

Borgess Medical Center  
1521 Gull Road  
Kalamazoo, Michigan 49001  
Telephone 616-383-7000

Member of  
Sisters of St. Joseph  
Health System, Inc.  
Nazareth, Michigan

*copy*  
DOD/DCB

April 4, 1991

**BORGESS**  
Medical Center

Roy Caniano  
United States Regulatory Commission  
Region III, Materials Licensing Section  
799 Roosevelt Road  
Glen Ellyn, IL 60137

RE: Notice of Violation  
License #21-12275-02

Dear Mr. Caniano:

Please accept this second response to our phone conversation regarding the Borgess Medical Center response to violation. I understand that our responses to all of the alleged violations except Item 6 were deemed sufficient. I also understand that our response to the management oversight of the radiation safety program needs to be expanded. I wish to thank you for your attention and consideration.

Regarding the management oversight of the radiation safety program at Borgess Medical Center I offer the following:

1. The management of Borgess Medical Center hold the Radiation Safety Program and the concepts of ALARA in the highest possible regard. We wish to do whatever is necessary to ensure you that we will be intimately involved with the program.
2. The Medical Physics Consultant reports directly to the Radiology Manager, who is responsible for Nuclear Radiology and the Radiation Therapy area, on a quarterly basis. The Radiology Manager also receives the written report from MPC and forwards that on to myself, as Radiology Director. I have attached a copy of the most recent MPC response, as well as Mr. TenCate's report to me.
3. I shall also make myself available at the closing session of the MPC consulting visit so I can hear the information first hand.
4. I shall also schedule a monthly meeting with Dr. Van de Reit as the R.S.O. to discuss any pertinent issues or concerns.

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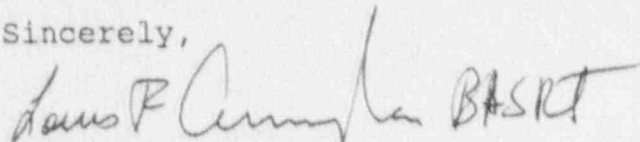
NRC - Mr. Roy Caniano  
RE: Notice of Violation  
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Regarding Item 6:

1. I have attached a copy of the procedure to be used by the technologist for Xenon trap monitoring. This will be monitored during a patient study, as our license requirement indicates.
2. We realize that one measurement did exceed the action level, and we will take the appropriate action if that happens again. Subsequent checks of the trap have not exceeded the action level and, at this point in time, we do not see the need to replace the trap.

I hope that this letter addresses your concerns. If you have further concerns or require additional information, please don't hesitate to contact me. I wish to thank you for your attention to our program and look forward to hearing your final response.

Sincerely,



Louis F. Cunningham, B.A.S., R.T.  
Director of Radiology

cc:  
Georgiann Ellis  
Medical Physics Consultants  
Dr. Van de Reit

LFC/lmr  
enclosures

BORGESS MEDICAL CENTER  
RADIOLOGY SERVICES  
MEMORANDUM

Date: Feb. 26, 1991

To: Lou Cunningham, Director Radiology

From: Tim TenCate, Manager, Radiology

Re: Response to MPC Inspection Dated Jan. 16, 1991

1. The accuracy test, linearity test, sealed source inventory and leak tests, have been sent to Dr. Van de Reit for his review and signature.
2. Exposure levels have been noted and posted in the Nuclear Medicine Hot Lab.
3. Quality Air Service Inc. has been contacted to perform the ventilation check for room N457.
4. Response from Nuclear Cardiology manager Phil Noack:  
"The Siemens flood fields are taken on 8x10 films. Uniformity images are obtained on the days in which the camera is used and a bar phantom for resolution check is performed weekly. The flood field images are dated and stored on a table top next to the Display Operators terminal and the gamma camera (Siemens). The Technicare images have been transferred from a collection taped together to a note book with pages. Floods, correction and resolution images are now in a notebook taped to pages. Review of these floods should be more presentable for JCAHO review with these organized changes.
5. As of this date the NRC letter has not been received. As per regulations, upon its arrival it will be posted in the Nuclear Medicine Department for 5 days.
6. Noted.
7. The technical staff will be reminded that department surveys are required by the NRC and must be performed when called in for procedures. *Tim let me see the memo. Lon*
8. I am unclear as to why the linearity check was not performed. To prevent this from recurring a quarterly reminder has been placed in the Nuclear Medicine NMIS computer to prompt technologists to perform the check.
9. Noted.
10. Noted.

*Tim TenCate*

*NRC 2-28-91*

## MEDICAL PHYSICS CONSULTANTS, INC.

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2309 Shelby  
Ann Arbor, Michigan 48103  
(313) 662-3197

January 16, 1991

Borgess Medical Center  
1521 Gull Road  
Kalamazoo, MI 49001

ATTN: Tim Tencate  
Manager, Radiology

Dear Tim:

Enclosed, please find the report on the evaluation of your Nuclear Medicine Unit on January 16, 1991. I have listed my comments and recommendations concerning licensed activities at your facility below:

1. In accordance with 10 CFR 35.50 and 35.59, Dr. Van de Reit must review and sign the enclosed accuracy test, linearity test, sealed source inventory and leak tests.

2. Nuclear Medicine personnel exposures for the third quarter of 1990 are as follows:

C. Woidan - 190 mrem: whole body\*  
770 mrem: extremity

P. Noack - 60 mrem: whole body  
220 mrem: extremity

K. Hailu - 100 mrem: whole body  
250 mrem: extremity

A. Gurczynski - 320 mrem: whole body  
620 mrem: extremity

T. Tencate - 50 mrem: whole body  
300 mrem: extremity

\*above ALARA Level I

For the period 07/01/90 through 08/31/90, Tony Gurczynski has received a whole body film badge reading of 290 mrem. This is most likely due to mishandling of the badge as 270 mrem was received in one month and Siemens revised their initial reading of the badge.

3. The semi-annual ventilation check will be due in February.

# Medical Physics Consultants, Inc.

Borgess Medical Center  
January 16, 1991 -- continued

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4. Camera floods for the Siemens camera and the Technicare portable are not organized in a manner which is conducive to a compliance review. The JCAHO requires that uniformity images be acquired daily for cameras in use and that resolution images be acquired weekly. The current organization makes it extremely difficult to review these images for compliance.
5. The NRC's inspection letter must be posted upon receipt for a period of five days. I recommend posting this in either the Hot Lab or the computer room where it will be seen by all technologists.
6. The Victoreen Ion Chamber was taken for calibration at the time of inspection.
7. Daily surveys were missed on several days in the last quarter. These appear to correspond mostly to weekend and holiday on-call work. All technologists must be instructed that all daily requirements apply to weekends and holidays.
8. A linearity test was not performed during the fourth quarter of 1990. A mechanism to prevent this from recurring should be implemented and documented.
9. The results of the wipe tests of the generator packages returned to the manufacturer must be recorded in unit of dpm/100 square cm.
10. Inservicing of Mary Kehyari, the Osteoporosis technologist was performed. Topics of discussion were proper use of a survey meter; proper surveying techniques, safe operating procedures, radiation risks and radiation protection. Mary has also viewed the manufacturer's instructional video tape in May of 1990. She will also review the tape before each source change.

If you have any questions concerning this report or if I may be of assistance, please contact me.

Sincerely,



Tracy I. King, M.S.  
Radiological Physicist

enclosures

TIK/tb

INSERVICE RECORD

Date: January 16, 1991

Present: Mary Kehyari, Osteoporosis Lab

Given by: Tracy King J.V.  
Medical Physics Consultants

Topics:

1. Proper use of the survey meter
2. Proper surveying techniques
3. Safe operating procedures
4. Radiation exposure and risks
5. Radiation protection

BORGESS MEDICAL CENTER  
RADIOLOGY SERVICES  
MEMORANDUM

Date: Feb. 27, 1991  
To: Nuclear Technologists  
From: Tim  
Re: Recent MPC Inspection

On Tracy's inspection of 1/26/91 she noted that there were days on which procedures were performed but the department survey was not completed. Upon looking up the dates I found that the majority of them were for Saturdays and Sundays. NRC guidelines stress that a survey must be completed for every day that the department is used. Please remember to perform the monitoring when coming in on call, at least once for each day. Areas to be monitored should at least include the hot lab, imaging room(s) used, hallway, and personnel. Thanks for your cooperation.

BORGESS MEDICAL CENTER  
DEPARTMENT OF NUCLEAR MEDICINE

Procedure For Xenon Trap Monitoring

Method

The following steps must be completed when a new source container is used.

1. Determine the background count rate in counts per minute (cpm) by counting for five minutes and dividing the total counts by (5) five.
2. Place a known activity of Xenon 133 (50 - 100 uCi's) in front of an uncollimated gamma camera at a fixed distance. The fixed distance should approximate the radius of the testing balloon. Window will be centered at the 81 keV photopeak.
3. Collect at least one million counts from the Xenon. Divide the total counts by the counting time to get the counts per minute from the source.
4. Divide the counts per minute determined in the previous step by the known activity on Xenon in the syringe. This yields the efficiency (EF) of the camera in CPM/uCi.

The following steps are to be carried out monthly.

1. Using an uncollimated gamma camera, obtain a background reading for five minutes. Determine cpm.
2. While a patient is performing the washout phase of a Xenon 133 ventilation scan, attach the test balloon to the exhaust of the Xenon trap and fill the balloon with air as it passes through the filter. The radius of the balloon should be approximately the same distance as between source and crystal outlined in step 2 above.
3. Place the balloon in front of the uncollimated gamma camera so that the edge of the balloon just touches the crystal. Count for two minutes. Divide by two to obtain counts per minute and subtract the background cpm found in step 1.
4. Determine the activity in the balloon as follows:  
$$\frac{\text{CPM (step 3)}}{\text{EF (step 4)}} \text{ activity in balloon in microcuries}$$
5. Determine action levels I and II by multiplying the background cpm by 1200 and 1600 respectively.