Northeast
Utilities System

107 Selden Street, Berlin, CT 06037

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

July 31, 1996

Docket No. 50-213
B15819

Re: 10CFR50.90
10CFR50.91

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Haddam Neck Plant
Proposed Exigent Change to Technical Specifications
Service Water System

The Connecticut Yankee Atomic Power Company (CYAPCO) hereby proposes to amend Operating License DPR-61 by incorporating the changes to the Haddam Neck Plant Technical Specifications identified herein. This license amendment request is submitted pursuant to 10CFR50.90. CYAPCO concludes that the amendment involves "no significant hazards considerations," as defined in 10CFR50.92, and requests that the amendment be evaluated as an exigent change in accordance with 10CFR50.91(a)(6).

Summary

On July 22, 1996, CYAPCO shut down the Haddam Neck Plant after it was determined that certain safety-related equipment would not be capable of performing its specified function during a postulated accident scenario. The postulated scenario involves the temporary interruption of service water flow to the containment air recirculation (CAR) system during a loss-of-normal power (LNP), coincident with a loss of coolant accident (LOCA) or a main steam line break (MSLB). Our evaluations have demonstrated that significant water hammer could occur in the CAR system under these circumstances and, therefore, we declared the CAR system inoperable and commenced an orderly plant shutdown.

A001 1/1

The changes proposed by CYAPCO will modify Technical Specification Sections 3.7.3 and 4.7.3 to allow the use of temporary diesel driven pumps to provide service water flow to the CAR cooling coils in the event of a full or partial LNP (i.e., a loss of power on buses 4 and 5, and/or buses 6 and 7). This will ensure continued service water flow through the CAR system during the postulated accident, until the service water pumps are capable of reestablishing flow through the CAR cooling coils.

As described below, CYAPCO has concluded that the requested changes to the Technical Specifications are safe, and do not adversely affect the public health and safety. Thus, notwithstanding any exigent treatment, CYAPCO believes that there is no additional or undue risk associated with the requested change or the renewed operation of the Haddam Neck Plant. CYAPCO has also evaluated this proposed amendment under the criteria set forth in 10CFR50.92, and has determined that it involves no significant hazards considerations.

CYAPCO requests that the NRC Staff process this license amendment request on an exigent basis, pursuant to 10CFR50.91(a)(6). The Haddam Neck Plant is currently off-line, with the reactor in the COLD SHUTDOWN condition (Mode 5). This amendment is necessary to declare the CAR system operable, and therefore CYAPCO will not be able to restart the Haddam Neck Plant until it is approved. Apart from this license amendment, we currently expect to have completed the necessary hardware modifications on August 6, 1996, and will be prepared to resume plant operations and enter Mode 4 on August 7, 1996. Due to the short time in which CYAPCO requests approval of this proposed license amendment, CYAPCO requests that the NRC Staff invoke 10CFR50.91(a)(6)(i)(B), having determined that an exigent condition exists and the amendment involves no significant hazards considerations. Under these provisions, the Staff would use local media to provide reasonable notice to the public in the area surrounding the facility of the proposed determination.

CYAPCO believes that exigent treatment is warranted in this case to allow the Haddam Neck Plant to resume power operation. The specific technical issue that triggered our decision to declare the CAR system inoperable was not identified previously and, therefore, an amendment could not have been requested prior to the current shutdown. As discussed below, we believe that we have pursued resolution of this issue, both from a technical and a regulatory perspective, in a timely manner, and that this exigent situation could not have been avoided.

In light of the capacity situation that currently exists in New England, and particularly in Connecticut, the Haddam Neck Plant is a key component in maintaining service reliability this summer. With the three Millstone units and the Haddam Neck Plant out of service, the region is relying primarily on fossil generating units to provide

a thin reserve margin beyond our projected peak load. More specifically, Connecticut now has available roughly 6050 MW to serve a projected peak load of 5800 MW, thus leaving a reserve margin of approximately 250 MW.

This situation creates the potential that, at some point during the summer, Connecticut's utilities will be unable to meet all of the electricity demands of our customers. For example, the unexpected outage of even one of the larger fossil units, which are in the 400 to 450 MW range, at the time of the system peak load would obviously exceed our 250 MW reserve, and would force the state's utilities to implement certain emergency actions. Such measures are designed to increase generation and decrease load through voltage reductions, running less environmentally efficient customer generation and at the furthest steps, even implementing load shedding, and rolling blackouts. These steps almost certainly would be inevitable with the loss of multiple large fossil units. The likelihood of such an occurrence is increased by the fact that several of the fossil units that we are relying on have only recently been reactivated to address the critical summer capacity situation, after having been retired for years. As a result, we may well encounter problems with the reliability and availability of these older units. In fact, a number of larger fossil units have already experienced several unplanned outages so far this summer.

The scenario in which we are unable to supply all of the power demanded by our customers creates significant risks for certain large industrial customers that receive power under interruptible contracts, and therefore would be among the first to be affected. In addition, while we are taking extraordinary measures to minimize the impact of any emergency actions that we may be forced to implement, other customers that may be largely dependent on electricity, in particular those on electrically operated life-support, will have to make arrangements for dealing with the possibility of a prolonged power outage. Given these and other challenges created by the current capacity situation, CYAPCO believes that there exists a substantial public benefit in the safe and timely restart of the Haddam Neck Plant.

Background

The CAR system is the primary means by which heat is removed from the reactor containment atmosphere during normal operation or during and after a LOCA or MSLB. There are four CAR units inside the containment. During normal operation, each unit is configured to include a cooling coil, fan and connected ductwork that distributes cool air throughout the reactor containment. Upon receipt of a high containment pressure signal, each CAR unit is configured to include moisture separators, particulate filters, and filter trays filled with

impregnated charcoal. In this configuration, each fan is capable of delivering approximately 50,000 to 55,000 cfm with the containment atmosphere at 40 psig, 272°F and 100% relative humidity.

Each CAR cooling coil is an air to water heat exchanger composed of 5 coils of finned copper-nickel tubes, 8 rows deep. The CAR fans blow air across the tubes with service water flowing inside of the tubes for heat removal.

The service water system is a dual header system, in which the two parallel full-size headers supply both the primary and secondary sides of the plant. Upon receipt of a high containment pressure, safety injection actuation signal (SIAS), or LNP, isolation valves are closed to isolate the non-essential loads. In addition, upon a high containment pressure actuation signal, the Adams filter bypass valves open to provide service water directly to the CAR units and spent fuel heat exchangers.

There are four service water pumps, with two pumps per train. During an LNP, one service water pump in each train will automatically start, powered from the diesel generators. Taking into account a 10 second delay in diesel start time and the sequencing of loads on the diesel, the service water pump will restart approximately 43 seconds after the LNP. In the event that the first pump does not start, the second pump on that diesel generator electric bus will automatically start after a five second delay.

An issue has been identified for the scenario of a LOCA inside containment coincident with an LNP. The reactor coolant system blowdown due to a LOCA inside containment results in a rapid rise in containment temperature and pressure. Power to the CAR fans and the service water pumps is not restored immediately because of the time delays associated with diesel generator startup and sequencing of service water pumps described above. During this time both the air flow and the service water flow in the CAR cooling coils decreases. While the decrease in service water flow and service water system pressure is expected to be rapid, it is expected that the decrease in air flow will be much slower because of the inertia of the CAR fan rotating assemblies. Thus, during the 48 second maximum time period between LNP and service water pump start, heat will continue to be added to the depressurized stagnant or nearly stagnant water in the CAR cooling coils.

It is postulated that enough heat could be added to the depressurized stagnant service water in the CAR unit cooling coils to cause the water to boil, creating steam voids in the cooling coils and the downstream piping. When the service water pumps restart, water slugs may form in the horizontal discharge lines which may be carried downstream by the steam at high velocity, creating the potential for

water hammer in the service water piping. If the water hammer were severe, piping integrity could be compromised.

CYAPCO informed the NRC Staff of these technical issues, which were the basis for the decision to shut down the Haddam Neck Plant, during a telephone conversation on the afternoon of July 23, 1996.[1] CYAPCO informed the staff that the corrective actions for these problems would require prior NRC approval and a license amendment.

Description of the Proposed Changes

In order to prevent damaging water hammer in the service water piping downstream of the CAR cooling coils, a design modification[2] is being implemented that will ensure that sufficient service water flow and pressure will be maintained throughout an LNP scenario. The design modification will revise the service water piping to provide supplemental flow through the CAR cooling coils while the service water pumps are de-energized. The design modification will connect into each of four 6" service water lines that run to the cooling coils (see Attachment No. 3 for specific design details and drawings). These connections will be made by welding a "T" branch connection into the service water lines. Four 6" branch lines will supply a common 10" header, fed from two diesel driven pumps which draw suction from an existing water storage tank (the "A" waste test tank (WTT)).

The two diesel pumps are skid-mounted. Each skid consists of one diesel pump and its associated auxiliary equipment and controls. The skids will be placed adjacent to the "A" WTT. A spare skid-mounted diesel pump will also be placed in the vicinity of the two diesel pumps in service, in order to ensure timely replacement if a diesel pump should fail a surveillance, or for other reasons be determined to be incapable of performing its designated function. The skids are entirely self-contained, but will require tie-in connections from the WTT to the skids, and from the skids to the service water piping. Electrical connection will be required to provide auto-start logic for the two pumps. The diesel pumps will be cold-started on a full or partial loss-of-normal power, either a loss of power from buses 4 and 5, and/or a loss of power from buses 6 and 7. Two redundant control schemes are provided to ensure at least one diesel pump operates and shuts down after the specified time in the event of a single failure

---

(1) W. T. Russell letter to T. Feigenbaum, "Summary of Our Telephone Conversation of July 23," dated July 24, 1996.

(2) The proposed design modification is a temporary modification that will be used for the remainder of operating cycle 19. A permanent modification will be installed prior to startup for operating cycle 20. The permanent modification will be discussed under a separate cover letter.

of a component. If the diesel pump fails to stop, the pump discharge pressure will fall below service water system operating pressure once the "A" WTT volume is depleted, thus allowing the check valves in the discharge piping to close. Sufficient fuel capacity will be maintained for pump operation of greater than 2 minutes.

Each skid unit is capable of providing 100% capacity flow through the CAR cooling coils. Each diesel pump is capable of providing approximately 3000 gpm at a delivered pressure of 100 psig, which will provide the required CAR cooling coil supply pressure of 50 psig within 7 seconds. A recirculation line will also be installed to permit surveillance flow testing. The service water hydraulic analysis shows that if 50 psig service water pressure is supplied to the CAR cooling coil piping within 7 seconds, no water hammer damage occurs.

The diesel pump discharge header will be protected by a 10" check valve, and the two 10" diesel pump discharge lines which feed the header will also be protected by check valves. Six inch check valves will also be installed upstream of the "T" connections to the augmented service water piping to prevent reverse flow to the rest of the service water system when the diesel pumps are required to deliver flow to the CAR cooling coils.

The proposed license amendment modifies Technical Specification Sections 3.7.3 and 4.7.3 to include limiting conditions for operation (LCOs) and surveillance requirements for the supplemental service water diesel pumps and storage tank. The proposed change will require that both diesel pumps and the "A" WTT be operable during Modes 1, 2, 3, and 4. If either diesel pump becomes inoperable, the action statement allows 72 hours of operation to restore the inoperable pump to OPERABLE status before an orderly shutdown must be commenced. The allowed outage time for the "A" WTT is 24 hours.

Attachment 1 provides a markup of the existing Haddam Neck Plant Technical Specifications showing the proposed changes. Attachment No. 2 provides proposed retyped pages. Attachment No. 3 provides design information, including drawings and sketches of the proposed physical plant modification.

Safety Assessment

These proposed changes to the Haddam Neck Plant's Technical Specifications, with the associated plant design modification, ensure that sufficient service water flow through the CAR cooling coils will be maintained throughout an LNP, in order to prevent damaging water hammer in the service water piping downstream of the CAR cooling coil piping. The existing plant configuration does not provide for service water flow through the CAR cooling coils until a maximum of 48 seconds

after an LNP, and recent evaluations have shown that damaging water hammer may occur in the CAR cooling coil piping in the absence of flow following a LOCA. Two diesel pumps will draw suction from the "A" WTT, and provide augmented service water flow for 1 to 1.5 minutes following a full or partial LNP (de-energization of electrical buses 4 and 5, and/or buses 6 and 7). This provides adequate flow through the CAR cooling coils until the service water pumps are energized from the emergency buses, and begin to supply service water flow.

As discussed below, CYAPCO has performed a review of the design modifications against 10CFR50, Appendix A, "General Design Criteria (GDCs) for Nuclear Power Plants," to ensure that the design is adequate and generally meets the intent of the relevant GDCs. It should be noted that the Haddam Neck Plant is not required to be in strict compliance with the GDCs as documented by the NRC on September 18, 1992,[3] wherein it was stated that "Plants with construction permits issued prior to May 31, 1971, do not need exemptions from the GDCs."

The piping design criteria for this proposed modification are consistent with the existing criteria, and the conclusions of all previous analyses are unaffected by this modification.

CYAPCO has considered GDC 57, "Closed System Isolation Valves," in the design of this modification. The design/licensing basis for the Haddam Neck Plant does not take credit for service water system pressure in the piping inside of containment as part of the resolution of the Systematic Evaluation Program (SEP) Topic VI-4, "Containment Isolation System" for the service water return line containment penetrations P-51, 52, 53, and 54. These penetrations are downstream of the CAR cooling coils, and could see service water system pressure that is less than peak containment accident pressure, P_a. The service water return line penetrations have been determined to be acceptable, without credit taken for service water system pressure. This modification does not change the nature of the four service water return penetrations to preclude adequate containment isolation.

GDC 2 requires that structures, systems, and components (SSC) important to safety be designed to withstand the effects of earthquakes without loss of capability to perform their necessary safety functions. The existing service water piping is a Category I, safety-related system. The augmented service water piping modifications will not degrade the seismic qualification of the existing service water system. The permanent piping components of this modification are being installed QA Category I, as well as Seismic Category I. The installation is seismically qualified from

---

(3) S. J. Chilk memo to James M. Taylor, dated September 18, 1992.

the point where the augmented service water flow enters the service water piping, and back through two 10" check valves in the augmented service water diesel pump discharge piping. These check valves serve as the ASME Section XI, Code Class 3 piping boundary. The portion of the augmented service water system upstream of the discharge check valves was not seismically analyzed. However, the diesel pump skids, the attaching flexible hose, and the "A" WTT are considered to have some degree of seismic ruggedness. Although the diesel skids will not be anchored, their aspect ratio is such that tipping is not a concern. Significant translation is not expected, based on their location at ground level where the seismic acceleration is low (0.48g) and the sliding coefficient is high. The diesel driven pumps themselves are commercial grade pumps that typically exhibit relatively high frequency response due to their configuration. The flexible hose to be used is a flanged wire-reinforced polypropylene hose manufactured to U.S. Coast Guard Standards. The hose has a bursting pressure of 250 psig, with a 4:1 factor of safety. The strength and flexibility of this hose, in conjunction with its location (i.e., 21' 6" elevation) provides considerable seismic ruggedness. This is considered to be a temporary installation, and includes the skid-mounted diesel pumps and the piping/hoses to the "A" WTT, and to the discharge piping check valves. A recirculation line will be run from the pump discharge to the "A" WTT. This has been designed using 2/1 criteria, and will serve as a restraint for portions of the non-seismic equipment.

A coincident seismic event with an LNP/LOCA is beyond the design basis for the Haddam Neck Plant, and was not considered in the design of augmented service water piping modification. However, CYAPCO did consider seismic issues when designing this modification. Although portions of the augmented service water system do not fully meet the seismic design basis of the existing service water system, CYAPCO has concluded that seismic issues have been reasonably addressed for this temporary modification.

Considering this review it is concluded that the design modification meets the intent of the appropriate GDCs.

This modification has no impact on the capability to withstand a design basis external flood. Procedures to mitigate the external flooding event require plant shutdown using equipment that would not be impacted by this modification. The failure of the non-Seismic Category I portions of this modification ("A" WTT, diesel skid, and connection piping/hoses) will have no impact on any other SSC, and will drain to the yard drain.

The diesel pump start logic, which detects a loss of power on either electrical buses 4 and 5, or buses 6 and 7, is protected by QA, Class 1E electrical relays. A short circuit, or other electrical failure,

of the diesel driven pumps will not propagate back into Class 1E systems. The start logic electrical components will be enclosed in a watertight enclosure, and will be physically located above the flood plain. This will protect the circuitry from vulnerabilities associated with flooding. Thus, there will be no impact upon the availability of Class 1E buses.

SRP 3.5.1.1 "Internally Generated Missiles (Outside Containment),"[4] has been considered in this modification by orienting the diesel pumps such that an expected missile from the pumps/engines will have a low probability of impacting an adjacent SSC. The augmented service water piping header attaching to the existing service water piping is located at the 21' 6" level on the north side of containment, adjacent to the service water supply risers. This location is not considered to create any external missile concerns, based on 1) the protection provided on three sides by the Primary Auxiliary Building, the Service Building, and Containment; 2) the low elevation of the piping header; and 3) the fact that the existing service water piping is located essentially in the same area, and that the Haddam Neck Plant was previously reviewed under ISAP Topic 1.06 for Tornado Missiles.

The "A" WTT is being refilled with water. The Chemistry department will then sample and analyze the "A" WTT contents for compliance with National Pollutant Discharge Elimination System (NPDES) and Radiological Effluent Technical Specifications (RETS) requirements. The chemistry department will provide a contingency release permit to the Operations Shift Manager such that if the tank is used, all of the appropriate regulations are adhered to. This process will be repeated in the event the tank needs to be refilled. Since the "A" WTT will be used strictly for this temporary modification, sensitivity will be heightened for test tank releases, in order to ensure that plant operations are not affected by the loss of waste tank volume.

CYAPCO has received pre-approval from the State of Connecticut Department of Environmental Protection (DEP) for the additional emissions that may occur from the operation of these pumps. There will be no impact on the DEP regulated discharge.

This plant modification has been reviewed for its impact on the site fire protection plan. The installation of the two diesel pumps, associated piping, and controls does not adversely affect the plant's ability to achieve and maintain safe shutdown, per the requirements of 10CFR50, Appendix R. Any hazards associated with this work have been reviewed and documented in a fire protection technical evaluation. Specifically, this modification will include the introduction of a

---

(4) NUREG-0800, Standard Review Plans, Section 3.5.1.1, "Internally Generated Missiles (Outside Containment)", Revision 2, dated July, 1981.

fuel source to support diesel operation. This fuel source will be located near plant structures and auxiliary systems. Compensatory measures, consisting of additional fire protection equipment (i.e., a stationed foam cart) and appropriate fire watches, will be established to reduce the exposure consideration created by this combustible source. The surrounding area will also be dyked to contain fuel oil from the diesel pump, or to collect run-off of any leak to prevent the combustible material from entering the storm drains.

Performance tests were performed at the diesel pump vendor's facility on each complete pump skid to verify that the capacity of the pumps met the original pump performance curve. The performance tests also verified that the pumps achieved full start within the specified time limit needed to satisfy system requirements, and that the pump discharge pressure was adequate to satisfy the system design requirements. All hoses and associated fittings were hydrostatically tested to verify the pressure retaining capacity and the integrity of the hose and fitting materials. The pump performance tests and hydrostatic tests were witnessed by a CYAPCO representative. To support the validation of the pump performance tests and hydrostatic tests, the CYAPCO representative verified that the test engineer demonstrated competency during the tests, and was knowledgeable of the test equipment, test set-up and testing methods. The results of the pump performance tests and the hydrostatic tests were reviewed by CYAPCO for acceptability. The CYAPCO representative verified certain attributes of the pumps, diesel engines, valves, hoses and fittings. This information will be re-verified during receipt inspection at the Haddam Neck Station. Fuel oil for the pump skids will be procured and receipt inspected by the Station in accordance with standard receipt inspection procedures. Each shipment of fuel oil will also be sampled, tested and analyzed in accordance with CYAPCO procedures. Post installation functional testing will be performed prior to declaring the system operable.

Periodic surveillances will be performed on the system components in accordance with plant procedures. These procedures will encompass vendor recommendations, as outlined in the vendor's operation and maintenance manual, to verify such attributes as fuel level, lube oil level, mechanical integrity, etc.

The proposed changes to the Technical Specification limiting condition for operation (LCO) and surveillance requirements are based on existing operability requirements and allowed outage times (AOTs) for other emergency core cooling systems (ECCS). The capability to provide augmented service water flow through the CAR cooling coils is most limited by the availability of the water source (the "A" WTT), but is also contingent upon the availability of the diesel pumps. The following descriptions provide the basis for the LCO AOT durations:

Waste Test Tank AOT

The Haddam Neck Plant Technical Specifications provide a one hour AOT for the refueling water storage tank (RWST) and a four hour AOT for the demineralized water storage tank (DWST). The RWST is vital for both high pressure and low pressure safety injection (HPSI and LPSI) to maintain adequate core cooling. (HPSI and LPSI are both ECCS systems.) The DWST is vital for auxiliary feedwater (AFW), which provides flow to the steam generators in the event normal feedwater is lost. (AFW is an engineered safeguards feature.) Efforts are currently underway by various owners groups (e.g., Combustion Engineering Owners' Group, Westinghouse Owners' Group) to submit technical bases to support RWST AOT extension from one to 24 hours.

The expected frequency of an LNP, based on the operating experience of U.S. nuclear reactors over the last ten years, is approximately 0.05 per year. When the spectrum of all breaks (e.g., stuck-open power-operated relief valves, reactor coolant pump seal failures, pipe breaks) is considered, the frequency of a LOCA is on the order of 0.01 per year. The frequency of a coincidental LNP/LOCA is therefore approximated to be on the order of 1E-06 per year within a 24 hour period. Even when the possibility of a large seismic event that causes a loss of power and creates pipe breaks is considered, the frequency of an LNP/LOCA is not expected to exceed 1E-05 per year within a 24 hour period.

Considering these facts, an AOT of 24 hours has been determined to be appropriate for the "A" WTT in conjunction with these plant modifications.

Diesel Pump AOT

As described above, the frequency of a coincidental LNP/LOCA is estimated to be on the order of 1E-06 per year within a 24 hour period. Therefore, the risk significance of the diesel pumps providing augmented service water flow through the CAR cooling coils is expected to be much less than the risk significance for systems and components that mitigate the LNP and LOCA events alone. The Haddam Neck Plant Technical Specifications provide a 72 hour AOT for an EDG. The EDG is the key mitigating component for an LNP. The Technical Specifications provide a 72 hour AOT for a single train of ECCS, which is the key mitigating system for a LOCA. Since the risk significance of the diesel pumps is expected to be less than that of either the EDG or ECCS, the AOT for the diesel pumps can be extended beyond 72 hours. However, considering the significance of minimizing the out of service duration of systems, and knowing that 72 hours provides a

reasonable time period in which to repair/replace/test a diesel pump (there will be a third, spare diesel pump on site), an AOT of 72 hours has been determined to be appropriate for the diesel pumps in conjunction with these plant modifications.

The proposed Technical Specification surveillance interval of the "A" WTT is once every 24 hours, which is more conservative than that for other vital tanks on site (the RWST is required to be surveilled every seven days). The level in the "A" WTT will be checked daily, to ensure that enough usable volume exists in the tank to provide augmented service water flow through the CAR cooling coils.

The Technical Specifications limit on the "A" WTT level will be 12,000 gallons. This level will ensure the required usable volume is available to support operation of two diesel pumps for 1 to 1.5 minutes, having taken into account unusable volume in the tank, as well as conservatisms for instrument uncertainties.

The modification is designed to keep water flowing through the CAR cooling coils during the 48 second maximum time interval where service water is momentarily interrupted. Cooling will be provided while service water pumps are idled until the service water pumps are loaded onto the emergency electrical buses (a maximum of 48 seconds after an LNP), and until the augmented service water system pumps are shut off to allow the check valves to open and the service water flow from the service water pumps to resume. Temperature of the "A" WTT water will be maintained at or below 95°F. This maximum temperature is based on the maximum analyzed service water temperature for CAR cooling coil performance. CYAPCO has performed a calculation which shows that 95°F provides adequate cooling of the containment via the CAR cooling coils following design basis events.

The proposed Technical Specification surveillance interval for the diesel pumps is once every seven days, on a staggered test basis, which is more conservative than that for other pumps specified in the Technical Specifications. For example, the auxiliary feedwater pumps require testing every two weeks, on a staggered test basis. It is more conservative than the interval for testing the EDGs, which is also at least once per 31 days. The EDGs, however, require testing every seven days (on a staggered test basis) if they have exhibited failures in the last 20 valid tests. Since the diesel pumps are non-Seismic / non-QA Category I, they will be tested on an interval consistent with the more conservative surveillance interval of the EDGs.

The scope of these proposed Technical Specification surveillance testing requirements will ensure that components continue to be maintained OPERABLE. In addition, a functional test of the

modification will be performed, including the proper operation of the start logic, prior to placing the system in service. Functional testing will verify the ability of the system to deliver a minimum required flow at a minimum of 50 psig within 7 seconds.

These proposed changes eliminate a potential adverse condition by preventing a postulated service water pipe break subsequent to a coincident LNP/LOCA. The frequency of this initiator, as described above, is extremely small. Service water flow will be returned to the CAR system in a maximum of seven seconds after an LNP (as opposed the 48 second maximum assumed in the current system design), and this will have a small positive impact on the CDF. The frequency of loss of containment integrity will be positively impacted, as well. This design, on the other hand, introduces potential service water diversion paths through check valves. The probability of check valve failures that divert service water flow, is small compared to the probability of active failures. The check valves will be surveilled to ensure that they are capable of allowing flow through the valve, and that they change position, as required. Therefore, it has been concluded that the increase in service water failure probability or the Haddam Neck Plant CDF attributed to this design modification is negligible. It has been concluded that the net effect of these small decreases and increases in CDF is minimal, and the impact on public safety is also minimal.

Considering all of the above, the proposed changes to Technical Specifications 3/4.7.3 do not adversely affect public health or safety, and the proposed change is safe.

Significant Hazards Consideration

In accordance with 10CFR50.92, CYAPCO has reviewed the attached proposed change and has concluded that it does not involve a significant hazards consideration. The basis for this conclusion is that the three criteria of 10CFR50.92(c) are not compromised. The proposed change does not involve a significant hazards consideration because the change will not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

   The diesel pump start logic, which detects a full or partial LNP (a loss of power on electrical buses 4 and 5, and/or buses 6 and 7), is protected by QA Category I, Class 1E electrical relays. A short circuit, or other electrical failure, of the diesel pumps will not propagate back into Class 1E systems. Therefore, the electrical modifications will not significantly increase the probability of an LNP. This separation also ensures that the consequences of an LNP are not affected.

These proposed changes eliminate a potential adverse condition by preventing a postulated service water pipe break subsequent to a coincident LNP/LOCA. The frequency of this initiator, as described above, is extremely small. Service water flow will be returned to the CAR system in a maximum of seven seconds after an LNP (as opposed the 48 second maximum assumed in the current system design), and this will have a small positive impact on the CDF. The frequency of loss of containment integrity will be positively impacted, as well. This design, on the other hand, introduces potential service water diversion paths through check valves. The probability of check valve failures that divert service water flow, is small compared to the probability of active failures. Therefore, it has been concluded that the increase in service water failure probability or the Haddam Neck Plant CDF attributed to this design modification is negligible. Even without a detailed analysis that considers uncertainties, it has been concluded that the net effect of these small decreases and increases in CDF is minimal (i.e., not significant), and so the probability of an accident leading to core damage is not significantly increased.

Coupled with the above discussion of CDF is the possibility of a loss of service water. The total loss of service water is functionally equivalent to a station blackout. The diversion of service water flow through the augmented service water flow path is bounded by the loss of all service water, which has been previously evaluated. The possible reduction in delivered service water flow due to the introduction of new in-line check valves in the service water supply lines to the CAR fans was reanalyzed for the most limiting accident condition. A negligible impact in delivered flow to the critical components will result from this plant modification.

The proposed design change provides assurance that the CAR fans and the service water system will perform their safety function in the event of a LOCA coincident with an LNP. The design change will provide assurance that damage to the service water piping will not occur during the short time frame between LNP and EDG sequencing when service water flow is interrupted to the CAR fans. A maximum allowable interruption time of seven seconds was determined by a calculation, and used as the basis for these modifications. The proposed design change will assure that sufficient flow is maintained through the CAR fans throughout this time period, thus preventing damaging water hammer in the service water piping upon collapsing of steam voids in the piping. Although voids are postulated to form in the CAR system piping, this design modification has been evaluated and has been determined to provide sufficient flow in a time to avoid a

significant water hammer. The design change provides assurance that containment heat removal and service water integrity will be maintained. The proposed Technical Specification changes provide assurance that the design modifications will function as designed.

Therefore, this modification (and the associated Technical Specifications) does not significantly increase the consequences of an accident previously analyzed.

2. Create the possibility of a new or different kind of accident from any accident previously evaluated.

The addition of the diesel pumps and associated piping modification does increase the amount of piping and components in the service water piping, as described above. However, the piping and components added to the QA and Seismic Category I portion of the service piping will be designed QA and Seismic Category I up to and including the new discharge check valves. The check valves will serve as the ASME Section XI, Code Class 3 piping boundary. Thus, failures in the non-QA, non-Seismic Category I portion of the modification will have no impact on service water integrity. The QA and Seismic Category I components will be surveilled and tested to ensure that the possibility of the Category I components causing a loss of service water is minimized. There is no leakage criterion for these valves, but they will be tested to verify flow through the valve, and that they change position as required.

The total loss of service water due to a failure of the new QA and Seismic Category I portion of the modification is the only credible failure mode associated with the proposed change. This is not different from failure of any of the current QA and Seismic Category I portions of the service water system. The total loss of service water is equivalent to the total loss of AC power (a station blackout) since service water is needed to cool the EDGs. A total loss of AC power scenario has been evaluated under 10CFR50.63 (station blackout) and as such does not represent an accident of a different kind than previously evaluated.

The diesel pump start logic, which detects a full or partial LNP (a loss of power on electrical buses 4 and 5, and/or buses 6 and 7), is protected by QA Category I, Class 1E electrical relays. A short circuit, or other electrical failure, of the diesel pump control circuits will not propagate back into Class 1E systems.

In addition, the impact of the modification on flood protection, internal missile generation and fire protection has been

evaluated and it has been shown to have minimal effect on the safety of the plant. Thus it is concluded that no new or different kinds of accidents are possible as a result of the proposed mechanical system plant modification and associated changes to the Technical Specifications.

3. Involve a significant reduction in a margin of safety.

These proposed changes eliminate a potential adverse condition by preventing a postulated service water pipe break subsequent to a coincident LNP/LOCA. The proposed changes provide added assurance that the CAR fans will provide the required containment cooling and that service water integrity will be maintained during a LOCA coincident with an LNP. Further, electrical separation and isolation between the non-QA and QA Category I portions of the service water system are maintained to provide assurance the service water system and electrical systems will continue to perform their safety function. The proposed surveillances and Action Statements provide assurance that the modification will work as designed to prevent damaging water hammer. The modifications have minimal effect on the consequences of floods, internally generated missiles or fires. Thus, it is concluded that the changes to the Technical Specifications do not represent a significant reduction in a safety margin.

The commission has provided guidance concerning the application of the standards of 10CFR50.92 by providing certain examples (51FR7751, March 6, 1986) of amendments that are not considered likely to involve a significant hazards consideration. While the proposed change is not enveloped by a specific example, it has been shown that the proposed changes to the Technical Specifications are safe and do not constitute a significant hazards consideration.

Justification for Exigent License Amendment

CYAPCO believes that exigent treatment is warranted in this case to allow the Haddam Neck Plant to return to power operation. CYAPCO requests that the NRC Staff process this license amendment request on an exigent basis, pursuant to 10CFR50.91(a)(6). The Haddam Neck Plant is currently shut down, with the reactor in the COLD SHUTDOWN condition (Mode 5). This amendment is necessary to declare the CAR units operable, and therefore CYAPCO will not be able to restart the Haddam Neck Plant until this amendment is approved. Apart from this license amendment, we currently expect to have completed the necessary hardware modifications on August 6, 1996, and will be prepared to resume plant operations and enter Mode 4 on August 7, 1996.

This specific technical issue was not identified previously and, therefore, an amendment could not have been requested prior to the current shutdown. We believe that we have pursued resolution of this issue, both from a technical and a regulatory perspective, in a timely fashion, and that this exigent situation could not have been avoided. CYAPCO was pursuing the resolution of an open NRC question regarding CAR system thermohydraulics when the information that resulted in the shutdown of the Haddam Neck Plant was identified. In evaluating the issue, we engaged a consulting firm (Creare, Inc.) to perform analyses. On Monday, July 22, 1996, Creare identified a concern related to the interruption of service water system flow during a LOCA coincident with an LNP. CYAPCO promptly reviewed the new information and determined that the potential existed for conditions that could adversely affect the operation of the CAR system. Based upon this information, the Haddam Neck Plant commenced an orderly shutdown at 1843 hours on July 22, 1996. Since that time, we have been evaluating a number of options for modifying the plant hardware to address the identified technical issue. We have only recently decided to implement the modification that involves the use of temporary diesel pumps. This proposed change to the Technical Specifications could not be developed until a decision on the physical plant modifications was reached. Therefore, CYAPCO believes that, following the plant shutdown, we have exercised our best efforts in pursuing the necessary license amendment, and that exigent treatment of our request is warranted.

In light of the current capacity situation in New England, and in particular in Connecticut, the Haddam Neck Plant is a key component in maintaining service reliability this summer. As discussed above, if an outage of a large generating unit were to occur while the Haddam Neck Plant remained out of service, the state's utilities may likely be unable to meet the peak load, and would be forced to implement certain emergency actions; which may involve voltage reductions, load shedding, and potentially even rolling blackouts. Given this current situation, CYAPCO believes that there exists a substantial public benefit in the safe and timely restart of the Haddam Neck Plant.

Notwithstanding any exigent treatment, CYAPCO has determined that this request does not involve any significant safety impact or a significant hazards consideration. Thus, there is no additional or undue risk associated with the request or the renewed operation of the Haddam Neck Plant.

Environmental Considerations

CYAPCO has reviewed the proposed license amendment against the criteria of 10CFR51.22 for environmental considerations. The proposed change does not significantly increase the types and amounts of effluents that may be released offsite, nor does it significantly

increase individual or cumulative occupational radiation exposures. Considering the foregoing, CYAPCO concludes that the proposed change meets the criteria delineated in 10CFR51.22(c)(9) for a categorical exclusion from the requirements for an environmental impact statement.

Nuclear Safety Assessment Board Review

The Nuclear Safety Assessment Board has reviewed and approved the attached proposed license amendment, and has concurred with the determination above.

State Notification

In accordance with the provisions of 10CFR50.92(b), CYAPCO is providing the State of Connecticut a copy of this amendment request via facsimile to ensure their awareness of this request.

Schedule

CYAPCO requests exigent treatment of this license amendment request. Exigent processing is required in order to allow the Haddam Neck Plant, which is currently shut down to perform modifications to the CAR system service water piping, to return to power operation. CYAPCO has demonstrated that the proposed change does not involve a significant hazards consideration, that it does not represent any undue safety risk, and that it does not require an environmental impact statement. CYAPCO requests that the NRC Staff invoke 10CFR50.91(a)(6)(i)(B), whereby having determined that an exigent condition exists and that the amendment involves no significant hazards considerations, the Staff may issue the amendment after providing reasonable notice to the public. CYAPCO further requests that the NRC Staff process and issue this proposed amendment on or before August 7, 1996, to support the timely restart of the Haddam Neck Plant. We acknowledge and apologize for the short time available to process this request on an exigent basis.

Conclusion

As discussed above, these proposed changes are safe and have been determined not to involve a significant hazards consideration pursuant to 10CFR50.92. Additionally, the proposed changes have been determined to warrant emergency processing pursuant to 10CFR50.91.

CYAPCO will promptly provide any additional information that the NRC Staff may require to respond to this request. Should the Staff require such information, please contact Mr. E. J. Perkins at (860) 267-3938.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

FOR: T. C. Feigenbaum
Executive Vice President and
Chief Nuclear Officer

BY: S. E. Scace
Vice President

cc: T. T. Martin, Region I Administrator
S. Dembek, NRC Project Manager, Haddam Neck Plant
W. J. Raymond, Senior Resident Inspector, Haddam Neck Plant

Mr. Kevin T.A. McCarthy, Director
Monitoring and Radiation Division
Department of Environmental Protection
79 Elm Street
P O Box 5066
Hartford, CT 06102-5066

Subscribed and sworn to before me
this 31st day of July, 1996

Kathleen T. Gabes

Date Commission Expires: _____

Kathleen T. Gabes
Notary Public
My Commission Expires December 31, 1997