CONNECTICUT YANKEE ATOMIC POWER COMPANY

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December 29, 1982

Docket No. 50-213
A02811

Director of Nuclear Reactor Regulation
Attn: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Reference: (1) D. M. Crutchfield letter to W. G. Counsil, dated September 30, 1982.

Gentlemen:

Haddam Neck Plant
Systematic Evaluation Program Integrated Assessment

Via Reference (1), the Staff forwarded the summary of differences from current licensing criteria generated through the evaluation of the SEP Topics applicable to the Haddam Neck Plant. This list of differences was discussed by Connecticut Yankee Atomic Power Company (CYAPCO) and NRC representatives in meetings on October 6 and 7, 1982 at the Northeast Utilities Service Company (NUSCO) offices and at the Haddam Neck Site. The purpose of those meetings was to ensure that CYAPCO and the NRC had a mutual understanding of the issues to be addressed and to attempt to establish a plan for resolving those issues. The purpose of this submittal is to document CYAPCO's intended actions to address these issues during the Integrated Assessment for the Haddam Neck Plant.

Attachment 1 contains a brief summary of the differences for each topic reviewed and a description of CYAPCO's intended actions to resolve each item. For those topics where additional information or action is required from CYAPCO to resolve open items, a schedule is provided. For issues where additional documentation is needed, CYAPCO intends to address those topics in topic-specific correspondence.

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We trust the Staff will find the attached information sufficient to ensure that adequate resolution of the outstanding issues will be achieved in a mutually acceptable manner.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

W. G. Counsil

W. G. Counsil
Senior Vice President

J. P. Cagnetta

By: J. P. Cagnetta
Vice President Nuclear and
Environmental Engineering

Docket No. 50-213

Attachment 1

Haddam Neck Plant

Systematic Evaluation Program Integrated Assessment

Resolution of Open Issues

Dec~mber, 1982

TOPIC NO.	TITLE
II-3.B	Flooding Potential and Protection Requirements
II-3.B.1	Capability of Operating Plant to Cope with Design Basis Flooding Conditions.
II-3.C	Safety Related Water Supply (Ultimate Heat Sink)
III-3.B	Structural and Other Consequences of Failure of Underdrain Systems

10 CFR 50 (GDC 2 and 44) and 10 CFR 100, as implemented by SRP Section 2.4.3, 2.4.4, 2.4.5, 2.4.7, 2.4.10, 2.4.11, and 9.2.5, Regulatory Guides 1.27 and 1.59, and ANSI N170, require, in part, that structures, systems and components (including the ultimate heat sink) important to safety be designed to withstand the effects of floods and consider hydrologic characteristics in the evaluation of the site.

1. Roof Flooding - The design live load for the service building roof could be exceeded during rainfalls less severe than the PMP.

2. Site Flooding - The original site design basis flood on the Connecticut River was 19.5 ft msl with maximum external protection designed to be at elevation 21.5 ft msl. The probable maximum flood (PMF) on the Connecticut River is estimated to have flood elevation of 39.5 ft msl at the site and a standard project flood (SPF) is estimated to have an elevation of approximately 23.2 ft msl. Failure of upstream dams either during a PMF or as a separate flood producing event has not been addressed by the licensee.

   However, protection to 39.5 ft msl is not practical and thus the licensee has proposed protection to 30 ft msl which is the highest protection possible if building walls are able to structurally withstand the flood waters. This level is 6.8 ft greater than the SPF, but 9.5 ft less than PMF. Protection to only 30 ft msl would not meet current NRC criteria.

3. Groundwater - The maximum groundwater elevation for hydrostatic load will be the PMF level (39.5 ft msl). The normal high groundwater elevation for use in combination with appropriate seismic conditions is plant grade (21.0 ft. msl). No credit is given for control of groundwater levels by the underdrain system.

4. Emergency Procedures - The licensee's proposed emergency flood procedure does not provide protection to the current NRC licensing flood level (PMF - elevation 39.5 ft msl). Recommendations for upgrading the emergency procedure to provide protection to 30.0 ft msl are given in the TER appended to the Report.

5. Ultimate Heat Sink - The Haddam Neck ultimate heat sink complex would not function during two postulated low water events in the Connecticut River. Full compliance with Regulatory Guide 1.27 has not been demonstrated.

6. Underdrain System - The mat sump system is not safety grade, and failure could enable groundwater rise to plant grade (see SEP Topic II-3.B). An evaluation under SEP Topic III-3.A using new groundwater elevation at plant grade is recommended.

CYAPCO Response

o Roof Flooding

CYAPCO will analyze the service building roof for loads associated with the PMP and demonstrate:

(1) that the roof is acceptable under PMP loadings and that structural failure would not occur, or
(2) that failure of the roof and the resulting internal flooding would not prevent the plant from achieving and maintaining a safe shutdown condition, or
(3) that structural modifications are necessary.

CYAPCO intends to incorporate this analysis in the work associated with Topic III-7.B.

o Site Flooding

The Haddam Neck site is currently protected to elevation 30.0 feet MSL. Based upon structural considerations, this is the highest elevation to which specific structures can be protected. Although current state-of-the-art methodologies for estimating exceedance frequencies do not permit us to closely estimate a probability associated with a flood resulting in a stage elevation of 30.0 feet MSL, CYAPCO has determined that such an event is of sufficiently low probability that protection to a higher elevation is not required to ensure plant safety.

o Groundwater

No credit was originally taken in structural analyses for control of groundwater levels by the plant underdrain system. Future analyses of structures will reflect a stillwater level at 30.0 feet MSL for flooding conditions and a level at 21.0 feet MSL for normal groundwater levels. This is addressed also in Topic III-3.A.

o Emergency Procedures

The current emergency procedure for flooding of the Connecticut River, forwarded to the Staff by letter dated September 21, 1982, is adequate to implement all required actions for a flood to elevation 30.0 feet MSL. However, CYAPCO will assess the time required to implement all actions to determine if the river levels selected for implementation of various portions of the procedure are appropriate.

CYAPCO intends to revise the emergency procedure for flooding of the Connecticut River to include contingincies in the event that certain flood protected areas become inundated. These provisions would include the capability to provide service water flow to cool the diesel generators by tying in to the service water line in the turbine building and feeding with an alternate pump. The revised procedure will also describe a method by which water could be provided to the steam generators via a portable pump feeding into the main feedwater lines in the turbine building. It is CYAPCO's position that these actions, in conjunction with the installed flood protection system, provide adequate protection from the effects of flooding. CYAPCO intends to revise this procedure to include the above actions before startup from the 1983 refueling outage.

o Ultimate Heat Sink

CYAPCO intends to demonstrate:

(1) that the service water pumps could provide the required flowrate at the stage elevation associated with a minimum low water level, or

(2) that the limiting minimum operating level is sufficiently low to assure a low probability of exceedence, or

(3) that alternate methods are available to achieve and maintain a safe shutdown condition.

o Underdrain System

CYAPCO intends to evaluate the consequences of failure of the underdrain system in Topic III-3.A.

TOPIC NO.	TITLE
III-1	Classification of Structures, Components and Systems (Seismic and Quality)

10 CFR 50 (GDC 1), as implemented by Regulatory Guide 1.26, requires that structures, components and systems important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of safety functions to be performed. The codes used for the design, fabrication, erection, and testing of Haddam Neck were compared with current codes.

The review of this topic identified several systems and components where insufficient information is available to justify a conclusion that the quality standards imposed during plant construction meet quality standards required for new facilities.

The staff safety evaluation of August 12, 1982, requested the licensee to provide information in the following areas:

1. Radiography requirements
2. Fracture toughness
3. Valves
4. Pumps
5. Storage tanks
6. Piping
7. Codes and standards
8. Pressure vessels

CYAPCO Response

- Radiography Requirements

  CYAPCO will provide the following information:

  a. Radiography requirements imposed on Class 1 vessels not designed as primary vessels for which Code Case 1273N was not invoked.

  b. Radiography requirements imposed on Class 2 and 3 vessels for which Code Case 1273N was not invoked and with welded thicknesses less than 1½ inches.

  c. Radiography requirements imposed on Class 1 and 2 piping and valves designed only to ASA B31.1-1955.

  d. Radiography requirements imposed on Class 1 and 2 pumps.

- Fracture Toughness

  CYAPCO will verify whether these items are exempted from fracture toughness requirements, or will evaluate on a sampling basis, whether the fracture toughness is sufficient to ensure integrity of the components.

- Valves

  CYAPCO will verify (on a sample basis) whether the design of valves meets current body shape and pressure temperature rating requirements.

- Pumps

  CYAPCO will evaluate pumps designed to standards other than ASME codes to determine whether they meet current fatigue analysis requirements.

- Storage Tanks

  CYAPCO will provide specifications for the demineralizer storage tank designed to USAS B96.1-1967, and design code or specifications for the RWST, Primary Water Storage Tank, Demineralized Water Storage Tank, and Boric Acid Mix Tank.

- Piping

  CYAPCO will identify the code cases invoked for piping designed to ASA B31.1 - 1955.

- Codes and Standards

  CYAPCO will provide the missing or incomplete information related to codes, classes, or code cases in Table 4-2 of the SER, confirmation of assumed code edition, and clarification of notes 3, 4, 6 and 7 in Table 4-1 of the SER.

- Pressure Vessels

  CYAPCO will demonstrate compliance with the current ASME code fatigue analysis requirements.

CYAPCO intends to provide the above information in accordance with the schedule for submittal of the updated FDSA, required by 10CFR50.71.

TOPIC NO	TITLE
III-2	Wind and Tornado Loadings

10 CFR 50 (GDC 2), as implemented by SRP Section 3.3.1, 3.3.2, and 3.8 and Regulatory Guides 1.76 and 1.117, requires, in part, that safety-related structures, components and systems be adequately designed to resist wind and tornado loadings, including tornado pressure drop loading.

In the staff's safety evaluation, it was concluded that portions of some structures cannot withstand the postulated design basis tornado loads of 300 mph winds and 2.25 psi pressure drop.

The licensee should either implement modifications for the following structures or portions of structures, or demonstrate that the consequences of their failure if subjected to tornado loads are acceptable:

1. Upper portion of the primary auxiliary building.
2. Ventilation stack.
3. Interior masonry walls protected by exterior walls with minimal tornado resistance (e.g., siding).
4. Auxiliary feedwater pumphouse (structural portion and siding system).
5. Screenwell house (structural portion and siding system).
6. Service building (structural portion and siding system).
7. Roof decks on Category I structures.
8. Siding system on any other Category I structures.
9. New and spent fuel pool superstructure.

For safety-related components not inside qualified structures, the licensee should either demonstrate acceptability for tornado loads or that the consequences of failure if subjected to tornado loads are acceptable.

It should be determined whether operating pipe reaction loads, thermal loads and snow loads were considered with wind in the original design. If these loads were not, the effect of combining them should be addressed.

The licensee should demonstrate that foundations and soil capacities are greater than original design and that they are not limiting.

CYAPCO Response

o Structures or Portions of Structures Susceptible to Failure.

CYAPCO intends to demonstrate that failure of any of the above 9 areas would not produce unacceptable consequences or inhibit the plant from achieving and maintaining a safe shutdown condition.

- Safety Related Components not Inside Qualified Structures

  CYAPCO will demonstrate the adequacy of all safety related tanks under the tornado wind loads.

- Operating Pipe Reaction Loads, Thermal Loads, Snow Loads and Straight Winds

  This load combination was not considered in the original design of the plant. The effects on appropriate structures will be addressed under Topic III-7.B.

- Foundations and Soil Capacities

  CYAPCO will demonstrate that these capacities are not limiting.

TOPIC NO. TITLE

III-3.A Effect of High Water Level on Structures

10 CFR 50 (GDC 2), as implemented by SRP Section 2.4.12, requires in part, that the plant be designed for high water levels, including the dynamic effects.

On the basis of SEP Topics II-3.A and II-3.B, the design basis flood level is expected to be 20 feet over plant grade. For this flood level, the Category I structures will be damaged and some possibly destroyed. The levels of damage may vary, but the overall conclusion is that the postulated situation would be structurally unacceptable.

CYAPCO Response

By letter dated November 24, 1982, CYAPCO provided the Staff with the results of the structural analyses assuming a flood level at elevation 30 ft. MSL (stillwater level) and the effects of wind generated waves. It is CYAPCO's position in Topic II-3.B that protection to this elevation is adequate to ensure that flooding would not pose an unacceptable risk at the plant site. The November 24, 1982 letter identified 3 isolated areas where modifications may be required. These areas were portions of the south end of the diesel generator building, the block walls of the Waste Disposal Building, and a portion of the South wall of the Primary Auxiliary Building. CYAPCO intends to address these areas in conjunction with the analyses to be performed for Topic III-7.B.

TOPIC NO.	TITLE
III-3.C	Inservice Inspection of Water-Control Structures

10 CFR 50 (GDC 1, 2, and 44) and 10 CFR 100 (Appendix A), as implemented by SRP Sections 2.5.4 and 2.5.5, and Regulatory Guides 1.27, 1.28, 1.59, 1.127, and 1.132, require, in part, that water-control structures built for use in conjunction with a nuclear power plant, whose failure could cause adverse radiological consequences, be inspected routinely.

Haddam Neck has met the acceptance criteria for this topic with the following exceptions:

1. Comprehensive report forms should be developed to convey field inspection information to the appropriate inspection program manager.

2. Criteria for initiating "special inspections" should be developed to ascertain the integrity of structures after the occurrence of extreme environmental events.

3. Inspection frequencies for each item should be established and included in the formal documentation.

4. Inspections should be performed by qualified technical personnel and directed by qualified engineering personnel.

5. A program for technical review and evaluation of inspection reports should be established.

CYAPCO Response

CYAPCO will review the existing inspection program considering the above 5 exceptions, and will revise the program where necessary. CYAPCO will provide the Staff with the results of this review and any intended revisions by April 29, 1983.

TOPIC NO.	TITLE
III-4.A	Tornado Missiles

10 CFR 50 (GDC 2 and 4), as implemented by the SRP 3.5.1.4 and Regulatory Guides 1.13, 1.27, 1.76 and 1.117, requires, in part, that structures, components and systems esssential to safety be designed to withstand natural phenomena, such as tornados and their missiles.

Based upon the staff review, we conclude that Haddam Neck does not meet the current licensing criteria for tornado missile protection in the following areas:

1. Atmospheric dump valve (ADV) and associated steam vent path piping located in the auxiliary feedwater building.

2. Main steam and feedwater isolation valves.

3. Auxiliary feedwater system.

4. Water sources - demineralized water storage tank, primary water storage tank and primary water transfer pump.

5. Service water system.

6. Emergency switchgear room including portions of the emergency power distribution system.

7. Safe shutdown instrumentation.

8. Control air system.

9. Control rod drive system.

10. Life support equipment for the control room.

CYAPCO Response

By letter dated March 31, 1982, CYAPCO outlined a method by which the plant would be shutdown assuming extensive tornado missile damage. CYAPCO is presently reevaluating the existing tornado missile protection at the Haddam Neck Plant to identify potential fully hardened methods of maintaining safe shutdown. These methods will be reviewed on a cost-benefit basis to determine whether additional tornado missile protection is justified. CYAPCO will inform the Staff of our conclusions by February 28, 1983.

TOPIC NO.	TITLE
III-4.C	Internally Generated Missiles

10 CFR 50 (GDC 4), as implemented by SRP Sections 3.5.1.1 and 3.5.1.2 and Regulatory Guides 1.13 and 1.27, requires in part, that components and systems essential to safety be protected from internally generated missiles.

Based on our review of the systems and components needed to perform safety functions, we conclude that the design of protection from internally generated missiles meet the intent of current licensing criteria, except that the essential 480 volt switchgear and the station batteries are not adequately protected from the internally generated missiles.

CYAPCO Resonse

The potential source of internally generated missiles in the switchgear room is from the two control rod drive motor-generator sets. The rod drive motors are 150 horsepower motors with a relatively low operating speed of 1750 rpm.

This issue was discussed with the NRC Integrated Assessment team at the Haddam Neck site on October 7, 1982. At that time, it was noted to the Integrated Assessment team that the station batteries are not in the path of any potential missiles. Additionally, the two battery sets are separated by a stiffened seismic CAT I masonry wall and thus would not both be damaged.

Due to the low operating speed of the motor-generators, it is unlikely that a missile could be generated with sufficient energy to penetrate the flywheel housing. However, should a missile be ejected, it would strike the control rod drive cabinets. The only consequence of this would be a reactor scram. No safe shutdown methods would be affected. CYAPCO considers it highly unlikely that a missile could travel through the flywheel casing and the rod control equipment to strike the essential 480 volt switchgear. Even if this should occur, the damage would be limited to one of two redundant trains and the plant would still be able to achieve a safe shutdown.

Based on the above information and the results of the walkdown with the Integrated Assessment team, CYAPCO concludes that the Haddam Neck Plant is adequately protected from internally generated missiles.

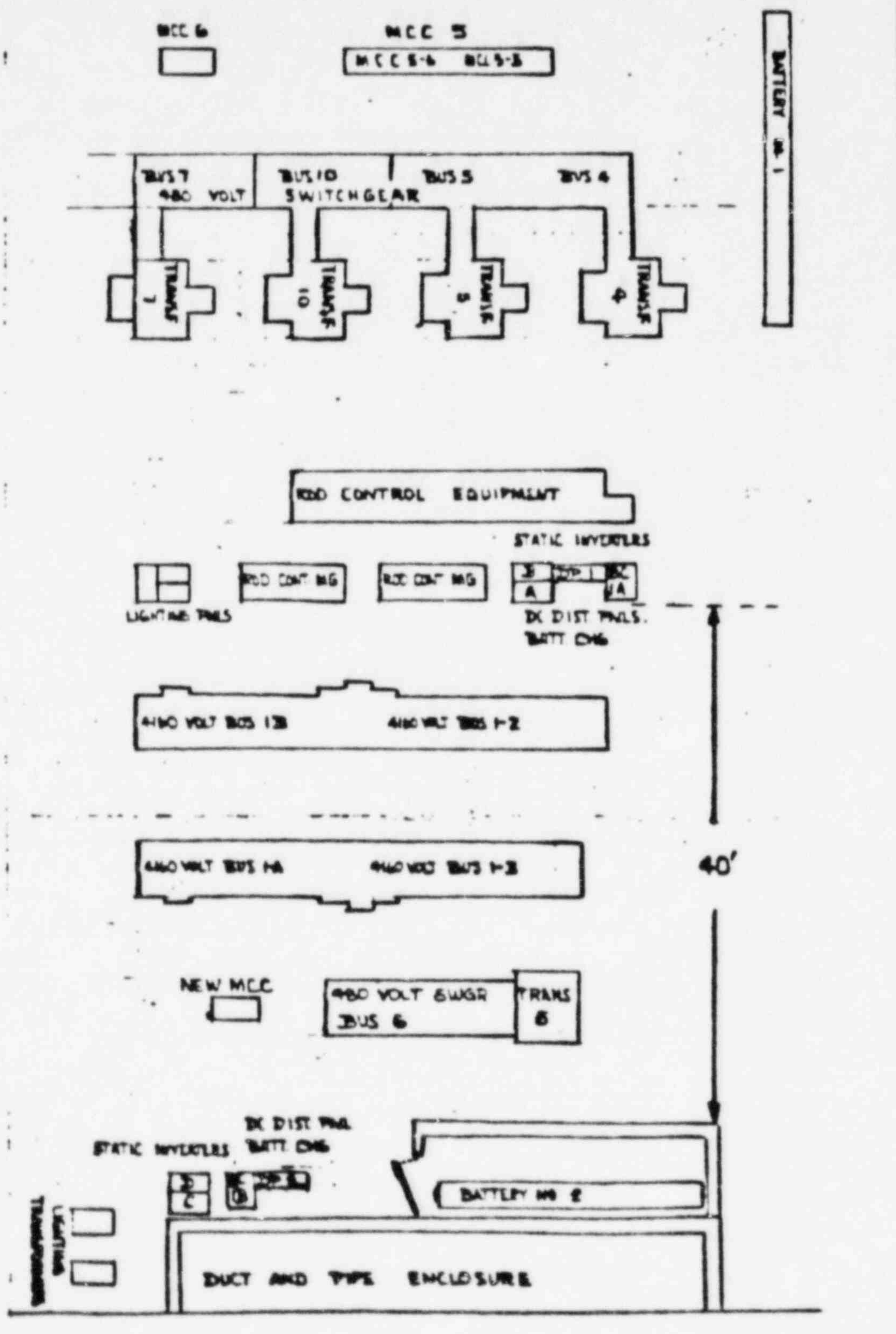
Additionally, it should be noted that as part of the modifications planned as a result of the Appendix R Fire Protection Review, CYAPCO has proposed to relocate one battery set, two inverters, an essential 480 volt bus and transformer, and install a new motor control center in the south end of the switchgear room. This will provide a minimum of 40 feet of separation between the redundant shutdown trains. Completion of these modifications will eliminate the dependancy on MCC-5 for safe shutdown and also provide assurance that both shutdown divisions could not be disabled by an internally generated missile. Further information on the intended modifications can be found in a letter from W. G. Counsil to D. G. Eisenhut dated July 16, 1982. A sketch of the configuration of the switchgear room following completion of the proposed modifications is attached.

It is CYAPCO's determination that the above modifications will provide sufficient protection from internally generated missiles and CYAPCO considers this issue resolved.

NOTES

BUS 7 LOADS ARE NOT REQUIRED FOR A FIRE IN THIS AREA. RELOCATED BUS 6 SERVES DIVISION B UNDER THESE CIRCUMSTANCES.

MCC 5 CAN RECEIVE POWER FROM EITHER DIVISION A OR DIVISION B THEREFORE IT IS COLORED YELLOW. AFTER THE PROPOSED MODIFICATIONS ONLY DIVISION A (RED) SAFE SHUTDOWN LOADS WILL BE POWERED FROM MCC 5.



NORTHEAST UTILITIES SERVICE COMPANY
CONNECTICUT YANKEE SWITCHGEAR RM.
APPENDIX R STUDY
SKBAT 060582

TOPIC NO.	TITLE
III-5.B	Pipe Break Outside Containment

10 CFR 50 (GDC 4), as implemented by SRP Sections 3.6.1 and 3.6.2 and BTP MEB 3-1 and ASB 3-1, requires, in part, that structures, components and systems improtant to safety be appropriately protected against dynamic effects, including the effects of pipe whipping and discharging fluids, that may result from equipment failures.

The staff has determined that Haddam Neck Plant is adequately protected against the dynamic effects of pipe break outside containment except for the following four issues which remain to be resolved.

1. Verification that flooding and spray effects of leakage cracks have been fully addressed.

2. Evaluation of postulated breaks in the auxiliary feedwater system.

3. Clarification of the jet impingement criteria utilized in the evaluation of piping in the primary auxiliary building.

4. Evaluation of the effects of turbine extraction steam line breaks on the switchgear room.

CYAPCO Response

CYAPCO is presently performing additional analyses to address the concerns identified above. CYAPCO will inform the Staff of the results and conclusions upon completion of these analyses, which is presently scheduled for March 1, 1983.

TOPIC NO. TITLE

III-7.B Design Codes, Design Criteria, Load Combinations, and Reactor Cavity Design Criteria

10 CFR 50 (GDC 1, 2 and 4), as implemented by SRP Section 3.8, requires, in part, that structures, components and systems be designed for the loading that will be imposed on them and that they conform to applicable codes and standards.

Code, load and load combination changes affecting specific types of structural elements have been identified where existing safety margins in structures are significantly reduced from that which would be required by current versions of the applicable codes and standards. The difference between plant design and current licensing criteria should be resolved as follows:

1. Review of Seismic Category I Structures at Haddam Neck to determine if any of the strucutral elements for which a concern exists are a part of the facility design of Haddam Neck. For those that are, assess the impact of the code changes on margins of safety on a plant specific basis.

2. Examine on a sampling basis the margins of safety of Seismic Category I Structures for loads and load combinations not covered by another SEP topic and denoted by "Ax" in the SER. (The load tables should be reviewed to assure their technical accuracy concerning applicability of the loads for each of the structures and their significance. The Category I structures considered should be reviewed to assure completeness.)

CYAPCO Response

- Structural Elements Impacted by Code Changes

  CYAPCO will review the safety-related structures to locate the structural elements listed in the SER for this topic. Based upon the individual applications at each location, CYAPCO will assess the impact of the particular code change on the integrity of the specific structure.

- Loads and Load Combinations

  CYAPCO will address each load combination denoted by Ax in the SER to demonstrate that the additional loads associated with the D+L+E' and $D+L+W_t$ combinations presently being analyzed under Topics III-2 and III-6 would create only localized effects that would not adversely effect the integrity of the structure. If CYAPCO is unable to demonstrate this, a sampling program will be established to address specific locations and/or structural elements.

TOPIC NO.	TITLE
III-8.A	Loose Parts Monitoring and Core Barrel Vibration Monitoring

10 CFR 50 (GDC 13), as implemented by Regulatory Guide 1.133, Revision 1, and SRP Section 4.4, prescribes a loose parts monitoring program for the primary system of light-water-cooled reactors.

Haddam Neck does not have a loose parts monitoring program that meets the criteria of Regulatory Guide 1.133.

CYAPCO Response

It is CYAPCO's position that a loose parts monitoring program is not required to ensure safe plant operation. Most loose parts can be detected during refueling outages and industry experience has shown that loose parts have little or no effect on risk. Therefore, no further work on this issue is planned.

TOPIC NO.	TITLE
III-10.A	Thermal-Overload Protection for Motors of Motor-Operated Valves

10 CFR 50 Appendix A (GDC 13, 21, 22, 23, and 29), as implemented by IEEE Std. 279-1971, requires, in part, that protective actions be reliable and precise and satisfy the single failure criterion using quality components. Regulatory Guide 1.106 presents the staff position on how thermal-overloads can be made to meet these requirements.

Thermal-overload protection for motor-operated valves at Haddam Neck does not satisfy current licensing requirements. Thermal-overload devices are not bypassed, no information is available to support adequacy of trip setpoints, and torque switches rather than limit switches are used to terminate valve travel.

CYAPCO Response

CYAPCO is presently committed to replace the actuators on seventeen motor operated valves in harsh environments as a result of electrical equipment qualification upgrades. As these actuators are replaced, the adequacy of the thermal overload devices will be verified. Similar verifications will be done on all safety-related motor operated valves which would be required to change position during an accident. Thermal overload protection will be revised as necessary and any required corrective actions will be completed by the time the actuator replacements are completed, which is currently scheduled for the 1984 refueling outage.

CYAPCO intends to modify, as necessary, the control circuits for the motor operated valves which utilize torque switches so that valve travel in the open direction will be terminated by a limit switch and valve travel in the closed direction will be terminated by a torque switch. Torque switch protection will be retained in both the open and close direction however this protection will be disabled near the closed seat when the valve is moving in the open direction and near the fully open position when the valve is moving in the close direction. By passing the torque switch protection as described above allows the actuator to develop full torque while breaking free and accelerating the valve plug, and to overcome binding which may occur at the extremes of valve travel. Motor operated valve control circuit work, both thermal overload and torque/limit switch modifications will be completed in conjunction with valve actuator replacement, which is currently scheduled for the 1984 refueling outage.

TOPIC NO.	TITLE
III-10.B	Pump Flywheel Integrity

10 CFR 50 (GDC 4), as implemented by SRP 5.4.1.1 and Regulatory Guide 1.14 recommended, in part, methods to minimize the potential for failures of reactor coolant pump flywheels.

Adequate information to determine the extent of inspections was not provided.

CYAPCO Response

By letter dated May 25, 1982 CYAPCO provided additional information concerning the inspection of reactor coolant pump flywheels. Based on that information, CYAPCO concluded that the inspection program meets the intent of Regulatory Guide 1.14 and Standard Review Plan 5.4.1.1. Therefore, no further work on this issue is planned.

TOPIC NO.	TITLE
IV-2	Reactivity Control Systems Including Functional Design and Protection Against Single Failures

10 CFR 50 (GDC 25), as implemented by SRP Section 15.4.3, requires, in part, that the reactor protection system be designed to assure that specified acceptable fuel design limits are not exceeded for any single malfunction of the reactivity control systems, such as accidental withdrawal of control rods.

Based upon an audit review of the information provided by CYAPCO, the staff has determined that the following may occur as a result of single failures.

1. Two banks of control rods may move simultaneously instead of one bank.

2. Two subgroups of control rods could move simultaneously instead of one subgroup.

3. A cluster, subgroup, or bank of shutdown rods may not move when movement is commanded.

4. A cluster, clusters, subgroup, bank, or banks of control rods may not move when movement is commanded.

5. One bank of shutdown rods could move inadvertently.

6. A subgroup, bank or banks (in overlap region) of control rods could move inadvertently.

7. An individual shutdown rod or a cluster, subgroup, bank, or banks of shutdown rods could fall into the core.

8. An individual control rod or cluster, clusters, subgroup, bank, or banks of control rods could fall into the core.

It was the staff's conclusion that CYAPCO should revise the evaluation of Topic XV-8 to include the eight items listed above or show why these types of failures cannot occur at Haddam Neck.

CYAPCO Response

CYAPCO will revise the analysis of Topic XV-8, Control Rod Misoperation, considering the potential rod movements identified in items 1, 2, 5, and 6, above. The balance of the misoperations identified do not result in a reactivity insertion, however, they will be considered with respect to their effect on peaking factors and Departure from Nucleate Boiling considerations. If the analysis predicts that no fuel damage would occur, no further action will be required. A schedule for completion of this task will be finalized during the Integrated Assessment.

TOPIC NO.	TITLE
V-5	Reactor Coolant Pressure Boundary (RCPB) Leakage Detection

10 CFR 50 (GDC 30), as implemented by Regulatory Guide 1.45 and SRP Section 5.2.5, prescribes the types and sensitivity of systems, as well as their seismic, indication and testability criteria, necessary to detect leakage of primary reactor coolant to the containment or to other interconnected systems. Reliable and sensitive leakage detection systems are required in order to identify primary system leaks at an early stage before failure occurs.

Based upon our review of the information available for Haddam Neck, we have determined that the systems employed for the detection of leakage from the reactor coolant pressure boundary to the containment do not meet all of the recommendations of Regulatory Guide 1.45, specifically.

1. Information indicates that the systems incorporated for measurement of leakage from the reactor coolant pressure boundary to the containment do not conform with Regulatory Guide 1.45 criteria regarding sensitivity and seismic qualification.

2. Standard Technical Specification 3/4.4.6 and the corresponding surveillance requirements concerning the operability of the reactor coolant pressure boundary to the containment leakage detection systems (excluding the sump flow monitor) should be added to the Haddam Neck Technical Specifications. Also, the current Haddam Neck Technical Specification 3.14 should be revised to state that the sensitivities of the reactor coolant pressure boundary to containment leakage detection system is 1 gpm within 1 hour for Items 1, 4 and 7 in Table 1 of the topic evaluation.

3. Information concerning the leakage detection systems for the detection of intersystem reactor coolant pressure boundary leakage and the reactor coolant inventory balance is incomplete. Therefore, we cannot determine the extent to which Regulatory Guide 1.45 is met.

CYAPCO Response

CYAPCO is presently reevaluating the pressure boundary leakage detection capabilities at Haddam Neck with respect to potential high energy pipe breaks inside the containment to determine if the existing leakage detection methods are adequate. CYAPCO will inform the Staff of our conclusions by February 28, 1983.

TOPIC NO.	TITLE
V-6	Reactor Vessel Integrity

10 CFR 50.55a(c) requires that pressure vessels which are part of the reactor coolant pressure boundary meet the requirements for Class A vessels set forth in Section III of the ASME Boiler and Pressure Vessel Code, applicable Code Cases, and Addenda.

The staff has recommended the following actions be taken in order to assure continued acceptability of reactor vessel materials throughout the expected plant service life:

1. The last two material surveillance capsules removed from Haddam Neck contained no weld metal samples. Therefore, it is recommended that another capsule be removed in the next several years. This capsule should contain weld metal specimens.

2. The present pressure-temperature operating limits are based on the extrapolation of data obtained from the material surveillance program. Since a capsule subjected to relatively high fluences has recently been removed from the vessel, we should have in the near future a better data base to estimate the amount of radiation damage. Therefore, the staff should review again the pressure-temperature operating limits when the test results on the recently removed capsule become available.

CYAPCO Response

The statement under recommended action No. 2, above, is not entirely correct. The present pressure-temperature operating limits are based on the Regulatory Guide 1.99 trend curve.

During the 1981 refueling outage, CYAPCO removed a material surveillance capsule (capsule "D") which contained weld metal specimens. Testing of this capsule is in progress. Once the results of this testing are available, CYAPCO will submit the results of the capsule testing and revise the present pressure-temperature operating limits.

It should be noted that, as this issue relates to the phenomenon of pressurized thermal shock, the effect of neutron fluence on the reactor vessel has not been severe. In fact, the most recent NRC listing of pressurized water reactors by RT_{NDT} ranked the Haddam Neck Plant as 35th out of 40 operating PWR's. The Staff has indicated that the PTS issue does not constitute a safety concern for the Haddam Neck Plant for the remaining lifetime of the plant. Therefore, this issue is of a lesser concern for Haddam Neck than for other PWR plants.

TOPIC NO.	TITLE
V-10.A	Residual Heat Removal System Heat Exchanger Tube Failures

SRP Section 5.2.3 requires monitoring and sampling of the primary coolant system.

The Haddam Neck Technical Specifications (TS) do not presently contain any chemistry limits for primary coolant chemistry. The existing TS contain a limit for primary system activity, but none for dissolved chemicals such as chlorides or fluorides. Therfore, the licensee does not conform to SRP 5.2.3 which requires limitations on the concentrations of impurities in the reactor coolant and monitoring on a scheduled basis. The licensee should have a technical specification which requires monitoring for dissolved chemicals.

CYAPCO Response

CYAPCO is presently converting to Standard Technical Specifications (STS) for the Haddam Neck Plant, which will include limitations for chlorides and fluorides. Therefore, conversion to STS should resolve the Staff's concern. The conversion process is expected to be completed by the latter part of 1983.

TOPIC NO.	TITLE
V-10.B	RHR System Reliability
V-11.B	RHR Interlock Requirements (Systems)

10 CFR 50 (GDC 34), as implemented by SRP 5.4.7 and Branch Technical Position RSB 5-1, requires, in part, that a system to remove residual heat be provided with suitable redundancy to assure that for onsite electrical power system operation the system safety function can be accomplished, assuming a single failure.

1. Because of the potential for Residual Heat Removal (RHR) overpressurization, the staff has determined that the following modifications should be considered for backfit during the integrated plant safety assessment:

   a. Interlocks on the RHR-to-core deluge motor-operated valves to prevent opening until RCS pressure is below design pressure.

   b. Modification of the technical specifications to require placing the overpressure protection system in operation whenever RHR cooling is in progress.

2. The staff concludes that the Haddam Neck systems fulfill the safety objectives of reliable plant shutdown capability using safety-grade equipment provided that plant operating procedures are modified to instruct operators how to perform shutdown and cooldown functions with the systems indentified in the minimum systems list.

3. The staff noted during the safe shutdown evaluation that no Technical Specification requirement governs the allowed outage time of an ECCS train. The need for this requirement will be evaluated under SEP Topic XVI, "Technical Specifications."

4. Based on our review, the staff concludes that procedural shortcomings exist with respect to shutdown from outside the control room in the areas of maintenance of batteries for portable instruments, the assignment of shutdown duties for shift personnel and emergency communication methods. The licensee should modify his procedures to alleviate these shortcomings.

CYAPCO Response

1.a. The RHR system is protected from overpressurization through the core deluge penetrations in the reactor vessel head by a motor operated valve and a check valve on each line. Upon receipt of a safety injection signal, the motor operated valve opens, exposing the check valve to RCS pressure. Failure of the check valve could then result in overpressurization of the LPSI or RHR system outside containment. Due to the potential for this to cause a LOCA outside containment, CYAPCO will install pressure interlocks on the motor operated valves to prevent opening until RCS pressure is below system design pressure. These interlocks will be installed during the 1984 refueling outage. It should be noted that this is the same issue identified in Topic V-11.A.

1.b. Current plant procedures require the Overpressure Protection System (OPS) to be placed in service prior to initiation of RHR. Technical Specifications require the OPS to be placed in service when the RCS temperature is below 350°F. By procedure, OPS is placed in service when RCS pressure and temperature are 350 psig and 340°F. It is CYAPCO's determination that these procedural restrictions are adequate and no Technical Specification changes are required.

2. Procedures presently exist for conducting a plant shutdown on loss of AC, station blackout, and operation outside the control room. In addition, Haddam Neck will be adopting the generic Emergency Procedure Guidelines currently being developed through the Westinghouse owners group. CYAPCO has concluded that this is sufficient to resolve the Staff's concern.

3. Haddam Neck currently operates under the plant's Technical Specifications and a supplemental set of specifications titled "Administrative Technical Specifications." The Administration Technical Specifications, which are not issued by the NRC, are more restrictive than the Technical Specifications, and do include limits on outage time for ECCS components and both onsite and offsite power supplies. These specifications are treated as if they were part of the Technical Specifications and, when conditions warrant, Licensee Event Reports are submitted on Administrative Technical Specification requirements.

   The Haddam Neck Plant is presently converting to Standard Technical Specifications, which include outage limits for ECC Systems. This should resolve the Staff's concern. It should also be noted that this issue was reviewed under NUREG-0737 Item II.K.3.17, ECCS Outages. By letters dated December 31, 1980, March 4, 1981 and August 16, 1982, CYAPCO submitted historical data on outages of ECCS components, to which the Staff has not yet responded.

4. Haddam Neck currently has administrative procedures which address the Staff's concerns. However, to ensure the required information is contained within one document, these items will be incorporated into the procedure for shutdown outside the control room. This procedure revision will be completed before startup from the 1983 refueling outage.

TOPIC NO.	TITLE
V-11.A	Requirements for Isolation of High and Low Pressure Systems.
V-11.B	RHR Interlock Requirements (Electrical)

10 CFR 50 (GDC 15) as implemented by SRP Section 7.6 and BTP ICSB 3, requires that interlock systems important to safety be adequately designed to assure their availability in the event of an accident. This includes those systems with direct interface with the reactor coolant system which have design pressure rating lower than the reactor coolant system design pressure. These interlocks will be installed prior to startup from the 1984 refueling outage.

Because of the severe consequence of a LOCA outside of containment the staff proposes that the SI system isolation valve control be modified to prevent opening if RCS pressure exceeds SI system design pressure as required by SRP 6.3

The charging pump discharge valves do not satisfy the applicable criteria and modifications to these valves will be pursued under SEP Topic VI-4.

CYAPCO Response

CYAPCO intends to install redundant pressure interlocks on four (4) HPSI isolation valves and two (2) LPSI isolation valves to prevent opening if RCS pressure exceeds system design pressure. These interlocks will be installed prior to startup from the 1984 refueling outage.

Since the charging pump discharge is at a higher pressure than RCS pressure, it is not clear what criteria are not satisfied. CYAPCO will address these valves under Topic VI-4.

TOPIC NO. TITLE

VI-1 Organic Materials and Post-Accident Chemistry

10 CFR 50 (GDC 1, 4, 14, 31, 35, 41, and Appendix B), as implemented by SRP Sections 6.1.1 and 6.1.2 and Regulatory Guide 1.54, requires, in part, that structures, systems and components important to safety be designed to accommodate the effects of and be compatible with the environmental conditions associated with normal operating and postulated accident conditions. In particular, paints and organic materials used inside containment and post-accident water chemistry should not adversely effect ESF functions.

Post Accident Chemistry - Based on the staff evaluations, we conclude that, although the Haddam Neck Plant can be operated with an acceptable degree of safety under normal conditions when containment spray and sump water recirculation are not required, the post accident water chemistry does not meet the acceptance criterion of Standard Review Plan Section 6.1.1 and Branch Technical Position MTEB 6-1 and is, therefore, not acceptable. In order to reduce the potential of stress corrosion cracking of the engineered safety feature equipment inside the containment following a design basis accident, the licensee should either show that the post accident water chemistry meets the acceptable criterion II.B.1 in Standard Review Plan 6.1.1 and Branch Technical Position MTEB 6-1, or provide an acceptable alternative.

CYAPCO Response

To raise the pH of the water in the containment sump used for recirculation mode cooling following an accident from 5.2 to 7.0, CYAPCO intends to install Trisodium Phosphate (TSP) baskets in the sump area. CYAPCO intends to install the TSP baskets during the 1984 refueling outage.

TOPIC NO. TITLE

VI-4 Containment Isolation System

10 CFR 50 (GDC 54, 55, 56, and 57), as implemented by SRP 6.2.4 and Regulatory Guides 1.11 and 1.141, establish explicit requirements for isolation valving in lines penetrating the containment. Specifically, they address the number and location of isolation valves (for example, redundant valving with one located inside containment and the other located outside containment), valve actuation provisions (for example, automatic or remote manual isolation valves), valve position (for example, locked closed, or the position of greater safety in the event of an accident or power failure) and valve type (for example, a simple check valve is not a permissible automatic isolation valve outside containment).

At Haddam Neck, the staff determined that the licensee does not comply with current licensing criteria in the following areas:

1. Both containment isolation valves are located outside of containment.

2. Use of simple check valve outside containment as a containment isolation valve.

3. Use of remote manual valves without provisions to inform operator when isolation is required.

4. The use of hand operated manual valves for containment isolation with no indication that these valves are sealed closed or otherwise under administrative control.

5. Containment penetrations with no valving identified for isolation purposes.

6. Containment penetrations with only one valve identified as an isolation valve.

7. Use of blind flanges without indicating if barriers are leak tested.

CYAPCO Response

The above summary does not reflect the comments provided by letter dated August 18, 1982. CYAPCO will address the differences from current criteria after the NRC issues a final SER for this topic.

TOPIC NO.	TITLE
VI-7.B	ESF Switchover from Injection to Recirculation Mode (Automatic ECCS Realignment)

10 CFR 50 (GDC 35) requires that a system to supply abundant emergency core cooling be provided.

At Haddam Neck the staff has determined that the licensee does not comply with current licensing criteria as follows:

1. The switchover from injection to recirculation in Haddam Neck is accomplished manually from the control room. The primary instrument for determining when to make the switchover does not satisfy the single failure criterion. Furthermore, present backup instrumentation (containment water level) is not independent of the primary instrumentation. Accordingly, the primary instrumentation should be replaced by a Class IE system satisfying the review guidelines.

2. There are no alarms to alert the operator to start the switchover when sufficient water has been pumped from the RWST.

3. The available time for the operator to detect the need for switchover and to complete the required actions is not consistent with the review guidelines.

4. The consequences of failing to complete the transfer before reaching the minimum RWST level have not been shown to be acceptable. The charging pumps, which take suction on the RWST during the injection mode and are thus susceptible to damage if the switchover is not completed before the tank level drops too low, are used for two-path recirculation.

CYAPCO Response

By letter dated June 8, 1981 in response to a request for prompt action on what the Staff considered to be a significant safety issue, CYAPCO committed to install a redundant, Class IE level indicator on the RWST. Installation of the new level indicator began during the 1981 refueling outage and the final connections to make the system operational will be completed during the 1983 refueling outage. Also, it should be noted that the backup instrumentation (containment water level) is independent of the primary instrumentation. The containment water level transmitter is expected to be fully qualified by April 1, 1983.

CYAPCO also intends to install an alarm on the RWST to alert the operator when to start the switchover process. The exact level of this alarm has not yet been determined as it depends on resolution of the concern related to the time available to the operator to complete the process. Assuming no delays are encountered in parts procurements, this alarm will be installed by June, 1983.

CYAPCO is presently reviewing the switchover procedure to determine if there is a need for changes or improvement. Following this review, CYAPCO intends to demonstrate by a walk-through of the procedure that adequate time exists to complete the switchover. The results of this review will be used to establish the RWST level alarm setpoint. This review will also address the potential for damage to the charging pumps if the switchover is not completed before the tank level drops too low. CYAPCO intends to perform the procedure walk-through during the 1983 refueling outage (scheduled to begin in January) in the presence of the NRC reviewers and/or the Resident Inspector.

TOPIC NO.	TITLE
VI-7.C.1	Independence of Redundant Onsite Power Systems

10 CFR 50 (GDC 17) as implemented by Regulatory Guide 1.6 and IEEE Std. 308-1974 requires that onsite electrical power supplies and their onsite distribution systems shall have sufficient independence to perform their safety function assuming a single failure.

The Haddam Neck onsite standby AC and DC power systems do not comply with current licensing criteria. In each case, a manual breaker exists which allows paralleling of the two power divisions; no interlocks or procedures prevent this. Additionally, the DC power system design permits all four inverters to be supplied from a single battery.

CYAPCO Response

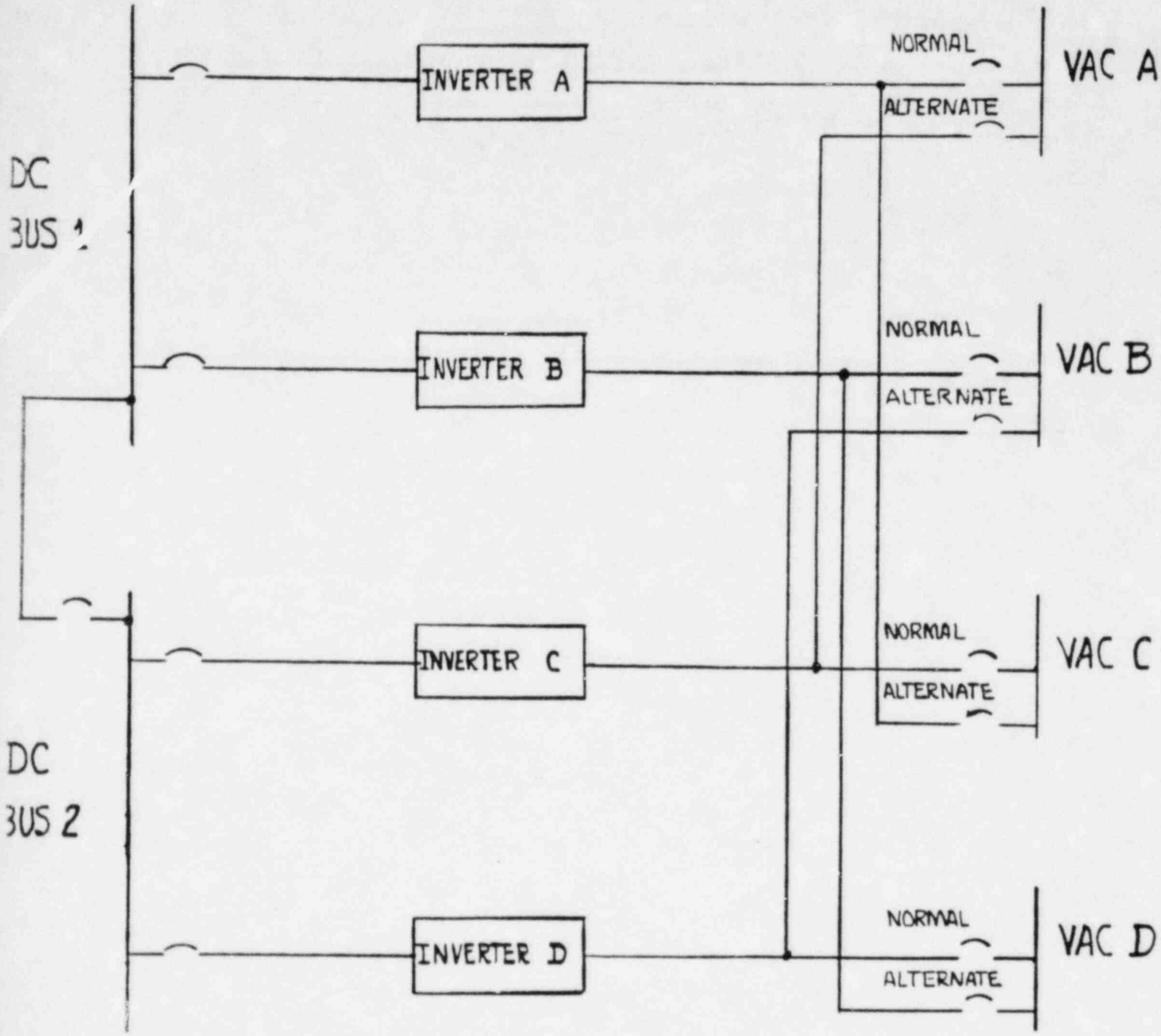
The manual tie breakers in the AC power system and the DC power system (between DC Bus 1 and DC Bus 2) will be administratively controlled to prevent an operator error which would parallel the two power divisions.

All four inverters can be powered from one battery only by tying the two DC buses together and removing one battery from service. This not only powers all four inverters from one battery but is also powers the entire DC system, both divisions, from one battery. As discussed above, this will be administratively controlled during power operation.

Each of the four inverters supplies a separate vital AC bus. Each of the vital buses has an alternate power source which can be switched into service manually. The alternate source breaker for each vital bus is interlocked with the normal source breaker so that both cannot be closed at the same time. Presently, however, the alternate source of power for each vital bus is supplied by an inverter from the redundant division. Thus, if one vital bus is fed from its alternate source, three vital buses would be receiving power through two inverters from one battery. CYAPCO intends to modify the existing alternate feeds to the vital buses so that the alternate source for each vital bus is taken from the other inverter in the same division. Therefore, it will not be possible to power three vital buses from one battery. Sketches of the existing and proposed arrangements are attached. CYAPCO intends to complete these modifications in conjunction with the modifications planned as a result of the Appendix R Fire Protection review.

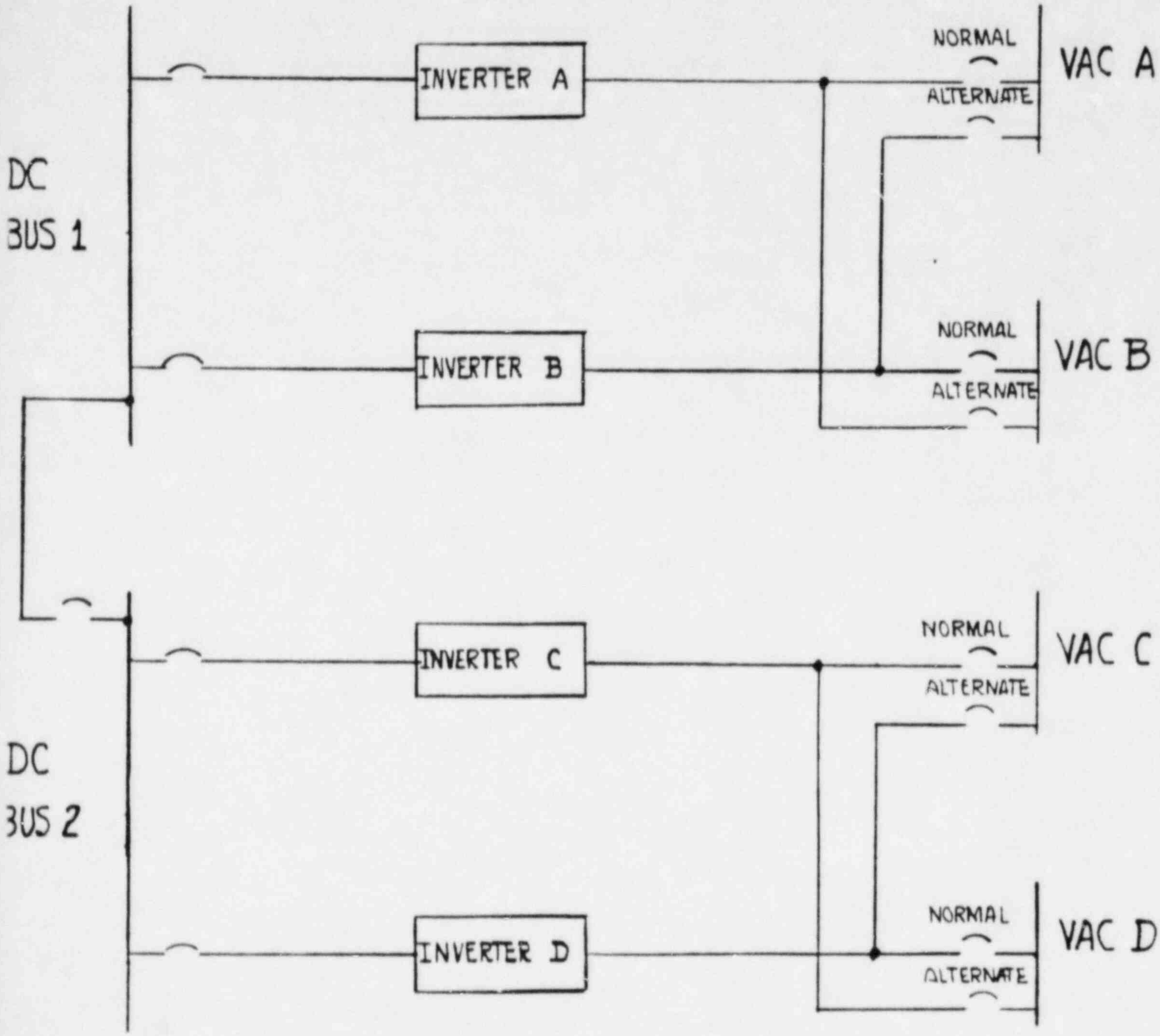
CONNECTICUT YANKEE

PRESENT DC BUS / VITAL AC BUS ARRANGEMENT



SKBAT 1119821

CONNECTICUT YANKEE
PROPOSED DC BUS / VITAL AC BUS ARRANGEMENT



SKBAT 1119822

TOPIC NO.	TITLE
VI-10.A	Testing of Reactor Trip System and Engineered Safety Features, Including Response-Time Testing

10 CFR 50 (GDC 21), as implemented by IEEE Stds. 279-1971 and 338-1977, and Regulatory Guide 1.22, requires that the reactor protection system be designed to permit periodic testing of its functioning, including a capability to test channels independently.

It is the staff's position that the design of systems which are required for safety shall include provisions for periodic verification that the minimum performance of instruments and controls is not less than that which was assumed in the safety analysis. Therefore, the licensee should implement a program for response time testing of all reactor protection systems (including engineered safety features systems such as containment isolation). As a part of this program, the response time test requirements should be stated in the Technical Specifications in a manner similar to that of the Standard Technical Specifications.

The staff proposes that the following corrections be made to existing programs by making suitable changes in the Haddam Neck test procedures and Technical Specifications:

1. The licensee should provide for calibration of the Low Pressurizer Pressure and High Steam Flow Channels.

2. The licensee should provide for functional tests of the following during reactor operations:

    a. Scram logic (both automatic and manual functions)
    b. Low pressurizer pressure
    c. High steam flow
    d. Steam-feedwater flow mismatch
    e. Low steam generator level

3. The licensee should provide for channel checks for low pressurizer and high steam flow channels.

4. The licensee should document the basis for the frequency of calibration, functional test, and channel check for each parameter required to protect the public health and safety.

5. For each parameter that is not tested during reactor operation, the licensee should provide the information specified in Position D.4 of R. G. 1.22.

6. The licensee should clarify the discrepancies in plant documentation that were identified by our contractor.

7. The licensee should design, provide suitable test equipment for, and conduct periodic response time tests of those channels and systems that are required for the protection of public health and safety.

CYAPCO Response

By letter dated November 8, 1982, CYAPCO provided comments on the staff's draft SER. Upon receipt of the final SER for this topic, CYAPCO will evaluate the need for hardware and/or procedural modifications.

TOPIC NO.	TITLE
VII-1.A	Isolation of Reactor Protection System From Non-Safety Systems, Including Qualifications of Isolation Devices

10 CFR 50 (GDC 24) as implemented by IEEE Std. 279-1971, requires that safety signals be isolated from non-safety signals and that no credible failure at the output of an isolation device shall prevent the associated protection system channel from meeting the minimum performance requirements specified in the design bases.

1. Isolation of RPS monitoring channels from remote meters, the data logger, and/or process recorders does not meet current licensing criteria in the following subsystems:

    a. Pressurizer pressure
    b. High pressurizer level
    c. Steam flow
    d. Feedwater flow
    e. Steam generator level

2. Isolation between the RPS and the following control circuits does not meet current licensing criteria:

    a. The computer which provides setpoints for reactor trip for variable low pressure also provides output signals to the rod control systems without isolation.

    b. The steam-feedwater flow mismatch system provides analog signals to the steam flow controller, the feedwater flow controller and the steam generator level controller without isolation.

CYAPCO Response

CYAPCO is presently reviewing the Staff's final evaluation of this topic dated October 20, 1982. It should be noted that the conclusions of the final SER differ from the summary given above. The results of our review of the final SER will be the subject of separate correspondence. Where adequate isolation does not presently exist, CYAPCO will install qualified isolation devices. The scope and schedule for this work will be determined following completion of our review of the final SER.

TOPIC NO.	TITLE
VII-3	Systems Required for Safe Shutdown

GDC 17, requires that offsite power be provided by two independent lines. One of these lines must be available immediately. At Haddam Neck, the two incoming lines (1772 and 1206) can be interconnected via a disconnect (389T399) or a tie breaker (2T3) between bus 1-2 and bus 1-3. The interconnections provide paths that could compromise independence. In addition, because line 1772 may not be synchronized with line 1206, a spurious closing of 2T3 may result in a loss of both lines and cause significant damage to the onsite distribution system.

The staff has not completed its review of how the Haddam Neck Plant meets GDC 17 and the resolution of these concerns will be addressed in the integrated assessment.

CYAPCO Response

Based on discussions with the Staff, it is CYAPCO's understanding that the specific concern noted above has been satisfactorily resolved. If the Staff's evaluation of compliance with GDC 17 identifies any other areas of concern, CYAPCO will address them at that time. At this point, however, no action is planned.

TOPIC NO.	TITLE
VIII-1.A	Potential Equipment Failures Associated With a Degraded Grid Voltage

10 CFR 50 (GDC 17), as implemented by IEEE Standards 279-1971 and 308-1977 and staff positions defined in an NRC Generic Letter to Connecticut Yankee Atomic Power Company, dated August 8, 1979, requires, in part, that an offsite electric power system be provided to permit functioning of systems important to safety. This topic looks at the effects of a sustained degradation of the offsite power source voltage that could result in the loss of capability of redundant safety loads, their control circuitry and the associated electrical components required to perform safety functions.

The staff has reviewed and found with the exception of operating procedures, Haddam Neck's design is acceptable.

CYAPCO Response

CYAPCO is presently in the process of developing operating procedures to cope with a degraded grid voltage. These procedures will be forwarded to the Staff upon completion.

TOPIC NO.	TITLE
VIII-2	Onsite Emergency Power Station - Diesel Generator

The review criteria are presented for Section 8.3.1 in Table 8-1 of the SRP.

The Haddam Neck design generator protective interlocks do not meet current licensing criteria.

CYAPCO Response

CYAPCO intends to either bypass under accident conditions or add coincident logic to all diesel generator protection trips other than the engine overspeed and generator differential trips. CYAPCO intends to retain the engine overspeed and generator differential trips in the existing single channel configuration. CYAPCO intends to implement these modifications during the 1984 refueling outage.

TOPIC NO.	TITLE
VIII-3.B	DC Power System Bus Voltage Monitoring and Annunciation

10 CFR 50.55a (h), as implemented by SRP Section 8.3.2 and Regulatory Guide 1.47, requires that the dc power system be monitored to the extent that it is shown ready to perform its intended function. This monitoring is considered necessary in order to assure the design adequacy of the dc power system battery and bus voltage monitoring and annunciation schemes such that the operator can (1) prevent the loss of an emergency dc bus; or (2) take timely corrective action in the event of loss of an emergency dc bus.

The Haddam Neck Plant control room does not meet current licensing criteria. Specifically, the staff proposes that as a minimum, the following additional indications and alarms of the Class 1E dc power system(s) status shall be provided in the control room.

- Battery current (ammeter-charge/discharge)
- Battery charger output current (ammeter)
- DC bus ground alarm (for ungrounded system)
- Battery breaker(s) or fuse(s) open alarm
- Battery charger output breaker(s) or fuse(s) open alarm
- DC bus voltage (voltmeter)

CYAPCO Response

During the site visit arranged for the NRC's PRA consultants on November 1, 1982, it was noted that all of the above indications, with the exception of battery current, are presently installed in the control room. CYAPCO intends to add control room indication of battery current during the 1984 refueling outage.

TOPIC NO.	TITLE
VIII-3.A	Station Battery Test Requirements

IEEE Standard 450-1975, IEEE Standard 308-1974, BTP EICSB 6 and the "Standard Technical Specifications for Westinghouse Pressurized Water Reactors" (NUREG-0452). The required tests are as follows:

1. At least once per 18 months, during shutdown, a battery service test should be performed to verify that the battery capacity is adequate to supply and maintain in operable status all of the actual emergency loads for 2 hours.

2. At least once per 60 months, during shutdown, a battery discharge test should be performed to verify that the battery capacity is at least 80% of the manufacturer's rating.

The technical specifications for the Haddam Neck Plant do not include any requirements for station battery tests. Therefore, the Haddam Neck Plant does not comply with current licensing requirements for station battery tests.

CYAPCO Response

The Haddam Neck Plant is presently converting to Standard Technical Specifications, (STS), which include the above requirements for battery testing. Therefore, conversion to the STS should resolve the Staff's concern. CYAPCO expects to implement the STS during the latter part of 1983.

TOPIC NO. TITLE

IX-3 Station Service and Cooling Water Systems

10 CFR 50 (GDC 44, 45 and 46), as implemented by SRP Sections 9.2.1 and 9.2.2, requires that a cooling water system be provided, inspected and tested, and that the system be capable of transferring heat from structures, systems and components important to safety to the ultimate heat sink.

The staff has determined that the design of the service and cooling water systems is adequate, except for the following:

Component Cooling Water System - The need for system modification to eliminate potential passive single failures will be evaluated during the integrated assessment.

Service Water System - The licensee should verify that those motor operated valves relied on for system isolation in the event of a loss of offsite AC power receive emergency power, have a fail closed design, or that sufficient time is available for operator action to close the valves.

The licensee should demonstrate by test or analysis that adequate procedures exist to balance system flow requirements and maintain system components below design thermal limits for a single active failure.

The licensee should demonstrate the ability to provide power to a second SWS pump with one pump out of service. (Assuming that the active failure was a diesel generator.)

The licensee should demonstrate that single passive failures (pipe break in containment fan cooler supply header) would not compromise containment integrity or core cooling in the event of a LOCA.

CYAPCO Response

o Component Cooling Water System

A passive failure in the component cooling water system would not prohibit the plant from achieving safe shutdown. The plant is operated with component cooling water isolated from the RHR heat exchangers so that in the event of an accident, service water would cool the RHR heat exchangers and RHR pump seals, and backflow through the CCW system would not occur. CCW flow to the reactor coolant pump thermal barrier is not essential since seal injection flow alone (from charging pumps) is sufficient to maintain seal integrity. The only other safety-related function of the CCW system is to service the charging pump oil coolers, however, the coolers are also equipped with fans which are adequate to perform this function. Based on the above, CYAPCO considers the Component Cooling Water System to be non-essential, and no action is required.

o Service Water System

The motor operated valves, SW-MOV-1 and SW-MOV-2 at the beginning of the secondary plant header automatically close to isolate the secondary plant service water supply in the event off-site power is lost. These motor operated valves automatically receive emergency power from either diesel generator. All other isolation valves are air operated and fail closed on loss of offsite power or instrument air. These valves are also accessible for manual operation if required.

CYAPCO is presently performing an analysis of the service water system to demonstrate that adequate procedures exist to balance system flow requirements and maintain system components below design thermal limits for a single active failure. This analysis, which will require extensive modeling of the service water system, is scheduled for completion by July 1, 1983.

Power for one service water pump is included in the capacity of the emergency diesel operators. Upon a loss of normal AC power, one service water pump will start automatically on each diesel generator. If the first pump does not start, the power supply is automatically transferred to the second pump on that diesel generator bus. Therefore, it is always possible to provide power to an alternate service water pump with one pump out of service and failure of a diesel generator.

CYAPCO will address single passive failures in the containment fan cooler supply header as part of the service water system analysis noted above. This analysis will be completed by July 1, 1983.

TOPIC NO.	TITLE
IX-5	Ventilation Systems

10 CFR 50 (GDC 5, 19, 60, and 61), as implemented by SRP Sections 9.4.1, 9.4.2, 9.4.3, 9.4.4, and 9.4.5, requires that ventilation systems be provided and have the capability to provide a safe environment for plant personnel and for the operation of engineered safety features.

The ventilation systems for the Haddam Neck Plant were found to be in conformance with criteria for this topic except for the following:

1. The spent fuel pool area ventilation system is neither single failure proof nor powered from emergency sources. To resolve this issue the licensee should either demonstrate that the results of a fuel handling accident without credit for area ventilation, are acceptable or propose corrective system modifications.

2. The primary auxiliary building ventilation system supply portion is not single failure proof. The licensee should evaluate the effects of degraded PAB ventilation on both equipment and personnel. If necessary corrective modifications should be provided.

3. The cable vault ventilation system is subject to several disabling failures. The licensee should either demonstrate that the operation of vital equipment located within this area would not be affected by loss of area ventilation or propose corrective system modifications.

4. The ventilation system associated with each of the emergency diesel generator rooms are subject to disabling single failures. The licensee should either demonstrate that the loss of ventilation will not significantly affect diesel generator availability or propose corrective modifications.

5. The switchgear room ventilation system is susceptible to disabling single failures. The licensee should either demonstrate that vital equipment located within this area would be unaffected by loss of area ventilation or propose corrective system modifications.

6. Supporting information to enable the staff to perform an independent assessment of the cable spreading areas, was not provided. The adequacy of room openings to maintain suitable service conditions should be evaluated.

CYAPCO Response

CYAPCO is presently reevaluating the ventilation systems for the spent fuel pool area and the primary auxiliary building relative to the concerns of items 1 and 2, above. CYAPCO will inform the Staff of the results of this evaluation and any required corrective actions by July 1, 1983.

The cable vault is a large volume area located below grade adjacent to the containment. This area was walked through with members of the Integrated Assessment team on October 7, 1982. During that walk-thru, it was noted by the Staff that the large volume of the cable vault and the very minimal heat load in the area make it highly unlikely that a loss of ventilation would result in adverse consequences. Also, should ventilation be lost, opening of the cable vault doors and hatches would provide sufficient flow of air through the area. If needed, temporary fans could also be provided. Based on this, CYAPCO concludes that the existing ventilation system is adequate and no modifications are required.

Concerning ventilation in the diesel generator rooms, it is noted that the individual diesel generator units themselves are not single failure proof and therefore, a single failure proof ventilation system should not be required. Analyses already assume failure of one diesel generator (for unspecified reasons), which is the most limiting single failure. Should the ventilation system for a diesel fail, opening of the doors to the room would provide sufficient cooling. Therefore, no modifications are planned in this area.

Ventilation in the switchgear room was discussed with the Integrated Assessment team during the October 7 site visit. The switchgear room is a very large area; most equipment in the room would not be operating following an accident. Heat loads in the area would be limited to the 480 volt switchgear, a motor control center, and the DC system equipment. Essential 4160 switchgear is not located in this area. Given the large volume of the area and the low heat load, it is CYAPCO's opinion that failure of the ventilation system would not inhibit safe shutdown. There is also a door leading directly to the outdoors which could be opened to provide air flow should the ventilation fail and heat buildup become a problem. Therefore, it is unlikely that a loss of ventilation would prevent the plant from achieving a safe shutdown. However, since this is a rather sensitive area of the plant due to the relative importance of equipment in the area, CYAPCO will analyze the effects of a loss of ventilation to determine if any modifications are desirable. CYAPCO will inform the Staff of the results of this analysis by July 29, 1983.

The cable spreading area at the Haddam Neck Plant is not an enclosed room and therefore does not have a didicated ventilation system. The fact that this area does not require a dedicated system during operation provides assurance that ventilation following an accident would not be a problem. For information, drawings showing the cable spreading area have been forwarded to the Haddam Neck Integrated Assessment Project Manager. Based on the October 7 site visit and the fact that sufficient open area exists to preclude overheating, CYAPCO considers this issue resolved and no further action is required.

TOPIC NO. | TITLE

XV-2 | Spectrum of Steam System Piping Failures Inside and Outside Containment (Radiological Consequences)

10 CFR 100, as implemented by SRP Section 15.1.5, requires, in part, that the radiological consequences of a steam line break outside containment not exceed specific guidelines for the reactor site.

The staff has determined that Haddam Neck meets the acceptance criteria for this topic. However, this conclusion is based upon a staff analysis in which certain assumptions regarding the design of Haddam Neck were made. Thus, we recommend that CYAPCO confirm these assumptions to support the validity of the staff evaluation.

CYAPCO Response

By letter dated September 8, 1982, CYAPCO provided comments on the Staff's evaluation of this topic. Although the steam release values used by the Staff were non-conservative, CYAPCO concluded that use of the appropriate values would result in doses which meet the acceptance criteria for this topic.

The Staff's analysis of this event also assumed the Standard Technical Specification limits for reactor water iodine concentration. It should be noted that the Haddam Neck Plant is presently converting to Standard Technical Specifications, which will include the assumed limits for iodine. Since the conversion process is being handled outside of the SEP, no further action or analysis of this event is required. CYAPCO expects to implement the STS during the latter part of 1983.

TOPIC NO.	TITLE
XV-7	Loss of Forced Coolant Flow, Reactor Coolant Pump Rotor Seizure and Reactor Coolant Pump Shaft Break

10 CFR 50 (GDC 10, 15 and 26), as implemented by SRP Sections 15.3.1 and 15.3.2, requires, in part, that the reactor, reactor coolant system and reactivity control system be capable of operating to keep the plant within design margins even in the event of anticipated operational occurrences.

Based on the information provided, we cannot conclude that the Haddam Neck Plant meets the requirements of GDC 27, 28 and 10 CFR 100 if analyzed in accordance with SRP Sections 15.3.3 and 15.3.4.

CYAPCO Response

CYAPCO is presently undertaking a comprehensive reanalysis of Design Basis Event for the Haddam Neck Plant utilizing, to the extent feasible, Standard Review Plan guidance and assumptions. This reanalysis will include an analysis of the reactor coolant pump rotor seizure and shaft break event.

It should be noted that the Staff's SER for this topic concluded that the loss of forced coolant flow transient was acceptable for Haddam Neck.

The DBE reanalysis effort is presently scheduled for completion in the first half of 1984.

TOPIC NO.	TITLE
XV-12	Radiological Consequences of a Rod Ejection Accident

10 CFR Part 100.11 provides dose guidelines for reactor siting against which calculated accident dose consequences may be compared.

The estimated low population zone thyroid doses are acceptable to licensing criteria. The estimated 2 hour EAB dose exceeds the criteria by 33% or 24 rem. However, because the percentage (10%) of failed fuel clad is conservative and because the dose model yields conservative estimates, it is the staff's judgement that an analysis using a DNB criteria would result in significantly lower estimations of failed fuel which would lead to lower doses. The need to perform a rod ejection accident evaluation to determine the number of fuel assemblies experiencing DNB will be determined during the integrated assessment.

CYAPCO Response

By letter dated September 16, 1982, CYAPCO provided comments on the Staff's evaluation of this topic. In that evaluation, the Staff assumed a DBA LOCA containment leakage of 0.25%/day as opposed to the 0.18%/day assumed in the evaluation of Topic XV-19 and proposed by CYAPCO in a technical specification change request dated March 21, 1978. Use of 0.18%/day containment leakage would reduce the calculated dose to 77 Rems, as opposed to the regulatory limit of 75 Rems. Further reduction in the dose would be expected due to the fact that the containment pressure resulting from a rod ejection would be less than the DBA LOCA containment pressure, and thus, the leak rate would be further reduced. Therefore, even using the conservative assumption of 10% fuel clad failure, the resulting doses would be less than the 75 Rem limit.

Based on this information, CYAPCO has concluded that further analysis to determine the amount of fuel failure is not warranted.

TOPIC NO.	TITLE
XV-16	Radiological Consequences of Failure of Small Lines Carrying Primary Coolant Outside Containment

10 CFR Part 100, as implemented by Standard Review Plan 15.6.2, requires that the radiological consequences of failure of small lines carrying primary coolant outside containment be limited to small fractions of the exposure guidelines of 10 CFR Part 100.

Based on the staff's evaluation, the radiological consequences of small line failures outside containment are a small fraction of the 10 CFR 100 guidelines, provided that the Standard Technical Specifications for coolant activity are implemented in order to limit reactor water iodine concentrations.

CYAPCO Response

The Haddam Neck Plant is presently converting to Standard Technical Specifications (STS) which include limits on reactor water iodine concentrations. Therefore, the conversion to STS should resolve the Staff's concern. CYAPCO expects to implement the STS during the latter part of 1983.

TOPIC NO.	TITLE
XV-17	Steam Generator Tube Rupture

Section 50.34 of 10 CFR Part 50 requires, in part, that each applicant for a license provide an analysis and evaluation of the design and performance of structures, systems and components of the facility with the objective of assessing the risk to public health and safety resulting from operation of the facility. The steam generator tube rupture is one of the postulated accidents used to evaluate the adequacy of these structures, systems and components with respect to public health and safety.

10 CFR Part 100.11 provides an acceptable dose consequence limit for reactor siting.

Radiological Consequences - The staff's calculated radiological consequences at the exclusion area boundary exceed the guideline values of 10 CFR Part 100. The calculated radiological consequences at the low population zone boundary are less than the guideline values of 10 CFR Part 100. However, SRP 15.6.3 criteria was exceeded.

Systems - In order for the staff to determine the ability of the plant to mitigate the consequences of a SGTR, we request that the licensee either provide the justification or reanalyze the event assuming operator actions consistent with ANSI-N660. The ANSI N660 times assumed should be consistent with the licensees event categorization of the SGTR event. Additionally, in order to better understand the operator actions and how they affect the plant, we request that the licensee submit emergency procedures for this event.

Until the above concerns are resolved, we cannot conclude that the predicted system performance provides a conservative basis for assessment of potential radiological consequences.

CYAPCO Response

By letter dated April 7, 1982 CYAPCO provided an analysis of the Steam Generator Tube Rupture event for the Haddam Neck Plant. This analysis, which showed acceptable consequences, was performed in accordance with the plant operating procedures specifically to resolve this SEP topic. It is CYAPCO's opinion that the concerns expressed above are generic in nature and resulted from the Staff's review of the recent tube rupture at the Ginna Station. These concerns should be addressed generically by the Staff and not within the context of the SEP.

It is CYAPCO's determination that the analysis submitted on April 7, 1982 is conservative and sufficient to resolve the SEP concerns related to steam generator tube rupture.

It would be premature at this time for CYAPCO to revise this analysis to address the above concerns. Following completion of the Staff's generic review of the tube rupture event and the Westinghouse Owners Group efforts on this matter, CYAPCO will reanalyze steam generator tube rupture as part of the DBE reanalysis effort noted in response to Topic XV-7.

TOPIC NO.	TITLE
XV-19	Loss of Coolant Accidents Resulting From a Spectrum of Piping Breaks Within the Reactor Coolant Pressure Boundary

10 CFR 100, as implemented by SRP Section 15.6.5 Appendices A and B, TID-14844 and Regulatory Guide 1.4, requires, in part, that exposure guidelines not be exceeded for design basis LOCA resulting in containment leakage or in leakage outside containment from the engineered safety features.

Based on the review of the licensee's analysis and our independent evaluations, we conclude that the offsite doses from a postulated design basis loss-of-coolant accident at Haddam Neck are within the guidelines of 10 CFR 100.11.

However, for the reasons set forth in the evaluation, the operation of the containment spray system to assure the effectiveness of the internal filter system will be considered in the integrated assessment of this plant.

CYAPCO Response

CYAPCO is presently evaluating the effectiveness of the containment air recirculation system in limiting the dose consequences resulting from a loss of coolant accident. CYAPCO will inform the Staff of the results of this review by February 14, 1983.