TDS-21091-2 (9-73)

SITE PROBLEM REPORT

BABCOCK & WILCOX

CUSTOMER Duke Power Company	CONTRACT NO 620-0004	SPR NO. 193	REV. NO. 01
VENDOR Rockwell	P.O. NO.	TASK NO. 28	GROUP NO. 41	SEQ. NO. 01
SITE ENGINEER R.S. Baker ~~J.S. Ward~~	REQ'D. RESOL. DATE	REQ'D. COMP. DATE	

TITLE 2RC - 1 FAILED IN OPEN POSITION

DESCRIPTION OF PROBLEM

See Attached:

STATUS - ACTION TO DATE INCLUDING PERSONS CONTACTED

See Attached:

FURTHER ACTION RECOMMENDED BY SITE PERSONNEL

See attached:

DESIGNATOR SIGN	DATE 6/24/74	S CONSTR. REP. SIGNATURE	DATE 6/, /74

RESOLUTION

RESOLUTION

APPROVED BY	SIGNATURE	DATE
N.S. SUPPORT ENGINEER	12/10/74	12/10/74
TASK ENGINEER		
PROJECT MANAGER	C.A. Creacy	12-12-74

COST CATEGORY ☐ NORM ☐ C ☐ D ☐ G ☐ L ☐ VENDOR CLAIM

AUTH. CHARGE NO. ☐ FIELD CHANGE REQ FC NO. 155

COMPLETION

SITE COMPLETION REPORT

~~FC-155~~ FC-281 (NSS-3), FC-155 (NSS-4), FC-102 (NSS-9) will be issued to install ~~Variable~~ reduced speed operator on valve.

This clears all revs. of this SPR.

☐ RECOMMENDED STDS. CHANGE

FINAL DISTRIBUTION

PROJECT MANAGER
S.O.M. CONST. REP.
QA DOC. FILE
CENT. ENGR
FILE

DEVIATIONS ☒ NONE ☐ SEE SPR REV. NO. ____

DATE COMPLETED 12/5/74 SIGNED BY [signature]

S.O.M. CONSTR. REP. APPROVAL [signature] DATE 12/6/74

8002100074 A

INSTRUCTIONS FOR PDS-21091 - SITE PROBLEM REPORT

Initiated by NPG Nuclear Service

(1) Originator - Fill in: Customer; Contract Number; Vendor; Purchase Order Number; Task Number; Group Number; Sequence Number; Name; Title; Description of Problem; Status; Further Action Recommended by Site Personnel; Originator Signature and Date; Vendor Claim (if applicable).

(2) Site Operations Manager - Fill in: SPR Number; Revision Number; Req'd. Resol. Date; Req'd. Comp. Date; Approval Signature; Date.

(3) Nuclear Service Support Engineer - Fill in: Cost Category; Authorized Charge Number.

(4) Task Engineer - Fill in: Resolution; Recommended Std.'s Change*; (if applicable, FC Req. and FC Number); Signature and Date.

*If recommended standard's change, transmit a copy to cognizant Standard Task Engineer to resolve with Standard Plant Manager.

(5) Field Engineer - Implement resolution; upon completion, fill in: Completion Report; Date Completed and Signature.

NOTE: If necessary to deviate from the approved SPR, note deviation and submit revised SPR to the Site Operations Manager.

(6) Site Operations Manager - Approve completion; sign.

Initiated by B&W Construction Company

(1) Originator - (Same as (1) above)

(2) Construction Co. Site Representative - (Same as (2) above)

(3) Project Manager - (Same as (3) above)

(4) Task Engineer - (Same as (4) above)

(5) Construction Co. Site Representative - (Same as (5) and (6) above)

Babcock & Wilcox

SPR # 193 Rev.0
June 12, 1974
Oconee - Unit II

DESCRIPTION OF PROBLEM:

After ~~the last~~ # reactor trip on Unit II on May 30, 1974, it was impossible to keep the normal operating pressure in the pressurizer with all heater banks on.

It appeared that the yoke bushing threads of the motor-operated valve 2RC-1 are stripped because the shaft does not move in and out of the valve, although the motor runs and indicates closed or open position of 2RC-1 in the control room.

STATUS - ACTION TO DATE INCLUDING PERSONS CONTACTED:

To maintain the pressure in the pressurizer, 2RC-3 was closed after the Reactor trip.

With 2RC-3 closed a minimum bypass spray flow of 0.75 gpm is not maintained as per DP 1101-01 section 1.2-5.

Stan Holland and Jim Hampton were informed that keeping RC-3 shut violates limits and precautions and that if they continue to operate, RC-3 should not be opened unless absolutely necessary to minimize the number of cycles on the spray nozzle. Duke was also asked to rewire RC-3 so that it could be throttled to maintain some small continuous spray flow.

Additionally, Mr. V. Miller and Mr. R. Reynolds of Mt. Vernon were contacted in an effort to determine what the effects of frequent cycling of 2RC-3 would be on the pressurizer spray nozzle. Mr. Miller could not provide an absolute number as to the allowable number of cyles, or even what constitutes a cycle; however, he did state that with the pressurizer at normal operating temperature, spray line temperatures as low as 522° F had been analyzed. The results of these analysis indicated that the expected nozzle lifetime was not significantly reduced.

Based on this additional information, Mr. Stan Holland and Duke Power operating personnel were informed that if they were going to cycle 2RC-3 in order to maintain pressurizer boron concentration, then they should cycle the valve at a frequency such that spray line temperature did not decrease to below 522° F. This information was also provided to Duke Power Company in a letter. (Encl. #1)

By June 11, Duke Power Co. had completed electrical modifications to the 2RC-3 operator to allow this valve to be stopped at intermediate positions, thus a allowing it to be used as a throttle valve to maintain continuous spray line flow. The valve is now being operated to maintain continuous spray line flow. The data requested by the letter of Enclosure #1 is here included as Enclosure #2. This data is highly suspect, since a brief examination of it will reveal gross discrepancies between time-between cycles, and spray line temperature prior to cycling the valve. These are unexplained at this time.

SPR # 193 Rev.0
June 12, 1974
Oconee - Unit II

With 2RC-3 in a throttling position, the following data was obtained from Unit II:

Tave = 579° F
Tc = 558° F
Prcs = 2155
T (spray line) = 473.5 °F
Rx. Power = 75%

By comparison, Unit I parameters are shown below:

Tave = 579° F
Tc = 556° F
Prcs = 2155
T (spray line) = 482.8
Rx. Power = 99 + %

The above data should be compared with the transient data of enclosure #2 to determine the validity of RC Spray line temperatures as listed. Note: Spray line termocouples are on the exterior of the pipe and therefore do not measure true fluid temperature.

FURTHER ACTION RECOMMENDED BY SITE PERSONNEL

It is recommended that the data of enclosure 2 be forwarded to Mr. R. Reynolds for analysis of the thermal shocks to which the spray nozzle was subjected. It is further recommended that more definitive information concerning the following be generated for all contracts:

1) What temperature differential constitutes a spray nozzle cycle?

2) How many cycles are available?

and 3) Given the same situation repeats itself, what is the best way to operate the system while continuing plant operations?

file
Encl. (1)

Babcock & Wilcox

Power Generation Group

P.O. Box 1260, Lynchburg, Va. 24505

Telephone: (804) 384-5111

June 5, 1974

SOM 2081

Duke Power Company
Oconee Nuclear Station
P. O. Box 1175
Seneca, South Carolina 29678

Subject: Unit II Spray Line Stop Valve (2RC-3)

Attention: Mr. J. Ed Smith

Dear Mr. Smith:

Recent failure of the spray line valve (2RC-1) in an intermediate position has required that the spray line isolation valve (2RC-3) be shut and opened only as necessary to maintain pressurizer boron concentration.

Mr. Stan Holland and Mr. Jim Hampton were informed by B. & W. personnel that operating with 2RC-3 shut violates limits and precautions, DP 1101-01, in that the minimum required spray flow of 0.75 gpm is not maintained. B. & W. has further recommended that if this method of operation is continued, 2RC-3 should not be operated unless absolutely necessary to minimize the number of temperature transients on the spray nozzle.

An additional factor to consider is the severity of the thermal shock suffered by the spray nozzle each time the valve is cycled. Analysis of temperature transients has been previously performed with 522° F as the limiting minimum spray flow temperature. Thus, it is further recommended that if it is anticipated that continuous cycling of RC-3 will be required to prevent excessive boron concentration buildup in the pressurizer, then the valve should be cycled at a frequency such that spray line temperature does not decrease to below 522° F.

While operating the pressurizer in this configuration, it is requested that you log the following data each time 2RC-3 is cycled:

1) time at which the valve is opened
2) time at which the valve is closed
3) temperature in the spray line just prior to opening the valve.

Babcock & Wilcox

SOM Letter # 2081
June 5, 1974
Oconee - Unit II

Based on conversations with Unit II operating personnel and Mr. Stan Holland of Duke Power Company, this data is now being logged. It is additionally recommended that you consider re-wiring the controller for 2 RC-3 such that the valve may be partially opened in order to maintain a small continuous spray flow.

Yours truly,

B. L. Day by R Baber Jr.

B. L. Day
Site Operations Manager

JJW/bh

cc: R. J. McConnell
W. A. Cobb
R. L. Pittman
Stan Holland (DPC)
Loyd Schmid (DPC)
W. O. Parker (DPC)

Babcock & Wilcox

Enclosure #2
SPR 193 Oconee II
June 14, 1974

2RC-3 Cycling

Date	Start	Stop	Temp.
6/11/74	0029	0030	412
	0128	0130	---
	0201	0202	427
	0258	0259	422
	0407	0408	410
	0500	0501	420
	0607	0608	408
	0700	0701	417
	0857	0858	393
	0922	0923	443
	1025	1025	425
	1046	1046	450
	1245	1248	400
	1416	1419	450
	1522	1524	460
6/11/74	1630	1633	560.9
	1801	1802	566.6
	1901	1903	564.0
	2006	2007	562.9 ?
	2126	2128	565.5
	2305	2307	561.7
	0100	0103	394.7
	0243	0244	428.2
	0317	0318	442.8
	0406	0407	424.8
	0501	0503	419.5
	0624	0625	428.5
	0705	0707	431.9
6/9/74	2203	2204	414.6
	2301	2302	416.4
6/10/74	0101	0102	394
	0204	0205	411
	0303	0304	412
	0402	0403	414
	0505	0506	412
	0606	0607	413
	0701	0702	417
	0805	0806	413
	0925	0926	406
	1103	1104	399
	1206	1207	424
	1304	1305	427
	1401	1402	421
	1503	1504	424

Date	Start	Stop	Temp.
6/10/74 (cont'd)			
	1602	1603	417.2
	1703	1704	417
	1759	1800	415.4
	1903	1904	413.0
	2015	2016	405.6
	2046	2047	434.9
	2207	2208	418.8
6/10/74	2301	2302	412.4

Date	Time Open	Time Shut	Spray Line Temperature
6/8/74	1237	1238	374.8
	1333	1334	421.7
	1433	1434	416.2
	1534	1535	418.3
	1623	1624	425.3
	1807	1808	400.9
	1902	1903	425.2
	2002	2003	415.8
	2124	2125	407.7
	2202	2203	430.6
6/8/74	2300	2301	425.3
6/9/74	0014	0015	452.8
	0118	0119	414.3
	0205	0206	425.7
	0303	0304	418.7
	0405	0406	421.3
	0528	0529	407.8
	0603	0603	437.9
	0702	0703	423.2
6/9/74	0822	0823	408.1
	0929	0931	413
	1018	1019	432.9
	1109	1110	424.2
	1220	1220	430.1
	1329	1329	561.4
	1555	1556	412.4
	1741	1742	397.5
	1809	1810	438.7
	1902	1903	420.9
	2008	2009	413.5
	2104	2105	416.4
6/4/74	0619	0620	371.9
	1030	1031	564.5 after
	1144	1145	560.3 ?
	1229	1230	560.4 ?
	1342	1343	561.1 ?

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Date	Time Open	Time Shut	Spray Line Temperature
6/4/74	1430	1431	564.5
	1529	1530	561.3
	1710	1711	566
	1915	1916	566.7
	2041	2041	564.7 ?
	2145	2145	558.5
	2239	2240	558.2
	2348	2349	558.3
6/5/74	0150	0153	395
	0258	0259	423
	0353	0354	429
6/6/74	0322	0323	426
6/7/74	0055	0056	---
	0900	0901	566 ?
	1008	1009	566

JJW/bh

Between 5/30 and 6/4 no record kept on cycling RC-3, but I don't [illegible] valve was cycled more than 40 this time.

[illegible] Baker