DOCKET NO. 50-133

April 14, 1970

Mono File

NOTE FOR A. B. HOLT
R. F. Dodds
J. P. O'Reilly

RECOMMENDED PRIORITIES FOR NONDESTRUCTIVE INSPECTION OF SAFE ENDS OF HUMBOLDT BAY REACTOR VESSEL

BACKGROUND INFORMATION

On March 27, 1970, Robert F. Dodds, Compliance Division Inspector at the Berkeley, California, Office, visited the Materials & Metallurgy Branch for a briefing on stress corrosion cracking of sensitized austenitic stainless steel safe ends of reactor vessels. At that time you requested me to become familiar with the vessel safe ends of the Humboldt Bay Plant in order to be able to determine the safe ends most in need of inspection due to possibility of stress corrosion cracks being present. Mr. Dodds said that he would telephone two weeks later in order to get the information, which he wanted to have for his forthcoming inspection of Humboldt Bay. During the briefing, I checked Compliance Division data and informed Mr. Dodds that all of the Humboldt Bay vessel safe ends were of Type 304 austenitic stainless steel and were furnace sensitized.

Subsequently, I compared the tabulation of reactor vessel nozzles given in the Humboldt Bay Tech Specs* with the vessel nozzles and safe ends shown in the reactor vessel isometric drawing of the Final Hazards Summary Report.**

The balance of this memorandum narrates the information given to Mr. Dodds during his telephone call on April 10, 1970.

INFORMATION GIVEN TO R. T. DODDS DURING APRIL 10, 1970 PHONE CALL

Safe Ends in Steam Atmosphere

I told Mr. Dodds that the highest priority of inspection should be given the safe ends that are exposed to the steam atmosphere. This judgment stems from the fact that oxygen content in the steam region is much higher than elsewhere in the reactor vessel of a boiling

*Docket No. 50-133. Appendix A to Operating License No. DPR-7. Technical Specifications for Pacific Gas and Electric Company Humboldt Bay Power Plant Unit No. 3. January 21, 1969. Table IV-1, Reactor Vessel Nozzles.

**Pacific Gas and Electric Company Final Hazards Summary Report, Humboldt Bay Power Plant Unit No. 3. September 1, 1961. Figure 20.

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water reactor, and oxygen content is one of the chief factors involved in stress corrosion cracking of austenitic stainless steel. Whereas, oxygen content is about 1/2 ppm in the primary water, oxygen contents greater than 18 ppm have been measured in the steam regions of the vessels of both Elk River and Big Rock Point. Moreover, all of the Elk River vessel safe ends that cracked were in the steam region.

The following list of steam atmosphere safe ends was given to Mr. Dodds:

Steam outlet nozzle safe end (one).

Core spray inlet nozzle safe end (one).

Vessel head instrument and sample nozzle safe end (one).

Relief valve flange nozzle safe ends (four).

Top liquid level instrument piping nozzle safe end (one).

Liquid poison inlet nozzle safe end (one).

Safe Ends Having Thermal Sleeves

Mr. Dodds was informed that the next highest priority of inspection should be given the safe ends that contain thermal sleeves. He was told that the crevice or stagnant fluid situation created by a thermal sleeve is conducive to stress corrosion cracking. The Nine Mile Point and LACBWR failures were cited as back-up evidence.

The list of safe ends having thermal sleeves that was given to Mr. Dodds is shown below. The list was formulated on the basis that every nozzle that introduces cold liquid into the vessel has a thermal sleeve. It was pointed out to Mr. Dodds that the first two safe ends also are steam region safe ends.

Core spray inlet nozzle safe end (one).

Liquid poison inlet nozzle safe end (one).

Reactor feedwater inlet nozzle safe end (one).

Emergency condenser return nozzle safe end (one).

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"Strawberries"

Finally, Mr. Dodds was told of the detection of small liquid penetrant indications (i.e., "strawberries") on the surfaces of many of the safe ends of the Nine Mile Point Plant and the random nature of this phenomenom, which appears to be stress corrosion cracking caused by local contamination. I told Mr. Dodds that the nature of the occurrence of "strawberries" makes it impossible to assign inspection priority to safe ends in regard to "strawberries".

Max Bolotsky
Materials & Metallurgy Branch
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cc: Edson G. Case, Director, DRS
R. R. Maccary, Asst. Dir., DRS

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