RI - DNMS Licensee Event Report Disposition

Licensee: AFRRI TRIGA

Event Description: Instrument Malfunction

License No: 19-08330-03 Docket No: 03006931 MLER-RI: 2005-046

Event Date: 6-6-05 Report Date: HQ Ops Event #: 41747

1. REPORTING REQUIREMENT

- [ ] 10 CFR 20.1906 Package Contamination
- [ ] 10 CFR 20.2201 Theft or Loss
- [ ] 10 CFR 20.2203 30 Day Report
- [X] Other 10 CFR 36.53 (a)(4)
- [ ] 10 CFR 30.50 Report
- [ ] 10 CFR 35.3045 Medical Event
- [ ] License Condition

2. REGION I RESPONSE

- [ ] Immediate Site Inspection — Inspector/Date
- [ ] Special Inspection — Inspector/Date
- [ ] Telephone Inquiry — Inspector/Date
- [ ] Preliminary Notification/Report
- [X] Information Entered in RI Log
- [ ] Report Referred To:
- [ ] Daily Report
- [ ] Review at Next Inspection

3. REPORT EVALUATION

- [X] Description of Event
- [ ] Levels of RAM Involved
- [X] Cause of Event
- [X] Corrective Actions
- [ ] Calculations Adequate
- [X] Additional Information Requested from Licensee

4. MANAGEMENT DIRECTIVE 8.3 EVALUATION

- [ ] Release w/Exposure > Limits
- [ ] Repeated Inadequate Control
- [ ] Exposure 5x Limits
- [ ] Potential Fatality
- [ ] Deliberate Misuse w/Exposure > Limits
- [ ] Pkging Failure>10 rads/hr or Contamination>1000x Limits
- [ ] Large# Indivs w/Exp>Limits or Medical Deterministic Effects
- [ ] Unique Circumstances or Safeguards Concerns

If any of the above are involved:

- [ ] Considered Need for IIT
- [ ] Considered Need for AIT

Decision/Made By/Date:

5. MANAGEMENT DIRECTIVE 8.10 EVALUATION (additional evaluation for medical events only)

- [ ] Timeliness - Inspection Meets Requirements (5 days for overdose / 10 days for underdose)
- [ ] Medical Consultant Used-Name of Consultant/Date of Report:
- [ ] Medical Consultant Determined Event Directly Contributed to Fatality
- [ ] Device Failure with Possible Adverse Generic Implications
- [ ] HQ or Contractor Support Required to Evaluate Consequences

6. SPECIAL INSTRUCTIONS OR COMMENTS

☐ Non-Public

☒ Public-SISP REVIEW COMPLETE

Inspector Signauture: L. D. Modes Date: 7.18.2005

Branch Chief Initials: Date: 7.18.2005

Location of File: G:\Reference\Blank Forms\LER FORM.wpd

Rev. 02/25/05

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE

AFRRI TRIGA REACTOR

TRIGA REACTOR DIVISION

COVER + 4 PAGES DATE 5 JUL 05

TO

NAME: Mr. Jack Bennett

PHONE: 610 337 5214

FROM

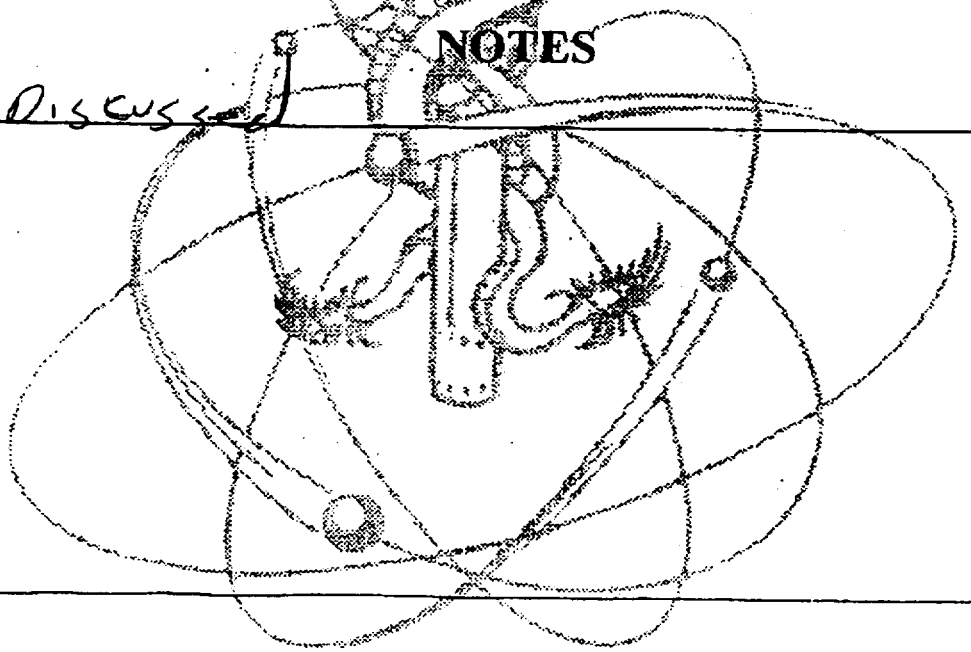
NAME: Stephen Reese

PHONE: (301) 295-1290 or (301) 295-1291

FAX: (301) 295-0735

NOTES

As discussed !



Mr. Kinneman

As discussed, attached is the final malfunction report. Unless we hear from you, we will send the original via U.S. Postal Service mail to the document control desk early this afternoon. As stated in the report, appropriate steps were taken to not only rectify this situation, but prevent a future occurrence.

Thank you for your assistance in resolving this matter.

Sincerely,

Stephen Miller
Head, Radiation Sciences Department
AFRRI Radiation Program Executive Manager

ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
8901 WISCONSIN AVENUE
BETHESDA, MARYLAND 20889-5603

July 5, 2005

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Report Reference Number 41747

Sir:

On June 6, 2005, an instrument malfunction occurred at the AFRRI Cobalt 60 Irradiator Facility (License 19-08330-03, Docket 030-06931) that is reportable under 10 CFR 36.83(a)(1) and (4). This malfunction has previously been reported to you telephonically as required by 10 CFR 36.83(b) (Report Number 41747). A time line for this malfunction and resolution is included (see attachment 1).

On that date, a routine workspace monitoring RAM calibration was performed. During the calibration, a semi-annual requirement, the console was powered down. Even with the control system powered down, the radiation safety systems continue to operate. As designed, when the RAM was activated, the high radiation alarm circuitry interrupted power to the elevators. The elevators were in the storage position during the RAM calibration. At the conclusion of the test, the safety system was reset, and the operator reenergized the elevators. Prior to returning to operational status, the system elevators were raised and the system tested. At an undetermined midway position the elevators unexpectedly SCRAMed. Neither elevator had emerged from the water. During a system SCRAM, the elevator clutch assembly is de-energized, allowing the source elevators to free fall to their storage positions. The north elevator returned to its storage position while the south elevator remained at a position below the surface of the water but not at its storage position at the bottom of the pool. The operator attempted to re-energize the console, but could not lower the south elevator. An indicator light on the console did not show that the elevator had reached its storage location. A radiation field of 10 mrem was detected in the exposure room, confirming the status of the source elevator. The operator ceased operations and notified the Cobalt Facility Director, who then informed the Head of the Radiation Sciences Department and the AFRRI Director. The exposure room remained closed and the console secured. Since the facility was in a safe, secured configuration, no other action was necessary to preclude access to the area.

The following day, facility engineers identified and replaced a failed interlock relay in the SCRAM and Fire Controller system (This was the cause of the

unanticipated SCRAM). The elevators were reenergized and the south elevator was driven to its storage position. All electrical and mechanical elevator systems were inspected. The cause of the hampered free fall during the unanticipated SCRAM on 6 June, 2005 was determined to be a misaligned elevator bearing assembly. This discrepancy was not noticed during testing and subsequent normal operations. No exposures were caused by this malfunction.

To prevent future occurrences, a "Go/No Go" Gauge will be created which will verify the required tension and position for all elevator bearings. All maintenance technicians will be trained on its proper use.

The point of contact concerning this malfunction is the undersigned.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 5, 2005.

FOR THE DIRECTOR:

Stephen I Miller
Head, Radiation Sciences Department
AFRRI Radiation Program Executive Manager

Attachment 1.

Time line

6 Jun 05 0900	Safety arrived to perform semi-annual C2 RAM check. C2 is the RAM on the outside of the exposure room door. The console was off. The RAM check causes a safety system SCRAM (even with the console off). The auxillary SCRAM system is independent of the system console. When the SCRAM system is activated a red indicator light activates (RAM and Fire alarm box)
0915	The operator reset the system by turning the key and pressing the "SCRAM reset" button located on the wall above the console. This was done a few times to enable the console.
0920	Console is activated. Operator goes into the exposure room to activate the operational delay.
0925	The key was placed into the console to raise the elevators for testing. Both elevators raised to some position midway then the system SCRAMed, causing the source racks to free fall to the storage position. The north elevator returned to its storage location. The south elevator did not. This SCRAM was caused by a burnt interlock relay in the SCRAM and Fire Controller. The south elevator did not return to its storage location due to a maladjusted upper right bearing assembly.
1000	Notified Cobalt Facility Manager. Manager verified the malfunction
1045	Notified FRM
1130	Notified Scientific Director
1300	Notified Director
1035	Notified Researchers
7 Jun 05	• Replaced relay • Bypassed operational time delay • Drove south elevator down • Put console into maintenance mode • Unloaded sources • Examined south elevator • Adjusted bearing assembly • Tested both elevator carriages • Facility declared operational

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE

AFRRI TRIGA REACTOR

TRIGA REACTOR DIVISION

COVER + 4 PAGES DATE 27 JUN 05

TO

NAME: KATHY MODES

PHONE: 610-337-5269

FROM

NAME: STEPHANIE YAUGHN

PHONE: (301) 295-1291 or (301) 295-1291

FAX: (301) 295-0735

NOTES

Mr. Kinneman

As discussed, attached is the final malfunction report. Incorporated into this version are comments/questions posed by Ms. Kathy Modes. As stated in the report, appropriate steps were taken to not only rectify this situation, but prevent a future occurrence.

Thank you for your assistance in resolving this matter.

Sincerely,

Stephen Miller
Head, Radiation Sciences Department
AFRRI Radiation Program Executive Manager

ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
8901 WISCONSIN AVENUE
BETHESDA, MARYLAND 20889-5603

July 5, 2005

United States Nuclear Regulatory Commission
ATTN: John Kinnerman
Washington, DC 20555

Report Reference Number 41747 (Requested Supplementary Information)

Sir:

On June 6, 2005, an instrument malfunction, which took place during facility testing, occurred at the AFRRI Cobalt 60 Irradiator Facility (License 19-08330-03, Docket 030-06931) that is reportable under 10 CFR 36.83(a)(1) and (4). This malfunction has previously been reported to you telephonically as required by 10 CFR 36.83(b) (Report Number 41747). A time line for this malfunction and its resolution is included (see attachment 1).

On that date, a routine workspace monitoring RAM calibration was performed. During the calibration, a semi-annual requirement, the console was powered down. Even with the control system powered down, the radiation safety systems continue to operate. As designed, when the RAM under test was activated, the high radiation alarm circuitry interrupted power to the elevator subsystem. The elevators were in the storage position during the RAM calibration. At the conclusion of the calibration, the safety systems were reset, and the operator reenergized the elevator subsystem. Prior to returning to operational status, the system elevators were raised and the system tested. At an undetermined midway position, the elevators unexpectedly SCRAMed. Neither elevator had emerged from the water. During a system SCRAM, the elevator clutch assembly is de-energized, allowing the source elevators to free fall to their storage positions. The north elevator returned to its storage position while the south elevator remained partially shielded, at a position below the surface of the water but not at its storage position at the bottom of the pool. The operator attempted to re-energize the console, but could not lower the south elevator. An indicator light on the console did not show that the elevator had reached its storage location. A radiation field of 10 mrem per hour was detected in the exposure room, confirming the status of the source elevator. The operator ceased operations and notified the Cobalt Facility Director, who then informed the Head of the Radiation Sciences Department and the AFRRI Director. The exposure room remained closed and the console secured. Since the facility was in a safe, secured configuration, no other action was necessary to preclude access to the area.

The following morning, June 7, 2005, facility engineers identified two independent malfunctions; a solid state relay failure in the SCRAM and fire control subsystem, and a misaligned upper right bearing assembly. The interlock relay is part of the console and is not located in the exposure room. The Cobalt 60 facility console was designed such that a relay failure would cause the source elevators to free fall into

the fully shielded storage position. The cause of the hampered free fall during the unanticipated SCRAM on 6 June, 2005 was determined to be a misaligned elevator bearing assembly.

Corrective actions taken:

On the morning of June 7th, the failed interlock relay in the "SCRAM and Fire Controller subsystem" was replaced, the elevators energized, and the south elevator driven to its storage position at the bottom of the pool. The sources were moved to storage racks, and the system was tested. Facility engineers were able to recreate the problem using a dummy load. The source elevator assemblies were then removed and inspected. The cause of the hampered free fall was determined to be a misadjusted bearing assembly. The elevator assemblies were adjusted and tested. All electrical and mechanical elevator systems were inspected and no radiation damage was identified. Maintenance on the elevators was last performed on June 1st and 2nd, 2005 by a two person team with 15+ years of experience in the operations and maintenance on the AFRRI cobalt 60 facility. The nature of the equipment dictates that the use of lubricants other than water would adversely affect the quality of the pool water and the pool ion exchange and filtration systems and are therefore not required or used. The bearing assembly misalignment was not observed during testing and normal operations following the June 1st and 2nd maintenance activities. No one entered the exposure room while the sources were in the partially shielded position. No personnel exposures resulted from this malfunction.

To prevent future occurrences, a "Go/No Go" Gauge will be created which will verify the required tension and position for all elevator bearings. All maintenance technicians will be trained on its proper use and a maintenance procedure will be written.

The point of contact concerning this malfunction is the undersigned.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 5, 2005.

FOR THE DIRECTOR:

Stephen I Miller
Head, Radiation Sciences Department
AFRRI Radiation Program Executive Manager

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