

Part 21 (PAR)

Event # 49904

<b>Rep Org:</b> VALCOR ENGINEERING CORPORATION	<b>Notification Date / Time:</b> 03/12/2014 18:24 (EDT)
<b>Supplier:</b> VALCOR ENGINEERING CORPORATION	<b>Event Date / Time:</b> 01/11/2014 (EDT)
	<b>Last Modification:</b> 08/15/2014
<b>Region:</b> 1	<b>Docket #:</b>
<b>City:</b> SPRINGFIELD	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> NJ	
<b>NRC Notified by:</b> JIMMY SHIEH	<b>Notifications:</b> KATHLEEN O'DONOHUE R2DO
<b>HQ Ops Officer:</b> CHARLES TEAL	PART 21 GROUP EMAIL
<b>Emergency Class:</b> NON EMERGENCY	
<b>10 CFR Section:</b>	
21.21(a)(2) INTERIM EVAL OF DEVIATION	

## PART 21 - AP-1000 SOLENOID OPERATED VALVES LEAKAGE

The following was excerpted from a fax received from Valcor Engineering Corporation:

## "Background:

"Valcor was chosen by WEC [Westinghouse Electric Corporation] as a supplier to the AP-1000 for the ASME Section III Class 1, 2 and 3 Solenoid Operated Valves. As part of the specification requirements Valcor is required to perform qualification testing in accordance with the requirements of IEEE-323-1974, IEEE-344-1987 and IEEE-382-1996.

## "Discovery:

"On Saturday January 11th, 2014, Valcor's lab technician discovered that the hard faced seat of an AP-1000 Solenoid Operated qualification valve had a crack through the thickness of the valve seat to the outlet port that caused the valve to leak in the closed position beyond its Technical Specification requirement (WEC Specification APP-PV13-ZOD-101). The subject valve had undergone heat rise testing to determine actuator temperatures during its specified design basis conditions. As part of the qualification process (IEEE-323) and in accordance with the test procedure the subject valve is given a factory acceptance test (FAT) at each stage of the qualification program.

"The valve design is unique to the model (V526-5631-36/40) in that the dimensional constrain resulted in a web thickness of the hard faced seat that is thinner than our standard historical valve designs. A total of eight (8) valves of this configuration (four (4) for Valve Model Number V525-5631-36 and four (4) for Model number V526-5631-40) have been delivered to Westinghouse for installation in the Sanmen and Haiyang nuclear power plants located in

IE19  
NRO

the People's Republic of China. Neither of these plants have loaded fuel or are operational.

"The investigation, failure analyses, and stress analyses completed to-date have not provided a firm conclusion of the root cause of the crack. Westinghouse, the purchaser who imposed 10CFR21 on the procurement document of the valve models identified in question, has been informed of the condition and current status of investigation."

Submitted by Jimmy Shieh Quality Assurance Director.

\* \* \* UPDATE PROVIDED BY JIMMY SHEIH TO JEFF ROTTON VIA FAX AT 0944 EDT ON 08/15/2014 \* \* \*

"Subject: An update to Interim Report initially filed on 3/12/14, revised 3/13/14

"Reference: SKA23651 previously submitted

"Investigation activities since the Interim Report:

"Computer Flow and Thermal Analysis conducted from March to April 2014.

"Finite Element Stress Analysis rerun using Computer Flow and Thermal Analysis in April 2014.

"Both analysis above suggest that the design is adequate and that stress induced by rapid temperature rise would not cause the seat to crack.

"With Westinghouse assistance and permission [two] 2 production valves were disassembled and NDE (Visual, LP, radiographic, and Eddy current) of body seat area performed during May. The examinations did not identify any defect in the valve seat area.

"Contrary to all stress/thermal analysis, cracking of valve seat was reproduced early June when one of the above mentioned bodies was subjected to the same thermal shock condition that caused the initial observed cracking. The second valve was tested at the same pressure and end temperature without the thermal shock. The valve seat remained intact without cracking.

"Westinghouse has been supporting the Part 21 investigation that Valcor is leading. Westinghouse has reviewed all metallurgy, CFD, FEA, NDE, heat rise laboratory and other data Valcor collected during our thorough investigation. All of this information is currently being evaluated by Westinghouse. At this time, the only outstanding issue is for Westinghouse to review all AP1000 transient conditions that are applicable to PV13 solenoid valves. Westinghouse anticipates having the preliminary transient research completed imminently and estimates to take until Nov. 30, 2014 to have all calculations and transient research validated.

"As stated in the original notification, the condition does not affect any operating plant. Affected valves are limited to overseas construction, none have been installed to date."

Notified R2DO (Hopper) and NRR Part 21 Group via email.

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**VALCOR ENGINEERING CORPORATION®**

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August 15, 2014

NRC Operations Center

Fax 301-816-5151

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A handwritten signature in black ink, appearing to read "Jimmy Shieh".

Jimmy Shieh  
Quality Assurance Director