

Mail Envelope Properties (4630E044.B0B : 15 : 15115)

Subject: Rad Condition Report
Creation Date 04/26/2007 12:24:54 PM
From: "Laura Gonzales" <laura.gonzales@ga.com>

Created By: laura.gonzales@ga.com

Recipients

nrc.gov
 ARL_PO.ARL_DO
 RJE (Bob Evans)

gat.com
 keith.asmussen CC

Post Office
 ARL_PO.ARL_DO

Route
 nrc.gov
 gat.com

Files	Size	Date & Time
MESSAGE	993	04/26/2007 12:24:54 PM
TEXT.htm	2183	
rad safety cond rad instruments 2-07.doc		30853
rad safety cond rad instruments 2-07.wpd		34166
Mime.822	94635	

Options

Expiration Date: None
Priority: Standard
ReplyRequested: No
Return Notification: None

Concealed Subject: No
Security: Standard

Junk Mail Handling Evaluation Results

Message is eligible for Junk Mail handling
 This message was not classified as Junk Mail

Junk Mail settings when this message was delivered

Junk Mail handling disabled by User
 Junk List is not enabled
 Junk Mail using personal address books is not enabled

070-00734
SNM-696

From: "Laura Gonzales" <laura.gonzales@ga.com>
To: "Bob Evans" <RJE@nrc.gov>
Date: 04/26/2007 12:24:49 PM
Subject: Rad Condition Report

Bob,

I have attached the Radiological Safety Condition Report I issued on March 16, 2007 (in word perfect and word) and e-mailed to you the same day. I tried to revise it this morning but there is really not much to add at this point.

A total of 44 instruments were source and/or response checked and 3 were found to not be working properly (the 2 identified by NRC and 1 which had a bad cable). All the others were working properly. The report dated March 16, 2007 summarized 42 of the 44 instruments checked so far.

We now need to go through the rest of the list of instruments to see if any more need and can be checked because the list includes area monitors, dosimeters, neutron monitors, and other instruments that are not that easy to check (and don't fall in the same category as the ones used for frisking). Plus, there are other action items that are still open.

So, I hope that what I had sent before (and is attached) is sufficient. Let me know.

Laura Gonzales

CC: <keith.asmussen@gat.com>

March 16, 2007
Prepared by Laura Gonzales

**Health Physics Report of Radiological Safety Condition -
Nuclear Instrumentation Found Not Working In Building 21 (TRIGA® Reactor Facility)**

Description of Occurrence

On Wednesday, February 28, 2006, NRC inspectors conducting a routine inspection and confirmatory survey at Building 21 (TRIGA® Reactor Facility) were monitoring themselves out using the hand and foot monitor as directed by John Greenwood, the Principle Investigator for the reactor facility. One of the inspectors (Mr. Emilio Garcia) noted that the needle on the readouts was at zero or slightly above zero instead of reading 40 cpm-100 cpm (a background common for geiger counters). Mr. Garcia remembered seeing radiation check sources in the counting trailer and asked John Greenwood if they could borrow it to test the detectors. The instrument did not appear to respond properly to the source. Because they were unsure of the activity of the source, they then obtained an RM-14 which has a geiger counter detector and used it to check the source. With the source on the detector, the instrument went almost off-scale on the lowest range (X1) before falling back to zero but then went back down to background (if working properly, it should have stayed at that reading until the source was moved away from the detector). Neither instrument was overdue for calibration.

This called into question whether there were other nuclear instrumentation used at GA which were also not working properly. Since GA had just performed confirmatory surveys using survey instruments which were at Building 21 (but not these two instruments), it still begged the question, "Were the instruments used for the confirmatory surveys properly working at the time of the surveys?"

Background

GA has over 100 portable radiation survey instruments currently in use. They include large area gas flow proportional detectors using for performing release surveys, geiger counters, alpha detectors, microR meters, wipe counters and other instruments routinely used for surveying.

Instruments are calibrated semiannually, except for dose rate meters (including microR meters) which are calibrated quarterly.

Response checking of instruments prior to use is required on a case-by-case basis.

Cause and Investigation

The reasons why GA personnel did not notice that the hand and foot monitor was not working properly were: 1) It was in current calibration, so there was no reason to believe it wasn't working properly, 2) It wasn't being source or response checked prior to each

use, and 3) Based on the fact that GA Health Physics staff had recently completed a final survey of all non-reactor areas and found the area to meet the release criteria for unrestricted use along with the fact that wipe surveys performed in the rest of the facility over the last 2 years have shown no contamination, GA Health Physics personnel knew that people touring the facility were not going to become contaminated.

The RM-14 was taken out of service on Thursday, March 1, 2007 by the Nuclear Calibration Technician. It was later repaired by the technician; improper operation was due to a bad rechargeable battery which was replaced.

There was also a question as to the source strength of the source used by the NRC inspectors to check the instruments. The source used was one of two ~0.23 microcurie Eu-152 gamma calibration source manufactured at GA by radiochemist Dale Hill on 11/30/88. These two sources have since decayed from the 1988 value. On March 13, 2007, radiation readings on each source was obtained using the recently repaired RM-14 (s/n 9158). Each source read ~1000 cpm (the alarm did sound on the x1 scale at ~200 cpm). Therefore, the sources were strong enough to response check the RM-14.

Immediate Actions Taken

- (1) The RM-14 (s/n 9158) was taken out of service on Wednesday, February 28, 2007 by the Nuclear Calibration Technician (Mario Monreal). Failure was due to a bad rechargeable battery which was replaced. The instrument was placed back into service on Thursday, March 1, 2007. On Friday, March 2, 2007 the instrument was source tested by Health Physics Technicians Scott Cowan and Joe Sullivan. It was found to be responding properly using the same NIST traceable Sr-90 source used by the Calibration Technician. The efficiency noted on the instrument was also double checked using Mario's NIST traceable standards and was found to have the same efficiency (within a half a percent) as noted on the sticker by Mario.
- (2) The hand and foot monitor was tested for proper operation on Friday, March 1, 2007 by Scott Cowan and Joe Sullivan (Health Physics Technicians). (I was also present for part of the testing). We found it to be inconsistent and unreliable (it would alarm in some instances and not alarm in other similar instances or if repeated). The background readings were also too low. The instrument was tagged "Out of Service" and later disconnected. It will eventually be removed from the area.
- (3) Based on the results of both the RM-14 and the hand and foot monitor, Scott Cowan and Joe Sullivan began source testing all survey instrumentation using the NIST traceable sources from the nuclear calibration lab. They started with Building 21.

- (4) On March 2, 2007, I completed an evaluation regarding the need for the hand and foot monitor. Based on this evaluation, it was decided that it was no longer necessary for people to check themselves before leaving the facility. As a result, it has been tagged "Out of Service". Note: A geiger counter will be placed outside of the Mark F room (21/108, the Mark F control room) so that individuals can manually check themselves after leaving this room.
- (5) By the end of Monday, March 5, 2007, all nuclear instruments located at Building 21 had been checked (total of 9 instruments including 3 located in John Greenwood's office). With the exception of the hand and foot monitor, all of the instruments were found to be operating properly. This included the floor monitors and hand held instruments that were used to do the Final Radiological Survey of the non-reactor portions of Building 21. All of the instruments had a current calibration sticker. Additionally, 4 other instruments located in Building 10 were source tested and found to be working properly.
- (6) As of Thursday, March 15, 2007, the following instruments had been source tested:

- 10 instruments from Building 21
- 6 instruments from GA-ESI
- 5 instruments in HP van
- 2 instruments assigned to Ed Rudgers
- 5 instruments assigned to Kim Moore
- 5 instruments from HP Lab (Imelda Cruz)
- 1 instrument from Building 2 (Diazyme)
- 2 instruments from Building 33
- 6 instruments from Building 34, 34-1, 34-2 (DIII-D facility)
- 42 total to date

Of the above, only 3 were found to not be working properly (the hand/foot monitor from TRIGA, the RM-14 from TRIGA which are the subject of this incident and a geiger counter located in a Diazyme lab which had a faulty cable and was replaced the same day).

Other instruments are in the process of source checked.

Reporting

NRC - NRC staff alerted GA to the situation.

State - The State of California was not formally notified because:

- (1) There was no release of radioactive material as a result of the incident (the source is a sealed source).

- (2) No radioactive contamination of an individual or offsite location occurred as a result of this incident.
- (3) No radioactive material was lost or stolen.
- (4) No one was injured and the source was never in the hands of a member of the public.

Specific Action(s) To Be Taken to Prevent Similar Occurrence

1. Complete the source testing of all instruments on site.
2. Re-chargeable batteries on the Eberline RM-14's and Ludlum 177's should be changed every 3 years. *Action Needed:* The Nuclear Calibration Technician will revise applicable procedures to require this.
3. Consider making it a requirement for response testing all alpha/beta survey instruments prior to use (except microR meters and dose rate meters). *Action Required:* Health Physics personnel will determine if this should be required and if applicable procedures should be changed.
4. Consider placing a check source on all alpha/beta survey instruments so that it is easy to source test an instrument prior to use. Also, consider what documentation may be required to verify that this was completed. *Action Required:* Health Physics personnel will determine if this should be done.

Follow-Up

Follow-up on each of the actions still needed is required. I will take the lead on following up on each item.

Reviewed by: John Greenwood/PI TRIGA

Approved: Laura Gonzales/RSO

Approved: Keith Asmussen/Director, LSNC

cc: Keith Asmussen
John Greenwood
Kim Moore
Ed Rudgers
Scott Cowan
Joe Sullivan
Mario Monreal
2007 HP Incident File