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Constellation Energy
Generation Group

July 13, 2006

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

ATTENTION: Document Control Desk

SUBJECT: **R.E. Ginna Nuclear Power Plant**
Docket No. 50-244

Response to Request For Additional Information Regarding Steam Generator Tube Inspection Summary Report For The Spring 2005 Outage (TAC NO. MD1207)

By letter dated May 16, 2006, you requested additional information regarding R.E. Ginna Nuclear Power Plant, LLC's (Ginna LLC's) steam generator tube inspection summary report for the spring 2005 outage, which was submitted to the NRC on July 1, 2005. The requested information is contained in Attachment 1.

There are no new regulatory commitments within this response.

Should you have questions regarding this matter, please contact Mr. Robert Randall at (585) 771-3734, or robert.randall@constellation.com.

Very truly yours,

Mary G. Korsnick

Mary G. Korsnick

Attachment

cc: S. J. Collins, NRC
P.D. Milano, NRC
Resident Inspector, NRC (Ginna)
J. P. Spath, NYSERDA
P.D. Eddy, NYSDPS

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ATTACHMENT 1
Response to NRC Request for Additional Information on Steam Generator Tube Inspection Summary Report for 2005 Outage dated 5/16/2006

Question 1

In order to better understand the design of the replacement SGs, provide the following information: tube manufacturer, tubesheet thickness (with and without clad), smallest U-bend radius (including the row of the tube with this radius), and tube pitch.

Tube manufacturer:	Valinox
Tubesheet thickness:	25.25" (nominal, unclad), 0.375" (min) cladding
Smallest U-bend radius[1]:	3.979" (row 2[2])
Tube pitch:	1.019"

1. All tubes with bend radii less than 12" received a two-hour stress-relief at approximately 1350°F after bending.
2. The B&W replacement design uses "cross-over" tubes where low-row tubes do not run between corresponding holes on either side of the tube-free lane. This allows a greater minimum bend radius to tube diameter ratio for a given tube-free lane width, and is the reason for the non-intuitive result that row 2 has the smallest bend radius.

Question 2

In Section 2.0 of the July 1, 2005, report, the licensee indicated that one tube in SG "B" was inspected with a rotating probe because it had reported non-conformance. Describe the condition of this tube (i.e., what prompted the non-conformance report).

During preparation of the pre-outage degradation assessment in 2002, Ginna personnel reviewed B&W non-conformance report NR 10603. This NCR dealt with two tubesheet hole conditions in SG "B"; the first was an undercut that resulted in the pre-service plugging of a tube, while the second was a tubesheet hole that had several scratches on the inside diameter. This hole was buffed to remove the raised, sharp edges of the scratches and then tubed normally. Leaving this tube in service was justified since it was felt that the scratch would not affect tubeability or hydraulic expansion. It was also stated that there should not be stress-corrosion cracking concerns since the hole was on the cold-leg side.

Ginna personnel verified the data in the NCR and found that the scored tube hole was actually on the hot-leg side of the associated steam generator tubesheet. This tube was conservatively added to the special inspection list due to the increased temperatures in the hot-leg and was inspected with a qualified rotating probe technique during the 2002 and 2005 inspections. No evidence of degradation has been found.

ATTACHMENT 1
Response to NRC Request for Additional Information on Steam Generator Tube Inspection Summary Report for 2005 Outage dated 5/16/2006

Question 3

In Section 2.0, the licensee stated that, as part of its supplemental inspection, it would inspect a 20% sample of reported dings/dents with a voltage greater than or equal to 2 volts. Then, in Section 5.2.1 of the report, the licensee stated that the reporting thresholds for dings/dents in the freespan was 2.5 volts and for dings/dents in the U-bend was 5 volts. Clarify this apparent discrepancy.

The reporting criteria for dents and dings was changed for the 2005 in-service inspection to the 2.5 volt and 5 volt (U-bend) values reported in Section 5.2.1 of the report. This change was made to reduce the number of overcalls made by CDS (computer data screening) and was based on previous experience. In addition, the current bobbin coil reporting criteria are based on a larger voltage normalization than is typically used in the industry since the Ginna steam generators were replaced prior to establishment of the current industry guidance. Based on the present Ginna voltage normalization criteria, the ding / dent reporting level is typical of present industry guidelines.

The dent and ding reporting criterion was 2.0 volts in previous in-service inspections. Section 5.2.1 of the report states that "... Previous signals identified as a dent or ding, were again identified as such to maintain database consistency." Therefore the population of dents and dings in the database, which is used to determine the supplemental inspection population, contains confirmed dents and dings reported at 2.0 volts and greater, even though they are no longer called at this low level.

Note that the Ginna steam generators have not experienced any service-induced denting in the free span or at tube supports to date, nor would it be expected based on the design of the lattice grid tube support structures. The recorded population of dings and dents is small and has been consistent from inspection to inspection.

Question 4

In Section 5.2.1, the licensee stated that a restricted tube was noted with a 0.620-inch probe diameter. Describe the nature of the restriction. Include a discussion of whether the obstruction was service-induced and the extent and location of the restriction.

The tube in row 9 / column 121 of SG "A" has been called with an RES code near the U-bend apex with a 0.620-inch bobbin probe in all three in-service inspections performed prior to 2005 (1997, 1999, and 2002), so the RES code was expected.

The restriction appears to be the result of a ding. A 0.610-inch bobbin probe has been able to traverse the tube and a DNG call has been made at the subject location during all four in-service inspections. The ding has also been inspected with a qualified rotating probe technique at each in-service inspection and no defect has been found, providing adequate assurance that there is no active degradation occurring at this location.

The pre-service inspection of the Ginna replacement steam generators was primarily performed with 0.610-inch diameter probe, so no restriction would have been expected

based on the fact that a 0.610-inch diameter probe has been successfully used during subsequent in-service inspections. Although no ding was recorded during the pre-service inspection, there is no realistic mechanism that could cause an in-service freespan ding at this location, so it is felt that there is a very low probability that the ding is service-induced.

Question 5

In Section 5.0, the licensee stated that a comparison was made between all the bobbin signals meeting the current reporting criteria with the 1997 inspection results to determine if the signal was present and if it had changed in characteristics. Discuss the results of this comparison.

All bobbin signals meeting the current reporting criteria were compared side-by-side against the corresponding traces from the first in-service inspection in 1997, which had 100% bobbin scope, to verify that the signal was previously identified at the same location, and to ensure that it had not changed. To facilitate this process a special database of these signals has been maintained for comparison purposes with the Zetec Data Segment Recall software. In addition to helping identify service-induced degradation since the first in-service inspection, this historical recall capability helps to ensure that prior calls were correctly recorded (type and location).

The call as to whether a "change" has occurred, defined as a change in the signal attributes (appearance, length), a 50% increase in voltage, or a 10 degree counter-clockwise rotation, is made by a resolution analyst. Ginna experience has shown only minor signal measurement differences from inspection to inspection which are well within the repeatability of eddy current testing.

The results of these comparisons are discussed in Section 5.2.1, *Bobbin Coil Specifics*, of the report, with relevant portions excerpted below:

> DNG, DNT - ...Previous signals identified as a ding or dent, were again identified as such to maintain database consistency. All signals not reported in past inspections, were verified as present in historical data. No active denting was observed ...
>
> DSS - Previous signal identified as a "distorted support plate signal". Historical data comparison was performed and the signal was re-identified as a DSS in 2005 upon finding no change.
>
> INF / INR - SPECIFICS:
> In SG-A, 2 bobbin deposits reported in previous outages were reported as indication not reportable because the signal was not present during the 2005 inspection or was insignificant. Three bobbin deposits reported during previous outages were reported as indication not found because the deposit signal was no longer present. Two dings reported in previous outages were mislocated during those outages, and were reported as indication not reportable and the actual ding reported at the correct location. One ding was reported from 08H-2.19" and was reported as indication not

reportable and the ding reported this outage at 07C+36.65". One dent reported in previous outages was probe motion or other parasitic non-anomalous condition and was reported as indication not reportable. Finally, a manufacturing buff mark reported in previous outages was mislocated during those outages and was reported as INR this inspection and the MBM reported at the correct location.

In SG-B, one bobbin deposits reported in previous outages were reported as indication not reportable because the signal was not present during the 2005 inspection or was insignificant. Nine bobbin deposits reported during previous outages were reported as indication not found because the deposit signal was no longer present. A distorted support signal reported in the 2002 inspection was reported this outage as an indication not reportable because it did not meet the current reporting criteria. Two manufacturing buff marks reported in previous outages were mislocated during those outages and were reported as INR this inspection and the buff marks reported at their correct location. Finally, a ding reported during the 2002 inspection was mislocated during that inspection, reported as indication not found during the current inspection, and the ding reported at the correct location.

MBM - Manufacturing Burnish Mark type signals represented the majority of all signals reported in both steam generators. The reporting criteria used was >=2.5vpp on channel 6 with consideration given to a response on the P1 mix channel. S/G-A had 254 reported, of these 23 had a response on Ch. P1. S/G-B had 260 reported, of these 25 had a response on Ch. P1. All signals observed were compared to historical data to look for signal "change" for possible degradation at these locations. No changes have been noted at these manufacturing anomalies to date.

NQS - A differential bobbin coil response, having been RPC tested in a previous inspection, showing no changes in signal characteristics during this inspection was again classified as NQS. No flaw-like signals were reported at any structure or any freespan location in any steam generator.

Question 6

For SGs "A" and "B", discuss whether a foreign object search and retrieval was performed in each SG and whether the loose parts were removed from the SGs. If the parts were not removed or the locations were not visually inspected, discuss the results of any evaluations performed to ensure these parts (or suspected parts) would not result in a loss of tube integrity for the period of time between inspections. In addition, discuss whether a visual inspection was performed around the tubes in row 94/column 54 and row 93/column 55 in SG "A" to confirm the eddy-current signals were from deposits.

Foreign object search and retrieval (FOSAR) campaigns were carried out in each steam generator during the 2005 refueling outage. The focus of these inspections was the tubesheet around the periphery of the tube bundle and in the tube-free lane.

In-bundle inspections in triangular pitch steam generators are difficult due to the narrow tube-to-tube gaps. Ginna had an inter-tube inspection "blade" probe fabricated prior to

the 2005 outage and used this probe to perform limited in-bundle inspections from a hand-hole that allows access to the center lanes of the hot- and cold-legs. However, the intention of this effort was to quantify sludge loading in the hot leg and not to perform a detailed FOSAR since the inspectable area was limited. During the inspection of SG "A", a wire bristle (0.010" x 0.75") that was not seen during the eddy-current inspection was found and retrieved. An evaluation was performed by the steam generator services vendor to demonstrate that this wire would not be expected to cause any significant damage, and that under worst-case conditions a tube would not be expected to reach the plugging limit of 40% through-wall for at least seven years.

No visual inspection was performed in the vicinity of the tubes in row 94 / column 54 and row 93/ column 55 in SG "A". The possible loose part (PLP) indication in the vicinity of these tubes was previously characterized as deposit in 1999 for the row 94/column 54 tube, and in 2002 for the row 93 / column 55 tube. Since no degradation of either tube has been detected after extended operation, it was judged that the PLP was not capable of causing significant tube damage.

The July 1, 2005 report discusses the visually-confirmed PLP on the periphery of SG "B" that was contacting tubes at row 48/column 114 and row 50/column 114 at an elevation above the bottom of the downcomer shroud and below the first lattice grid support structure. Efforts to remove this metallic PLP, which was thin and pliable enough to become firmly wedged between the subject tubes, were unsuccessful. Based on the deposit that has started to build up at the points where the object contacts the tubes, the object has been in this location for some time and is no longer mobile. No degradation of the tubes has resulted from this PLP, but four tubes were conservatively staked and plugged.

Question 7

Provide a discussion if any wear indication at support structures was identified. If so, discuss the number of tubes affected and the severity of the indications.

Approximately 50% of the tubes in the Ginna steam generators have been inspected twice since being placed into service using qualified bobbin coil techniques. The remaining tubes have been inspected three times using qualified bobbin coil techniques since being placed into service. No wear indications have been detected or reported at any Ginna support structures during these inspections.

Question 8

In Section 4.4, the licensee stated that previously identified U-bend areas having tube to tube proximity signals were examined to verify that no change has occurred. Although no changes to these previously identified proximity signals were identified, discuss whether any new tube to tube proximity signals were identified. If so, discuss the number of tubes affected and the implications.

The weight of the U-bend support structure in the B&W replacement steam generator design is distributed over the outermost row of steam generator tubes at hundreds of locations by J-tabs. The J-tabs are inserted against the outermost tube then welded to the arch-bar/clamping bar assemblies with the steam generator in a horizontal position. Prior to discovery of the proximity issue, no special attention was paid to ensure proper positioning the outermost tubes before setting and welding the J-tabs. If a given tube was not properly positioned (i.e. not spaced consistently to maintain design clearances relative to the tube below it) prior to welding the J-tab, then the load applied by the associated J-tab may distort the tube shape when it is brought to the vertical position during site installation of the steam generator. It is important to note that the proximity of one tube to the tube below it may differ between the cold (inspection) condition and the normal operating temperature.

Since the proximity issue is a result of how the J-tabs were inserted during steam generator fabrication, it is not expected that the extent of the condition would change as a result of the accumulation of additional service time on the steam generators. Ginna continues to perform supplemental inspections on the tubes that were originally identified to have the proximity condition, but does not screen new tubes for the condition. To date the location and extent of the tube-to-tube proximity has been static with no change.