From: Robert Shewmaker (RES), NMSS
To: MFW1 mweber, NMSS
Date: Wednesday, November 15, 1995 4:26 pm
Subject: REVIEW OF ENGINEER'S REPORT REFERENCED IN EMER. PLAN

Attached is my comments on the report that Kevin Ramsey found referenced in the AMS Emergency Plan resubmittal. I find it lacking in the scope that is needed to address the issues I believe NRC has in front of it on the AMS facility. The report apparently included some photographs which apparently were not mentioned to you. I need to get a set of the photos to see what they consist of.

I got your phone message and will turn my material into a report. Will you assign a number to it or will you use it as a feeder report /attachment to something you will issue? I will go to work on the report this week with a target of having it out to you by the end of next week, which is really the first part of the following week due to two day out of next week. Target 11/28/95.

CC: rmw1

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COMMENT ON ENGINEER'S OPINION REPORT
NEFF & ASSOCIATES
by
JOHN W. DENEGA
dated September 22, 1995

RE: AMS FACILITY
1020 LONDON ROAD
CLEVELAND, OHIO

1. Denega states:

"Other reports reviewed were ACI 437 R-91 and ACI 201.1 R-92 and found to be valuable in content but not pertinent to the investigation being conducted for this report."

"... evaluation inspection ... was conducted by me ... to determine the structural adequacy of the this (sic) building to withstand earthquake and tornado damage to certain elements of the structure."

RESPONSE:

ACI 201.1R-92, Guide for Making a Condition Survey of Concrete in Service, states that, "A condition survey is an examination of concrete for the purpose of identifying and defining areas of distress. ... While it probably will be used most often in connection with the survey of concrete that is showing some degree of distress, its application is recommended for all concrete structures."

ACI 437R-91, Strength Evaluation of Existing Concrete Buildings, states that, "This report provides recommendations to be followed in an investigation to establish the loadings that can safely be sustained by the structural elements of an existing concrete building."

It is not explained in the report why it was concluded that these two guidance documents were not pertinent to the goal stated by Denega of determining the structural adequacy of the building. Perhaps his reason was that he has characterized the structure as a "primarily structural steel frame with masonry walls" and documents addressing concrete and concrete buildings were not appropriate for a primarily structural steel frame. It was noted however, that, "This investigation was conducted under procedures described in ACI 364.1R-94, Guide for Evaluation of Concrete Structures Prior to Rehabilitation, which would indicate that Denega did place some degree of importance on the concrete portions of the building, so perhaps they were not used for some other reason not identified in the report.

A question should be asked of the licensee to determine why these two guidance documents were dismissed by the consultant as not pertinent to the investigation relative to the concrete portions of the structure.

2. Denega states:

"To arrive at my conclusions as to the structural adequacy I have relied on plans, field observations, discussion with personnel at the facility, field measurements and visual inspection of the various types of construction utilized for the units under investigation."

RESPONSE:

Details as to which specific plans or parts of plans were used are not mentioned or referenced in the report. Information that was obtained from any field measurements is not even provided in summary form nor is there a description of the results of the visual inspection mentioned in the report. It is assumed that the photographs that are supposed to be attached to the report would provide information on what elements of the various units identified in the report were inspected, but the photographs have not been provided.

The licensee should provide copies of the photographs and additional details relative to the bases for the conclusions.

3. Denega states:

"This structure is primarily structural steel frame with masonry walls..."

RESPONSE:

It is not clear whether this statement was made to address all of the building facility at the 1020 London Road address which is a composite from different time frames that would include at least six different construction periods that were used to complete the facility. An examination of the drawings such as F-1, Rev. 2; A-2, Rev. 2; S-1, Rev. 1 and S-2, Rev. 0 would indicate that the 1958 building that contains the areas apparently designed to house the radioactive materials is not primarily a structural steel frame building. The 1958 building can probably best be described as a hybrid structure consisting of a reinforced concrete core area around the hot cell portion surrounded by load-bearing masonry walls on about two sides of the building and structural steel framing on the other two sides. The roof framing is structural steel supported by a combination of steel columns and load-bearing masonry walls. At the second floor level approximately 45% of the 1958 building framing is structural steel with the balance being reinforced concrete and load-bearing masonry.

The licensee should provide a more realistic physical description of the structural system for the facility.

4. Denega states:

"Within this structure several areas are designed to contain radioactive materials. These areas are contained within reinforced concrete floors, walls and ceilings ranging from three feet to five and a half feet thick."

RESPONSE:

It is not made clear whether or not the investigator is aware of the fact that the design intent with regard to areas that would contain radioactive materials and where they may now be stored or where there may now be contamination are in fact not the same. The NRC has concluded that there is, in general, no current structural safety concern regarding compartments (described by Denega as included among the units of the facility) made up of the heavy reinforced concrete construction that would include the WHUT room, the hot cell, the radiography lab (now designated high level waste storage), the source garden, and the front and back basements. Other units where there is either contamination or stored radioactive material are not housed in such compartments and include the isotope shop, the HEPA equipment room, the air lock and the isotope warehouse. These units rely at least partially on concrete masonry construction and some steel framing and light-weight precast concrete panels or thin-gauge steel decking for the structural elements.

The exception or reservation of NRC regarding the heavy reinforced concrete construction relates to the unknown conditions that exist internally in the reinforced concrete in the area of the second floor slab, Beam B7 (18"x26") and the north wall of the hot cell. The underside of the slab in this area shows evidence of apparently previous water movement through the concrete with the source of the water being unknown. The underside of the second floor slab exhibits a region of efflorescence and possibly some incrustation. This leaves a potentially open item with respect to the condition of the reinforcing steel. Evidence of water entry and flow down the wing-wall of the labyrinth into the original radiography room (now called high level waste storage) which is adjacent to this area was also noted by NRC. On the roof above this area is the location of roof line intersections between the pre-1958 warehouse building that was modified and incorporated into the 1958 construction. Leakage of water from the roof surfaces could have been at this location.

Since the consultant has identified specific areas within the AMS building facility, called units, the licensee should characterize the type of building construction that each of these unit's volume is defined by, so that the location of source materials and/or contamination levels can be identified with. This will assist in identifying the level of protection that might be afforded for the various hazards for each of the units.

5. Denega refers to the Ohio Basic Building Code when describing the building type with respect to fire safety.

RESPONSE:

It is assumed that the reference is to the version of the code that is currently in force, but the specific reference is not provided. The licensee should provide this information.

6. Denega states:

"Minimal distress to this structure was observed at the time of my visit

which could be attributed to the quake events."

RESPONSE:

The report provides no description of where this "minimal distress" was located and what it consisted of and what areas were inspected. The licensee should provide additional information that supports this conclusion.

7. Denega states:

"It is my opinion based on reasonable scientific certainty that the structure located at 1020 London Road, Cleveland, Ohio has the structural integrity to withstand seismic forces as great as 5.2 Richter."

RESPONSE:

This statement has many problems associated with it. If the subject of certainty is going to introduced there should be some quantification of the certainty. What is meant by the use of the term "reasonable scientific certainty" has no real value in a technical sense in attempting to evaluate what the report is trying to establish. If a statement were made regarding a numerical value of the probability of the structural integrity not being compromised over the period of additional service life needed for the facility, then that would have some value. Additionally, it is not clear what is meant by "the structure" and whether or not this includes the entire building complex known as the AMS facility or is only the reinforced concrete portions described by the engineer like a bunker or the pillbox used by the military. In addition, a comparison to "seismic forces as great as 5.2 Richter" has no technical meaning. The Richter scale is a method of numerically classifying the energy released by an earthquake. It is not a measure of or an indication of the forces that may be imposed on a specific structure that could be impacted by an earthquake at some location.

The licensee needs to correct this statement and probably expand any such statement so that it has some technical meaning and can have some logical basis.

8. Denega states:

"It is also my opinion that this facility is in Group 1 seismic hazard exposure."

RESPONSE:

No reference is given as to what system, organization, etc. the mentioned classification system is related to, so the statement cannot be evaluated.

The licensee needs to provide the appropriate reference for the cited "Group 1".

9. No information was provided in the report relative to the original design

bases for the AMS building facility complex that was the subject of the inspection report. Since the report is stated to be addressing the structural adequacy of certain elements of the building to withstand earthquake and tornado damage, it is necessary to provide some basic information about the building facility and the elements needing the main focus with respect to the storage of radioactive materials and the isolation of contamination. As outlined in ACI 437R-91, Chapter 2, The Preliminary Investigation, there should be a review of the existing information. All sources of existing information concerning the design, construction and service life of the building should be researched to learn as much as possible about the structure. Attempts should be made to clearly reconstruct the original design assumptions and theories. One obvious piece of information needed in any such investigation is the identification of the building code under which the building facilities were designed and constructed. Such a source of information would provide insight into the design bases of the building. In addition, no information was provided in the report on the lateral loads, if not included in the building code requirements, to include seismic loads, that the original facility may have been designed to resist.

The licensee needs to expand the information in the report to address this type of missing information.

10. No information is provided on the serviceability of the relevant units described in the report, nor the entire balance of the AMS building facility that could impact the concept of the decay in-place of the source material for the period contemplated prior to decommissioning.

The licensee needs to address the subject of serviceability of the structure of the AMS building facility.

11. There is no indication that the inspector was aware of the fact that there is source material stored in the isotope warehouse which does not qualify as a bunker type installation.

The licensee should address this issue.

R. Shewmaker, 11/15/95

FILE: AMSNeffE.val