



**Entergy  
Operations**

Entergy Operations, Inc.

Route 1, Box 1873

Manchester, NH 03101

TS 501-864-3100

May 3, 1991

0CAN059101

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Mail Station P1-137  
Washington, DC 20555

SUBJECT: Arkansas Nuclear One - Units 1 and 2  
Docket Nos. 50-313 and 50-368  
License Nos. DPR-51 and NPF-6  
Response to Inspection Report  
50-313/91-06; 50-368/91-06

Gentlemen:

Pursuant to the provisions of 10CFR2.201, attached is the response to the violation identified during the inspection of activities associated with the failure to perform receipt inspection activities in 1981 as required.

Should you have questions or comments, please call me at 501-964-8601.

Very truly yours,

James J. Fisicaro  
Director, Licensing

JJF/RMC/mmg  
Attachment

JE01

U. S. NRC  
May 3, 1991  
Page 2

cc: Mr. Robert Martin  
U. S. Nuclear Regulatory Commission  
Region IV  
611 Ryan Plaza Drive, Suite 1000  
Arlington, TX 76011

NRC Resident Inspector  
Arkansas Nuclear One - ANO-1 & 2  
Number 1, Nuclear Plant Road  
Russellville, AR 72801

Thomas W. Alexion  
NRR Project Manager, Region IV/ANO-1  
U. S. Nuclear Regulatory Commission  
NRR Mail Stop 11-D-23  
One White Flint North  
11555 Rockville Pike  
Rockville, Maryland 20852

Ms. Sheri Peterson  
NRR Project Manager, Region IV/ANO-2  
U. S. Nuclear Regulatory Commission  
NRR Mail Stop 11-D-23  
One White Flint North  
11555 Rockville Pike  
Rockville, Maryland 20852

STATE OF ARKANSAS     )  
                              )  
COUNTY OF LOGAN     )

SS

I, J. J. Fisicaro, being duly sworn, subscribe to and say that I am Director, Licensing for Entergy Operations, Inc.; that I have full authority to execute this oath; that I have read the document numbered 0CAN019101 and know the contents thereof; and that to the best of my knowledge, information and belief, the statements in it are true.

James J. Fisicaro  
J. J. Fisicaro

SUBSCRIBED AND SWORN TO before me, a Notary Public in and for the County and State above named, this 3rd day of May, 1991.

Sandy Siebenmorgen  
Notary Public

My Commission Expires:

May 11, 2000

### NOTICE OF VIOLATION

During an NRC inspection conducted on February 25 through March 15, 1991, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC enforcement Actions," 10 CFR Part 2, Appendix C (1990), the violation is listed below:

#### Inadequate Receipt Inspection of Safety-Related Pipe

Criterion VII of Appendix B to 10 CFR Part 50 and the licensee's approved quality assurance program require measures be established to assure that purchased material, whether purchased directly or through contractors, conforms to the procurement requirements.

Contrary to the above, the licensee did not establish measures to assure that material purchased through a contractor met the procurement requirements. Specifically, the NRC inspector noted (on February 27, 1991) visible indentations on 2-inch Type 316L stainless steel piping, Heat No. 97521, which was in the process of being fabricated into a safety-related piping subassembly. This piping had been purchased by Bechtel in 1981 to the requirements of ASME Material Specification SA-312 and ASME Code Section III, Class 2. Licensee evaluation of segments of piping with this heat number identified, in the worst case, that the surface defects resulted in the pipe not meeting the minimum wall thickness requirements of SA-312. Licensee follow-up inspections of piping stock revealed that other segments of similarly procured materials (Heat No. 080270) also did not meet the requirements of SA-312 in that they contained unacceptable linear surface defects.

This is a Severity Level IV violation. (313/9106-01; 368/9106-01)  
(Supplement II)

#### Response to Violation 313/9106-01; 368/9106-01

##### (1) Reason for the violation:

The pipe noted in the above notice of violation was initially purchased and received in 1981, per the Bechtel Quality Assurance (QA) Program. The Bechtel procurement receiving records, for the subject pipe, required that the vendor have an approved QA Program and that the vendor supplied documents be included. The visual inspection criteria, as required in the Bechtel Field Inspection Procedure G-5, "Control of Material", for material receipt, was not specific in defining inspection criteria for workmanship like qualities and physical appearance of materials. Material Receiving Reports were to be used to document any visual inspection results of material received by Bechtel. During the transfer process from Bechtel to AP&L, the pipe heat numbers and quality documentation were reviewed; however, a re-inspection of the subject pipe for possible manufacturing surface indications was not performed since AP&L relied on the Bechtel approved QA Program for material receipt inspections.

Physical inspections performed by ANO on the subject Bechtel turnover pipe, determined that pipe with nonconforming surface indications was stored in the warehouse. The pipe with nonconforming indications is limited to one specific size, and three specific heat numbers. The pipe with nonconforming indications was manufactured by Al Tech Speciality Company and the majority was transferred to AP&L in one Bechtel special transfer file. ANO has determined that the cause of the subject violation was insufficient visual inspection of the SA-312, type 316L stainless steel pipe transferred to AP&L.

(2) Corrective steps taken and results achieved:

On February 27, 1991, upon notification that the Bechtel purchased stainless steel piping contained surface defects, a Quality Control (QC) hold was placed on this pipe in the warehouse. This QC hold on the subject stainless steel pipe will ensure that an inspection by a certified QC inspector will be done prior to stores issuing pipe to the field for safety related applications. The pipe involved in the turnover from Bechtel is approximately 20,800 linear feet of stainless steel pipe types 304/304L and 316/316L, in diameter sizes 1/4 inch through 3 inch.

The initial piping indentations were discovered in the ANO fabrication shop by the NRC inspector, and he noted in the inspection report that Arkansas Nuclear One (ANO) was in the process of identifying where the Bechtel purchased pipe was installed and addressing the operability concerns. Piping material was procured by Bechtel in 1981 for generic piping applications. No Bechtel records for these specific applications could be located; however, a review of the ANO Units 1 and 2 Service Water piping isometric drawings revealed that the majority of the piping material of the heats containing rejectable indications was installed in the Units 1 and 2 Service Water System which is a low temperature, low pressure system. The piping material was transferred to AP&L by Bechtel in 1983-84, and ANO determined through a review of the computerized inventory tracking systems, that since 1984 ANO also installed this piping in the Units 1 and 2 Service Water System. A sampling of the installed piping, of heat 97521, was inspected and no nonconforming indications were found on the inspected piping material installed in the field. We are further evaluating the need to perform field inspections of an additional pipe heat (08025), manufactured by Al Tech Speciality Company, for which no stock exists in the warehouse. This pipe is also 2 inch SA-312, type 316L stainless steel pipe installed in the ANO Unit 2 Service Water System.



A preliminary operability assessment was performed on March 1, 1991, and it was determined that for the type of indications observed, pipe minimum wall requirements were not exceeded. After discovery of pipe indications that were code rejectable, an additional operability determination was performed on March 14, 1991, and it was determined that the piping would retain its integrity during an analyzed accident condition. An engineering assessment was completed on March 28, 1991, to support the preliminary operability determination. The assessment included fracture mechanics analysis for longitudinal indications and the effects on minimum wall thickness. Hoop and bending stresses were calculated for the chattermark indications assuming that: (1) the flaw extends 360 degrees circumferentially around the pipe, (2) the flawed material is located in a piping system at its highest stressed location and these location stresses are at the code limits, (3) the worst case for maximum design pressure and temperature was considered, to investigate the effects of these surface flaws upon the hoop and bending stresses, and (4) minimum yield strength from the certified material test reports. The analysis concluded that for the worst case identified indication, if the nonconforming piping material were installed in the Service Water System, the continued use of the pipe would be acceptable. At the time of discovery of this condition, ANO Unit 2 was in a refueling outage and Unit 1 was operating at power.

To determine the extent of the surface defect problem, a re-inspection of the affected stainless steel pipe in the warehouse began on March 7, 1991. As of April 16, 1991, approximately 2200 linear feet of stainless steel pipe have been inspected. There have been a few surface defects detected in 2 inch SA-312 type 316L stainless steel pipe heat numbers 08027, 97521, and 20855. A total re-inspection of these heat numbers located in the warehouse has been accomplished. To date, there have been no surface defects found in any other stainless steel pipe material heat numbers. The surface defects are in 2 inch diameter SA-312, type 316L stainless steel pipe. The above three heat numbers have been isolated and will not be used without the proper evaluation.

From the indications found on piping material in the ANO warehouse, there were two types of indications detected and were characterized by the Entergy corporate metallurgist as chattermarks and laps that were mechanically induced during the manufacturing process. The worst case indications were analyzed by an independent laboratory and they determined that one chattermark indication exceeded the code allowable minimum wall thickness and confirmed that the indications were mechanically induced during the manufacturing process. The laboratory also concluded that the chemical content and physical makeup of the piping material conformed to code specifications.

Since the surface defects have been confined to specific heat numbers, a statistical sampling plan, for the re-inspection of other stock Bechtel turnover stainless steel pipe heat numbers, is currently being developed for the affected pipe in the warehouse. This sampling plan is expected to be developed by June 15, 1991. The sampling plan will be implemented to replace the on-going re-inspection and QC hold of Bechtel 1981 purchased pipe.

(3) Corrective steps that will be taken to prevent recurrence

Improvements to the material receipt inspection process at ANO has continued to evolve since 1981. Currently, a 100% inspection of purchased pipe is required to be performed before acceptance and placement in stock. Additionally, visual requirements for workmanship have been expanded to include code workmanship attributes such as, cracks, seams, laps, pitting, etc.

The piping flaw noted by the NRC Inspector was discovered prior to required QC weld inspections. Quality Control inspection procedures require that QC personnel inspect completed piping installations which includes verification that the piping material is free from visible damage (surface gouges, etc.); it is likely that, had this particular pipe spool been installed, the flaw would have been identified during the final installation inspection. To reinforce inspection sensitivity to manufacturing induced deformities, a revision to the applicable QC training module to incorporate lessons learned from these piping problems was implemented on April 29, 1991. With the required 100% receipt inspection and expanded workmanship inspection requirements, coupled with special inspection of existing warehouse inventory prior to field issue, expansion of QC surveillance beyond current practice is unwarranted.

Additionally, the ANO welder training program is being revised to ensure that the appropriate craft personnel are sensitized to detecting piping defects and will be implemented by September 30, 1991.

(4) Date of full compliance:

Full compliance regarding enhanced receipt inspection and stores issue was achieved on February 27, 1991, when ANO began a 100% visual inspection of the Bechtel purchased stainless steel piping in the warehouse for surface indications.

The QC training module was revised on April 29, 1991, to incorporate lessons learned from these piping problems.

The ANO welder training program will be revised by September 30, 1991 to ensure that the appropriate craft personnel are sensitized to detecting piping defects.

Since the surface defects have been confined to specific heat numbers, a statistical sampling plan, for the re-inspection of other stock Bechtel turnover stainless steel pipe heat numbers, is currently being developed for the affected pipe in the warehouse. This sampling plan is expected to be developed by June 15, 1991. The sampling plan will be implemented to replace the on-going re-inspection and QC hold of Bechtel 1981 purchased pipe.