

From: Michael F. Weber (MFW1), NMSS
To: CDP1, RIII, C Pederson
Date: Friday, December 8, 1995 7:16 am
Subject: Completion of requested reviews -Forward

Cindy,

That depends on how one defines "a few days."

On 10/2/95, R. Shewmaker sent me (via e-mail) a 5 page draft summary of the structural integrity inspection - shortly thereafter I sent (via e-mail) his main conclusions to the "AMS Group" in NMSS and RIII. On 10/16/95, he sent me (via e-mail) a summary of his conclusions, and his recommendations. Both of these documents were discussed among the RIII AMS group, and were forwarded to NMSS.

On 10/25/95 NMSS and RIII held a phone conf. The first topic discussed was the structural integrity report. We proposed that NMSS would issue the structural integrity report. They disagreed, and said that R. Shewmaker would write the report, but we would format it and issue it. R. Shewmaker would be listed as the contact. We were very clear on the point of contact, since no one here in the RIII AMS Group is a civil engr. R. Shewmaker was NOT at this meeting. However, within a few days, I called him and explained the above.

On 11/9/95 RIII had another phone conf. with NMSS to discuss my recent trip to AMS, etc. Again, we discussed the Shewmaker report. R. Shewmaker was NOT at the meeting. However, within a few days, I called him.

Last Friday I left a voice mail message w/ R. Shewmaker about the report. He replied (voice mail) and indicated that he had just finished a report on some 2 year project, and would get back to the AMS report Monday (12/4).

Bottom line - if R. Shewmaker was confused about writing the report, apparently I didn't do a very good job communicating with him.

Mike W.

F114

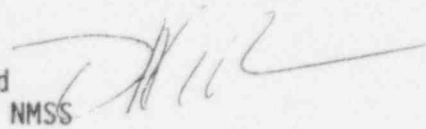


UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

December 6, 1995

MEMORANDUM TO: James Caldwell, Deputy Director
Division of Nuclear Materials
Safety, RIII

FROM: Donald A. Cool, Director 
Division of Industrial and
Medical Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST RE: REVIEW OF REVISED
EMERGENCY PLAN FOR ADVANCED MEDICAL SYSTEMS (AMS)

We have reviewed the revised AMS emergency plan dated September 21, 1995, and our comments are attached. It was difficult to determine exactly what changes AMS made in response to some of our previous comments and it would be helpful if AMS identified the specific changes they make in response to each comment when they resubmit the plan. Considering the large number of outstanding issues, we believe that it would be useful to meet with AMS at their facility to discuss the resolution of our comments.

Attachment: As stated

CONTACT: Kevin Ramsey, IMOB
(301) 415-7887



F115

COMMENTS ON THE EMERGENCY PLAN
FOR ADVANCED MEDICAL SYSTEMS, INC.
DATED SEPTEMBER 21, 1995

Contact: Kevin Ramsey, IMOB
(301) 415-7887

1. The response to our previous comment I.A did not provide an adequate assessment of how current staffing levels will be able to fulfill the functions and responsibilities described in the plan, especially during nonworking hours. The following issues should be addressed in the plan:
 - a. It appears that the onsite emergency organization is comprised of only 3 individuals during working hours, and the absence of 1 or more individuals could severely impact the licensee's capability to promptly notify offsite response organizations and coordinate the response to an emergency. The licensee is required by 10 CFR 30.32(i)(3)(viii) to plan the notification and coordination so that unavailability of some personnel will not prevent notification and coordination. The plan should describe how the licensee will compensate for the functions assigned to an absent member of the emergency organization.
 - b. Section 4.2 of the plan should clearly state the order in which AMS staff members assume the role of Emergency Manager if the Radiation Safety Officer (RSO) is not available (see previous comment V.C).
 - c. It is still difficult to determine which personnel are assigned to each of the functional areas specified in Section 4.2.2 of Regulatory Guide 3.67 (see previous comment V.D). It would be helpful if these functional responsibilities were all specified in one place such as Figure 7.
 - d. During nonworking hours, it is unclear whether a fire or other emergency situation will be detected promptly if power lines or phone lines are down. The plan should describe how the alarm system signal is transmitted to ADT Security Systems and how ADT would detect a loss of contact with the alarm system. Any difference in the response to a loss of contact versus an alarm signal should be described also.
 - e. During nonworking hours, it appears that local fire or police units could arrive before AMS staff and it is unclear whether there are adequate provisions to alert offsite response personnel to radiological hazards if no AMS personnel are there to meet them. The plan should describe arrangements with fire, police and rescue personnel regarding how they will fight fires and respond to alarms if AMS personnel are not present when they arrive at the site. The plan should also describe signs and other provisions to prevent offsite response personnel from unknowingly entering areas with elevated radiation levels.

2. In response to our request for an engineering analysis of the facility structure, the emergency plan refers to an Engineers Opinion Report issued by Neff and Associates dated September 1995. We obtained a faxed copy of the report dated September 22, 1995 (after the date of the emergency plan) and we have the following comments:
- a. The report fails to provide an adequate technical basis to support its conclusions. The report states that the engineer relied on plans, field observations, discussions with personnel, field measurements and visual inspection of the building. The plans used by the engineer are not specified. The results of the field measurements are not provided, nor is there a detailed description of the results of the visual inspections in each area of the building. In addition, the report refers to attached photographs which were not included in the copy of the report we received. The engineering analysis must include enough detailed information for NRC to verify that there is an adequate technical basis for the conclusions in the report.
 - b. We disagree with the statement that the structure is primarily structural steel frame with masonry walls. The structure we refer to is the 1958 building, whereas the entire facility is a composite of structures from at least 6 different time frames. The 1958 building containing the hot cell is a hybrid structure consisting of a reinforced concrete core surrounded by load-bearing masonry walls on 2 sides, structural steel framing on the other 2 sides, and some interior bays of steel framing. The report should provide a more accurate description and analysis of the structural system in the facility.
 - c. We are concerned about conditions that may exist internally in the reinforced concrete in the area of the second floor slab (beam B7) and the north wall of the hot cell because of water seepage. The underside of the slab shows evidence of water movement through the concrete. There is also evidence of water entry and flow down the wing-wall of the labyrinth into the original radiography room (now called high level waste storage). This puts the condition of the reinforcing steel in question. The report should address this issue.
 - d. The report refers to the Ohio Basic Building Code when addressing fire safety, but it does not specify which version of the code the engineer used. The report should provide this information.
 - e. The reports states that "minimal distress to the structure was observed" during a visit to the facility. The report fails to specify where this distress was located or what it consisted of. This information should be provided.
 - f. The report states that the structure can "withstand seismic forces as great as 5.2 Richter." Since the Richter scale is a method of classifying the energy released by an earthquake without defining

other parameters such as epicentral distance, the statement fails to define the associated seismic forces on the structure. The report should state in appropriate units the ground acceleration, velocity, and displacement that the engineer believes a worst case earthquake could impose on the structure. The report should evaluate how well the various structural systems in the building would withstand these seismic forces.

- g. The report states that the facility is in a Group 1 seismic hazard exposure, but it does not specify the classification system used to make this statement. The report should provide the appropriate reference for the "Group 1" rating.
- h. The report does not provide any information regarding the original design bases for the facility. The report should include information regarding the original design, construction, and service life of the building (including the building codes under which each relevant portion of the facility was constructed). Information regarding original design assumptions and theories should be provided. In addition, the report should address the lateral loads, including seismic loads, that the original facility may have been designed to resist.
- i. No information was provided regarding the service life of each portion of the facility. The report should address how long each area of the facility will remain serviceable, and discuss any rehabilitation or repairs that may be required to reach a specific lifetime.

3. Facility Description

- a. Section 1.1 contains a brief description of activities formerly conducted at the site, but there is no description of the activities currently authorized or conducted. The plan should describe the current activities.
- b. Section 1.1 and Table 1 describe the amount of licensed material possessed on September 21, 1995. This inventory is subject to change and could increase up to the possession limits stated in the license. The plan should state the total quantity of radioactive material authorized by the license. Typical quantities possessed at one time may be noted also.
- c. Section 1.1 states that there is over 60,000 curies of cobalt-60 and 2200 kilograms of depleted uranium in the facility, but it is unclear where this material is typically located. Sections 1.2 through 1.2.12 only identify the location of approximately 34,000 curies of cobalt-60. The typical storage locations for the remaining material authorized by the license should be identified.
- d. The plan still lacks a detailed site drawing showing the exterior features of the building and property described in Section 1.2 of

regulatory Guide 3.67 (see previous comment II.B). A detailed drawing of the exterior features of the site must be provided in addition to the interior floor plans. In addition to detailed information about the licensee's property, the drawing should show the pump house on Mandalay Avenue, the rail line that runs past the facility, and the nearest residents in each direction.

- e. The terminology used to describe areas in the facility is still inconsistent (see previous comment II.D). Section 1.2 refers to a shielded work room on the main floor, but this term does not appear in the following sections or on Figure 3/Appendix B. Section 1.2 refers to a mechanical equipment room and a ventilation system equipment room on the second floor, but these areas are labeled as the clean equipment room and HEPA equipment room in the following sections and Figure 4/Appendix B. Section 1.2 refers to a source storage area and irradiation facility in the basement, but Section 1.2.3 discusses a source garden, and Figure 2/Appendix B does not identify any of these areas in the basement. Consistent terminology should be used and all areas discussed in the text should be indicated on the drawings.
- f. Section 1.2.3 states that there is an L-shaped shield of sand-filled vaults on two sides of the source garden in the basement, but the floor plan in Figure 2/Appendix B does not show the shield. Significant safety features such as the sand shield, the emergency generator, fire pull stations, and storage locations of emergency response kits should be shown on the floor plans. The floor plans should also identify where electrical and natural gas services enter the building.
- g. Section 1.3 states that Figure 1.5 identifies the facility and its proximity to near-site structures. It states that Figure 5 shows the location of schools, hospitals and fire stations also. Figure 5 appears to be a poor quality copy of a street map and neither the licensee's building nor any structures within 1 mile of the site are clearly identified. Figure 1 does not provide an adequate picture of the area near the site either. The plan should contain a reasonably detailed drawing of the site area as described in Section 1.3 of Regulatory Guide 3.67 (see previous comment II.F). The plan should also contain a U.S. Geological Survey topographical map (7.5 minute series).

4. Types of Accidents

- a. The discussion on page 2-2 refers to guidance issued by the International Commission on Radiological Protection (ICRP). This guidance is not directly applicable to facilities in the United States. The guidance applicable to protecting the public in this country is contained in the Manual of Protective Action Guides and Protective Actions for Nuclear Incidents issued by the U.S. Environmental Protection Agency (EPA 400-R-92-001). The plan should

refer to this guidance regarding offsite protective action recommendations.

- b. We have a number of concerns regarding the analysis in Section 2.1.1 and Appendix C of potential doses from a fire (see previous comment IV.A). Appendix C states that the source term for the worst case fire was assumed to be 40.4 curies, but the basis for that number is not provided. This does not appear to be a conservative assumption because the revised AMS license application dated October 30, 1995 requests a possession limit of 50 curies for packaged waste and surface contamination, and there is no explanation why the source term should not include bulk quantities of cobalt-60 from containers ruptured by one of the accidents postulated in Chapter 2 such as a gas line explosion, train derailment, or earthquake.

In addition, we disagree with the statement in Footnote No. 40 that a 10-meter release height is a conservative assumption. A ground level release with no plume rise would maximize the offsite dose estimate.

We note that the CAP88-PC computer code is not intended to estimate short term doses resulting from an unplanned release during an emergency. Using a 40-curie source term, we estimated an inhalation dose at 100 meters of 7.7 millirem using the hand calculation in Section 2.1.3 of NUREG-1140, A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees, January 1988. This estimate is over an order of magnitude greater than the 0.2 millirem dose estimated by the CAP88-PC code. A more detailed and conservative analysis using more appropriate calculational methods should be provided.

- c. Section 2.1.2 and Appendix C state that an earthquake could create a 100 millirem/hour dose rate 20 feet beyond the outside wall of the source garden. The plan should state the distance at which the dose rate would drop below 2 millirem/hour and whether that location is in an area accessible to the public. In addition, we attempted to run the Microshield code using the assumptions stated in Appendix C but we could not duplicate the results stated in the plan. The input parameters and assumptions should be described in enough detail to permit us to duplicate and evaluate the calculation.
- d. Section 2.1.3 states that a tornado would not compromise the structural integrity of restricted areas and references the Engineers Opinion Report issued by Neff & Associates. Although this report states that portions of the building contained within the bunker-type construction would not sustain any appreciable distress, it also states "that it is scientifically certain that a tornado passing over this facility would impose significant structural damage" to other parts of the building. Restricted areas on the second floor and in the warehouse areas of the first floor could be completely demolished by a tornado releasing radioactive materials in those areas. Section 2.1.3 should provide a more accurate

description of the potential damage from a tornado, and postulate the maximum amount of radioactive material that could be in these areas as a result of routine storage, preparation for shipments, or other operations.

5. Classification and Notification

- a. Section 3.2 is still inconsistent with the notification requirements in the regulations (see previous comment III.A). Pursuant to 10 CFR 30.31(i)(3)(viii), the plan must contain a clear commitment to notify appropriate offsite response organizations promptly after declaring an Alert or Site Area Emergency (SAE). The plan should not differentiate between these classifications or give the impression that the licensee can needlessly wait a full hour before notifying offsite officials of an Alert declaration. In addition, the plan must clearly state that the licensee shall notify NRC immediately after notification of local and State authorities. Simply stating that NRC will be notified within one hour is not sufficient.
- b. Several of the emergency action levels (EALs) in Attachment 1 of Appendix D are defined in terms of potential exposure rates or actual exposures. It is unclear how the Emergency Manager will be able to identify these conditions in a timely manner. It is unacceptable to wait for survey results if it will take more than 15 minutes to get them. EALs must be defined in terms of conditions that are apparent within the first few minutes of an emergency. This is especially important during nonworking hours. If an alarm goes off and the condition cannot be verified within 15 minutes, the Emergency Manager should act conservatively by declaring an emergency and initiating notification of offsite response organizations. The EALs should be redefined.
- c. The offsite response organizations listed in Attachment 1 of Appendix D to receive a notification vary depending on the event. Each of the organizations identified as a "first responder" should be notified every time an Alert or Site Area Emergency is declared. In addition, all NRC notifications should be made to the NRC Operations Center. The Operations Center coordinates event reports with regional staff.
- d. The plan does not establish the initial recommendations for offsite protective actions that will be included in the initial SAE notification to offsite organizations (see previous comment III.B). If an accident has the potential to require road blocks or other protective actions offsite, the licensee should act conservatively and make initial recommendations to offsite officials until the scope of the accident can be verified. This would include recommendations to stop traffic on the rail line or rope off potentially contaminated areas. Protective action recommendations should be addressed in Sections 3.1.4 and 3.3, and Appendix D.

- e. Section 3.3 should specify the minimum frequency of updates to offsite response organizations after the initial notification (see previous comment IX.B). The response to our previous comment states that Section 8.3 was being modified to include the information, but the revision does not have a Section 8.3.

6. Responsibilities

- a. Section 4.2 states that an environmental consulting firm and a certified health physicist been retained to assist in all matters relating to radiation safety and environmental issues. Table 7 only shows the environmental consultant as part of the AMS emergency organization and it is unclear what function either of these parties would perform during an emergency. The roles of the environmental consultant and the certified health physicist should be clarified.
- b. The response to our previous comment V.E states that letters from the hospital, fire department, and police department will be included in the plan. Section 4.3 states that Appendix E contains letters of agreement from "first responders" listed in Table 2 along with information on the agreed upon means of communication and notification with these agencies. Contrary to these statements, Appendix E only contains letters from the fire department and 2 State agencies and there is almost no information about methods of communication. Complete documentation that offsite response agencies are aware of, and have agreed to their roles as specified in the plan should be provided.
- c. The response to our previous comment V.G concerning the capabilities of offsite organizations and rumor control arrangements stated that the plan would be modified to address these items. The plan does not appear to include this information. In addition to other capabilities, Section 4.4 should specifically address whether local fire or police personnel have the capability to conduct radiation surveys.
- d. Section 4.4 fails to describe some of the organizations listed in Table 2. A description of the responsibilities and capabilities of each of these organizations should be provided.
- e. In Table 2, the organizations do not appear to be listed in the order they would be called. The NRC Operations Center should be notified immediately after appropriate local and State organizations. Table 2 and Attachments 2 and 3 of Appendix D should be revised to prevent confusion.

7. Response Measures

- a. The terms used for accidents are still inconsistent (see previous comment IV.B). The plan should establish the terms for accidents in Chapter 2 and these terms should be used consistently through the rest of the plan. The terms we found are listed below:

Chapter 2

Fire
 Earthquake
 Tornado
 Vandalism
 Flood
 Industrial Facility
 Impact
 Underground Gas Line
 Explosion
 Transportation
 Accident

Chapter 5

Fire
 Natural Phenomenon
 Tornado
 Vandalism
 Flood

Appendix D

Loss or Theft
 Unauthorized Entry
 Power Failure
 Minor Spill or
 Release
 Major Spill or
 Release
 Minor Fire
 Significant
 Exposure
 Fire, Explosion or
 Other Major
 Emergency

- b. We disagree with the statement in Section 5.3 that no actions can be taken to mitigate the consequences of a tornado or flood. When there is advance warning of severe weather conditions, we would expect the licensee to take reasonable steps to secure the facility and minimize releases. If a tornado warning is issued for the site area, we would expect the licensee to declare an alert and take immediate steps to secure licensed materials especially in the warehouse portions of the facility. Section 5.3 and Appendix D should address the mitigating actions that will be taken if a severe weather warning is issued.
- c. Section 5.4.1 states that evacuated personnel will assemble at the designated muster area, however the location of the muster area is not specified and it is not shown on any of the drawings. The location of the muster area should be identified.
- d. Section 5.4.1 does not describe provisions for search and rescue operations if the RSO cannot account for all personnel. This issue should be addressed.
- e. Footnote 25 on page 5-2 states that respirators are not permitted when responding to fires, however Section 5.4.2 states that respirators may be worn during fires. In addition, Section 6.4 states that respirators are maintained in the building and Table 3 indicates that a respirator is maintained at the pump house. It does not appear that the self-contained breathing apparatus required to respond to a fire is available, yet Section 5.3 states that licensee staff will assist the fire department by conducting surveys during fire fighting efforts. The availability and use of respiratory protection during an emergency should be clarified.
- f. Section 5.5 still does not address informed consent (see previous comment VI.A). The plan should describe how the Emergency Manager will verify that a volunteer is aware of the health risks before authorizing emergency exposures exceeding 25 rem.

- g. Issuing dosimeters to firemen is not addressed in section 5.11 of Appendix D. This issue should be addressed in the implementing procedure.
- h. Section 5.5 states that personnel will be monitored for contamination, but there is no description of the procedures for decontaminating personnel if contamination is found. This issue should be addressed.
- i. Section 5.6 states that the Cleveland Emergency Medical Service personnel receive annual training, but it is unclear who conducts this training. In addition, there is no letter of agreement confirming that this organization has agreed to transport contaminated individuals. The training issue should be clarified and a letter of agreement should be provided.
- j. Sections 5.6 and 5.7 state that the University Hospital of Cleveland is capable of diagnosing and treating radiation injuries, and has a Radiation Safety Officer who will perform surveys and control contamination. There is no letter of agreement from the hospital verifying their capabilities and confirming their agreement with these statements (see previous comment VI.D). A letter of agreement should be provided.

8. Equipment and Facilities

- a. Section 6.2 does not describe any communications capability at the alternate command center (the pump house). Both the primary and alternate command center should have a telephone or other means of communication with offsite organizations.
- b. Section 6.4 states that dosimeters and survey meters are stored in the "instrument calibration room" shown in Figure 3, and that protective clothing and respirators are stored "in the locker room or storage room." There is no instrument calibration room indicated on Figure 3 and the storage location for the protective clothing is too vague. It is unclear whether these locations would be accessible during postulated accidents. Section 6.4 should use terminology that is consistent with the labels on the drawings. It would be helpful if command center, equipment storage locations, first aid kits, emergency generator and other features related to emergency response were specifically indicated on the drawings.
- c. Section 6.4 and Table 3 only list pocket dosimeters. While pocket dosimeters are useful for real-time dose assessment, they are not very accurate. The licensee should provide more accurate dosimeters (i.e., film badges or TLDs) that can be used to verify personnel exposures after an emergency is brought under control.
- d. Table 3 indicates that only one respirator and two pocket dosimeters are maintained at the pump house. This does not appear to be sufficient to cover the licensee's staff and offsite rescue

personnel that may need to enter the building. The pump house should contain enough respirators and dosimeters to cover the licensee's emergency staff, and enough additional dosimeters to monitor hose crews, search and rescue teams, or other offsite rescue personnel.

- e. Table 3 indicates that only one frisker and one survey meter are maintained at the pump house. We believe that at least one additional survey meter should be provided at this location for backup. The range of the survey meters should be specified also.

9. Maintaining Emergency Capabilities

- a. Section 7.2 should specifically state that the risks of emergency doses will be covered in the training of offsite rescue personnel so they can decide in advance what risks they would be willing to accept during lifesaving operations. Numerical estimates of health risks are provided in the EPA Manual of Protective Action Guides.
 - b. Section 7.3 should state that the exercise objectives and scenario shall be provide to NRC in advance (typically 60 days) to allow NRC to review and comment on the exercise.
 - c. Sections 7.4 and 7.5 should specify who is responsible for tracking findings from critiques and audits, and verifying that they are closed out.
 - d. Section 7.5 states that there will be periodic audits. The plan should clearly state that there will be annual audits.
 - e. Section 7.6 should state that the shelf-life of protective clothing and other degradable materials shall be tracked and changed out on a regular basis. In addition, provisions for calibration of the stack monitor and testing of the emergency generator should be described.
10. Records - Section 8.1 should specify that records of incidents shall be permanently retained with the licensee's decommissioning records.

11. Format

- a. The plan still does not have a list of effective pages that a reader can use to verify his copy is complete and up-to-date (see previous comment XII). A list of effective pages should be provided.
- b. Although Figures 2, 3, 4, and 5, and Appendix B have cover pages that are numbered, the actual drawings are not numbered or identified as part of the emergency plan. The drawings can be removed from the plan without creating any gaps in the page numbers. Every page of the plan, including the drawings, must be identified with a page number and a revision number/date.