

# YANKEE ATOMIC ELECTRIC COMPANY

B.3.2.1



20 Turnpike Road Westborough, Massachusetts 01581

December 1, 1978

United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Office of Nuclear Reactor Regulation  
D. L. Ziemann, Chief  
Operating Reactors Branch #2  
Division of Operating Reactors

References: (a) License No. DPR-3 (Docket No. 50-29)  
(b) USNRC Letter dated November 1, 1978, from  
D. L. Ziemann to R. H. Groce, Subject: Staff  
Positions on Outstanding Fire Protection Issues  
(c) YAEC letter (WYR 78-89) dated October 16, 1978,  
from D. E. Moody to D. L. Ziemann, Subject: Fire  
Protection Evaluation Safe Shutdown Methods.

Dear Sir:

Subject: Yankee Positions on Outstanding Fire Protection Issues

Yankee has reviewed the expressed NRC concerns and staff positions in Reference b. above. In addition, we have reviewed Enclosure 1 to Reference b. to insure that it correctly represents YAEC's responses to the NRC staff positions. We find several instances where it does not, and these are listed here.

H.2, Switchgear room Halon system, was listed as A, accepted. It should have been S, study.

H.4, Battery room air flow alarms, was listed as R, rejected. It should have been A, accepted.

J.5, Weatherproof hose house ventilators. It was agreed at the site visit that YAEC had adequately answered this concern, and that it would be deleted.

J.8.d, portable radios dedicated for fire brigade use, is listed as R, rejected. We feel it was agreed at the site visit that YAEC had adequately responded to the concern, and that it would be deleted.

O.1, dealing with shutdown considerations. At the site meeting,

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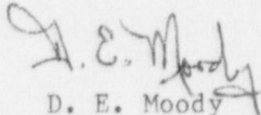
considerable discussion was held on this item. YAEC feels that it was decided that the words "alternate shutdown method" rather than "dedicated shutdown system" more fully expressed the NRC concerns on this subject.

R.4.c, has no designation of action taken beside it. It should be A-I.

Attachment 1 to this letter contains YAEC's response to the unresolved NRC staff positions. Several of those responses are proposed alternatives which we feel adequately answer the concerns expressed in the NRC positions. We trust that the responses will resolve the outstanding issues; however, should you have any questions, please contact us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

A handwritten signature in dark ink, appearing to read "D. E. Moody", is written over the typed name.

D. E. Moody  
Manager of Operations

## Attachment 1

Several NRC staff positions dealing with fire protection were listed as rejected or under review by YAEC. Those positions have been reviewed and YAEC's responses follow here. We have not included those positions to which we previously agreed.

### A. Primary Auxiliary Building

- A.4. Hydrogen Storage Room should have forced air vent with low air flow alarm.

Response: There are twelve 6 inch diameter holes open in the floor of the room (six on both the east and west side) and three 9 3/4 inch diameter vents in the roof directly above the H<sub>2</sub> manifold. With the dampers of the vents weighted to stay open, the YAEC feels that this is enough natural circulation to ensure that there will not be a buildup of H<sub>2</sub> in the room. In addition, ignition sources have been minimized by making the area a No Smoking area, using only nonsparking tools and enclosing the electrical equipment in explosion proof fixtures. Personnel will be instructed that air flow in the room is not to be restricted.

### B. Diesel Generator Room

- B1. Fuel oil piping should be rerouted outside the safety injection pump area of D-G building.

Response: Subsequent conversations with members of the NRC review team defined the concern, namely that a ruptured fuel oil line in this area could result in a large quantity of fuel oil being released without plant operator awareness and endanger all safety injection pumps. The fuel oil line is the supply to the diesel generator day tanks and is under pressure from the elevation head of the fuel oil storage tank in the yard.

YAEC has addressed the concern and proposes to add the following modifications as a substitute for the staff position.

The area outside the diesel room doors will be enclosed with a curb so arranged that any leakage from the fuel oil supply piping will be contained and directed to the drainage collection tank which is provided with a high level alarm. In addition, a fireproof partition will be provided to insure that any potential fuel oil piping leak will not spray beyond the confines of the enclosing berm. In this manner, any potential



leakage will be contained and plant operators will be alerted to the existence of a fuel line leak in time to take corrective action.

- B.2. An automatic suppression system should be provided to protect each diesel generator room with flame detector actuation.

Response: YAEC feels that the addition of an automatic fire suppression system would decrease the reliability of the diesel generators. Specifically, this could occur when a small fire, such as a fuel header leaking onto the exhaust manifold, started burning and actuated the fire protection equipment. Use of an automatic sprinkler system would require tripping of the diesel because of potential damage to the vulnerable electrical equipment in the room. Actuation of an automatic gaseous system could prohibit the access of plant personnel to correct the source of the problem, and the diesel would have to be secured to insure that (1) the source of fuel or ignition was eliminated, and (2) an adequate concentration of the gas could be maintained. The result is that small fires, which would alarm and be put out by operators using portable extinguishers, would require the securing of the diesels; thus decreasing their reliability.

As an alternative, YAEC proposes the installation of a fused head dry pipe system, manually operated from outside the diesel room. The increased detection capability in the rooms will alert the operators. If it is a fire, they will fight it manually, and if it appears that they cannot control it, the brigade leader will open the manual valve, thus applying the sprinkler water to the fire.

YAEC feels that this is a much preferred alternative to the NRC position.

- B.4. The doors between the Diesel Generator Rooms should be electrically supervised.

Response: The fire doors between the D.G. Cubicles ride on an inclined track to shut and remain shut by gravity. The doors have never been blocked open as part of the plants normal routine. Based on the above, the plant does not feel that the doors need to be supervised.

- B.6. The diesel fuel oil shutoff valve to the diesel generator rooms should be modified to actuate by an electro thermal link actuated by the automatic suppression system.

Response: YAEC feels that this is unnecessary. There are

presently two thermal links in the room, either of which, when broken, will shut off the flow of diesel fuel oil to the diesel generator rooms. We feel that this is sufficient. It should be noted that spurious operation of the link at a time when the diesel was needed could degrade the safe operation of the unit.

- B.7. The diesel generator room should have a drain to outside the room as a backup to the existing limited capacity floor drain.

Response: Each D.G. Cubicle has a floor drain that goes to a collecting tank with a capacity of 637 gallons, which alarms at 23", corresponding to 177 gallons. Because each cubicle will be curbed, the YAEC feels that even if a pipe should break, there would be sufficient time for the operator to secure the flow of oil without it spreading to the other cubicles.

C. Vapor Container

No outstanding issues

D. Fuel Storage Vault

- D.1. Wood storage boxes should be removed.

Response: The fuel storage area is not needed to safely shut down the plant. The amount of wood in there is small, there are no ignition sources. In addition, there is no better place to store the boxes, which contain control rods and belong in that area. For these reasons, YAEC feels that the wood boxes need not be removed.

E. Mechanical Equipment Room #3

- E.1. A fire hose station should be provided for Mechanical Equipment Room No. 3.

Response: There is a hose house within 105 feet of the mechanical equipment room which contains as a minimum 150 ft. of 2 1/2" hose, 200 ft. of 1 1/2" hose and two 1 1/2" combination nozzles. The area between the hose house and the mechanical equipment room is clear, with a straight line to the door. The hose house will supply fire fighting capacity and equipment in excess of a hose station in nearly the same time, and is a more reliable supply. Therefore, YAEC feels that a hose station is no needed to protect mechanical equipment Room #3.

F. Screen Well Pump House

There are no outstanding issues.

G. Heating Boiler Room

- G.1. An automatic sprinkler system should be provided in the heating boiler room.

Response: The heating boilers operate only when the reactor plant is shut down, hence, present no hazard to Safe Shutdown. Fuel oil is present in this room at all times, however, since the make-up supply to the emergency diesel generator passes through the area. Yankee is currently evaluating this situation and will either remove the fuel oil piping and thus remove the hazard, or provide automatic sprinkler coverage for the area.

H. Switchgear Room

- H.2. An automatic total flooding Halon 1301 suppression system should be provided.

Response: YAEI will comply with this position.

- H.4. Air flow alarms should be provided for the battery room exhausts.

Response: As noted in the cover letter, this was incorrectly listed as rejected; YAEI had agreed to comply with this position.

I. Control Room

- I.4. Cables above the false ceiling, in the Control Room, should be coated with a flame retardant coating. (Above control board and in side wall risers.)

Response: There are only a small amount of cables above the main control board. The cable trays on the south wall are all separated from one another by at least 18 inches with the exception of the two trays containing the 2300 volt cables. The 2300 volt cable trays are 4 inches apart with metal dividers between sets of cables, and the cable sets are wrapped with asbestos above the ceiling. The cables above the dropped ceiling have a minimum amount of horizontal travel before they go through the concrete ceiling. The ceiling penetrations have all been sealed with a ANI approved three hour fire seal. There are three ionization detectors spaced over the south edge of the control boards. The panels of the dropped ceiling are easily removed for free access to the area above the ceiling.



Therefore, YAEC does not feel that spraying the cables is necessary.

J. Yard Loop and Hose Houses -- Portable Equipment

J.1. Each hose house should have the following additional equipment:

f. One Haligan forceable entry tool

The doors for areas of the plant that contain equipment required for safe shutdown are either controlled by our security system or are unlocked. In the event of a fire the doors could be readily unlocked from the security console. The ready access of a haligan forceable entry tool would be contrary to the philosophy of the security program adopted by the plant as requested by the NRC. Therefore, the plant feels that forceable entry tools should not be obtained for use.

J.3. Post barricades should be provided for the hydrants and PIV's which could be damaged by vehicles.

There is one hydrant and one PIV not protected by a physical structure of some type. The hydrant is 14 feet and the PIV is 10 feet from the nearest drive. Each is on a lawn between the road and a building. Between the road and the lawn is an asphalted storm drain ditch. The ditch has rounded shoulders but is 14 inches deep 8 feet in front of the hydrant and is 16 inches deep 7 feet in front of the PIV. The vehicle speed through these areas is slow, therefore, the plant feels based on slow speed of vehicles, the storm drain and the position of the devices that post barricades are not needed.

J.5. Hose houses should have weather proof ventilators.

Response: As discussed in the cover letter, this position was adequately addressed previously, and should be deleted.

J.7. A foam cart should be provided for foam pick-up tubes and ten containers (5 gallons each) of foam. Adapters should be provided so pick-up tubes can be fitted to 2 1/2 inch hose.

There are three areas in which foam is stored for use:

- a. 35 gallons in Compressor Room of Waste Disposal Building.
- b. 25 gallons in Turbine Building at North door.
- c. 45 gallons in the Security Diesel Generator Building

\*NOTE: 25 gallons has been ordered for training purposes and to insure we have 100 gallons

These supplies of foam are physically separated so as not to jeopardize all the foam with one fire, yet store it close to the various sources of flammable liquids. A foam cart could not be stored in an area where the foam would not be subject to freezing, be readily accessible, and would not be in the way of normal plant evolutions. The pick-up tube in the waste disposal building is made for use on a 2 1/2 inch hose and the pick-up tube in the turbine building is for use on a 1 1/2 inch hose. They are sized to the hose that they would normally be used on. Based on the above discussion the plant does not feel that the foam cart and adapters increase the suppression capability.

J.8. Additional equipment should be provided at equipment storage locations consisting of:

- d. Three portable radios dedicated to the fire brigade and plant operations personnel emergency use should be provided.

Response: As noted in the cover letter this was adequately answered at the site meeting, and should be deleted.

- e. Four air breathing apparatus and eight spare bottles should be provided.

Response: YAEC will comply with this position.

J.10. A cooling tank should be provided at the air recharging station (compressor)

Response: YAEC has been consistently able to fill air bottles to the required pressure at a rate of less than five minutes per bottle. This was explained to the NRC team during the site visit. In addition, YAEC has agreed to purchase four more extra breathing apparatus and eight spare bottles (J.8.e). For this reason, we see no need to provide a cooling tank at the air recharging station.

J.11. A cascade recharge system with the existing large air storage filters should be provided.

Response: There are two compressors located at the air recharging station, providing ample means of filling air bottles. Because of this and the reasons expressed in J.10 above, YAEC sees no need to add a cascade recharging system to the air recharging station.



L. Turbine Building

L.1 An automatic foam deluge system should be provided for the following:

a. Lube Oil reservoir

Response: YAEC will comply with this position.

b. H<sub>2</sub> seal oil unit

Response: Because of the decision to curb the area and drain oil and water out of the building, the existing deluge system can be used. It will be modified to be automatic and independent of sprinklers and hose stations protecting the same area.

c. Transformer oil cooler

Response: A decision has been made to curb the area and drain any oil outside the building. The transformer oil has level alarms which indicate a leak to the control room. Automatic fire suppression will be provided by the modified deluge system described in L.1.b above.

L.2. The turbine lube oil reservoir should be dyked to contain the contents of the lube oil reservoir plus an allowance for suppression water.

Response YAEC will comply with this position.

L.4. An automatic sprinkler system should be provided throughout the turbine building with a 0.3 gpm/ft<sup>2</sup> density over the most hydraulically remote 3000 ft<sup>2</sup>. The feed to the system should be independent of deluge systems and hose stations protecting the same area.

Response: The existing sprinkler system will be modified and/or extended to meet the above requirement for areas of the turbine building under the operating floor. YAEC does not intend to extend the system to the operating floor or to the area of the turbine building under the switchgear room.

L.6. The oil storage room doors should be curbed to contain normal oil storage (500 gallons) plus an allowance for suppression water.

Response: The oil storage room is presently curbed with a six inch curb. With this curb the room will hold over 1900 gallons.

M. Fire Water Supply

- M.1. An automatic start diesel fire pump rated for at least 2000 gpm @ 125 psi should be provided with an independent feed to the yard loop underground system. Valving should be provided at the yard loop connection, independent of the existing loop feed, per NFPA 20.

Response: It is YAEC's intent to comply with this position by meeting the requirements of BTP 9.5-1, Sections E.2.c and e. However, due to the many variables to be considered when evaluating the position (dealing mainly with the space available for such a modification) we cannot provide details at this time. The study is continuing, and these details will be provided in the near future.

- M.3. Fire Pumps should start at 110 and 100 psig.

Response: The plant will change the setting of the pressure switches to start the fire pumps at the above pressures.

N. Yard Hazards

No outstanding issues

O. Shutdown considerations

- O.1. An alternate shutdown method should be provided which is independent of the turbine building, switchgear room, control room, manhole #3 and single cable run in PAB for charging and shutdown pumps.

Response: Our proposed alternate shutdown method was submitted to you in Reference c. of the cover letter. At a meeting in Bethesda on November 8, further information was requested. Specifically, Yankee was asked to review the instrumentation requirements for the shutdown methods previously described and to verify that the information would be available to the operating crew performing the shutdown. Acquiring that information must not require assistance which would affect the manpower needs of the fire brigade.

This information is currently being developed. As agreed in our telephone conversation of November 28, 1978, it will be provided before startup of the plant.

P. Fire Dampers

- P.1. Fire dampers with a rating equivalent to fire barrier penetrated should be provided to isolate the control room and switchgear room from the turbine building.

Response: YAEC will comply with this position.

Q. Fire Brigade

- Q.4. Fire brigade members should have offsite hands on fire fighting training.

Response: Attachment 2 lists the training being given to the fire brigade at present. This was based upon the recommendation of the Massachusetts Fire Fighting Academy. At present, it is not practical to increase the amount of, or change the type of, hands on training; nor do we presently agree that it is necessary. YAEC will further evaluate the present training; and, if changes are deemed necessary, will make them.

- R. Steps should be taken to enhance manual fire fighting capability, including interim fire fighting actions, at the earliest possible time.

- R.1. Increase fire brigade size to seven trained members. (Action has been initiated by the licensee to have five trained members on day shifts and an hourly fire watch of safety-related areas at all other times, until the unit is shut down for refueling.)

Response: This position now applies to the time from plant startup until the changes and modifications indicated in other staff positions are completed; and was discussed fully at the meeting on November 8. At that meeting, the actions we had taken between the time of the site visit and the meeting on the improvement of our manual fire fighting capability was sufficient for you to reduce this requirement to five fully trained members with an interim requirement of hourly plant tours until we have completed the changes and modifications indicated in other staff positions. Therefore, YAEC will address itself to the five member fully trained fire brigade criterion rather than to the seven.

Yankee Atomic Electric Company, in an effort to resolve the question on interim fire brigade size (until additional automatic suppression systems and increased detection systems are installed) proposes the following. We will train and add to each shift one additional auxiliary operator. Our interim fire brigade will then consist of four trained fire fighters, with the Shift Supervisor as brigade leader. They will be



supported by two security personnel who will provide communications and life safety help. In addition, these support personnel will be responsible for providing additional air bottles, portable ventilation equipment, and other additional fire fighting equipment as directed by the brigade leader.

It should be realized that it will take time to hire and train these additional personnel. Until they are hired, trained and on shift, we propose to provide a fire brigade of five trained fire fighters, led by the Shift Supervisor, at any time that significant maintenance and/or construction activities are taking place in any area needed to safely shut down the plant or in any area where a fire could affect the ability to safely shut down the plant. This fire brigade will be supported by two security personnel with the duties stated previously. At any other time (backshifts, weekends, holidays, when significant work is not going on) the fire brigade will consist of three trained fire fighters, led by the Shift Supervisor, and the two support security personnel. It is our intent that after the additional modifications, revisions and additions have been made to the automatic suppression systems and detection systems, the normal fire brigade at Yankee Rowe will consist of three trained fire fighters led by the Shift Supervisor, and backed up by two support personnel at all times on all shifts.



DIVISION OF  
OCCUPATIONAL EDUCATION

# *The Commonwealth of Massachusetts*

## *Department of Education Massachusetts Firefighting Academy Rowe, Mass.*

*P.O. Box 248 Framingham 01701*

October 19, 1976

Ray Berry  
Technical Assistant  
Yankee Atomic Electric Company  
Rowe, MA 01367

Re: Fire Brigade Training Schedule and Course Outline

Dear Mr. Berry,

In reference to our meeting of October 8th regarding fire brigade training, the following program is submitted. It is both theory and practical designed to provide the brigade member with firefighting knowledge and safety practices in the following areas:

- |   |                 |
|---|-----------------|
| I. Breathing Apparatus                            | 11/29 - 6 hours |
| A. Necessity                                      |                 |
| B. Function and operation                         |                 |
| C. Safety precautions                             |                 |
| D. Donning  |                 |
| E. Practical application                          |                 |
| II. Hose and Nozzles                              | 11/30 - 6 hours |
| A. Construction                                   |                 |
| B. Care and maintenance                           |                 |
| C. Testing  |                 |
| D. Advancing                                      |                 |
| E. Repacking                                      |                 |
| F. Nozzle operation                               |                 |
| III. Portable Fire Extinguishers                  | 12/1 - 6 hours  |
| A. Chemistry of Fire                              |                 |
| B. Classification                                 |                 |
| C. Proper application                             |                 |
| D. Foam application                               |                 |
| IV. Electricity                                   | 12/2 - 4 hours  |
| A. Electric utility company installations         |                 |
| B. Electricity on the human body                  |                 |
| C. Extinguishing fires involving electrical fires |                 |

V. Automatic Sprinkler Systems

12/2 - 2 hours

- A. Wet system
- B. Dry system
- C. Deluge

It is understood that you can provide the following facilities and equipment.

1. Corridor and adjacent rooms first floor of generating plant for practical application with breathing apparatus and hose lines (dry).
2. Facility for re-charging air bottles.
3. (7) 20# purple K fire extinguishers  
(5) 15# CO<sub>2</sub> extinguishers  
(5) 2½ gallon water extinguishers
4. (1) 5' X 5' X 8" pan
5. #2 fuel oil
6. Gasoline
7. Foam concentrate

Additional equipment will be supplied by the Fire Academy.

The program is scheduled for four days, 9 a.m. to 4 p.m. and the suggested starting date is 11/29 finish 12/2.

The instructor and administrative costs for this program is \$958.00.

The policy of the Massachusetts Firefighting Academy at this time does not provide for charging tuition for industrial training courses. Chapter 842 Acts of 1971 authorizes the Fire Academy to accept donations or grants from private firms or corporations to reimburse such expenditures. This program could not be offered otherwise.

Your interest in improved brigade practices reflects your professionalism and the safety standards of Yankee Atomic Electric. If you have questions please feel free to call me at (617) 568-8348.

Very truly yours,

*Bud Kirkman*

Captain Bud Kirkman  
Program Specialist

NOTE: Donations made payable to:  
Massachusetts Firefighting Academy Trust Fund  
Mr. Edward H. McCormack, Jr., Administrator

c.c. Lawrence Faria  
E. A. Sawyer, Yankee Atomic

BK/jk