

## FINAL REPORT 10CFR PART 21 REPORT OF A POTENTIAL SAFETY HAZARD

PREPARED BY: Ed Grandway 4/16/98

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APPROVED BY: Robert M. Laylin 4/16/98

PART NAME: Governor Valve Stem

### 1. Description of Defect or Non-Compliance

Inconel 718 material was used in place of 410 stainless steel for the new spray coated valve stems. The Material selection process did not fully evaluate the impact of a higher coefficient of thermal expansion in the steam seal arrangement using carbon washers for steam seals.

### 2. Potential Safety Hazard or Non-Compliance:

If the cold clearance is not adequate to accommodate the stem growth, control problems will result that may prevent the turbine/pump assembly from performing it's intended function.

### 3. Number and Location of all components:

A total of 28 sites have purchased these stems, 23 domestic and 5 foreign.

List on page 2.

### 4. Corrective Action by Nuclear Product Engr. completed by 5/1/98

ECR# 10673 issued to create a new carbon spacer part number 800714-002. This carbon spacer has an inside diameter that is .0005" larger than the original spacer p/n 800714-001. This will return the running clearance at operating temperature to the values of the original nitrided 410 SS stems.

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### 5. Advice to Affected Customer Related to This Report

#### a. For stock parts not assembled in a valve body assembly.

Insure the clearance between the carbon washers and the stem is at least .0015" when assembled in the valve.

#### b. For parts installed in an operational AFW or RCIC turbine.

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Number and Location of all components:

COUNT	TURBINE S/N	LOCATION
1	T35685A T35686A T35687A	BROWNS FERRY 1 BROWNS FERRY 2 BROWNS FERRY 3
2	T35690A	MONTICELLO
3	T35693A	PILGRIM 1
4	T35939A	COOPER
5	T36546A	MAINE YANKEE
6	T36555A T38492A	BEAVER VALLEY 1 BEAVER VALLEY 2
7	T36565A T36566A	DIABLO CANYON 1 DIABLO CANYON 2
8	T36681A	EDWIN I. HATCH
9	T36683A	BRUNSWICK 2
10	T37008A & B	PRAIRIE ISLAND 1 & 2
11	T37009A	CRYSTAL RIVER
12	T37273A	MILLSTONE 2
13	T37476A	HANFORD 2
14	T37549A T40239A	ST. LUCIE 1 ST. LUCIE 2
15	T37858A & B	FARLEY 1 & 2
16	T37948A	McGUIRE 1
17	T38171A	NINE MILE POINT 2
18	T38677A & B	WATTS BAR 1 & 2
19	T38765A	SUMNER 1
20	T39622A	COMANCHE PEAK
21	T41062A T41063A	SEABROOK 1 SEABROOK 2
22	T41173A & B	ALVIN W. VOGTLE 1 & 2
23	T41812A, B & C	TURKEY POINT 3&4
24	T38174A	LEIBSTADT
25	T40366A	KRSKO
26	T41925A	VANDELLOS 2
27	T37476C	TOKAI 2
28	T38848A	ANGRA
29	T36700A	DC COOK

Corrective Action by Nuclear Product Engr. completed by 6/1/98

The failure to adequately evaluate the potential effects of the thermal expansion characteristic of the new material was a design oversight that occurred even though procedures for controlling the design process are currently in place. These procedures include:

EA-001 Engineering Design Control

- Section 5 part B item number 2 places the control of Nuclear units and repair orders under Product Engineering.
- Section 5 part C item 4 identifies EA-025 as the Process Control Procedure for New Concepts and Development Programs.
- Section 8 gives guidance for Design Verification and New Drawing Approval.
- Section 9 gives guidance for Design Validation.

EA-025 Design Control for New Concepts And Development Programs.

- Section 4 Project Planning and Authorization establishes objective, scope and time/cost estimates.
- Section 5 Execution and Control defines a project leader, review requirements and reporting format.
- Section 8 Verification & Completion gives guidance for Design review and verification.
- Section 9 Final Report defines minimum requirements for the documentation in the report, required signatures and storage location.

NNSOP 1.2.004 Drawing Approval referenced in EA-001

- Section 4.0 states design engineering must satisfy all the requirements of ED-1-018.
- Section 4.1.2 requires checker to verify all interface requirements and have drawing reviewed by other groups if necessary.
- Section 4.1.3 requires a Supervisor to review drawing against ALL DESIGN REQUIREMENTS.
- Section 4.1.4 requires the Nuclear Product Engineer to review drawing against ALL DESIGN REQUIREMENTS and proper material and processing.

Per our procedure NNSOP 1.1.001, a Corrective Action Request (form QC-5), CAR NO.: 0953 has been initiated to address this design oversight issue. In response to this Corrective Action Request existing procedures will be thoroughly reviewed with special focus on paragraphs with potential relevance to this design oversight experience. Then procedures will be revised and/or supplemented, e.g. by check lists and/or personnel training, as judged necessary to maximize the probability that all potentially relevant factors will be considered and adequately evaluated in future executions of our design process. Similar design projects performed since the formation of Dresser-Rand will also be reviewed for compliance to these design requirements. As noted above this Corrective Action will be defined and fully implemented by June 1, 1998.

D-R Part Numbers and Drawings for Governor Valve Stems:

800743-001	800743 rev n/a
800744-001	800744 rev n/a
800745-001	800745 rev n/a
800746-001	800746 rev n/a
800768-001	800768 rev n/a
800768-002	800768 rev n/a
800777-001	800768 rev n/a