- review and audit personnel qualifications

b. Observations and Findings

The NSC meeting schedule and membership satisfied TS requirements and the Committee's procedural rules. Review of the minutes indicated that NSC provided guidance, direction, and operations oversight of the reactor.

Records showed that the safety reviews were conducted at the TS required frequency. Topics of these reviews were also consistent with TS requirements to provide guidance, direction, and oversight and to ensure satisfactory use of the reactor.

The audit records showed that reviews had been completed in those areas outlined in the TS and at the required frequency.

The inspector noted that the safety reviews and audits and associated findings were acceptably detailed and that the licensee responded and took corrective actions as

needed. The safety review and audit personnel qualifications were consistent with licensee administrative controls.

Since the transfer to UCD the committee has been changed to meet the new organization and TS requirements. Membership and qualifications of the new committee satisfied TS and charter requirements.

c. Conclusions

The review and audit program satisfied TS requirements.

4. **OPERATIONS PROGRAM**

a. Inspection Scope (39745)

The inspector reviewed selected aspects of:

- operational logs and records
- staffing for operations
- selected operational, startup, or shutdown activities

b. Observations and Findings

Reactor operations were carried out following written procedures and TS. Information on operational status of the facility was recorded in log books and checklists as required by procedures and TS. Use of maintenance and repair logs satisfied pertinent requirements. Significant problems and events noted in the operations log were reported and quickly resolved as required by TS and administrative procedures.

Scrams were identified in the logs and records, and were reported and resolved as required before the resumption of operations under the authorization of a SRO.

The inspector verified that TS and procedure required items were logged and cross referenced with other logs and checklists as required, and that TS operational limits had not been exceeded. Start-up, steady state power operation, a shutdown, and several facility checks and tests were observed by the inspector with no problems noted.

Operation logs and records confirmed that shift staffing met the minimum requirements for duty and on-call personnel.

c. Conclusions

Operational activities were consistent with applicable requirements.

5. **FUEL HANDLING**

a. Inspection Scope (Inspection Procedure 60745)

The inspector reviewed selected aspects of:

- fuel handling procedures
- fuel handling equipment and instrumentation
- fuel handling and examination records

b. Observations and Findings

Procedures for refueling, fuel shuffling, and TS required inspections/surveillances were thorough and detailed, ensuring controlled operations. Fuel movement, inspection, log keeping, and data recording followed the facility's procedures. Data recorded for fuel movement was clear and cross referenced in fuel and operations logs. Radiological controls and procedures conformed to health physics ALARA principles. Log entries clearly identified, as required by procedure, the minimum two persons present when moving fuel. Observation by the inspector of movement of a C-ring element confirmed that fuel movement, operations, and log recording was performed as required.

c. Conclusions

Fuel handling activities and documentation were as required by TS and facility procedures. No safety concerns were identified.

6. **OPERATOR REQUALIFICATION**

a. Inspection Scope (Inspection Procedure 69003)

The inspector reviewed selected aspects of:

- the Requalification Program
- operator licenses
- operator training records
- operator physical examination records
- operator examination records
- operator active duty status

b. Observations and Findings

All currently licensed SROs were successfully completing the emergency procedure and abnormal events training, reactivity manipulations, and participating in the ongoing training as required by the NRC-approved Requalification Plan. Lectures were conducted for the reactor operator Requalification Program included appropriate subject material and a comprehensive written examination. Training records contained the documentation required by the program. Review of records indicated that operator performance and competence evaluations had been given as required. Past test questions covered the material prescribed by the program and demonstrated technical depth. Required quarterly

operation hours, as SROs, were being tracked. Biennial medical exams had been performed as required.

Training was provided to the reactor operators on maintenance operations and 10 CFR 50.59 design changes and evaluations.

c. Conclusions

The Requalification Program was being acceptably implemented. TS and NRC-approved Requalification Plan requirements were met.

7. **SURVEILLANCE**

a. Inspection Scope (Inspection Procedure 61745)

The inspector reviewed selected aspects of:

- surveillance and calibration procedures
- surveillance, calibration, and test data sheets and records
- reactor operations, periodic checks, tests, and verifications were observed.

b. Observations and Findings

Daily and other periodic checks, tests, and verifications for TS required LCOs were completed as required. All surveillance and LCO verifications were completed on schedule as required by TS and in accordance with licensee procedures. All were within prescribed TS and procedure parameters and in close agreement with the previous surveillance results.

The computerized preventive maintenance system (PMS) was used to track surveillances, checks, and inspections. This included the date last performed, date presently completed, information on where documented and by whom, overdue status, trends, full system historical records, etc. This provided clear and concise control of the reactor operational tests and surveillances. PMS use at the facility was comprehensive and timely.

Some of the daily and periodic checks of equipment operability included recording system parameters such as temperature, pressure, and flow. All values checked by the inspector satisfied the limits/parameters listed in the procedure or checklist.

c. Conclusions

The licensee's program for surveillance and LCO confirmations satisfied TS requirements.

8. **MAINTENANCE**

a. Inspection Scope (Inspection Procedure 39745)

The inspector reviewed selected aspects of:

- maintenance procedures
- equipment maintenance records

b. Observations and Findings

Routine/preventive maintenance was controlled and documented in the PMS and/or operations log consistent with the TS and licensee procedures. Unscheduled maintenance or repairs were reviewed to determine if they required a 50.59 evaluation. Verifications and operational systems checks were performed to ensure system operability before return to service. Trends were identified and problems resolved as required. Maintenance procedures made staff aware that repair or maintenance beyond a certain point could become a facility change requiring an evaluation under 10 CFR 50.59.

During a facility tour it was noted that control and reactor room equipment was operational. No missing or malfunctioning equipment was noted.

c. Conclusions

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements. Facility condition was well maintained for its intended function and use.

9. **DESIGN CONTROL**

a. Inspection Scope (Inspection Procedure 40745)

The inspector reviewed selected aspects of:

- facility design changes and records
- facility configuration

b. Observations and Findings

Changes were rigorously controlled requiring a facility staff review, a committee review, and were recorded and stored in individual change binders. Questions from the committee and replies from the reactor and health physics (HP) staffs were documented and incorporated into the modification packages.

Change package 99-0149 and a number of other projects were reviewed. The evaluations were far-reaching with supporting documentation and information. NSC involvement was also comprehensive. Post installation verification testing of the systems was thorough. Procedure and drawing changes were included and were consistent with the observations.

c. Conclusions

The licensee's design change procedures were in place and were implemented as required.

10. **PROCEDURES**

a. Inspection Scope (42745)

The inspector reviewed selected aspects of:

- administrative controls
- records for changes and temporary changes
- procedural implementation
- logs and records

b. Observations and Findings

Written procedures required by the TS were available and used by the staff. The inspector observed procedure use during operations. Implementation of and adherence to the procedures was acceptable. Procedures were routinely updated as needed. Pen and ink changes and SOP used for interim/temporary changes satisfied licensee requirements. Review of procedures verified that changes had been evaluated and approved required.

Training of personnel on procedures and changes was acceptable. Personnel conducted activities in accordance with applicable procedures.

Coordination between operation and HP staffs on procedures was acceptable.

c. Conclusions

The procedural control and implementation program satisfied TS requirements.

11. **SECURITY**

a. Scope (81401 AND 81421)

The inspector reviewed selected aspects of:

- the PPP
- security systems, equipment and instrumentations
- implementation of the PPP
- audits

b. Observations and Findings

The PPP was the same as the latest revision approved by the NRC. Physical protection systems (barriers and alarms), equipment, and instrumentation were as required by the PPP. Security checks, tests, verifications, and periodic audits were performed and tracked as required by the PPP. Corrective actions were taken when required. Access control was implemented as required by the PPP and licensee procedures. Acceptable security response and training were demonstrated through alarm response and drill response in accordance with procedures. Response rosters were current and posted as required.

c. Conclusions

Security facilities, equipment, and procedures satisfied PPP requirements.

12. **EXIT MEETING SUMMARY**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on February 11, 2000. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Ching	Health Physics Supervisor
H. Egbert	Maintenance Coordinator/RO
B. Hasslett	Radiochemist
* C. Heidel	Reactor Operations Supervisor
* T. Majchrowski	Science Applications International Corporation Site Manager
D. Newell	Nuclear Engineer/SRO
D. Reap	HP Technician
* W. Richards	Reactor Director
G. Stoddard	HP Technician
A. Weeks	Training Coordinator/SRO

(*Attended Exit Meeting)

INSPECTION PROCEDURE (IP) USED

IP 39745	Class I Non-Power Reactors Organization and Operations and Maintenance Activities
IP 40745	Class I Non-Power Reactor Review and Audit and Design Change Functions
IP 42745	Class I Non-Power Reactor Procedures
IP 60745	Class I Non-Power Reactor Fuel Movement
IP 61745	Class I Non-Power Reactor Surveillance
IP 69003	Class I Non-Power Reactor Operator Licenses, Requalification, and Medical Activities
IP 69005	Class I Non-Power Reactor Experiments
IP 81401	Plans, Procedures, and Reviews
IP 81421	Fixed Site Physical Protection of MSNM

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

NONE

DISCUSSED

NONE

PARTIAL LIST OF ACRONYMS USED

HP	Health Physics
LCO	Limiting Conditions for Operations
NSC	Nuclear Safety Committee
NRC	Nuclear Regulatory Commission
OS	Operations Supervisor
PMS	Preventive Maintenance System
PPP	Physical Protection Plan
SRO	Senior Reactor Operator
TS	Technical Specifications
UCD	University of California, Davis