ENCLOSURE
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
DEFICIENT INSTALLATION OF SEISMIC PIPE HANGER ANCHORS
NCR CAQR M-31
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

This deficiency is the failure, in several different cases, to properly install anchor bolts which attach seismic pipe hanger base plates to concrete walls. It was initially discovered by mechanical engineers providing normal surveillance of the installation of seismic pipe hangers. Six instances of improper anchor bolt installation have been found. (Nine examples of failure to strictly follow procedures for anchor installation have also been discovered and are explained in more detail below.) Systems to be mounted on the hangers where the deficiently installed anchors were located include Safety Injection (SIS), Chemical and Volume Control (CVCS), Component Cooling Water (CCS), and Essential Raw Cooling Water (ERCW).

This deficiency resulted from lack of concern on the part of some individual craftsmen installing the seismic pipe hangers. If the installation of base plate anchor bolts was made difficult, either by interference with reinforcing steel in the concrete or some other reason, the craftsmen used nonapproved methods to install those anchor bolts.

Safety Implications

If this deficiency had remained uncorrected, the hanger plates with deficient anchor bolts may not have been able to resist loads associated with severe seismic events. Piping systems, such as ERCW and CCS, supported by these hangers might have been damaged. Thus, the safe operation of the plant could have been adversely affected.

Corrective Action

Hangers installed by the craftsmen responsible for the improper installations that are described in our first interim report have been 100 percent inspected, and the deficient anchor bolts have been replaced. The crews responsible have left the site.

Since the initial discovery of this deficiency, the inspection of newly installed hangers has been increased from one anchor per hanger to one anchor per plate. (Typically, there are between two and eight anchors per plate and between one and three plates per hanger.) No examples of improper installation have been found since these inspection methods have been initiated.

An inspection of anchor bolts used to attach seismic pipe hanger base plates to concrete walls has been carried out on those anchor bolts

installed before this deficiency. About 300 hangers (five percent of the total installed before discovery of this deficiency) have been 100 percent inspected up to this time. Nine examples of failure to strictly follow installation procedures were noted (see below). None, however, have been found since our second interim report.

Since our first interim report, it has been determined that the deficient anchor bolts were installed by several crews assigned to install the seismic pipe hanger anchors. The six instances of improper anchor bolt installation described in the first interim report were more significant than the nine cases discovered since. The original six defective anchors as described in our first interim report had no load-carrying capability, whereas the nine cases of failure to strictly follow installation procedures discovered since our first interim report all had significant load-carrying capability. This was verified with several of these nine being subject to and successfully passing a pull test. The nine cases described above have all been replaced. TVA believes that the condition represented by the nine anchors discovered recently is not significant like the condition represented by the six defective anchors originally reported in our first interim report and, hence, does not represent a reportable condition as defined in 10 CFR 50.55(e).

Means Taken to Prevent Recurrence

TVA has provided additional instructions for craftsmen at Watts Bar Nuclear Plant who are installing pipe hanger anchor bolts in concrete. All pipe hangers that have been discovered with improperly installed anchor bolts have been replaced with properly installed anchor bolts.

TVA believes that the present program of inspection of installation of anchor bolts is adequate to discover future examples of improper installation. TVA further believes that the inspection of hangers installed before the initiation of this deficiency has proven that defective hanger anchor bolts were a problem limited to a very few craftsmen, who have since left the Watts Bar Nuclear Plant site.