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LONGITUDINAL WELD DEFECTS IN ASME SA-312 TYPE 304 STAINLESS STEEL PIPE SPOOLS MANUFACTURED BY YOUNGSTOWN WELDING AND ENGINEERING COMPANY

Description of Circumstances:

On September 27, 1978, the Arizona Public Service Company reported that defects had been discovered in longitudinal welds in ASME Section III class 2 pipe supplied for the Palo Verde Nuclear Generating Station (PVNGS). On November 17, 1978, the Southern California Edison Company reported similar defects in pipe supplied for the San Onofre Nuclear Generating Station, Units 2 and 3.

Pullman Power Products of Los Angeles, California supplies safety-related fabricated piping spools of various diameters for the PVNGS. The defects were discovered by Pullman in ASME SA-312 type 304 stainless steel pipe supplied to Pullman by Youngstown Welding and Engineering Company of Youngstown, Ohio. The pipe is manufactured by rolling plate into cylinders and then fusion welding the longitudinal seam without filler metal.

Pullman discovered defects in the longitudinal welds while radiographing their circumferential shop welds. Further radiographic examination of the longitudinal welds revealed rejectable porosity and lack of fusion.

Pullman then performed ultrasonic examination of the full length of the longitudinal welds and discovered indications exceeding the acceptance criteria of ASME Section III. Further ultrasonic examination revealed indications in other piping subassemblies where pipe was supplied by Youngstown. Two indications verified by radiography were identified as porosity and measured 0.350 inch by 0.125 inch in one case and 0.300 inch by 0.125 inch in another case in pipe with a nominal wall thickness of 0.375 inch.

The additional examinations revealed that of 103 spools and four pipe supports shipped to PVNGS, 44 spools and one pipe support were found to contain ultrasonic indications exceeding those permitted by the ASME Code. Of 65 partially fabricated piping spools, 30 were found to be similarly defective. The acceptance criteria for the pipe supplied by Youngstown includes 100 percent ultrasonic examination of the longitudinal

welds in accordance with ASME Section III. The documentation provided with the pipe indicated that the required ultrasonic examination had been performed by Youngstown but the rejectable indications were not identified.

A special inspection was performed at Youngstown by NRC inspectors during the week of January 22, 1979. It was determined that the apparent cause of the identified defects was inadequate control of welding parameters although no specific ASME Code violations could be identified. Youngstown has recently hired a consultant to reevaluate the fusion welding parameters and revised their welding procedures to provide better control of welding current, voltage and travel speed for all material thickness ranges.

Ultrasonic examinations of the pipe welds were performed by a subcontractor to Youngstown. The reason why this subcontractor's ultrasonic testing did not detect indications exceeding ASME Code acceptance criteria was not determined. The piping was known to have been tested in the heat treated condition, prior to the removal of surface oxides. However, a comparison of attenuation of the pipe in as heat treated vs. heat treated and pickled condition did not reveal a discernible difference.

The NRC inspectors could not determine a definite time period during which the welding and ultrasonic testing problems are thought to have existed. All type 304 or 316 SA 312 pipe manufactured before mid-November, 1978 may have been shipped in similar condition. As a large supplier, Youngstown is known to have supplied piping for nuclear applications to the Dravo Corporation, Chicago Bridge and Iron, Flowline Corporation and ITT Grinnell Industrial Piping Inc. In addition, piping was also supplied to material warehousing operations including Albert Pipe Supply, Guyon Alloys Inc., and Allegheny Ludlum Steel Corporation which may have eventually been used in safety-related nuclear applications.

Action to be Taken by the Licensees and Permit Holders:

For all power reactor facilities with an operating license or a construction permit:

1. Determine whether ASME SA-312, type 304 or other welded (without filler metal) pipe manufactured by Youngstown Welding and Engineering Company is in use or planned for use in safety-related systems at your facility.

2. For those safety-related systems where the subject piping is in use or planned for use, identify the application of the piping including system, pipe location, pipe size and design pressure/temperature requirements.

3. Develop a program for volumetric examination of the longitudinal welds including acceptance criteria for the piping identified in Item 2 above. Describe planned corrective actions if acceptance criteria are not met. If a sampling program is utilized explain the basis for the sample size.

4. For facilities with an operating license, a report of the above actions, including the date(s) when they will be completed shall be submitted within 30 days of receipt of this Bulletin.

5. For facilities with a construction permit, a report of the above actions, including the date(s) when they will be completed shall be submitted within 60 days of receipt of this Bulletin.

Reports should be submitted to the Director of the appropriate NRC Regional Office and a copy should be forwarded to the NRC Office of Inspection and Enforcement, Division of Reactor Construction Inspection, Washington, D.C., 20555.

Approved by GAO, B180225 (R0072); clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

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LISTING OF IE BULLETINS
ISSUED IN LAST TWELVE MONTHS

Bulletin No.	Subject	Date Issued	Issued To
78-05	Malfunctioning of Circuit Breaker Auxiliary Contact Mechanism-General Model CR105X	4/14/78	All Power Reactor Facilities with an OL or CP
78-06	Defective Cutler-Hammer, Type M Relays With DC Coils	5/31/78	All Power Reactor Facilities with an OL or CP
78-07	Protection afforded by Air-Line Respirators and Supplied-Air Hoods	6/12/78	All Power Reactor Facilities with an OL, all class E and F Research Reactors with an OL, all Fuel Cycle Facilities with an OL, and all Priority 1 Material Licensees
78-08	Radiation Levels from Fuel Element Transfer Tubes	6/12/78	All Power and Research Reactor Facilities with a Fuel Element transfer tube and an OL.
78-09	BWR Drywell Leakage Paths Associated with Inadequate Drywell Closures	6/14/79	All BWR Power Reactor Facilities with an OL or CP
78-10	Bergen-Paterson Hydraulic Shock Suppressor Accumulator Spring Coils	6/27/78	All BWR Power Reactor Facilities with an OL or CP

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Bulletin No.	Subject	Date Issued	Issued To
78-11	Examination of Mark I Containment Torus Welds	7/21/78	BWR Power Reactor Facilities for action: Peach Bottom 2 and 3, Quad Cities 1 and 2, Hatch 1, Monticello and Vermont Yankee
78-12	Atypical Weld Material in Reactor Pressure Vessel Welds	9/29/78	All Power Reactor Facilities with an OL or CP
78-12A	Atypical Weld Material in Reactor Pressure Vessel Welds	11/24/78	All Power Reactor Facilities with an OL or CP
78-13	Failures In Source Heads of Kay-Ray, Inc., Gauges Models 7050, 7050B, 7051, 7051B, 7060, 7060B, 7061 and 7061B	10/27/78	All general and specific licensees with the subject Kay-Ray, Inc. gauges
78-14	Deterioration of Buna-N Components In ASCO Solenoids	12/19/78	All GE BWR facilities with an OL or CP
79-01	Environmental Qualification of Class IE Equipment	2/8/79	All Power Reactor Facilities with an OL or CP
79-02	Pipe Support Base Plate Designs Using Concrete Expansion Anchor Bolts	3/8/79	All Power Reactor Facilities with an OL or CP