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June 29, 1976

Mr. James G. Keppler, Regional Director
Directorate of Regulatory Operations - Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
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SUBJECT: Supplemental Report to Abnormal Occurrence Report No. 50-237/1975-11,
Entitled "Core Spray Injection Line Through-Wall Cracks"

REFERENCES: 1. Letter from B. B. Stephenson to J. G. Keppler, dated February 6, 1975 (Report No. 50-237/1975-11)
2. Drawing Number M-27
3. Metallurgical examination of cracks in Dresden 2 BWR emergency core-spray system 10-inch diameter piping; C. F. Cheng, R. B. Poeppel, S. Danyluk, J. Y. Park/Argonne National Laboratory

REPORT NUMBER: 50-237/1975-11A

REPORT DATE: June 29, 1976

OCCURRENCE DATE: January 27, 1975

FACILITY: Dresden Nuclear Power Station, Morris, Illinois

INTRODUCTION

The final report on the metallographic examinations of the Unit-2 stainless steel core spray piping weldments was completed in April, 1976 by Argonne National Laboratory. Based on the Argonne report, the following supplement to the original abnormal occurrence report was prepared.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE

A total of eight weldments were found to be defective in the two loops of the core spray system. Four of the eight welds were examined in detail by Argonne, three others were sent to General Electric, and one was retained by Commonwealth Edison. The attached Table A summarizes the various crack data for all eight defective welds. Figures 1 and 2 give the locations of the cracked joints. Conclusions of the Argonne study are as follows:

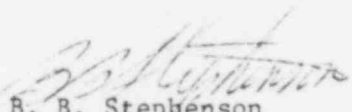
- a) The cracks were generally circumferential and were located in the heat-affected zone near the welds

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- b) The mode of failure was strictly intergranular stress corrosion, initiating at the I.D. surface and propagating toward the O.D.
- c) Fatigue striations were not observed on the cracked surfaces by scanning electron microscopy
- d) None of the cracks propagated through welds, but were limited to a penetration of about 0.2 inches
- e) The cracks were similar to those found in 4-inch recirculation bypass lines, even in the relative composition of corrosion products.

CORRECTIVE ACTION

Corrective action taken to prevent recurrence was to replace the stainless steel portion of the core spray piping from the vessel nozzle to the second isolation valve with SA-333 Grade 6 carbon steel, and to replace the reactor vessel core spray safe-ends with SA-182 type 316L stainless steel with I.D. cladding of 308L weld material.


B. B. Stephenson
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BBS:JBM:jo

TABLE A. Summary of Cracks in 10-in. Core-spray Piping of Dresden-2 BWR

Loop	Weld- ment	Component	Description of Crack	Location		Length at ID (in.)	Max. Depth (in.)	Remarks
				Circumferential Clock Position	Distance From Weld (in.)			
A	10-2	Safe End	Longitudinal	3:30	1/4-1-1/2	1-1/4	Leak	Sent to GE
			Longitudinal	8:30	1/2-1-3/4	1-1/4	Leak	-
	10-24	Dutchman	Longitudinal and Circumferential	Multiple	0-3/4	-	-	Sent to GE
		Pipe Side Weld 10-24	Longitudinal	10:30	0-1/2	>1/2	Leak	-
			Circumferential	Multiple	-	4	-	-
	10K16	Elbow Side Weld 10K16	Y-shape	12:00	3/8	0.8	0.07	Sent to GE
	10K14	Elbow Side Weld 10K14	Longitudinal or U-shape	7:00	-	-	0.4	-
		Pipe Side Weld 10K14	U-shape	7:00	0-3/8	3/4	0.28	-
	10-25	Pipe Both Sides Weld 10-25	Circumferential	Multiple	0-1/4	5 max.	Leak at 11:30	-
B	10K5	Pipe Side Weld 10K5	Circumferential	-	1/8	-	-	Retained by CECS
	10-2	Safe End	Longitudinal	4:00	1/4-1-1/8	-	-	Sent to GE
	10-28	Dutchman	Circumferential	10:00-12:30	0-1/4	5-1/4	Leak at 11:30	Sent to GE

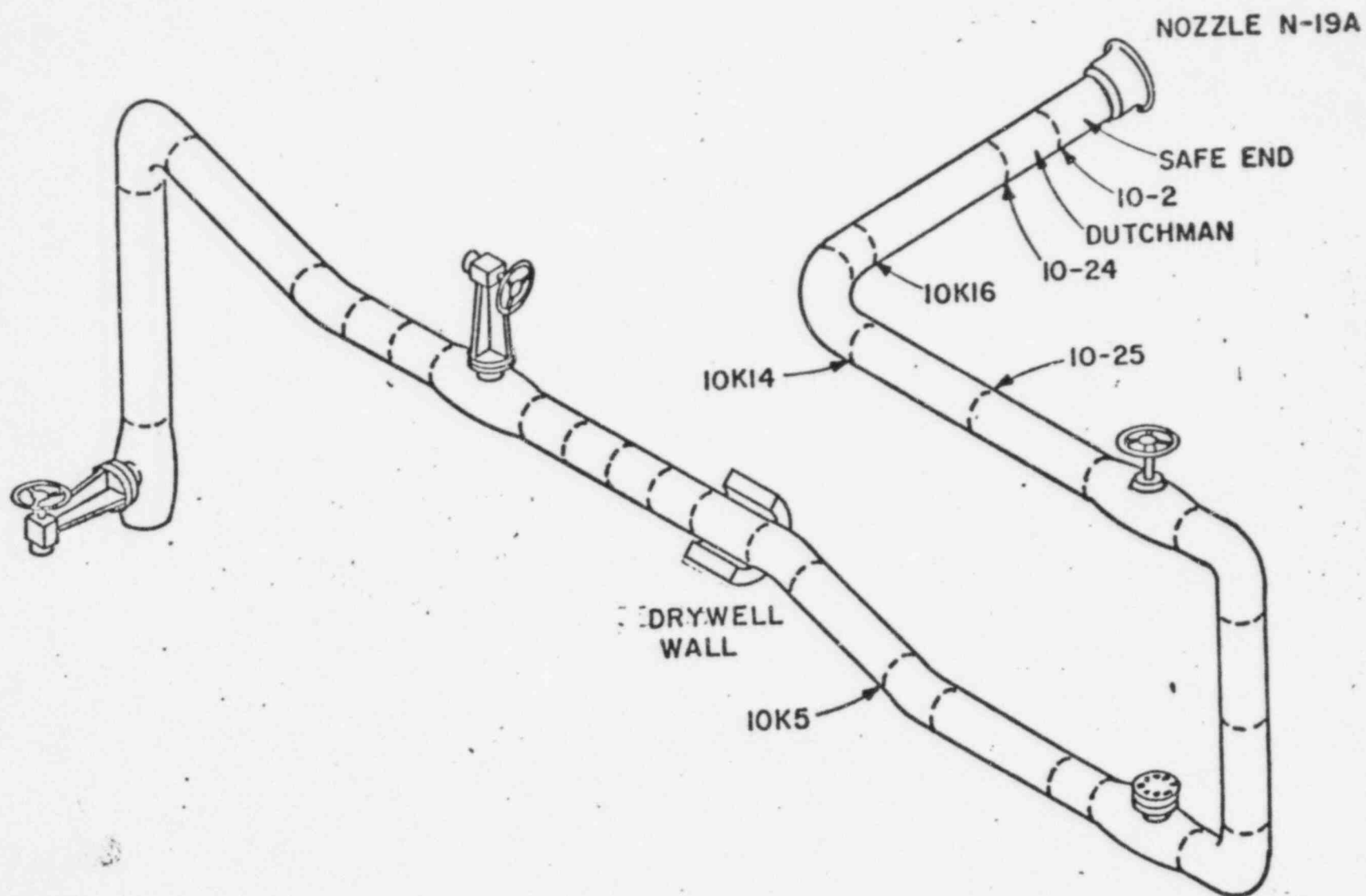


Fig. 1. Loop A Emergency Core-spray Piping of Dresden-2 BWR. The weldments are indicated by dashed circumferential lines. Crack areas are denoted by arrows and weld identification numbers.

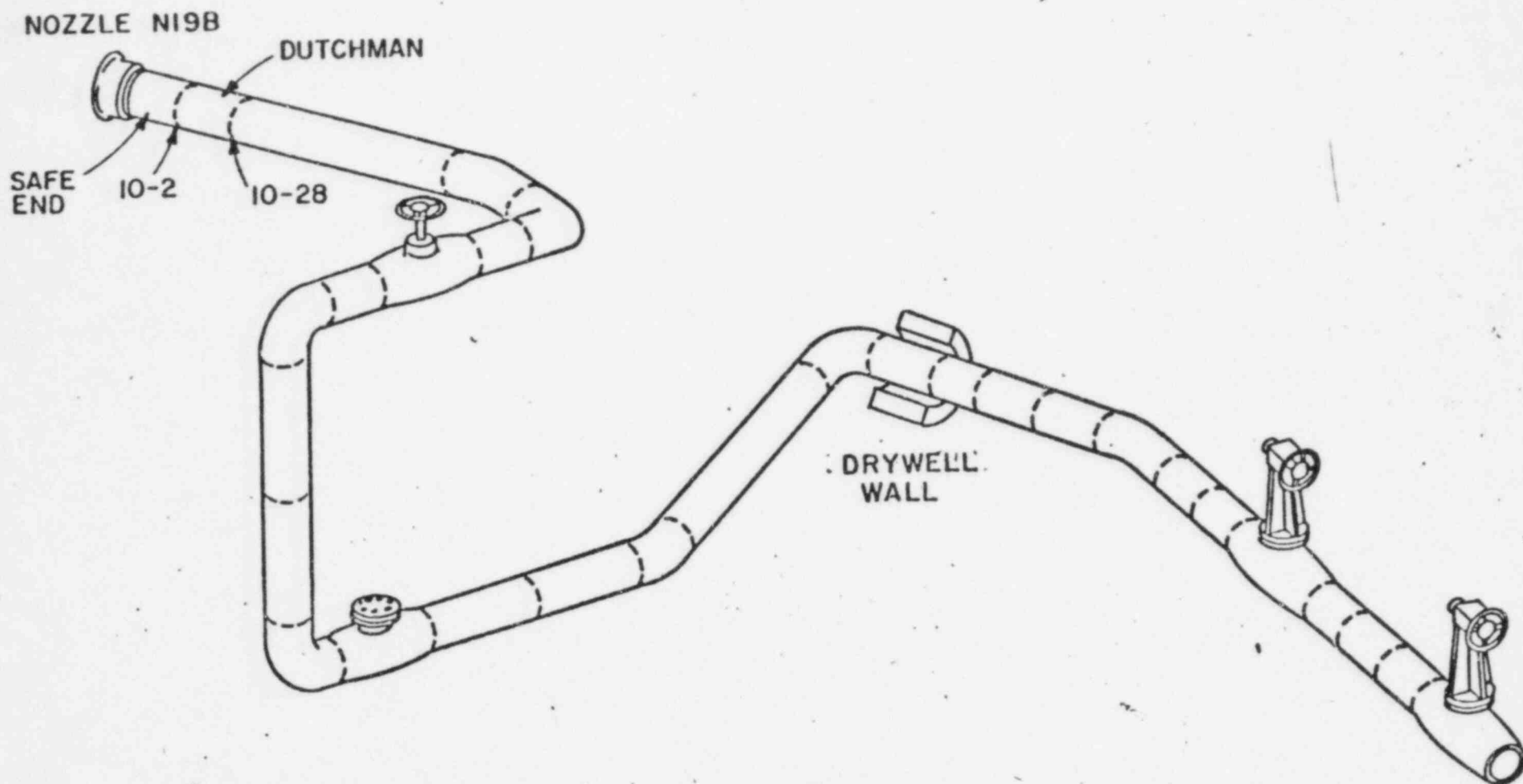


Fig. 2. Loop B Emergency Core-spray Piping of Dresden-2 BWR. The weldments are indicated by dashed circumferential lines. Crack areas are denoted by arrows and weld identification numbers.