

The Service Difference™

Syncor International Corporation

Reportable pursuant to 10 CFR 30.50(b)(2)

July 5, 1994

Don Sreniawski
U.S. NUCLEAR REGULATORY COMMISSION
Region III
801 Warrenville Road
Lisle, IL 60532-4351

RE: NRC Event #27367 - Written Report pursuant to 10 CFR 30.50(c)(2)

Dear Mr. Sreniawski:

Enclosed is a written follow-up to NRC Event #27367 which was reported to Steve Sandin at the NRC Operations Center on June 7, 1994. The reported event was a fume hood failure at Syncor's St. Louis radiopharmacy, NRC License #24-19360-01MD.

I also request NRC Region III's clarification on Syncor's application of 10 CFR 30.50(b)(2) to a fume hood failure at a radiopharmacy which possesses I-131 sodium iodide. Typically, a fume hood failure is a result of a power surge/outage, and the fume hood is rarely down for more than a day.

Following is a summary of events surrounding the failure of St. Louis' main fume hood on June 7, 1994. All times are PDT unless otherwise specified:

- 1330 Larry Adamovic (Staff Pharmacist, St. Louis) phoned from a car phone and informed David Pellicciarini (Sr. Health Physicist, Chatsworth, CA) that the main fume hood at the pharmacy in St. Louis was down. He said that it had shut off yesterday (6/6/94) briefly, but then came back on again. It shut off again 6/7/94 and was still not operating. David informed him that this may require NRC notification, as well as transferring the volatile material to a different Syncor pharmacy.
- 1335 David Pellicciarini informed Jeff Mueller (Program Manager, Health Physics) that the main fume hood in St. Louis had failed. Jeff asked David Pellicciarini to take the lead.
- 1336 David Pellicciarini phoned the St. Louis pharmacy and spoke with Karen Juergens (Staff Pharmacist). She said that the fume hood had shut off at about 1230 CDT. She said that the main fume hood had shut off yesterday for about a half hour, and the HVAC repair person had gone onto the roof and flipped a switch off and then on again, which restarted the hood. Karen was not aware of what switch the HVAC person had operated. Karen said that the weather has been hot lately. David told Karen to restrict access to the area

9409060086 940826
PDR ADOCK 03017488
C PDR

to only essential personnel, to perform air sampling, and to make provisions for transferring the material to another Syncor location. David told Karen to consider bioassay based on the air sampling results.

David asked what the current xenon-133 and iodine-131 inventory was. Karen said they had on hand 160 mCi of xenon-133, and 350 mCi of iodine-131. David also informed her that this may involve NRC notification.

1353 David phoned St. Louis back, and asked Karen if anyone had informed the RSO (Joe Huber). Karen said that she hadn't, and that she didn't think that Larry had. David told her to phone the RSO and inform him of the events along with the notification requirement.

1355 David Pellicciarini briefed Jeff Mueller on the situation.

1450 David Pellicciarini phoned Karen. The hood was back in operation, and had come on at about 1630 CDT. The HVAC repair person was there and stated that he didn't do anything to the hood yesterday to cause it to come back on, it was operating when he went up to the roof to check it out. The HVAC repair person thinks that the motor overheated which caused it to shut off and that the motor may need replacing. The region was having its first fairly hot weather of the season.

Karen stated that she had performed air flow measurements and had verified proper air flow and direction. Karen stated that air sampling was in progress, and David Pellicciarini asked her to fax the results to me. She also had reached Joe Huber (RSO) and informed him of the situation.

1510 David Pellicciarini received the RS-55 (I-131 Air Monitoring Record) via fax.

1530 David Pellicciarini phoned St. Louis and spoke with Michael Howard (Customer Service Specialist). He stated that the hood was still running, and that there was a supply diffuser to the room. The HVAC repair person was still there and would be replacing the motor this evening. Apparently the motor had been overheating, which was causing an overcurrent, which was tripping the breaker.

1545 David Pellicciarini briefed Jeff Mueller on the situation.

Based on the air sampling results, the average restricted area air concentration of iodine-131 over the sampling period (0830-1700) was 1.25×10^{-11} uCi/ml (less than 1% of the DAC). David and Jeff were comfortable that the restricted area air concentration did not exceed this amount, since the sample filter was counted after the hood was back in service, and the sampling period was short relative to the half life of iodine-131. The average unrestricted area iodine-131 air concentration was 5.085×10^{-11} uCi/ml over the sampling period (approx. 25% of the effluent release limit). David and Jeff were comfortable that the unrestricted area air concentration did not exceed this amount, since

the sample filter was counted after the hood was back in service, and the sampling period was short relative to the half life of iodine-131.

David Pellicciarini performed calculations to estimate the release of xenon-133. Based on the pharmacy's inventory, and assuming that the fume hood was down for 4 hours:

$$160 \text{ mCi} \times 0.05 \% \text{ per day} \times \frac{4 \text{ hours}}{24 \text{ hours}} = 0.0133 \text{ mCi} = 13.3 \text{ uCi}$$

$$\text{Room Volume} = 8 \times 8 \times 8 \text{ ft}^3 \times 2.83 \times 10^4 \text{ ml/ft}^3 = 1.45 \times 10^7 \text{ ml}$$

$$[A_{\text{Xe-133}}] = \frac{13.3 \text{ uCi}}{1.45 \times 10^7 \text{ ml}} = 9.17 \times 10^{-7} \text{ uCi/ml}$$

However, this room has a supply vent. Following are the diffusion calculations, assuming the supply vent supplies air at 100 CFM.

$$C = C_0 e^{-\frac{rV}{V}}$$

$$C = 9.17 \times 10^{-7} \frac{\text{uCi}}{\text{ml}} e^{-\frac{240 \text{min} \times 100 \text{CFM}}{512 \text{ft}^3}}$$

$$C = 4.03 \times 10^{-27} \text{ uCi/ml}$$

Even assuming no air flow in the room, the restricted area air concentration of xenon-133 is only 0.9% of the Derived Air Concentration (DAC). Assuming 100 CFM of air flow in the room, the air concentration of xenon-133 in the restricted area is negligible.

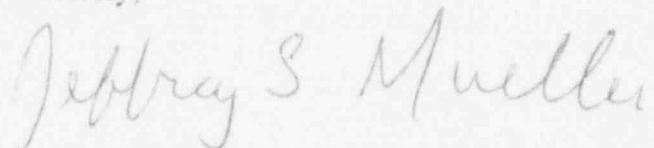
Assuming no air flow, and that the xenon-133 was released immediately into the unrestricted area (i.e., no dilution), this air concentration would represent 183% of the Effluent Limit value for the day. When averaged over one year, this value would be well below the annual Effluent Limit. Assuming 100 CFM of air flow, the unrestricted area air concentration of xenon-133 would also be negligible.

1624 David Pellicciarini phoned the NRC Operations Center to report the incident, and made a report to Steve Sandin (Event #27367).

The fume hood has been operating properly since June 8, 1994. At no time were I-131 air concentrations excessive.

If you have any questions or require additional information, please contact me at 800/999-9098, X-4457. Thank you for your time and consideration.

Sincerely,

A handwritten signature in cursive script that reads "Jeffrey S. Mueller".

Jeffrey S. Mueller, M.S.
Program Manager
Health Physics

cc: Joseph Huber, R.Ph., Manager, St. Louis, MO
Katherine Seifert, R.Ph., BCNP, Corporate Radiation Safety Officer