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March 30, 2000

In Reply Refer To:

636/151C

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

SUBJ: 10 CFR 50.59 Annual Report

REF: License R-57 Docket #50-131

The following report is submitted for the period January 1, 1999 to December 31, 1999 in accordance with Paragraph 50.59, Title 10, Code of Federal Regulations.

- (a) The original General Atomics console for our facility was replaced with a new solid state General Atomics Mark II console along with the safety, shim, and regulating rod drives.

An inner wall to the EM Suite (SW 2A and 2B) was redesigned to make the dark room smaller.

SOP#2 "Reactor Start up and Operation" and SOP#3 "Reactor Shutdown" were changed to accommodate the newer console.

- (b) The quarterly fuel element inspections indicate nothing out of the ordinary. All elements appear to be in good condition. Annual inspection of the facility control rods found the rods to be in good condition. The reactor was power calibrated in accordance with the SOP. Both required neutron detectors were within two percent of the thermally calibrated value. All measuring channels were adjusted to match the calibrated value. The control rods were calibrated using the integral method. The total excess reactivity was determined to be \$0.99, which is in compliance with TS 3.2(2). The shut down margin was \$2.42 meeting the requirement stated in TS 3.2(1). Time of Flight measurements show full rod insertion times no greater than 0.5 seconds for any of the three control rods. This is less than the limitation established in TS 3.3.1.

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2. Tabulation showing the energy generated by the reactor:

Month	Total KW-Hr
January	0
February	0
March	105.54
April	21.23
May	0
June	0
July	200.30
August	0
September	0
October	0
November	0
December	188.40
Total 1999	515.47

3. During 1999 there was one unscheduled shutdown due to a noise spike, causing a period trip at a low power level.

4. **Major safety related corrective maintenance:**

The control panel chassis ground (on the old console) was disconnected but close enough to make recurrent contact. This caused the magnet on/cont, up, and down lights to flicker intermittently. The ground was reconnected.

The short mentioned above caused the CPU card of our NM-1000 Wide Range fission channel to become inoperable. The CPU card was replaced.

5. (a) **Console upgrade:**

Our original control console from 1959 was replaced with a newer TRIGA Mark II console. This 3rd generation console was designed by General Atomic to be an exact channel by channel replacement for our earlier Mark I console. The only difference lies in the Mark II console is newer, all solid state, and more reliable.

In upgrading the console, the facility now has additional channels at its disposal. In keeping with our current Technical Specifications (TS), the NM-1000 channel was kept completely intact. The Operator interface (e.g. bar graphs, chart recorder, and Burr-Brown) was mounted into a cabinet right next to the newer console. The newer console has a Honeywell recorder and log power channel

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meter which serves as output for a wide range fission chamber from source to power range. It also houses two percent power channels, each separately connected to ion chambers. Each channel outputs to a percent power meter. With respect to our TS, the NM-1000 channel continues to have its existing scram capabilities and interlocks. Each of the two-percent power meters on the newer console has the required scram at 100% power.

Three newer control rod drives replaced our existing drives. These drives are designed similarly to the previous control rod drives. They were replaced in order to match the connection interface of the newer console. Unlike our old console, the newer console has position indication for all three control rods. The old console only had position indication for the shim and regulating rods with the safety manipulated only to a seated or full-out position. Thus, the old console was interlocked to prevent various control rod withdraws as defined in our TS. Additional design was provided to the newer console to continue this interlock even though all three control rods now have position output displays. This ensures we continue compliance with our current TS.

The inline GM measuring channel was also retained to continue to measure for radiation levels in the coolant. The conductivity probes and output interface were replaced with newly purchased parts.

EM Suite Renovation:

An inner wall within the operations boundary was redesigned. The EM Suite (SW 2A and 2B) was remodeled in order to accommodate additional research equipment. Construction and renovation of the room did not effect the outside boundaries nor did it alter the existing airflow.

(b) **Modification of SOP #2 and #3:**

The checklists for reactor start up, operation, and shutdown was supplemented to include the additional functionality of the newer console. Additional items were included to check electronic calibration of both percent power meters, safety rod position, and power indication from the additional wide range channel.

(c) There were no new or untried experiments or tests performed during the reporting period that are not described in the Safety Analysis Report.

6. **Console upgrade:**

With regards to the safety evaluation of the console upgrade. The newer console provides an exact channel by channel replacement as well as newer solid state components. The Original NM-1000 channel was not changed in this process and

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thus retained all its original capabilities. The newer console also provided for output from two additional measuring channels. One of these channels (percent power) is also wired into the scram loop. As a result, the upgrade has provided an additional scrambling percent power channel.

All aspects of our current TS remain in compliance. In the process of upgrading the system several tests were performed. Rod drop times for each of the control rods were much less than the 2 second requirement. The reactor was power calibrated and all the measuring channels were matched with the calibrated value. The control rods were calibrated with the excess reactivity and shutdown margin values meeting TS requirements.

The newer control rod drives function similarly to the old drives. Reactivity insertion rates were calculated to ensure compliance with the value specified in the facilities license application. Currently the facility is under timely renewal of its operating license.

EM Suite Renovation:

Construction and subsequent redesign of the EM Suite provided no additional of degraded safety levels.

7. Summary of radioactive effluents released or discharged beyond the effective control of the license:
 - (a) Liquid - none
 - (b) Airborne - < 1mCi
 - (c) Solid - none

8. During 1999 there were no outside environmental radiological surveys performed.

The reactor facility continues to be without a Scientific Director. A VA site visit committee reviewed the research aspect of the facility in Autumn of 1999. Their recommendation to VA Central Office was to provide the necessary funds to reestablish research projects at the facility. Funding for research, however, has not yet been issued and continues to undergo administrative review. The reactor continues to receive its yearly budget for operation.

An additional employee is currently being sought in order to train that individual for a SRO license.

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The Reactor Facility continues to be utilized for medical research with emphasis on the current health needs of the veteran. The facility also continues to be used by the Fort Calhoun Nuclear Power Station as a part of their operator-training program.

A handwritten signature in black ink, appearing to read "John J. Phillips". The signature is written in a cursive style with a large initial "J" and "P".

JOHN J. PHILLIPS
Director

cc: Alexander Adams, Jr.