UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

February 18, 2009

NRC INFORMATION NOTICE 2009-04: AGE-RELATED CONSTANT SUPPORT DEGRADATION

ADDRESSEES

All holders of operating licenses or construction permits for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

PURPOSE

The Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to a possible age-related degradation of mechanical constant supports that may adversely impact design stresses on piping systems. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

During the fourteenth refueling outage at the Palo Verde Nuclear Generating Station, Unit 2, Arizona Public Service (the licensee) tested four safety-related constant supports as part of an investigation for failures on these components and associated beam attachments for these supports. The testing performed by the licensee measured deviations in the supporting force of between 8.7 and 13.3 percent. The allowable deviation of the supporting force, including friction, specified in American Society of Mechanical Engineers (ASME) Section III, Division I, Subsection NF, is 6 percent. The licensee and the vendor preliminarily concluded that deviations in the supporting force resulted from wear on the linkages and increased friction between the various moving parts and joints within the constant support. The wear on the linkages may have been caused by cyclic loading or vibration, from the main steam lines. The measured vibrations on the main steam lines were below the analyzed values of displacement and velocity but were above the ASME OM-3 value of 0.5 inches per second.

The licensee conducted physical inspections and engineering evaluations to determine whether any structural damage to the main steam piping had occurred. It did not identify any main steam line piping operability concerns, although analyzed margins to ASME code allowable stresses were reduced. The licensee subsequently restored these constant supports and evaluated the effect on the steam generator nozzles with the measured deviations of supporting force to ensure that ASME code limits were not exceeded.

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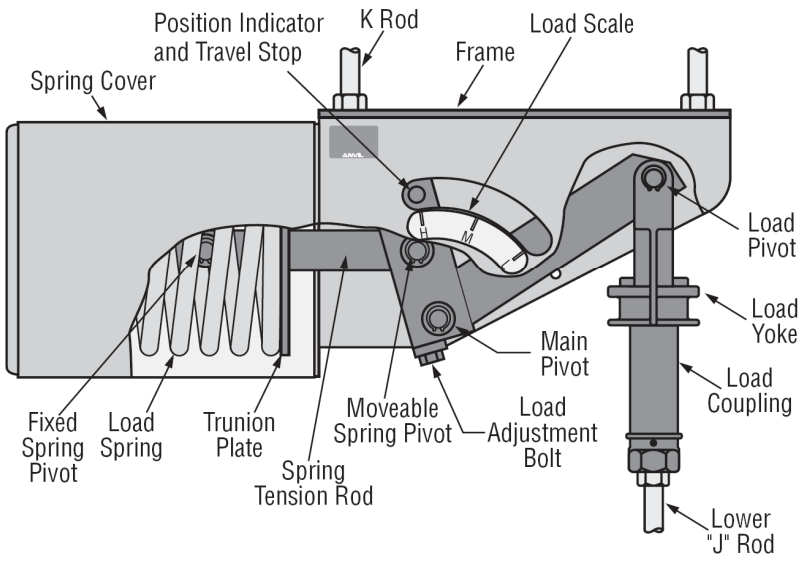
BACKGROUND

Constant support hangers are designed to provide a substantially uniform supporting force for a piping system throughout its full range of pipe movement. This is accomplished through the use of a spring operating in conjunction with a lever, in such a way that the spring force times the distance to the main lever pivot is always equal to and opposite of the pipe load times its distance from the main pivot point (see illustration below). These constant support hangers have been used to limit nozzle loads on pipes that experience large thermal variations from cold conditions to normal operating conditions.



DISCUSSION

The licensee for Palo Verde does not routinely test these mechanical constant supports, and these supports are not part of any routine preventive maintenance program. The vendor, ITT-Grinnell (now Anvil), did not require any routine maintenance on these supports. The physical condition of the constant supports is visually examined as required by the ASME Section XI, Subsection IWF, which calls for inspecting a certain number of supports every outage. This required visual inspection does not determine whether these supports exceed ASME code allowable load deviation of 6 percent. Although there is no regulatory requirement to do so, licensees may wish to consider testing the constant supports (e.g., displacement testing while measuring load) to identify constant supports that exceed the ASME code allowable load deviation of 6 percent.

The licensee and the vendor have preliminarily determined that deviations in the supporting force resulted from wear on the linkages and increased friction between the various moving parts and joints within the constant support. This age-related degradation mechanism may affect the supporting force provided by constant supports and can adversely affect the analyzed stresses of connected piping systems.

CONTACT

This information notice requires no specific action or written response. Please direct any questions about this matter to the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

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