



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005**

August 11, 2004

MEMORANDUM TO: Arthur T. Howell, Director, Division of Reactor Projects

FROM: Troy W. Pruet, Chief, Reactor Project Branch D **/RA/**

SUBJECT: MANAGEMENT DIRECT 8.3 EVALUATION FOR PALO VERDE
NUCLEAR GENERATING STATION

Pursuant to Regional Office Policy Guide 0801, "Documenting Management Directive 8.3 Reactive Team Inspection Decisions," the attached table provides the evaluation for determining that a special inspection should be conducted at the Palo Verde Nuclear Generating Station.

cc w/Attachment:
B. Mallett, RIV
D. Chamberlain, RIV
V. Ordaz, RIV
C. Marschall, RIV
N. Salgado, RIV
C. Paulk, RIV
J. Clark, RIV
M. Hay, RIV
G. Miller, RIV
J. Shea, NRR
T. McMurtray, NRR
R. Laura, NRR

ADAMS: Yes No Initials: __TWP__
 Publicly Available Non-Publicly Available Sensitive Non-Sensitive

R:\ MD8.3Decisions04-001.wpd

ML042240579

RIV:SRA:DRS	C:DRP/D	D:DRP		
RBywater	TPruett	ATHowell III		
T- TWPrueett	/RA/	CSMarschall for		
8/11/2004	8/6/2004	8/11/2004		

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MD 8.3 DECISION DOCUMENTATION FORM

PLANT - Palo Verde Nuclear Generating Station

EVENT DATE - July 29, 2004

RESPONSIBLE BRANCH CHIEF - Troy Pruett

EVALUATION DATE - August 4, 2004

BRIEF DESCRIPTION OF THE SIGNIFICANT OPERATIONAL EVENT OR DEGRADED CONDITION - The internal volume of the emergency core cooling system (ECCS) piping sections between the closed inboard containment isolation valve and the sump recirculation check valves is void of water and occupied with air (115 cubic feet). Upon a recirculation actuation signal (RAS), the potential exists for the trapped air volume to be forced into the suction of the safety injection pumps. This action could lead to cavitation of the pumps, air binding, or a water hammer event.

The licensee completed a Froude correlation and determined that for a 24 inch diameter pipe, a volumetric flow rate of greater than 5200 gpm would be needed to relocate the air pocket from the horizontal run of piping and 8300 gpm for the vertical run of piping. The combined minimum flow to pump run-out flow for the high pressure safety injection and containment spray pumps is in the range of 4800 to 6900 gpm per recirculation train. Therefore, the possibility exists that a significant portion of the total air volume could be drawn into the suction of the safety injection pumps as a diffused air/water mixture.

Y/N

DETERMINISTIC CRITERIA

No

a. Involved operations that exceeded, or were not included in, the design bases of the facility

Remarks - As of August 2, 2004, the licensee had not identified information associated with the acceptability of an air filled suction line from the containment sump.

Yes

b. Involved a major deficiency in design, construction, or operation having potential generic safety implications

Remarks - Key factors associated with a design deficiency involve the total volume of air, the expected flow rates of the safety injection pumps, and the size and orientation of the sump suction piping. This issue is applicable to plants with air voided suction lines.

No

c. Led to a significant loss of integrity of the fuel, primary coolant pressure boundary, or primary containment boundary of a nuclear reactor - significant loss applies to each boundary.

Remarks - None

Yes

d. Led to the loss of a safety function or multiple failures in systems used to mitigate an actual event

Remarks - On July 31, 2004, the licensee made a 50.72(b)(3)(v)(B) and (D) report due to a loss of safety function for residual heat removal and mitigating systems. Specifically, following a recirculation actuation signal, the safety functions associated with the high pressure safety injection and containment spray systems could be lost.

No

e. Involved possible adverse generic implications

	Remarks - None
No	f. Involved significant unexpected system interactions
	Remarks - None
No	g. Involved repetitive failures or events involving safety-related equipment or deficiencies in operations
	Remarks - None
No	h. Involved questions or concerns pertaining to licensee operational performance
	Remarks - None
No	x. Involved one or more of the radiological or materials criterion provided in MD 8.3 guidance
	Remarks - None

CONDITIONAL RISK ASSESSMENT

IF IT IS DETERMINED THAT A RISK ANALYSIS IS NOT REQUIRED - ENTER NA BELOW
AND CONTINUE TO THE DECISION BASIS BLOCK

RISK ANALYSIS BY - Russ Bywater

DATE - August 4, 2004

THE ESTIMATED CONDITIONAL CORE DAMAGE PROBABILITY (CCDP) IS 6E-5 AND PLACES THE RISK IN THE RANGE OF A SPECIAL OR AUGMENTED INSPECTION PROCEDURE.

The analyst modeled the degraded condition using the Palo Verde SPAR model assuming a loss of high and low pressure recirculation following a recirculation actuation signal. The condition was assumed to exist for a year with average test and maintenance. No operator recovery was credited and all accident initiators were considered. The core damage frequency result was 6E-5/yr. Since the condition was assumed to exist for a year, this result was directly comparable to the CCDP table in MD 8.3. The approach and results were confirmed by headquarters senior reactor analyst (SRA) Rick Rasmussen. The result was also consistent with the licensee's result.

The NRC and licensee analysts results were reliant on the assumption that the air in the containment sump suction lines directly caused the pumps to fail. Therefore, the result of this analysis is considered an upper maximum bound. This is a critical assumption which will require engineering analysis of bubble transport and effect on pump performance.

Large early release was not considered as part of this analysis, but since the containment spray pumps also take suction from the sump following a RAS, containment spray pump performance and potential for containment failure should be considered during the followup inspection and significance determination process evaluation.

DECISION BASIS

USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION, AS APPROPRIATE, THE BASIS FOR THE DECISION SHALL BE PROVIDED BELOW

Details of the basis for the decision -

A special inspection for the review of air voiding in the emergency core cooling system piping between the containment sump and the safety injection pumps is warranted. The principle factor in favor of the special inspection involves the potential generic safety implications for the industry. No immediate safety concern exists given the licensee's compensatory measures to fill the effected piping with borated water.

The special inspection should evaluate: (1) existing operating experience and compare the data to activities implemented at Palo Verde, (2) calculations used to evaluate the condition, (3) Technical Specification Implications, (4) compensatory measures implemented following discovery of the condition, and (5) circumstances associated with the influential assumptions in the risk analysis (degree to which the pumps are affected, recovery of failed pumps, and event sequences of concern).

COMPLETED BY - Troy Pruett

DATE - August 5, 2004

BRANCH CHIEF REVIEW - Troy Pruett

DATE - August 5, 2004

DIVISION DIRECTOR APPROVAL - Arthur T. Howell III

DATE - August 11, 2004