

FINAL REPORT ON IMPROPER RETAINER CLIP MATERIAL IN THERMAL
PRESSURE RELIEF VALVES INSTALLED IN WKM GATE VALVES

San Onofre Nuclear Generating Station, Units 2 and 3

INTRODUCTION

This report is submitted pursuant to 10CFR50.55(e)(3). It describes a substitution in thermal pressure relief valve materials supplied by Marotta Scientific Controls, Inc. and incorporated into the design of motor operated and pneumatic gate valves of WKM Valve Division of ACF Industries, Inc.

BACKGROUND

By letter dated November 14, 1979, Southern California Edison confirmed notification to the NRC concerning this deficiency. A carbon steel retaining clip was substituted for a stainless steel clip in thermal pressure relief valves supplied by Marotta Scientific Controls, Inc. to WKM Valve Division for use in certain gate valves supplied for San Onofre Units 2 and 3. Marotta has identified a possible failure of the carbon steel retaining clip.

DISCUSSION

The following discussion is responsive to 10CFR50.55(e)(3).

Description of Deficiency

Corrosion of the carbon steel clip in process fluids such as borated water could cause it to release the poppet stem, a circumferentially grooved stainless steel cylinder approximately 1/10 inch in diameter and 1/2 inch long. Pressure within the gate valve body cavity could then expel the poppet stem causing it to fall into the flow path and be carried through the associated system.

Analysis of Safety Implications

WKM has provided 118 gate valves with the Marotta thermal pressure relief valve installed. Of these, 32 have the relief valve mounted at right angles to the discharge hole so that the poppet stem, if released by the clip, would not be expelled nor would

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it block pressure relief flow. The remaining valves are used in the following systems: Non-safety related feedwater, non-safety related chilled water, safety related component cooling water, and safety related low pressure safety injection. It was first determined that no potential safety hazard exists as a result of losing the regulated pressure relief characteristic in any of the systems involved. Continuous pressure relief of the gate valve body cavity through the passage cleared by displacement or expulsion of the poppet stem would be an acceptable condition.

In the non-safety related feedwater system a free poppet stem is expected to be removed by flushing during startup or to settle in a low point outside containment and to be retained without adverse effect on reliability.

In the non-safety related chilled water system the potential problem of the poppet stem preventing the containment isolation valve from closing was considered. Since these isolation valves are of a butterfly configuration, the closing motion of the butterfly valve is expected to sweep a poppet from the valve seat without interfering with valve function.

In the safety related component cooling water system the potential safety hazard involves the WKM gate valve, itself, since this valve must open in an accident condition. An analysis shows that maximum interferences caused by a free poppet stem trapped in the gate and segment motion would be overcome by the thrust of the actuator. The result would be a scoring of the seat surfaces, but the safety function of the valve would be accomplished.

In the safety related low pressure safety injection system a free poppet stem could, conceivably, cause degraded performance or seizure of the close toleranced low pressure safety injection pump or could enter the core and lodge in a spacer grid of a fuel assembly where it could cause failure of up to four fuel rods.

Corrective Action

Remedial action for valves presenting a potential safety hazard is as follows: A pipe plug of qualified material with a through

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hole small enough to retain the poppet stem but provide a bleed-off to relieve any body pressure buildup was inserted in the downstream side of the bore provided for the pressure relief valve. The plug is staked in position after assembly to preclude its backing out.

The pipe plugs were installed in the LPSI valves and all other gate valves of this type which are not yet installed.

WKM was asked to take appropriate steps with regard to their own quality assurance program and with regard to the quality assurance program of Marotta to insure that the quality assurance problem is limited to the relief valve poppet retainer clip. WKM has contacted Marotta and received assurance that clips furnished for all necessary replacements were of the proper material. WKM has conducted metallurgical tests to verify material type. All tests verified correct material. All other materials in the Marotta thermal relief valve assembly have been rechecked by Marotta and are correct with the exception of an inlet filter screen. This was supplied as Monel in place of 300 Series stainless steel. This is acceptable for the operating environment and has been approved by WKM. New drawings have been submitted to WKM by Marotta for record.

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