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SEP 9 1996

Docket No. 50-213
B15887

Mr. H. J. Miller
Regional Administrator, Region I
475 Allendale Road
Kind of Prussia, PA 19406

Haddam Neck Plant
Response to Recent Operational Events

The purpose of this letter is for Connecticut Yankee Atomic Power Company (CYAPCO) to provide information to the NRC Staff relative to recent events that occurred at the Haddam Neck Plant during its current refueling outage and to outline the activities that will be taken to recover from these events. Recovery will be completed when we have completed preparations for and begun core offload.

Event Summary

On August 31, 1996 and September 1, 1996 the following events occurred:

1. A pinhole leak was discovered in the body of valve RH-V-791A (inlet isolation to the "A" RHR heat exchanger),
2. It was discovered that, over a period of several days, nitrogen gas inadvertently entered the reactor coolant system via the charging system,
3. The "B" RHR pump (P-14-1B) failed to start.

Subsequent to the three events stated above, on September 4, 1996, approximately 200 - 300 gallons of reactor coolant water was diverted to the containment sump via an automatic drain valve in the containment spray header.

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Short Term Response

Response Philosophy

CYAPCO's response to this series of events has been based on a philosophy of maximizing protection of the three principle safety barriers (cladding, reactor coolant system integrity, and containment integrity) while proceeding cautiously with the plant recovery efforts. The decision to proceed cautiously was based on the recognition that this was a serious, but relatively stable condition. Therefore, the engineering and maintenance staff was tasked to fix the problems right, the first time, while management focused attention on preserving and/or improving margins in the key safety functions. The actions taken were as follows:

Cladding (Decay Heat Removal)

At the time of the event the mitigation strategies for a loss of RHR event, as outlined in AOP 3.2-12, "Loss of Residual Heat Removal System," would be:

1. Pressurization and natural circulation using steam generators for heat sinks,
2. Forced circulation with reactor coolant pumps using steam generators for heat sinks,
3. Use of LPSI pumps in lieu of RHR pumps for core cooling.

In order to maximize the availability of these options, the following steps were taken:

1. On Sunday, September 1, 1996, after refill of the pressurizer was complete, operators unisolated the four steam generators by opening all loop stop valves. This provided for use of steam generators as an immediate alternate heat sink option and also increased the time to core boiling in the event of a failure of the "A" RHR pump. This sequence (valves opened after nitrogen ingress stopped and RCS inventory restored) provided reasonable assurance the loops were nitrogen free, thus maintaining natural circulation capability. In addition, efforts to restore a reactor coolant pump were expedited in order to provide forced circulation capability.
2. On Tuesday, September 3, 1996, a temporary jumper was installed which gave the operators core exit thermocouple readout in the control room. This indication enhances the operators' ability to successfully implement loss of RHR strategies by giving unambiguous indication of core temperature (and by inference, cladding condition).

Additionally, CYAPCO has taken actions to preserve the operating RHR loop including cordoning off the area, increasing the frequency of monitoring, and staging tools to vent the pump in the event of air binding.

Reactor Coolant System Integrity

On Sunday, September 1, 1996, operators verified that they had the ability to isolate the reactor coolant system so that it could be pressurized to support natural circulation. They additionally verified that this action could be completed prior to core temperature reaching 200° F. Note this is standard operating practice to verify this contingency on a shift basis as part of the shutdown risk program.

Containment Integrity

As part of the shutdown risk program, the containment boundary had been maintained prior to these events and was reverified early in the event on Sunday. Operators verified that they could establish the containment boundary well before reaching 200° F. The 200° F is used to correspond to the mode change, as opposed to 212° F for saturation conditions at ambient pressure.

Additional Response/Recovery Actions

Reactor Vessel Inventory

The most important issue on Monday, September 2, 1996, was verifying where reactor vessel level was. Because the missile shield was removed, the reactor vessel level indicating system (RVLIS) was out of service. CYAPCO therefore put a priority on flowing water out of the head vent to verify level. This was changed on Tuesday, September 3, 1996, by two new pieces of information; 1) A member of the I & C staff identified the potential to use an existing RVLIS test box and 2) A staff concern surfaced about filling the reactor head prior to verifying the proper operation of the head vent valves. Accordingly, CYAPCO elected to use the RVLIS test box on Tuesday, September 3, 1996, to verify proper inventory in the reactor vessel head, while completing work on the test procedures. The head vent valve test and the reactor head fill test were completed on Thursday, September 5, 1996, with satisfactory results.

Stop Work

Finally, in order to ensure that ongoing refueling outage work, which was scheduled to recommence on Tuesday, September 3, 1996, did not adversely affect RCS inventory, a stop work order for work potentially affecting RCS inventory was issued Monday, September 2, 1996, by the Unit Director. The intent of this order was to provide additional protection for the RCS inventory key safety function. As documented in CYAPCO's letter dated September 5, 1996¹, the barrier was inadvertently violated and in response the unit director, in conjunction with Nuclear Safety & Oversight (NSO), issued a general stop work order on Wednesday, September 4, 1996.

Organizational Issues

Although actions were taken to maintain the plant in a safe configuration, we were late to initiate our formal recovery from these events, and when we did, we were not well coordinated in our efforts. This is the first event where the line and new Nuclear Safety and Oversight organization have had to address a problem of this magnitude. From Tuesday, September 3, 1996, through Thursday, September 5, 1996, meetings were held in order to clearly define roles. These efforts improved the situation, but were not complete. On Friday, September 6, 1996, a line response organization was named to clearly address these situations (See Attachment 1). The response organization is headed by a senior line manager. This organization is tasked with providing the overall recovery from the events, including proper interface between the Independent Review Team (IRT) (See Attachment 2) and the line organization. CYAPCO feels that while the technical issues have been worked on independently in an appropriate fashion, this overall look is necessary to ensure a coordinated recovery. In retrospect, CYAPCO feels this organization should have been formed sooner in our recovery from the series of events.

Activities to Resume Core Offload

CYAPCO's focus is to complete preparations and proceed with core offload. This represents the area of lowest shutdown risk in the schedule as indicated on the attached RFO 19 Shutdown Risk Profile (See Attachment 3). Accordingly, CYAPCO intends to resume core offload activities as soon as the following criteria are met:

1. Both trains of RHR are available for service,
2. IRT review complete,

¹ T. C. Feigenbaum letter to H. J. Miller, "Haddam Neck Plant Loss of Reactor Coolant System Inventory," dated September 5, 1996.

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3. Appropriate corrective actions from the IRT, that are germane to resumption of core offload, have been completed.

Restoring both trains of RHR to operable status may require NRC Staff action depending on the nature of the defect in valve RH-V-791A.

CYAPCO believes that meeting these criteria will place the plant in an appropriate posture to resume core offload activities.

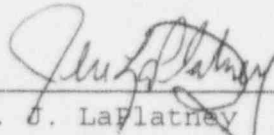
If you should have any questions, please contact myself or Mr. Jere LaPlatney at (860)267-3690.

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY

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

BY:



J. J. LaPlatney
Nuclear Unit Director

cc: S. Dembek, NRC Project Manager, Haddam Neck Plant
W. J. Raymond, Senior Resident Inspector, Haddam Neck Plant

Attachment 1

Haddam Neck Plant

Line Response Organization

RFO 19 Issues Corrective Action

J. Stanford

B RHR Pump
Lead - L. LeBaron
Support - J. Tyler

Repair/Replace

RH-V-791A
Lead - R. Pritchard
Support - J. Tyler

Radiography
Repair/Replace
Generic Imp.

Inventory Control
Lead - J. Calderone
Support - D. McCracken
D. Bazinet

Head Vent
CET Jumper*
RVLIS Jumper
Procedures

E- Plan
Lead - J. Deveau

Classifications*

*= Closed

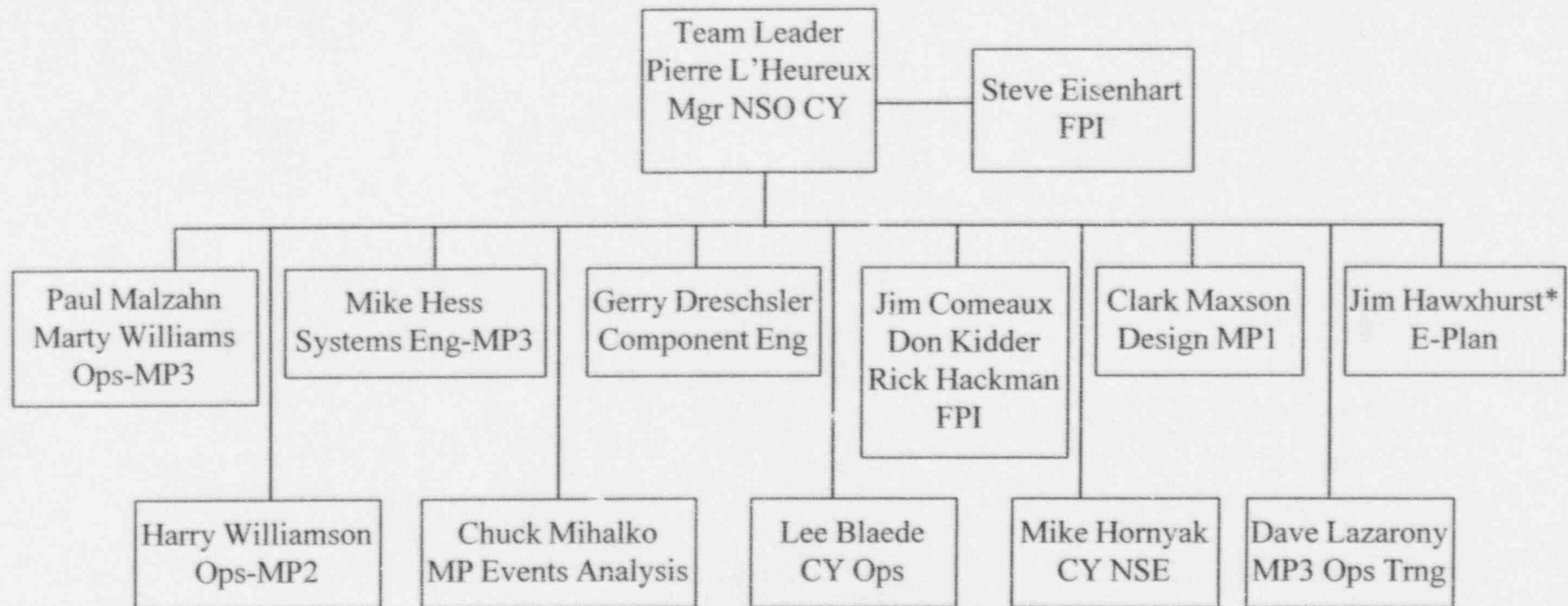
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Attachment 2

Haddam Neck Plant

Independent Review Team Organization

CY Independent Review Team



* For specific area of expertise only; part-time

Attachment 3

Haddam Neck Plant

RFO 19 Shutdown Risk Profile

CONNECTICUT YANKEE CYCLE 19 REFUELING 1996 SHUTDOWN RISK PROFILE

