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Iowa Electric Light and Power Company
August 12, 1981
DAEC-81-414

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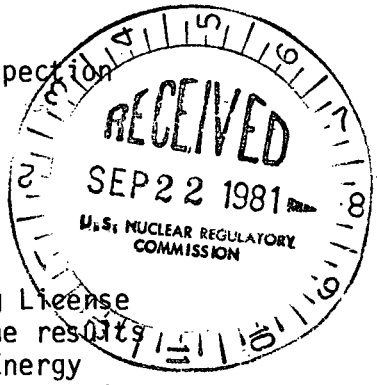
Mr. James G. Keppler, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Re: Duane Arnold Energy Center

Subject: Unique Report 81-3, 1981 Inservice Inspection

File: A-103, A-118, A-286, R/T-1



Dear Mr. Keppler:

In accordance with the requirements of Appendix A to Operating License DPR-49, Specification 3.6.G and 6.11.3.C, this letter summarizes the results of the Inservice Inspection Program conducted at the Duane Arnold Energy Center. Attachment 1 provides the results of the nondestructive examinations of welds and components which were conducted during the 1981 Refueling Outage. Attachment 2 provides the results of the Pump and Valve Operability testing which was performed during the past year.

The inspection was performed in accordance with the ASME Boiler and Pressure Vessel Code, Section XI, 1974 Edition including the Summer 1975 Addenda and the IE inservice inspection program that was submitted to NRC on October 13, 1978. The ISI program which covers the forty month period of plant operation beginning June 1, 1978 had been submitted initially on March 1, 1978. Changes had been made to comply with NRC requests by letter of May 22, 1978 and at a meeting on June 13, 1978.

The Attachment 1, inspections were performed during the period between March 10, 1981 and May 16, 1981, and included routine examination of selected reactor and piping welds and components and augmented examination of piping welds. Inspection methods included visual, liquid penetrant, magnetic particle and ultrasonic. A total of three (3) category "BB" welds, two (2) category "BC" welds, eight (8) category "BD" welds, seventeen d(17) category "BF" welds, one hundred thirty seven (137) category "BJ" welds and fifty eight (58) category "CF" welds were nondestructively examined. Nineteen (19) reactor vessel flange studs and the reactor vessel flange ligaments between the threaded stud holes were examined. Forty (40) vessel flange stud nuts were examined. In addition, the inner radius was examined on four of the

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recirculation inlet nozzles and on the CRD hydraulic return nozzle. The feedwater thermal sleeve to safe-end weld was examined on all four (4) feedwater nozzles. The bolting and hanger lugs were examined on recirculation pump "A". In addition the pump hangers were visually inspected. Main steam MSIV's CV 4412, 4413, 4416, 4419, 4420 and 4421 were given a visual inspection. Motor operated valve #2003 (RHR 20" DLA-GT) was also visually inspected. All pipe hangers on the HPCI steam inlet line (inside HPCI room) were visually examined. Baseline data was taken on SCRAM Discharge header butt welds and reactor water cleanup discharge welds CUB-BJ2 and CUB-BF4. Two reportable indications were discovered. One was in the reactor vessel meridional head weld category "BB" and one was in a category "BJ" circumferential pipe weld. Both indications have been evaluated and determined to be within ASME code allowances.

The records and specific details of the nondestructive examinations of welds and components are available in our Engineering Department files. The records of the pump and valve operability testing are available in the Surveillance Coordinator Files at the Duane Arnold Energy Center.

Very truly yours,

DLwilson for

Daniel L. Mineck
Chief Engineer
Duane Arnold Energy Center

DLM/JVS/pl

Attachments (2)

cc: Director, Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

J. Van Sickel
D. Arnold
L. Liu
S. Tuthill
L. Root
R. McGaughy
J. Vinquist
NRC Resident Inspector - DAEC

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
RPV shell to flange circumferential weld	VCB-C5	168, 169, 170				BC
RPV top head to flange circumferential weld	HCC-C1	173, 178, 187				BC
RPV top head meridional welds	HMC-B1	176, 177, 188				BB
	HMC-B3	175, 180, 189				BB
	HMC-B4	174, 179, 186				BB
RPV closure studs	#60 &	291				BG-1
*nuts	#1 - #18	239		236		BG-1
Bushings			237			
Washers			237			
RPV shell flange ligaments	354°-108°	243				BG-1
RPV shell to recirculation inlet nozzle weld	N2C-D1	202, 208, 213				BD
	N2D-D1	201, 207, 214				BD
	N2G-D1	203, 205, 215				BD
	N2H-D1	204, 206, 216				BD
Recirculation inlet nozzle - inner radius	N2C-D1-IR	233				
	N2D-D1-IR	232				
	N2G-D1-IR	234				
	N2H-D1-IR	235				
RPV CRD hydraulic return nozzle - inner radius	N9-D1-IR	231				
RPV feedwater nozzle thermal sleeve to safe end weld (N4A, 4B, 4C, 4D)	No code desig.	220				No code category designation
		217				
		218				
		219				
*	#60 - #1-39					

Attachment 1

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
RPV core spray nozzle to safe-end weld plus entire safe-end area	CSA-BF2	190				BF
	CSB-BF2	191				BF
Feedwater - loop "B" - pipe welds	FWB-BJ3	171				BJ
	FWB-BJ5	172				BJ
Core spray - loop "A" pipe welds	CSA-BF2	190				BF
	CSA-BF2A	195				BF
	CSA-BJ3	196				BJ
	CSA-BF4	197				BF
Core spray - loop "B" - pipe welds	CSA-BF2	191				BF
	CSB-BF2A	192				BF
	CSB-BJ3	193				BJ
	CSB-BF4	194				BF
Reactor water clean-up loop "A" - pipe welds	CUA-BJ1	54				BJ
	CUA-BJ2	55				BJ
	CUA-BJ4	56				BJ
	CUA-BJ5	57				BJ
	CUA-BJ6	58				BJ
	CUA-BJ9	59				BJ
	CUA-BJ10	60				BJ
	CUA-BJ12	61				BJ
	CUA-BJ13	62				BJ
	CUA-BJ14	63				BJ
	CUA-BJ15	64				BJ
	CUA-BJ17	65				BJ
	CUA-BJ18	66				BJ
	CUA-BJ19	67				BJ
	CUA-BJ20	68				BJ
	CUA-BJ21	69				BJ
	CUA-BJ23	70				BJ

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
Reactor water clean-up loop "B" - pipe welds	CUB-BJ1	247				BJ
	CUB-BJ2	248				BJ
	CUB-BF4	241, 249				BF
	CUB-BJ5	242				BJ
	CUB-BJ8	268				BJ
	CUB-BJ10	184				BJ
	CUB-BJ11	183				BJ
	CUB-BJ13	182				BJ
	CUB-BJ14	181				BJ
	CUB-BJ16	151				BJ
	CUB-BJ17	150				BJ
	CUB-BJ19	149				BJ
	CUB-BJ22	148				BJ
	CUB-BJ25	153				BJ
	CUB-BJ27	152				BJ
Reactor water clean-up loop "B" pipe hanger	CUB-BK12		185			BK
CRD hydraulic return loop "A" - pipe welds	CRA-BF2	200				BF
	CRA-BJ3	221				BJ
	CRA-BF4	222				BF
Reactor core isolation cooling - water pipe welds	RSB-BJ1	244				BJ
	RSB-BJ2	245				BJ
	RSB-BJ3	246				BJ
Main steam loops A, B, C & D	CV-4412		294			
MSIV's	CV-4413		295			
	CV-4416		296			
	CV-4419		297			
	CV-4420		299			
	CV-4421		298			
RHR Valve 20" DLA-GT	MOV-2003		293			

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
Recirculation system bypass loop "A"	RBA-BJ1	53				BJ
	RBA-BJ2	52				BJ
	RBA-BJ3	51				BJ
	RBA-BJ6	50				BJ
	RBA-BJ7	49				BJ
	RBA-BJ8	48				BJ
	RBA-BJ9	47				BJ
	RBA-BJ10	46				BJ
	RBA-BJ12	45				BJ
Recirculation system loop "A" weldolets	RCA-BJ27	92				BJ
	RCA-BJ34	93				BJ
Recirculation system loop "A" pump stud/nuts	RCA-BG23	71, 89				BG
Recirculation system loop "A" pump hangers & lugs	RCA-BK23	147	292		147A	BK
Recirculation system manifold "A"	RMA-BJ2	126				BJ
	RMA-BJ4	124				BJ
	RMA-BJ8	123				BJ
	RMA-BJ10	122				BJ

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
Recirculation system manifold "A" risers	RRE-BJ4	95				BJ
	RRE-BJ4A	96				BJ
	RRE-BJ5	97				BJ
	RRF-BJ4	99				BJ
	RRF-BJ4A	98				BJ
	RRF-BJ5	100				BJ
	RRF-BJ7	101				BJ
	RRG-N2G	234				
	RRG-BD1	203, 205, 215				BD
	RRG-BF2	211				BF
	RRG-BF2A	224				BF
	RRG-BJ3	229				BJ
	RRG-BJ4	83				BJ
	RRG-BJ4A	82				BJ
	RRG-BJ5	73				BJ
	RRG-BJ7	125				BJ
	RRH-N2H	235				
	RRH-BD1	204, 206, 216				BD
	RRH-BF2	212				BF
	RRH-BF2A	225				BF
	RRH-BJ3	230				BJ
	RRH-BJ4	75				BJ
	RRH-BJ4A	74				BJ
	RRH-BJ5	72				BJ
	RRH-BJ7	127				BJ

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
Recirculation system bypass loop "B"	RBB-BJ1	38				BJ
	RBB-BJ2	37				BJ
	RBB-BJ3	35				BJ
	RBB-BJ6	36				BJ
	RBB-BJ7	34				BJ
	RBB-BJ8	39				BJ
	RBB-BJ9	40				BJ
	RBB-BJ10	41				BJ
	RBB-BJ12	42				BJ
Recirculation system Loop "B" weldolets	RCB-BJ30	87				BJ
	RCB-BJ37	88				BJ
	RCB-BJ21	94				BJ
Recirculation system manifold "B"	RMB-BJ2	115				BJ
	RMB-BJ5	112				BJ
	RMB-BJ9	114				BJ
	RMB-BJ11	113				
Recirculation system manifold "B" risers	RRA-BJ4	106				BJ
	RRA-BJ4A	105				BJ
	RRA-BJ5	107				BJ
	RRA-BJ7	102				BJ
	RRB-BJ4	109				BJ
	RRB-BJ4A	108				BJ
	RRB-BJ5	110				BJ
	RRB-BJ7	103				BJ

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
Recirculation system manifold "B" risers	RRC-N2C	233				
	RRC-BD1	202, 208, 213				BD
	RRC-BF2	210				BF
	RRC-BF2A	228				BF
	RRC-BJ3	223				BJ
	RRC-BJ4	80				BJ
	RRC-BJ4A	79				BJ
	RRC-BJ5	81				BJ
	RRC-BJ7	104				BJ
	RRD-N2D	232				
	RRD-BD1	201, 207, 214				BD
	RRD-BF2	209				BF
	RRD-BF2A	226				BF
	RRD-BJ3	227				BJ
	RRD-BJ4	77				BJ
	RRD-BJ4A	76				BJ
	RRD-BJ5	78				BJ
	RRD-BJ7	116				BJ
RHR-20A pipe welds	RHC-BJ25	134				BJ
Class II transition	RHF-CF100	133				CF
	RHF-CF99	135				CF
	RHF-CF96	131				CF
	RHF-CF94	199				CF
RHR-20B pipe welds	RHD-BJ25	132				BJ
Class II transition	RHJ-CF87	136				CF
	RHJ-CF86	130				CF
	RHJ-CF80	129				CF
	RHJ-CF78	198				CF
RHR-18B pipe welds	RHB-BJ2	240				BJ

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
RHR pump discharge (NW) (RHR valve room)	RHI-CF19	117				CF
	RHI-CF21	118				CF
	RHI-CF46	86				CF
	RHI-CF47	43				CF
	RHI-CF50	44				CF
	RHI-CF51	33				CF
	RHI-CF53	32				CF
	RHI-CF54	85				CF
	RHI-CF55	84				CF
	RHI-CF57	120				CF
	RHI-CF59	119				CF
CRD-scram discharge headers north and south pipe welds	SDN-BJ1	286				BJ
	SDN-BJ2	287				BJ
	SDN-BJ3	288				BJ
	SDN-BJ4	289				BJ
	SDN-BJ5	258, 267				BJ
	SDN-BJ6	256, 265				BJ
	SDN-BJ7	255, 264				BJ
	SDN-BJ8	254, 263				BJ
	SDN-BJ9	253, 262				BJ
	SDN-BJ10	251, 259				BJ
	SDN-BJ11	257, 266				BJ
	SDN-BJ12	252, 261				BJ
	SDN-BJ13	250, 260				BJ

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
CRD-scram discharge headers north and south pipe welds (cont)	SDS-BJ1	285				BJ
	SDS-BJ2	284, 290				BJ
	SDS-BJ3	283				BJ
	SDS-BJ4	282, 279				BJ
	SDS-BJ5	281, 278				BJ
	SDS-BJ6	277				BJ
	SDS-BJ7	275				BJ
	SDS-BJ8	274				BJ
	SDS-BJ9	273				BJ
	SDS-BJ10	272				BJ
	SDS-BJ11	269				BJ
	SDS-BJ12	276				BJ
	SDS-BJ13	271, 280				BJ
	SDS-BJ14	270				BJ
HPCI-pump discharge pipe welds	HPB-CF2	13, 28				CF
	HPB-CF7	12, 27				CF
	HPB-CF8	26, 30				CF
	HPB-CF9	11, 25				CF
	HPB-CF11	10, 24				CF
	HPB-CF12	23, 31				CF
	HPB-CF14	7, 22				CF
	HPB-CF16	9, 21				CF
	HPB-CF19	8, 20				CF
	HPB-CF21	6, 19				CF
	HPB-CF22	5, 18				CF
	HPB-CF24	4, 17				CF
	HPB-CF26	3, 16				CF
	HPB-CF29	164				CF
	HPB-CF32	161				CF
	HPB-CF33	162				CF
	HPB-CF35	166				CF
	HPB-CF37	165				CF
	HPB-CF39	167				CF
	HPB-CF42	163				CF
	HPB-CF44	2, 15				CF
	HPB-CF45	1, 14				CF

System or Component Description	Weld or Component Designation	Ultrasonic and Visual Report No.	Visual Report No.	Magnetic Particle Report No.	Penetrant Report No.	Weld Category
HPCI-turbine steam inlet piping welds	HPC-CF 6	128				CF
	HPC-CF12	137				CF
	HPC-CF14	138				CF
	HPC-CF16	139				CF
Pipe hanger (for all CE)	HPC-CE18		121			CE
	HPC-CF20	140				CF
	HPC-CF21	141				CF
	HPC-CF23	142				CF
	HPC-CF24	143				CF
	HPC-CE27		121			CE
	HPC-CF29	144				CF
	HPC-CE30		121			CE
	HPC-CF32	145				CF
	HPC-CF33	146				CF
	HPC-CE34		121			CE
	HPC-CF35	159				CF
	HPC-CE36		121			CE
	HPC-CF37	160				CF
	HPC-CE39		121			CE
	HPC-CF40	158				CF
	HPC-CF41	155				CF
	HPC-CE42		121			CE
	HPC-CE47		121			CE
	HPC-CF48	156				CF
	HPC-CF49	157				CF
	HPC-CF50	154				CF
	HPC-CE51		121			CE

ASME Code XI Pump and Valve Testing Program

In compliance with ASME Code XI the valves and pumps required to be functionally tested (whether it be cycling, timing, checking position of valve, or verifying pump speed and amount of vibration) were tested in accordance with the Code XI testing frequency requirements. All components tested per ASME Code XI performed as intended except for those discussed below.

The following report summarizes the component failures discovered as a result of surveillance testing of ASME Code XI equipment.

1.0 During testing of the LPCI pumps and motor-operated valves, the following two valves were found to perform unsatisfactorily.

1.1 In January, 1980 MOV 2038 (RHR Test Loop A Isolation Valve) indicated intermediate valve position when valve was closed. Limit switch was adjusted and valve was cycled and timed satisfactorily.

1.2 In April, 1980 MOV 2012 (RHR Pump Suction Header Valve) and MOV 1936 (RHR Radwaste Discharge Valve) could not be stroked as required by the surveillance test. Motors were replaced on the valves during the 1980 refueling outage. Valves were tested satisfactorily prior to being returned to service.

2.0 During testing of the River Water System's pumps and motor operated valves, the following pump maintenance was necessary to satisfactorily complete functional tests.

2.1 In July, 1980 1P-117D (River Water Supply System Pump) could not be started from the Control Room. The contacts in the pump's breaker were cleaned and the DC power fuses were replaced to restore proper control of pump to the Control Room.

2.2 In September, 1980 1P-117B (River Water Supply Pump) was vibrating excessively during functional test. Motor coupling was realigned to reduce pump vibration.

3.0 During Standby Diesel Generator Operability testing, 1P-44A (diesel fuel oil transfer pump) would not control fuel oil level adequately.

3.1 In October, 1980 LS 3208A (Emergency Diesel Generator Day Tank Level Control) was found inoperable. The float is believed to have been stuck. The float was cycled and linkage checked prior to returning level switch to operation.

3.2 In November, 1980 LS 3208A didn't secure fuel oil transfer pump when level reached 850 gallons. Float on LS 3208A was sticking. Float repaired to return switch to operability. A discharge pressure gauge was installed on 1P-44A

at this time to allow differential pressure calculation in accordance with ASME Code XI requirements.

4.0 During surveillance testing of RCIC pumps and motor-operated valves, several valves did not perform as designed.

4.1 In May, 1980 no open indication was available for CV 2409 (RCIC Steam Pot Level Control). The fittings on SV 2409 were tightened to reduce air leakage. In addition the limit switches were adjusted to provide proper valve position indication.

4.2 Also in May, 1980 CV 2410 (RCIC Condensate Drain to Condenser) had intermediate valve indication when valve was open. Limit switches were adjusted to provide proper valve position indication.

4.3 In July, 1980 MOV 2405 (HPCI Pump Turbine Trip-Throttle Valve) cycled close but could not be remotely opened. The contacts in the operator were cleaned, and valve tested satisfactorily.

4.4 In September, 1980 MOV 2401 (Main Steam Supply to HPCI Pump Turbine Isolation Valve) would not open during testing. The torque switch was replaced and adjusted to provide proper valve control.

4.5 In October, 1980 CV 2513 (RCIC Pump Discharge Valve) had no position indication.

4.6 In December, 1980 CV 2411 (RCIC Condensate Drain to Condenser) did not indicate full closure of valve during testing. The limit switches were cleaned and adjusted. Valve was subsequently cycled satisfactorily.

5.0 During monthly operability testing of Emergency Service Water pump, MOV 2078 (Well Water Return Line) would not close electrically. The valve was checked subsequently and found to work satisfactorily.

6.0 During HPCI operability testing, MOV 2247 (Cooling Water to Barometric Condenser Valve) position indication indicated an intermediate valve position when the valve was closed. The motor operator was replaced and the limit switches were adjusted prior to returning the valve to operation.

7.0 During quarterly PCIS valve functional testing, three valves were found to respond unsatisfactorily.

7.1 In February, 1980 XFV 4608 would not check when its drain valve was opened. The excess flow valve was subsequently checked and found to work satisfactorily.

7.2 In September, 1980 MOV 2740 (Reactor Water Cleanup Regenerative Heat Exchanger Discharge Valve) closed in greater than the required ten seconds (10.4 seconds). A loose set rod (adjusting screw for limit switch) was tightened and limit switch was adjusted. The valve then cycled with a closing time of 8.4 seconds.

7.3 In December, 1980 SV 8107A (Isolation for Torus High Sample Point for CAD) was found closed. Investigation determined the solenoid coil was burnt out. The coil was replaced and valve operated satisfactorily.

8.0 During the annual ASME In-Service valve testing (relief valve testing) program completed during the 1980 refuel outage several problems arose.

8.1 Six relief valves tripped at out-of-specification set-points. The valves and their as found/as left setpoints are listed below:

PSV 1988	> 470 PSIG/455 PSIG
PSV 2109	420 PSIG/445 PSIG
PSV 2223	19 PSIG/ 16 PSIG
PSV 2228	100 PSIG/110 PSIG
PSV 2301	105 PSIG/125 PSIG
PSV 2501	110 PSIG/125 PSIG

8.2 PSV 1911 lifted at 150 PSIG rather than 175 PSIG. Investigation resulted in the valve seat being replaced due to leakage and the pilot being reset to lift at 175 PSIG.

8.3 PSV 2068 failed to lift with a pressure greater than 470 PSIG (set-point is 450 PSIG). In addition the valve leaked through at 450 PSIG but did not lift with authority. An engineering review determined rapid opening was not a requirement for this application and therefore the test results were acceptable.

8.4 PSV 4439A was removed from service, its seat area was lapped and the valve was reassembled. The valve setpoint was adjusted. The valve was tested and worked satisfactorily.

9.0 During quarterly ASME In-Service valve testing two valves were found to perform unsatisfactorily.

9.1 In April, 1980 CV 5703A (Drywell cooling water loop A Backwash Inlet Valve) did not respond to remote controls. The valve was manually cycled open and subsequently performed satisfactorily.

9.2 In December, 1980 SV 4308 was sticking preventing CV 4308 (Suppression Pool Purge Inlet) from cycling normally. The solenoid valve was cleaned and its O-rings lubricated prior to returning the valve to normal operation.