

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-267/86-04

License: DPR-34

Docket: 50-267

Licensee: Public Service Company of Colorado
P. O. Box 840
Denver, Colorado 80201

Facility Name: Fort St. Vrain

Inspection At: Platteville, Colorado

Inspection Conducted: January 13-23, 1986

Inspector:

D. P. Tomlinson
D. P. Tomlinson, Reactor Inspector, Engineering
Section

2-06-86
Date

Approved:

R. E. Ireland
R. E. Ireland, Chief, Engineering Section

2/6/86
Date

Inspection Summary

Inspection Conducted January 13-23, 1986 (Report 50-267/86-04)

Areas Inspected: Special, announced inspection of Fort St. Vrain Generating Station high-energy piping systems. The inspection involved 51 inspector-hours onsite by one NRC inspector.

Results: Within the area inspected, no violations or deviations were identified.

DETAILS

1. Persons Contacted

Licensee Personnel

- *S. Chesnutt, Licensing
W. A. Craine, Superintendent of Maintenance
- *R. L. Craun, Nuclear Site Engineering Manager
- *M. J. Ferris, QA Operations Manager
- *C. H. Fuller, Station Manager
- *J. Gramling, Supervisor Site Licensing
C. Holland, Lead Security Officer
- *J. Jackson, Supervisor QA/QC
- *D. Johnson, Supervisor Site Engineering
F. Novachek, Technical/Administrative Services Manager
- *T. Prenger, QA Services Manager
- *L. W. Singleton, Manager QA

EBASCO Personnel

- *R. Paillaman, ISI Supervisor (Corporate Level III)

NRC Personnel

- M. R. Hum, Materials Engineer (NRR)
- K. V. Cook, NDE Staff (Oak Ridge National Laboratory)
- *R. E. Farrell, Senior Resident Inspector

*Denotes those attending the exit interview.

2. Special Inspection of High Energy Piping Systems

The NRC inspector reviewed the licensee's actions taken as a result of Confirmatory Action Item 6, "Inspection of High Energy Piping," as set forth in letters from PSC to NRC dated January 3, 1986 (P-86004), and January 8, 1986 (P-86012). In these references it was stated that PSC would conduct a limited In-Service Inspection (ISI) of the four high-energy piping systems at Fort St. Vrain (main steam, feedwater, hot reheat, and cold reheat). The NRC inspector and an NRR representative reviewed the proposed inspection program for adequacy. Included in the program were: the areas of each system to be inspected, specific inspections to be performed, area selection criteria, and acceptance criteria. It was concluded by both parties above that the program was adequate for the detection of service-induced anomalies and indications of general piping degradation.

The NRC inspector reviewed the personnel certification records for all 11 EBASCO inspectors assigned to perform the examinations. The education and experience for each inspector was consistent with EBASCO's certification requirements and exceeded the recommendations of the Society of

Nondestructive Testing SNT-TC-1A for each level of inspector. The NRC inspector reviewed the calibration records for seven ultrasonic examination instruments and noted each had recently been calibrated by a laboratory with standards certified traceable to the National Bureau of Standards (NBS).

The NRC inspector witnessed the accomplishment of the initial inspection instrument calibration to fabricated standards for two instruments and several in-process checks to verify instrument stability during the examinations. Each inspector seemed knowledgeable of the inspection equipment and procedures being used. Following informal interviews with the Corporate Level III and the Level II inspectors onsite, along with the above observations, the NRC inspector had no further questions about the personnel qualifications or equipment being used.

During the examinations, several indications were noted using the magnetic particle method. Minor surface conditioning and reinspection proved that all but one of these were irrelevant surface discontinuities that did not affect the integrity of the piping.

The single discontinuity that could not be removed by surface conditioning was an area of in-line porosity connected by a faint linear indication. This area was found in the fusion zone of a weld in a 34" diameter hot reheat piping joint. Abrasive metal removal was continued until the indication was entirely gone. The area was further ground to the specified repair weld configuration and the adjacent surfaces polished to a bright metal condition. Following approved procedures, the area was preheated, welded, post weld heat treated, and reinspected with no further indications noted. The NRC inspector and the PSC supervisor, QA/QC, observed the initial inspection and all in-process inspections until the indication was totally removed. Prior to any metal removal the NRC inspector and the PSC supervisor, QA/QC, observed that minor abrasive work had been performed at some previous time in the area of the indication. This is a machine weld produced at a fabrication shop, along with other welds, prior to shipment to the site as a piping assembly. It was apparent to both observers that this was a fabrication defect rather than a service-induced defect, since it followed the weld preparation angle as it progressed to the final defect depth. The final depth at which the indication was removed was approximately 3/16", or about the thickness of the final weld layer. Both observers agreed that this appeared to be an area of weld nonfusion that was known, by the fabricator, to exist prior to installation in the plant. Repair welding was performed even though physical measurement of the cavity depth and ultrasonic measurement of the adjacent piping indicated the minimum wall thickness requirement for the nominal 1.511" thick pipe wall had not been violated. After the repair welding was completed, the entire area was reinspected by the magnetic particle and ultrasonic methods with no rejectable or reportable indications noted.

During the course of the inspection of the four high energy piping systems, several reportable ultrasonic reflectors were noted. Each of these was explored and ultrasonically sized prior to disposition. In each case the

reflectors were found to be located in the base material and to be of less than rejectable size.

One weld on a 14" cold reheat line exhibited ultrasonic oscilloscope indications that could not be readily explained. Supplemental radiography was performed and it was ascertained that this weld was produced utilizing a non-removable backing strip. A review of the construction specification, dated February 25, 1972, revealed that this was an acceptable practice for butt-welded piping with a diameter greater than 2½". Ultrasonic reinspection of this joint indicated that the backing ring had been properly fused into the weld and base metal and is now an integral part of the piping system. No rejectable or reportable indications were found during this reinspection.

It appeared that the sample size was adequate to detect any generic service-induced degradation of the piping. The analyses used for the selection of the inspection areas was comprehensive and capable of identifying those areas most susceptible to corrosion, erosion or other forms of service-induced degradation. The actual hands-on inspection was performed in a professional manner by personnel knowledgeable in the methods being utilized. The results of the inspections performed indicate that some minor manufacturing anomalies may exist in the high energy piping systems but there was no evidence of defects caused by stress, erosion, or corrosion.

Based upon the observations of the NRC inspector of examination activities as they were performed, interviews with cognizant personnel, and a review of preliminary inspection results, the NRC inspector concluded that there was no evidence of service-induced degradation in the areas inspected on the four high-energy piping systems.

No violations or deviations were identified during this inspection.

3. Exit Interview

An exit interview was held January 21, 1986. The NRC senior resident inspector also attended this meeting. At the meeting, the scope of the inspection and findings were summarized.