



Pacific Northwest Laboratories  
P.O. Box 999  
Richland, Washington, U.S.A. 99352  
Telephone (509) 375-2838  
Telex 15-2874

April 22, 1986

Ted Sullivan  
Division of Engineering  
Materials Engineering Branch  
Office of Nuclear Reactor Regulations  
Nuclear Regulatory Commission  
Washington, DC 20555

Subject: Trip Report on Site Visit to Seabrook Station

Dear Ted:

On April 15, 1986, a meeting was held with personnel from Seabrook Station, Westinghouse, and the NRC. The purpose of the meeting was to observe and evaluate ultrasonic examinations performed on cast stainless steel primary piping welds.

Before witnessing the ultrasonic examinations, the examination procedure and data recording were discussed. The discussions produced the following description of the examination procedure and equipment.

- The UT instrument used for examinations was a Sonic Mark I. The angle beam search unit used for examination was specially designed by Westinghouse and incorporates a water column. The ultrasonic examination uses a refracted longitudinal wave during the angle beam examination.
- The calibration block used during the UT examinations was block SBRC-5. The block was fabricated from a statically cast elbow found at the Sharon Harris plant. Noise level measurements were made to ensure the calibration block was representative of the pipe. The noise level measurements were made using two search units in a pitch-catch mode, and compared the noise level of the calibration block to the noise level of the pipe.
- Thickness measurements of each weldment that was examined were made at 0, 90, 180, and 270 degrees.

8605130524 3pp/A

- During the required Section XI zero-degree examination, attenuation differences between the pipe and calibration block were noted.
- For each examination, evidence of counterbore and root geometry were documented as proof that the ultrasonic examination penetrated to the required examination volume.

Based on the discussion of the examination procedure and data recording, the examination procedure used at the Seabrook Station appears to meet or exceed ASME Code requirements. However, the actual written procedure used by Westinghouse was not made available for review; therefore, I cannot state positively that the ultrasonic examination procedure meets ASME Code requirements.

After discussions about the ultrasonic examination procedure concluded, the examination procedure was demonstrated on test blocks provided by Westinghouse and PNL. A description of both sets of test blocks is contained in NUREG/CR-3753. The demonstration of the examination procedure showed the following:

- Using the examination procedure, an inservice inspection technician was able to detect mechanical fatigue cracks in both Westinghouse samples.
- When used on the PNL test samples, the procedure and technician could detect thermal fatigue cracks when the examination was conducted from the columnar side. The examination procedure and technician could not unambiguously detect thermal fatigue cracks when the examination was conducted on the equiaxed grain side.

Based on the demonstrations performed on both the Westinghouse and PNL samples, I conclude that the examination procedure will perform better when used for examination of a columnar grain structure.

Prior to the site visit, NRC personnel requested inspections of two welds. The welds were 5-1-1 and 5-1-2 (Loop 2 steam generator nozzle-to-elbow and elbow-to-nozzle). The results of the examinations witnessed showed:

- Evidence of the weld root and weld counterbore could be detected during the zero-degree and angle-beam examinations, but not continuously on all pipe.

Ted Sullivan  
Page 3  
April 22, 1986



- During the angle examination of weld #5-1-2, signals attributed to weld counterbore were not continuous but intermittent. Representatives from Seabrook Station stated that during construction, portions of the weld counterbore accessible from the steam generator manway were blended via hand grinding. A blended counterbore might not be detected during an angle-beam examination and could create the intermittent signals witnessed during the examination.
- The ambient acoustic noise level shown on the ultrasonic instrument ranged between 20-30% full screen height.

Based on the demonstrations and discussions at Seabrook Station, I conclude:

1. The demonstrations show that adequate penetration of the cast piping material could be obtained during both zero-degree and angle-beam examinations.
2. Intermittent signals detected during angle-beam examination and clarified as geometry should be well documented so that subsequent inservice examinations may verify that the extent of the geometric indication has not changed. Any changes in the geometric signals detected during subsequent inservice inspections should be carefully evaluated to determine the cause of the change.
3. All ultrasonic examinations had not been completed at the time of the site visit. If an examination of any weld does not provide reasonable assurance of penetration, a request for relief should be processed for that weld.

If you have any questions or I may be of further service, please contact me at 509-375-2838.

Sincerely,

A handwritten signature in cursive script that reads "T. T. Taylor".

T. T. Taylor  
NDE&M Section

TTT:kw

cc: Boyd Brown, EG&G Idaho