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Calvert Cliffs
Nuclear Power Plant

A Member of the
Constellation Energy Group

April 4, 2001

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 & 2; Docket Nos. 50-317 & 50-318
Additional Information Concerning the Containment Tendon Long-Term Corrective Action Plan (TAC Nos. MA7782 and MA7783)

REFERENCES:

(a) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated December 7, 1999, Revisions to the Containment Tendon Long-Term Corrective Action Plan

(b) Letter from Mr. A. W. Dromerick, Sr. (NRC) to Mr. C. H. Cruse (BGE), dated May 25, 2000, Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 – Request for Additional Information RE: Containment Tendon Long-Term Corrective Action Plan (TAC Nos. MA7782 and MA7783)

(c) Meeting with NRC and Calvert Cliffs Nuclear Power Plant, November 16, 2000, Regarding Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 – Containment Tendon Long-Term Corrective Action Plan

In our letter dated December 7, 1999 (Reference a), we stated we would provide the NRC a listing of the vertical tendons that will be replaced and actions that will be taken for tendons that will not be replaced. Attachment (1) provides this information and justification for the corrective actions that are planned. Attachment (1) also provides the information requested in References (b) and (c).

A001

Should you have questions regarding this matter, we will be pleased to discuss them with you.

Very truly yours,

CHC/DJM/bjd

Attachments: (1) Calvert Cliffs Nuclear Power Plant Containment Tendon Long-Term Corrective Action Plan

Enclosures:
(1) Vertical Tendon Forces at End of Plant Life (2034) -- Unit 1 (w/new tendons, low jacked)
(2) Vertical Tendon Forces at End of Plant Life (2036) -- Unit 2 (w/new tendons, low jacked)
(3) Vertical Tendon Forces at End of 2002 -- Unit 1 (w/new tendons, low jacked)
(4) Vertical Tendon Forces at End of 2002 -- Unit 2 (w/new tendons and low jacked)
(5) Updated Model for Containment Structure Vertical Tendon Degradation for Calvert Cliffs 1 and 2, Revision 1

cc: R. S. Fleishman, Esquire
J. E. Silberg, Esquire
Director, Project Directorate I-1, NRC
D. M. Skay, NRC
H. J. Miller, NRC
Resident Inspector, NRC
R. I. McLean, DNR

ATTACHMENT (1)

CALVERT CLIFFS NUCLEAR POWER PLANT CONTAINMENT

TENDON LONG-TERM CORRECTIVE ACTION PLAN

Calvert Cliffs Nuclear Power Plant, Inc.
April 4, 2001

ATTACHMENT (1)

CALVERT CLIFFS NUCLEAR POWER PLANT CONTAINMENT TENDON LONG-TERM CORRECTIVE ACTION PLAN

During the 1997 Tendon Surveillance on the Unit 1 Containment, corrosion was discovered on some vertical tendons. The inspection scope was expanded to include inspection of all the vertical tendons on both the Unit 1 and Unit 2 Containments. The inspections included performing a lift-off test as well as a visual exam under the top end stressing washer to determine the extent of the corrosion. The root cause analysis concluded that the tendon wire failures and corrosion problems resulted from combinations of water and moist air intrusion into the end caps and inadequate initial grease coverage of wires in the area just under the stressing washer, thus creating a void. To address issues identified in the root cause, short-term corrective actions were taken during the 1997 inspection and following years. These actions included spraying hot grease under the stressing washer, re-orienting the shims to leave a gap between the shims to allow a vent path to help eliminate the void, regreasing non-corroded tendons, and replacing the existing end cap with a new redesigned grease cap at the upper bearing plate to prevent water intrusion. Additional inspections were also performed during the following years to verify the assumptions that were used in the engineering evaluation and to provide additional data to help develop our long-term corrective action plan. References (1) through (6) provide more details on these short-term actions and the results of these inspections.

The goal of the long-term corrective action plan is to ensure that the Containments meet design requirements until the end-of-life. As one part of the long-term corrective action plan, all the vertical tendons will be regreased with new corrosion inhibiting grease. The non-corroded tendons were regreased in 2000 and the tendons with corrosion that are not being replaced will be regreased during 2001. The remaining vertical tendon population is scheduled to be replaced in 2002 and will have the new grease put in place at that time. In addition, all the vertical tendons will have a redesigned grease cap installed on the upper bearing plates to prevent water intrusion.

Another part of the long-term corrective action plan involves the replacement of a portion of the corroded tendon population. To determine which vertical tendons will be replaced, a selection criteria was developed. The criteria for selecting tendons for replacement is described below:

1. *Replace all tendons that currently have 2 or more broken wires.* Most of the additional broken wires discovered in 1999 were in tendons with two or more previous broken wires. Therefore, these tendons appear to be the most likely to have future broken wires. One isolated wire break in a tendon did not warrant replacement of the tendon by itself. However, it should be noted that if a tendon with a single broken wire was found to meet any of the other criteria, it was selected for replacement.
2. *Replace corroded tendons demonstrating lower lift-off forces.* This applies to all tendons that were classified as having extreme or heavy corrosion and had a lift-off force of less than 649 kips. The small additional strain imparted by lift-off testing has the potential to cause additional wire breaks, as occurred in 1997. Corroded tendons with lower than predicted lift-off forces will be replaced to eliminate the possibility of premature wire breakage during lift-off testing in future code inspections. Furthermore, replacing severely corroded tendons with low lift-off forces would prevent potential prestress losses associated with wire breakage from re-stressing of these tendons. Re-stressing tendons with low lift-off forces would increase the strain more than lift-off testing created and potentially result in an even greater number of wire breaks. All other remaining corroded tendons had a lift-off force in excess of the predicted force.
3. *Replace corroded tendons to ensure uniform distribution of prestress.* The third criteria was specific to Unit 1 since it has two tendons that were not installed and therefore has two areas with lower running force distribution. We will replace all the tendons that have extreme or heavy corrosion near the two empty tendon sheaths.

4. *Replace corroded tendons to ensure uniform distribution after accounting for prestress losses from statistical model.* This criteria ensures the loss of prestress that would result from the conservative prediction of wire breakage, would not violate design criteria at end of plant life. We applied the statistical model predictions to all of the remaining original tendons that were not replaced based on one of the first three criteria. This last criteria identified the areas around the Containments that, if the predicted wire breaks occurred, had the potential of driving the running force distribution below the minimum of 606 kips. Once those areas were identified, appropriate corroded tendons were selected for replacement until all of the running averages exceeded the 606 kip minimum at end of plant life.

Based on the selection criteria stated above, the total number of tendons that will be replaced is 46 on Unit 1 and 46 on Unit 2. This number will provide sufficient margin to ensure that design requirements of the Containments are met or exceeded through the plant license's lifetime of 2034/2036. The objective of replacing tendons is to ensure adequate gross and localized prestress at the end-of-life. We recognize that there is a possibility that a condition exists which could prevent the replacement of select tendons. The goal is to replace 46 tendons on each unit, but if conditions exist where replacement of a tendon is not possible, the situation will be evaluated to determine if additional re-stressing is required to compensate for this condition. The replacement is scheduled to be completed by December 31, 2002. If however, conditions exist, such as poor weather, that do not allow safe and event free maintenance on top of the Containments, we will complete the replacement work as close to the original planned date as possible.

Enclosures (1) and (2) contain a list of vertical tendons for Unit 1 and Unit 2 and show the exact locations of tendons that will either be replaced or re-stressed. In the tendon ID column of these enclosures, tendons that will be replaced are depicted with "new" after the tendon number, and those that will be re-stressed are depicted with "jack".

The Design Basis calculation for the Unit 1 and 2 Containments requires a minimum gross prestress in the vertical direction of 123,620 kips to satisfy all concrete and reinforcing steel stress allowables during all design loading conditions. The minimum vertical gross prestress value equates to a minimum required running force distribution of 606 kips at each of the available 204 vertical tendon locations (or 204 sheaths in Unit 1's case). Enclosures (1) through (4) are spreadsheets that were used to determine the amount of Unit 1 and 2 Containment Vertical Prestress available at years 2002, 2034, and 2036.

To further explain the attached spreadsheets:

- Enclosures (1) and (2) calculate the predicted gross and running force distribution vertical prestress available for the Unit 1 and 2 Containments at the end of their operating license on July 31, 2034 and August 13, 2036. The spreadsheets account for the corrective actions of re-stressing and replacing tendons during 2002. In addition, the spreadsheets consider the prestress losses caused by relaxation and a conservative amount of predicted wire breaks.
- Enclosures (3) and (4) calculate the predicted gross and running force distribution vertical prestress available for the Unit 1 and 2 Containments at the time of completion of the corrective actions of re-stressing and replacing selected tendons. The re-stressing and replacement of selected tendons on the Unit 1 and 2 Containments is scheduled to be completed by the end of 2002. Enclosures (3) and (4) do not consider any future predicted tendon wire breaks and future prestress losses due to concrete creep, shrinkage, elastic shortening, and tendon wire relaxation. The spreadsheets only predict the conditions immediately following the completion of the tendon corrective actions of re-stressing and replacement. The columns referring to 1997 and 2002 lift-

off force and effective wires are meant to depict tendon status for remaining vertical tendons with 1997 data, and new tendons representing 2002 data.

The Enclosures (1) through (4) spreadsheets were used to aid in determining which tendons were selected for re-stressing and replacement on each of the Containments. It has been determined than 46 tendons on each Containment will be replaced. Should minor numerical changes be made to the spreadsheets that do not change the total number and identity of individual tendons selected to be replaced, we do not intend to re-submitted this information to reflect the changes to Enclosures (1) through (4). If the number and location of tendons selected for replacement change in the future, we will provide this information in writing to the NRC.

Table 1 provides a summary of conditions for both units in 2002, 2034 for Unit 1, and 2036 for Unit 2. The table is intended to provide a comparison of required and predicted gross prestress and a comparison of required and predicted mean average force per tendon sheath distribution. Enclosures (1) through (4) were utilized in the development of the table and should be referenced for additional information, if desired. These enclosures contain all of the necessary information regarding predicted relaxation losses, predicted wire breaks, and predicted running force distributions at specific locations throughout the Containment, not just the mean average force per tendon sheath.

To further explain Table 1:

- The first line lists the minimum requirements to satisfy the design basis.
- Line 2 depicts the prestresses at the end of 2002 for Unit 1 and Unit 2 as predicted by the original design of the vertical tendon system. The respective data considers the prestress losses associated with relaxation only, and does not consider potential wire breaks.
- Line 3 represents the prestress data following corrective actions of re-stressing and replacing tendons and incorporating prestress losses due to relaxation only. Comparing Lines 2 and 3 shows that the predicted margins after the planned corrective actions far exceed the original design margins for 2002.
- Line 4 of the table represents the predicted prestress for the Containments in 2034/2036. These values were extrapolated using the original design equations but do not account for wire breaks or corrective actions such as tendon replacement or re-stressing. These values can therefore be considered the "original design" margins we would expect at the end of the operating licenses in 2034 and 2036, if tendon corrosion and wire breakage had never occurred.
- Line 5 denotes the predicted prestress values following planned corrective actions of re-stressing and replacing tendons while accounting for prestress losses associated with relaxation and a conservative amount of predicted wire breaks. Comparing Lines 4 and 5, there is minimal difference between the original design margins and the predicted margins affected by potential future wire breaks. Note that the margins in Line 5 are based on a very conservative prediction of wire breakage. The actual prestress losses caused by wire breakage are expected to be much smaller. Calvert Cliffs Nuclear Power Plant (CCNPP) expects that future tendon inspection data will result in a revision to the statistical model resulting in far less predicted wire breaks than currently assumed, allowing the predicted margin at the end of the extended operating licenses to approach or exceed the original design margin.

Table 1 – Prestress Comparison in Vertical Tendons System
(Values in kips)

	Unit 1				Unit 2			
	Gross Prestress	Mean Average Force per Tendon Sheath	Gross Margin	Mean Average Force per Tendon Sheath Margin	Gross Prestress	Mean Average Force per Tendon Sheath	Gross Margin	Mean Average Force per Tendon Sheath Margin
1. Design Basis	123,620	606	N/A	N/A	123,620	606	N/A	N/A
2. Predicted Prestress in 2002. No replacements, no re-stressing, no wire breaks. Original tendon design.	130,694	641	7074	35	131,988	647	8368	41
3. Predicted Prestress After 2002 Corrective Actions. Includes replacements, includes re-stressing, no wire breaks.	143,362	703	19,742	97	142,653	699	19,033	93
4. Predicted Prestress at 2034 and 2036. No replacements, no re-stressing, no wire breaks. Original tendon design.	129,280	634	5660	28	130,560	640	6940	34
5. Predicted Prestress at 2034 and 2036. Includes replacements, includes re-stressing, includes wire breaks.	128,684	631	5,064	25	127,573	625	3,953	19

ENHANCED INSPECTIONS

The future inspection of the vertical tendons is a two-tiered approach. First, code inspections, done every five-years, will be performed as required by the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section XI, Subsection IWL. Calvert Cliffs Nuclear Power Plant will conduct testing on the replacement tendons as required by the current ASME Code, the 1992 Edition through the 1992 Addenda. Second, enhanced inspections will be performed to examine the tendons for potential wire breaks. It is these latter inspections that will be discussed in more detail.

The goal of enhanced inspections is to validate if the actual conditions of the containment tendons are within the conditions predicted by the statistical model. By ensuring that the model bounds existing field conditions, we are ensuring that the design requirements, as affected by corrosion of the vertical tendons continue to be met. To accomplish the enhanced inspections, the anchorhead/buttonhead region should be examined to determine if any wire breaks have occurred in the area under the vertical tendon top stressing washers.

By the end of 2005, we will complete an enhanced inspection of the vertical tendons. Based on existing information, a minimum of 16 randomly selected remaining original tendons on Unit 1 and 23 randomly

selected remaining original tendons on Unit 2 will be inspected. These minimum numbers are derived statistically and represent the amount of inspection data necessary to provide a 95% confidence that the actual fraction of broken tendon wires [from both hydrogen-induced cracking (HIC) and general corrosion] is less than or equal to the statistical model-predicted fraction.

By the end of 2007, we must complete the 30-year tendon surveillance. Concurrent with that surveillance, we will complete an enhanced inspection of the vertical tendons. Based on existing information, a minimum of 10 randomly selected remaining original tendons on Unit 1 and 13 randomly selected remaining original tendons on Unit 2 would be inspected. These minimum numbers are, again, intended to ensure that a 95% confidence exists that the actual fraction of broken tendons wires (from both HIC and general corrosion) is less than or equal to the statistical model-predicted fraction.

In 2007, following results of the code and enhanced inspections, we will assess the need to continue with enhanced inspections. This assessment will determine if enhanced inspections need to continue every two to three years and determine if the code inspections would be adequate in determining whether the statistical model provides a bounding prediction of future wire breaks for the vertical tendons. Factors that will determine how often the enhanced inspections should be completed and the number of tendons that should be inspected are:

1. Has the statistical model continued to bound field conditions in 2005 and 2007?
2. Has the statistical minimum sample size for 95% confidence become the same or less than the sample size required by the next required code inspections?

If both answers are yes, then, as a minimum, the code required inspection program will envelop the enhanced inspections. If the model continues to bound field conditions, but require more of a sample than that provided by code population, the enhanced inspection frequency will be changed to a five-year span and the required number of inspections completed concurrently with the code inspections.

Calvert Cliffs has done some preliminary work to evaluate if radiography provides accurate results when looking for potential broken wires. This new methodology appears to allow a faster and less invasive inspection than currently accomplished by removing the end cap, removing a portion of the grease, and then examining the buttonhead area for wire breaks. In order to validate that radiography provides as accurate a depiction of tendon wire status as the current visual exam does, radiography will be conducted over the next two years. In both 2001 and 2002, during the regreasing and replacement of tendons, radiography will be conducted on a portion of the tendons. These same tendons will then be visually inspected during their respective regreasing or replacement. A detailed comparison of the radiography and visual results would then be made, to verify that data from radiography is as complete and accurate as data from visual examinations. We have successfully performed some initial testing using radiography and found it to be as accurate as the visual examinations. If radiography continues to provide accurate results, it could be relied on to conduct future enhanced inspections.

We currently plan to complete the 50.59 process to determine if the final condition for the Containments requires a license amendment by June 1, 2001. If a submittal is required, we should be able to complete the license amendment request process by September 30, 2001.

REVISED WEIBULL MODEL

A summary of changes to the Containment Tendon Statistical Model is as follows:

The statistical model for vertical tendon degradation was modified in the year 2000. A review of tendon wire breakage data from 1997 showed that a significant number of wire breaks were discovered immediately after lift-off testing. In previous statistical models, these lift-off-induced failures were included in the total number of tendons affected and wires broken in 1997. Virtually all of these lift-off-induced wire breaks occurred in wires with general corrosion, where there was significant thinning of the wire cross-section. No general corrosion induced wire failures have been discovered since 1997 leading to the speculation that general corrosion breaks that would have occurred after 1997 were accelerated and occurred in 1997. We thus experienced a "delay period" between 1997 and 2000 during which general corrosion failures were artificially suppressed. The overall effect of accelerating these wire failures is to reduce the apparent rate of increase of wire breaks between 1997 and 2000. To conservatively account for this possibility, we developed the 2000 model assuming that none of the lift-off induced wire breaks would have occurred in 1997 without lift-off. It is likely that the lift-off induced failures would have occurred over a period of years following 1997; however, we cannot quantify the length of this period. No general corrosion failures have been observed between 1997 and 2000; therefore, we assumed the liftoff induced failures would all occur by 2000. (If the delay period were over, we would expect to see the resumption of general corrosion induced failures.)

The new model (Enclosure 5) is based on the same assumptions inherent in the 1999 model, i.e.:

- The Units 1 and 2 vertical tendons are behaving similarly in terms of numbers of affected tendons and numbers of broken wires.
- The additional failed tendon wires found by the 1999 inspection represent continuing degradation that has not been arrested by the short-term remedial actions performed following the 1997 inspections.
- The observed failures are the leading edge of a Weibull distribution of failures. This implies the rate at which additional tendons develop broken wires will increase as the peak of the distribution is approached. (This is a conservative assumption because the failure rate may actually decrease with time as a result of the remedial actions taken, and future remedial actions.)
- The distribution of the number of broken wires per affected tendon can be modeled by a Gamma distribution.
- The mean and variance of the number of broken wires per affected tendon will continue to increase at a linear rate determined from the increase between 1997 and 1999.

The two major areas of change between the 1999 and 2000 models can be summarized as follows:

1. Separate models have been developed for tendon wire failures caused by general corrosion and hydrogen induced cracking.
2. The general corrosion model accounts for the possibility that wire breakage was accelerated by lift-off testing in 1997.

The additional assumption made in developing the 2000 model is:

- All wire failures discovered since the completion of lift-off testing were accelerated by the lift-off test, and in the absence of lift-off testing would have occurred by the time of the 2000 inspection.

The revised statistical model is based on data from three inspections: 1997, 1999, and 2000. Only during 1997 were 100% of the vertical tendons inspected at one time. In 1999 we inspected all tendons categorized as severely corroded or having broken wires, while in 2000 we inspected all tendons without severe corrosion or broken wires. For the HIC model, the 1999 and 2000 inspection data points were effectively combined; while for general corrosion, since no new general corrosion failures were discovered in either 1999 or 2000, the 2000 data point is an artificial one created by the assumption described above.

Table 2 compares the statistical model parameters for the 1999 and 2000 models. Figures 1 and 2 show the changes to the predicted tendon status when comparing the 1999 and 2000 models. Increases in the Weibull slope b and decreases in the characteristic time θ cause the fraction of tendons affected to grow more rapidly. The slope b has slightly decreased and the characteristic time θ has slightly increased for the general corrosion model as compared to the 1999 model, while the b and θ parameters for HIC are much smaller and larger, respectively. The reason for the large b and small θ in 1999 is that these are based on a 95% confidence interval upper bound data slope necessitated by a random sample inspection. The changes in b and θ result in the fraction of affected tendons growing slightly less rapidly. However, the assumption that the lift-off-induced failures occurred by 2000 results in a more rapid increase in the mean number of wires broken per affected tendon (Δm), which accounts for the much larger number of wires broken at the end-of-life. The last three columns in Table 2 provide the predictions of the number of affected tendons and broken wires for three different years of the two models without any corrective action. Note that with replacement of the most degraded tendons scheduled to occur by the end of 2002, the actual numbers of broken wires in 2014 and 2036 would be less.

Table 2 – Comparison of Statistical Model Parameters in 1999 and 2000 Models

Model	GC+HIC			GC			HIC			Predicted # Affected Tendons/Broken Wires		
	b	θ	Δm	b	θ	Δm	b	θ	Δm	2002	2014	2036
1999	7.5	32	0.052	N/A	N/A	N/A	N/A	N/A	N/A	80/450	204/1137	204/1380
2000	N/A	N/A	N/A	7.132	40.9	0.237	0.836	702	0.103	30/157	141/1233	204/2714

Δm = change in mean number of broken wires per affected tendon, per year
GC = general corrosion
HIC = hydrogen-induced cracking

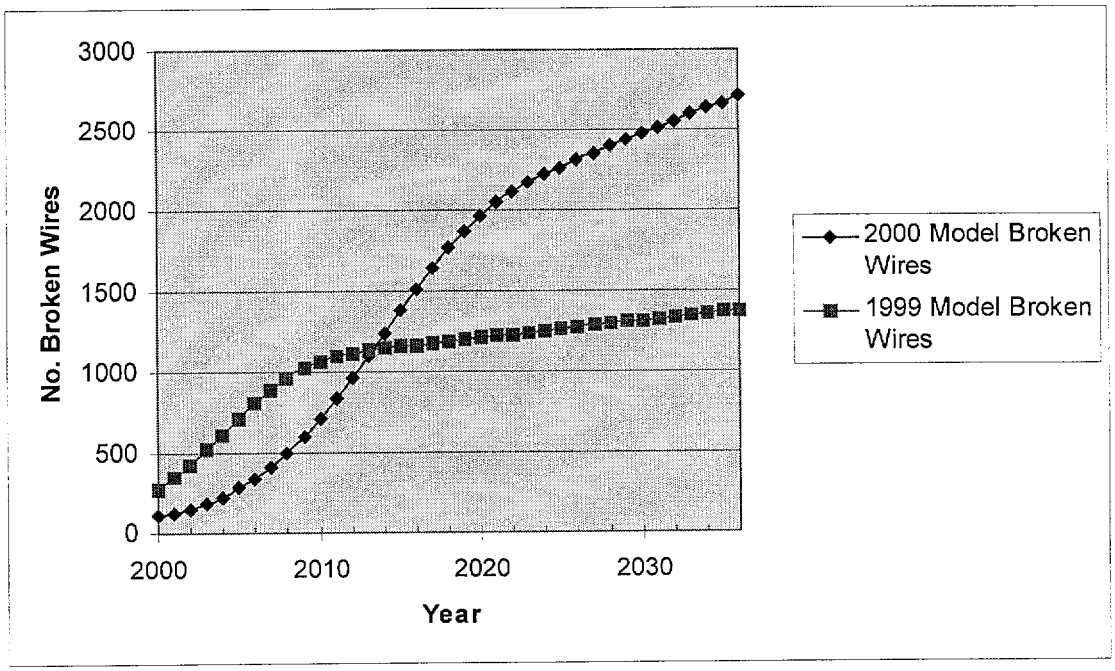

Figure 1 – Graphical Comparison of 1999 and 2000 Weibull Models Number of Broken Wires

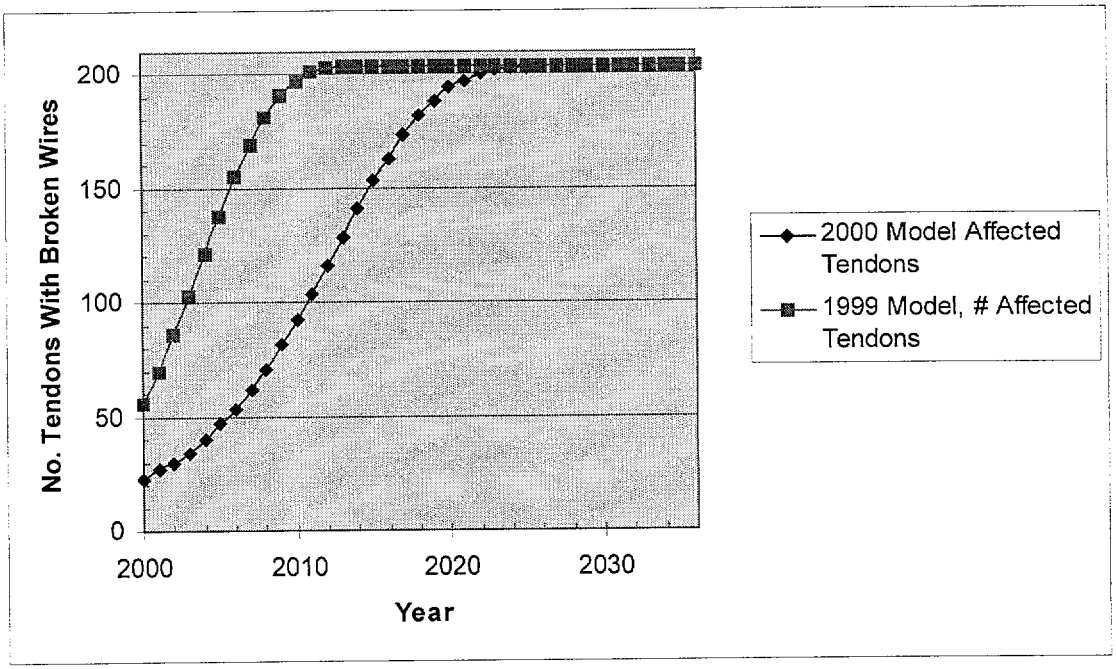

Figure 2 –Comparison of 1999 and 2000 Weibull Models Number of Tendons with Broken Wires

Regarding the general corrosion portion of the statistical model, the assumption that all lift-off-induced wire breaks occur by 2000 results in a prediction of more rapid increase in degradation than predicted by the 1999 model. The assumption that all lift-off-induced wire failures would have occurred by 2000 is conservative because these failures may well have actually occurred over a much longer period.

Regarding the HIC portion of the statistical model, because only one tendon with no previous broken wires has developed a broken wire caused by HIC since 1997, and no HIC breaks were accelerated by the lift-off test, the Weibull parameters result in relatively slow growth in the number of affected tendons. The rate of increase in the mean number of broken wires per affected tendon is also relatively low.

The revised model assumes that HIC and general corrosion failures can occur in the same tendon. A convolution algorithm is used to determine the total number of wire breaks, rather than simply adding the totals for HIC and general corrosion.

The following is our response to the Request for Additional Information transmitted to us on September 20, 2000.

NRC REQUEST

Since the extended model for containment building vertical tendon degradation for Calvert Cliffs Unit 1 and Unit 2 discussed in Attachment 1 to Reference 6 is based on minimal data (i.e., limited data from 1997 and 1999 inspections) and several unverified assumptions, staff considers it is neither appropriate nor acceptable to rely solely upon the results of the model prediction in defining Calvert Cliff's containment tendon long-term corrective action plan. The staff believes that it is essential for Calvert Cliffs to implement periodic future inspections of reasonable scope and frequency to verify that the model consistently predicts an upper bound to actual Calvert Cliffs' tendon degradation experience. Therefore, the licensee is requested to provide a periodic future inspection program with discussion of basis for the problem contents which will amply fulfill the above noted need for verification.

As part of the information request, please indicate the completion status of your planned summer 2000 inspection which you expected to complete your evaluation by October 2000. As appropriate, discuss how did the latest inspection data verify the expected upper bound characteristics of the model.

CCNPP RESPONSE:

In the December 7, 1999 letter, Calvert Cliffs stated that regreasing and visual inspections for broken wires at the upper tendon anchorage on tendons that did not have severe corrosion identified during the 1997 inspections would be completed by December 31, 2000. This work is completed. New, redesigned upper end caps were installed when each of the 253 vertical tendons were regreased with new, Visconorust P-4 grease.

During the 2000 inspections, there were no additional broken wires due to corrosion identified in the upper tendon anchorage. In addition, approximately 13 severely corroded tendons were inspected when their grease caps were replaced, and they too exhibited no new wire failures due to corrosion. The 1999 version of the statistical model in your reference, which assumes that regreasing efforts have not been effective in reducing the rate of corrosion, predicted that by 2000 there would be ~340 cumulative broken wires on each unit. To date, Unit 1 has 110 wires broken due to corrosion and Unit 2 has 117 wires broken due to corrosion. The statistical model currently bounds actual field conditions.

The future inspection program is discussed in detail above.

NRC REQUEST

With respect to the third paragraph, Page 8 of Reference 2, Calvert Cliffs stated that "Depending on the results of the engineering analysis, replacement may be any number between 0 and 153 vertical tendons identified during the 1997 inspection to be severely corroded." Please discuss specific criteria to be used in deciding the final percentage of tendons to be replaced and the basis thereof. Also confirm that the corrective action schedules describe in the fourth paragraph of the same page will be maintained by Calvert Cliffs.

CCNPP RESPONSE:

The specific criteria that were developed to determine the number of vertical tendons that will be replaced is discussed in detail above. The corrective action schedule continues to match the previously submitted schedule, subject to comments made previously in this letter.

REFERENCES:

(1) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated August 28, 1997, Containment Tendon Surveillance – 30-Day Report

(2) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated October 28, 1997, Containment Tendon Engineering Evaluation Report

(3) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated May 14, 1998, Containment Tendon Long-Term Corrective Action Plan

(4) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated August 20, 1998, Response to Verbal Request Regarding Containment Tendon Long-Term Corrective Action Plan

(5) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated December 7, 1999, Revisions to the Containment Tendon Long-Term Corrective Action Plan

(6) Letter from Mr. C. H. Cruse (BGE) to NRC Document Control Desk, dated July 24, 2000, Response to Request for Additional Information Concerning the Containment Tendon Long-Term Corrective Action Plan (TAC Nos. MA7782 and MA 7783)

ENCLOSURE (1)

Vertical Tendon Forces at End of Plant Life (2034)

Unit 1

Calvert Cliffs Nuclear Power Plant, Inc.
April 4, 2001

ENCLOSURE (1)

Based on Calculated Prestress Losses

Unit 1 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
1	12V01	748.5	712	90	0	5	7.9111	0.1	7.8111	663.94	26.89	631.59
2	12V02(new)	724.76	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	626.42
3	12V03(new)	739.12	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	621.07
4	12V04	757.85	662	90	0	13	7.3556	0.1	7.2556	558.68	-78.37	616.76
5	12V05	757.85	692	90	0	45	7.6889	0.1	7.5889	341.50	-295.55	613.41
6	12V06(jack)	745.34	700	90	0	1	7.7778	0.55	7.2278	643.27	6.22	611.28
7	12V07(new)	754.73	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	610.31
8	12V08	754.73	714	90	0	45	7.9333	0.1	7.8333	352.50	-284.55	610.38
9	12V09(new)	726.67	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	611.42
10	12V10	729.78	707	90	0	5	7.8556	0.1	7.7556	659.22	22.17	611.59
11	12V11DE	743.4	669	90	0	5	7.4333	0.1	7.3333	623.33	-13.72	613.38
12	12V12	740.16	665	89	0	5	7.4719	0.1	7.3719	619.24	-17.81	613.58
13	12V13(new)	723.55	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	614.18
14	12V14	723.55	697	90	0	5	7.7444	0.1	7.6444	649.78	12.73	614.64
15	12V15	757.85	691	89	0	5	7.7640	0.1	7.6640	643.78	6.73	614.38
16	12V16	736.02	668	90	0	5	7.4222	0.1	7.3222	622.39	-14.66	614.17
17	12V17(new)	754.73	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	613.94
18	12V18(jack)	735.97	700	89	0	5	7.8652	0.55	7.3152	614.47	-22.58	613.79
19	12V19	757.85	710	90	0	45	7.8889	0.1	7.7889	350.50	-286.55	614.24
20	12V20	748.5	734	90	0	5	8.1556	0.1	8.0556	684.72	47.67	614.23
21	12V21(new)	736.02	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	614.34
22	12V22	739.14	725	90	0	13	8.0556	0.1	7.9556	612.58	-24.47	614.82
23	12V23(new)	748.5	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	615.05
24	12V24	739.14	716	90	0	5	7.9556	0.1	7.8556	667.72	30.67	615.19
25	12V25DE(new)	745	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	615.61
26	12V26	742.26	705	90	0	5	7.8333	0.1	7.7333	657.33	20.28	613.84
27	12V27	745.38	684	90	0	13	7.6000	0.1	7.5000	577.50	-59.55	612.32
28	12V28	757.85	720	89	0	5	8.0899	0.1	7.9899	671.15	34.10	612.28
29	12V29	751.62	730	90	0	45	8.1111	0.1	8.0111	360.50	-276.55	611.74
30	12V30(new)	736.02	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	612.46
31	12V31	729.78	726	90	0	45	8.0667	0.1	7.9667	358.50	-278.55	614.54
32	12V32	736.02	693	90	0	5	7.7000	0.1	7.6000	646.00	8.95	617.51

(NI) = Never Installed
Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (1)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
33	12V33(new)	742.26	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	620.81
34	12V34	736.02	733	90	0	5	8.1444	0.1	8.0444	683.78	46.73	624.25
35	23V01	742.26	716	90	0	5	7.9556	0.1	7.8556	667.72	30.67	627.77
36	23V02	748.5	725	89	0	5	8.1461	0.1	8.0461	675.87	38.82	630.81
37	23V03	748.5	725	90	0	13	8.0556	0.1	7.9556	612.58	-24.47	633.27
38	23V04	736.02	738	90	0	5	8.2000	0.1	8.1000	688.50	51.45	635.89
39	23V05	742.26	709	90	0	13	7.8778	0.1	7.7778	598.89	-38.16	639.13
40	23V06DE	730.9	659	90	0	13	7.3222	0.1	7.2222	556.11	-80.94	640.90
41	23V07(new)	736.02	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	643.10
42	23V08	754.73	723	89	0	5	8.1236	0.1	8.0236	673.98	36.93	645.52
43	23V09	739.14	706	88	0	5	8.0227	0.1	7.9227	657.59	20.54	647.60
44	23V10	754.73	704	90	0	1	7.8222	0.1	7.7222	687.28	50.23	649.64
45	23V11DE	741.8	650	89	0	5	7.3034	0.1	7.2034	605.08	-31.97	651.40
46	23V12DE	745	707	90	0	1	7.8556	0.1	7.7556	690.24	53.19	652.82
47	23V13	748.5	685	90	0	1	7.6111	0.1	7.5111	668.49	31.44	654.09
48	23V14	757.85	708	90	0	1	7.8667	0.1	7.7667	691.23	54.18	654.63
49	23V15	748.5	724	90	0	1	8.0444	0.1	7.9444	707.06	70.01	655.55
50	23V16	754.73	721	90	0	1	8.0111	0.1	7.9111	704.09	67.04	654.56
51	23V17(new)	748.5	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	654.31
52	23V18	739	650	89	0	1	7.3034	0.1	7.2034	633.90	-3.15	652.62
53	23V19DE(jack)	748.1	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	650.96
54	23V20	736.02	704	90	0	5	7.8222	0.1	7.7222	656.39	19.34	649.33
55	23V21DE(jack)	729.4	700	89	0	5	7.8652	0.55	7.3152	614.47	-22.58	647.96
56	23V22DE(jack)	749.7	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	647.08
57	23V23DE	741.9	689	90	0	5	7.6556	0.1	7.5556	642.22	5.17	646.79
58	23V24DE	738.7	672	90	0	5	7.4667	0.1	7.3667	626.17	-10.88	643.69
59	23V25DE(jack)	729.4	700	89	0	5	7.8652	0.55	7.3152	614.47	-22.58	643.35
60	23V26	748.5	690	90	0	1	7.6667	0.1	7.5667	673.43	36.38	643.56
61	23V27	748.5	709	90	0	5	7.8778	0.1	7.7778	661.11	24.06	643.25
62	23V28(jack)	739.14	700	90	0	1	7.7778	0.55	7.2278	643.27	6.22	642.67
63	23V29(new)	739.14	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	641.92
64	23V30	748.5	696	90	0	5	7.7333	0.1	7.6333	648.83	11.78	641.02

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Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (1)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
65	23V31	748.5	678	90	0	5	7.5333	0.1	7.4333	631.83	-5.22	640.30
66	23V32	714.19	698	89	0	5	7.8427	0.1	7.7427	650.39	13.34	639.01
67	23V33(new)	736.02	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	637.66
68	23V34	745.44	680	90	0	5	7.5556	0.1	7.4556	633.72	-3.33	635.42
69	34V01(jack)	732.57	700	89	0	5	7.8652	0.55	7.3152	614.47	-22.58	633.38
70	34V02(jack)	739	700	90	0	1	7.7778	0.55	7.2278	643.27	6.22	631.00
71	34V03	755.08	678	90	0	1	7.5333	0.1	7.4333	661.57	24.52	628.54
72	34V04	758.29	720	90	0	1	8.0000	0.1	7.9000	703.10	66.05	625.41
73	34V05(new)	745.44	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	621.94
74	34V06(jack)	751.87	700	90	0	1	7.7778	0.55	7.2278	643.27	6.22	617.91
75	34V07(new)	758.29	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	614.68
76	34V08	758.29	698	89	0	5	7.8427	0.1	7.7427	650.39	13.34	612.12
77	34V09(NI)	0	0	0	0	0	0.0000	0	0.0000	0.00	-637.05	611.00
78	34V10	723.5	682	90	0	5	7.5778	0.1	7.4778	635.61	-1.44	611.46
79	34V11(new)	726.6	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	613.58
80	34V12	758.29	704	90	0	5	7.8222	0.1	7.7222	656.39	19.34	616.50
81	34V13DE(jack)	743.5	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	620.17
82	34V14DE	745	662	90	0	5	7.3556	0.1	7.2556	616.72	-20.33	622.70
83	34V15	745.44	699	90	0	5	7.7667	0.1	7.6667	651.67	14.62	626.32
84	34V16(new)	758.29	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	629.22
85	34V17	759.29	681	90	0	1	7.5667	0.1	7.4667	664.53	27.48	632.14
86	34V18	758.29	688	90	0	1	7.6444	0.1	7.5444	671.46	34.41	634.65
87	34V19	745.44	699	90	0	20	7.7667	0.1	7.6667	536.67	-100.38	636.74
88	34V20	758.29	702	90	0	1	7.8000	0.1	7.7000	685.30	48.25	638.68
89	34V21	751.87	690	90	0	5	7.6667	0.1	7.5667	643.17	6.12	639.89
90	34V22	758.29	736	90	0	1	8.1778	0.1	8.0778	718.92	81.87	640.90
91	34V23(new)	745.44	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	641.33
92	34V24(new)	748.65	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	640.92
93	34V25(jack)	751.87	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	640.31
94	34V26	745.44	720	90	0	1	8.0000	0.1	7.9000	703.10	66.05	639.10
95	34V27	751.87	697	90	0	5	7.7444	0.1	7.6444	649.78	12.73	636.94
96	34V28	751.87	738	90	0	5	8.2000	0.1	8.1000	688.50	51.45	634.68

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Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (1)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
97	34V29	755.08	694	90	0	5	7.7111	0.1	7.6111	646.94	9.89	634.01
98	34V30	751.87	689	89	0	1	7.7416	0.1	7.6416	672.46	35.41	630.31
99	34V31	751.87	682	90	0	5	7.5778	0.1	7.4778	635.61	-1.44	626.48
100	34V32	751.87	698	90	0	5	7.7556	0.1	7.6556	650.72	13.67	622.92
101	34V33	751.87	680	90	0	45	7.5556	0.1	7.4556	335.50	-301.55	620.21
102	34V34	758.29	689	90	0	1	7.6556	0.1	7.5556	672.44	35.39	618.28
103	45V01	732.59	708	90	0	20	7.8667	0.1	7.7667	543.67	-93.38	616.59
104	45V02	748.65	674	90	0	1	7.4889	0.1	7.3889	657.61	20.56	615.79
105	45V03	751.87	670	90	0	5	7.4444	0.1	7.3444	624.28	-12.77	615.80
106	45V04(jack)	732.59	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	616.28
107	45V05	751.83	665	90	0	5	7.3889	0.1	7.2889	619.56	-17.49	617.71
108	45V06	745.44	686	90	0	20	7.6222	0.1	7.5222	526.56	-110.49	618.77
109	45V07	739.01	684	90	0	5	7.6000	0.1	7.5000	637.50	0.45	620.34
110	45V08DE	746.7	680	90	0	5	7.5556	0.1	7.4556	633.72	-3.33	621.47
111	45V09	742.23	654	89	0	5	7.3483	0.1	7.2483	608.86	-28.19	623.17
112	45V10DE(new)	746.8	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	624.66
113	45V11	739.01	686	90	0	5	7.6222	0.1	7.5222	639.39	2.34	625.90
114	45V12DE	740.5	652	89	0	5	7.3258	0.1	7.2258	606.97	-30.08	626.48
115	45V13	739.01	679	90	0	1	7.5444	0.1	7.4444	662.56	25.51	627.82
116	45V14	739.01	663	89	0	5	7.4494	0.1	7.3494	617.35	-19.70	628.67
117	45V15	744.8	694	90	0	5	7.7111	0.1	7.6111	646.94	9.89	629.42
118	45V16	745.44	686	90	0	5	7.6222	0.1	7.5222	639.39	2.34	630.15
119	45V17(jack)	739.01	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	630.92
120	45V18	745.44	680	90	0	5	7.5556	0.1	7.4556	633.72	-3.33	631.91
121	45V19	732.59	683	89	0	5	7.6742	0.1	7.5742	636.23	-0.82	633.81
122	45V20DE	743.5	705	90	0	20	7.8333	0.1	7.7333	541.33	-95.72	635.09
123	45V21	732.59	659	88	0	5	7.4886	0.1	7.3886	613.26	-23.79	637.09
124	45V22DE(new)	746.6	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	638.58
125	45V23(new)	739.01	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	640.00
126	45V24DE	743.5	737	90	0	5	8.1889	0.1	8.0889	687.56	50.51	641.27
127	45V25	739.01	738	89	0	5	8.2921	0.1	8.1921	688.14	51.09	641.88
128	45V26	745.44	760	90	0	5	8.4444	0.1	8.3444	709.28	72.23	642.16

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Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (1)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
129	45V27	758.29	726	90	0	13	8.0667	0.1	7.9667	613.43	-23.62	641.36
130	45V28	732.59	738	90	0	5	8.2000	0.1	8.1000	688.50	51.45	640.18
131	45V29	745.44	673	90	0	5	7.4778	0.1	7.3778	627.11	-9.94	638.93
132	45V30	758.29	737	90	0	20	8.1889	0.1	8.0889	566.22	-70.83	637.50
133	45V31	745.44	715	89	0	20	8.0337	0.1	7.9337	547.43	-89.62	636.49
134	45V32	745.44	775	90	0	5	8.6111	0.1	8.5111	723.44	86.39	635.66
135	45V33	758.29	710	90	0	5	7.8889	0.1	7.7889	662.06	25.01	634.99
136	45V34	732.57	671	90	0	5	7.4556	0.1	7.3556	625.22	-11.83	634.32
137	56V01	758.29	702	90	0	5	7.8000	0.1	7.7000	654.50	17.45	632.31
138	56V02(jack)	745.44	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	631.16
139	56V03	758.29	666	90	0	5	7.4000	0.1	7.3000	620.50	-16.55	630.63
140	56V04	755.08	692	90	0	20	7.6889	0.1	7.5889	531.22	-105.83	630.38
141	56V05(new)	758.29	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	630.27
142	56V06	739.01	707	90	0	5	7.8556	0.1	7.7556	659.22	22.17	630.62
143	56V07	745.44	679	90	0	5	7.5444	0.1	7.4444	632.78	-4.27	630.65
144	56V08	758.29	660	90	0	5	7.3333	0.1	7.2333	614.83	-22.22	630.29
145	56V09(new)	758.29	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	629.92
146	56V10	751.87	691	90	0	5	7.6778	0.1	7.5778	644.11	7.06	629.38
147	56V11	732.59	676	90	0	5	7.5111	0.1	7.4111	629.94	-7.11	628.15
148	56V12(jack)	759.29	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	627.34
149	56V13	783	657	91	0	5	7.2198	0.1	7.1198	612.30	-24.75	627.05
150	56V14(jack)	759.29	700	90	0	5	7.7778	0.55	7.2278	614.36	-22.69	626.27
151	56V15(jack)	758.29	700	88	0	5	7.9545	0.55	7.4045	614.58	-22.47	625.37
152	56V16	739.01	663	90	0	1	7.3667	0.1	7.2667	646.73	9.68	624.98
153	56V17DE	746.7	650	88	0	1	7.3864	0.1	7.2864	633.91	-3.14	624.95
154	56V18DE	746.7	717	90	0	1	7.9667	0.1	7.8667	700.13	63.08	624.48
155	56V19	751.87	680	86	0	5	7.9070	0.1	7.8070	632.37	-4.69	624.77
156	56V20	745.44	722	90	0	45	8.0222	0.1	7.9222	356.50	-280.55	625.15
157	56V21	758.29	696	90	0	13	7.7333	0.1	7.6333	587.77	-49.28	626.51
158	56V22(new)	751.87	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	628.36
159	56V23	758.29	717	90	0	1	7.9667	0.1	7.8667	700.13	63.08	630.53
160	56V24	758.29	721	90	0	5	8.0111	0.1	7.9111	672.44	35.39	632.86

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Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (1)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
161	56V25	758.29	715	90	0	5	7.9444	0.1	7.8444	666.78	29.73	634.18
162	56V26(new)	758.29	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	635.12
163	56V27(jack)	758.29	700	90	0	1	7.7778	0.55	7.2278	643.27	6.22	635.61
164	56V28(new)	745.44	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	632.67
165	56V29(new)	751.87	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	631.50
166	56V30	745.44	693	90	0	20	7.7000	0.1	7.6000	532.00	-105.05	630.52
167	56V31(new)	745.44	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	629.71
168	56V32(new)	751.87	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	629.23
169	56V33(jack)	751.87	700	89	0	5	7.8652	0.55	7.3152	614.47	-22.58	628.72
170	56V34	751.87	700	90	0	20	7.7778	0.1	7.6778	537.44	-99.61	628.36
171	61V01	745.44	718	89	0	13	8.0674	0.1	7.9674	605.52	-31.53	628.08
172	61V02	758.28	685	89	0	1	7.6966	0.1	7.5966	668.50	31.45	627.90
173	61V03(new)	751.87	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	627.51
174	61V04	758.28	729	90	0	5	8.1000	0.1	8.0000	680.00	42.95	626.98
175	61V05	751.87	694	90	0	20	7.7111	0.1	7.6111	532.78	-104.27	626.90
176	61V06(new)	745.44	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	627.34
177	61V07	751.87	673	88	0	5	7.6477	0.1	7.5477	626.46	-10.59	626.44
178	61V08	739.01	708	90	0	5	7.8667	0.1	7.7667	660.17	23.12	624.92
179	61V09(new)	739.01	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	623.12
180	61V10(new)	757.32	742	93	0	0	7.9785	0.82	7.1585	665.74	28.69	621.89
181	61V11(new)	745.44	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	620.76
182	61V12(new)	751.87	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	620.51
183	61V13(NI)	0	0	0	0	0	0.0000	0	0.0000	0.00	-637.05	621.43
184	61V14DE(new)	722.8	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	623.57
185	61V15DE(new)	754.6	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	627.44
186	61V16DE	756.2	748	90	0	5	8.3111	0.1	8.2111	697.94	60.89	632.38
187	61V17DE	735.7	782	90	0	5	8.6889	0.1	8.5889	730.06	93.01	636.86
188	61V18DE	756.2	691	90	0	1	7.6778	0.1	7.5778	674.42	37.37	641.10
189	61V19DE(new)	759.3	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	644.70
190	61V20DE(jack)	740.2	700	89	0	1	7.8652	0.55	7.3152	643.73	6.68	646.83
191	61V21DE(new)	740.2	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	649.14
192	61V22DE	740.2	723	90	0	13	8.0333	0.1	7.9333	610.87	-26.18	651.17

(NI) = Never Installed
Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (1)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2034)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2034 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 7/31/2034	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
193	61V23(new)	732.59	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	651.59
194	61V24	729.38	758	90	0	5	8.4222	0.1	8.3222	707.39	70.34	652.88
195	61V25	763.74	805	93	0	20	8.6559	0.1	8.5559	624.58	-12.47	654.45
196	61V26(new)	732.59	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	654.87
197	61V27	745.44	747	90	0	5	8.3000	0.1	8.2000	697.00	59.95	654.81
198	61V28	751.87	722	90	0	5	8.0222	0.1	7.9222	673.39	36.34	654.13
199	61V29	745.44	795	90	0	1	8.8333	0.1	8.7333	777.27	140.22	652.62
200	61V30(new)	739.01	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	650.32
201	61V31(new)	748.5	742	90	0	0	8.2444	0.82	7.4244	668.20	31.15	647.29
202	61V32	739.06	730	90	0	13	8.1111	0.1	8.0111	616.86	-20.19	644.16
203	61V33	754.73	771	90	0	20	8.5667	0.1	8.4667	592.67	-44.38	642.62
204	61V34	736.02	757	90	0	5	8.4111	0.1	8.3111	706.44	69.39	636.59
		150734.79		18149	0	1200				128684.15		128684.02
							(Based on 202 tendons) Mean Average:			637.05		637.05
	Note: Shaded Tendon ID means it is or was a corroded tendon						(Based on 204 sheaths) Mean Average:			630.80		630.80
	Shaded line across page means tendon is new or re-stressed (jacked)											
	average force per wire in 2034 =			7.5924								
			Minimum required gross prestress =							123620		
			Minimum required mean average force per tendon based on 199 tendons =							622		
			Minimum required mean average force per tendon based on 202 tendons =							612		
			Minimum required running force based on 204 tendons/sheaths =							606		

ENCLOSURE (2)

Vertical Tendon Forces at End of Plant Life (2036)

Unit 2

Calvert Cliffs Nuclear Power Plant, Inc.
April 4, 2001

ENCLOSURE (2)

Based on Calculated Prestress Losses

Unit 2 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
1	12V01(jack)	732.61	700	89	0	2	7.8652	0.55	7.3152	636.42	11.06	627.44
2	12V02	751.87	719	90	0	2	7.9889	0.1	7.8889	694.22	68.86	626.06
3	12V03(new)	726.11	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	624.58
4	12V04	758.23	677	90	0	35	7.5222	0.1	7.4222	408.22	-217.14	623.79
5	12V05	732.6	668	89	0	1	7.5056	0.1	7.4056	651.69	26.33	623.08
6	12V06	732.6	664	90	0	10	7.3778	0.1	7.2778	582.22	-43.14	622.72
7	12V07	745.42	666	90	0	4	7.4000	0.1	7.3000	627.80	2.44	622.94
8	12V08	738.97	675	90	0	1	7.5000	0.1	7.4000	658.60	33.24	622.86
9	12V09	745.42	687	90	1	10	7.6333	0.1	7.5333	595.13	-30.23	623.37
10	12V10	758.23	707	90	0	1	7.8556	0.1	7.7556	690.24	64.88	623.35
11	12V11DE	731.3	725	88	0	14	8.2386	0.1	8.1386	602.26	-23.10	623.34
12	12V12	745.42	676	90	0	1	7.5111	0.1	7.4111	659.59	34.23	622.57
13	12V13(jack)	726.11	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	622.23
14	12V14	732.48	668	90	0	1	7.4222	0.1	7.3222	651.68	26.32	620.44
15	12V15	758.23	686	89	0	1	7.7079	0.1	7.6079	669.49	44.13	618.95
16	12V16	745.42	678	90	0	1	7.5333	0.1	7.4333	661.57	36.21	617.39
17	12V17	766.01	759	89	0	35	8.5281	0.1	8.4281	455.12	-170.24	616.88
18	12V18	745.42	707	89	0	35	7.9438	0.1	7.8438	423.57	-201.79	616.91
19	12V19	726.11	654	90	0	5	7.2667	0.1	7.1667	609.17	-16.19	617.00
20	12V20	758.23	666	90	0	1	7.4000	0.1	7.3000	649.70	24.34	618.64
21	12V21	732.61	667	90	0	4	7.4111	0.1	7.3111	628.76	3.40	620.87
22	12V22	758.23	718	90	0	7	7.9778	0.1	7.8778	653.86	28.50	621.77
23	12V23	751.87	741	90	0	1	8.2333	0.1	8.1333	723.87	98.51	623.46
24	12V24(jack)	758.23	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	625.20
25	12V25DE	732.7	692	90	0	7	7.6889	0.1	7.5889	629.88	4.52	625.58
26	12V26	745.42	713	90	0	1	7.9222	0.1	7.8222	696.18	70.82	625.20
27	12V27	751.87	692	90	0	14	7.6889	0.1	7.5889	576.76	-48.60	624.44
28	12V28	730.76	691	90	0	1	7.6778	0.1	7.5778	674.42	49.06	623.31
29	12V29	745.42	704	90	0	14	7.8222	0.1	7.7222	586.89	-38.47	622.23
30	12V30(jack)	732.61	700	90	0	7	7.7778	0.55	7.2278	599.91	-25.45	620.83
31	12V31	726.11	683	90	0	7	7.5889	0.1	7.4889	621.58	-3.78	619.96
32	12V32	726.11	656	89	0	7	7.3708	0.1	7.2708	596.20	-29.16	619.04
33	12V33(jack)	726.11	700	90	0	7	7.7778	0.55	7.2278	599.91	-25.45	618.24

ENCLOSURE (2)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
34	12V34	745.42	668	90	0	2	7.4222	0.1	7.3222	644.36	19.00	617.61
35	23V01(new)	726.09	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	616.74
36	23V02(jack)	732.59	700	89	0	2	7.8652	0.55	7.3152	636.42	11.06	616.18
37	23V03	758.23	685	89	0	7	7.6966	0.1	7.5966	622.92	-2.44	615.57
38	23V04	751.87	705	90	0	35	7.8333	0.1	7.7333	425.33	-200.03	616.05
39	23V05(new)	742.24	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	616.19
40	23V06DE(new)	742.4	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	616.96
41	23V07	745.42	706	90	0	35	7.8444	0.1	7.7444	425.94	-199.42	618.45
42	23V08	751.87	699	90	0	1	7.7667	0.1	7.6667	682.33	56.97	620.41
43	23V09	718.05	660	89	0	7	7.4157	0.1	7.3157	599.89	-25.47	622.41
44	23V10	758.23	720	90	0	1	8.0000	0.1	7.9000	703.10	77.74	623.72
45	23V11DE	735.8	672	90	0	10	7.4667	0.1	7.3667	589.33	-36.03	625.72
46	23V12DE	737.6	681	90	0	1	7.5667	0.1	7.4667	664.53	39.17	627.52
47	23V13	742.24	702	90	0	5	7.8000	0.1	7.7000	654.50	29.14	629.54
48	23V14(jack)	755.05	700	89	0	2	7.8652	0.55	7.3152	636.42	11.06	630.64
49	23V15(jack)	732.61	700	89	0	2	7.8652	0.55	7.3152	636.42	11.06	631.75
50	23V16	758.23	667	90	0	2	7.4111	0.1	7.3111	643.38	18.02	632.28
51	23V17	758.23	717	90	0	5	7.9667	0.1	7.8667	668.67	43.31	632.31
52	23V18	755.05	681	90	0	2	7.5667	0.1	7.4667	657.07	31.71	632.14
53	23V19DE(new)	748.7	742	78	0	0	9.5128	0.82	8.6928	678.04	52.68	630.49
54	23V20	732.61	658	90	0	2	7.3111	0.1	7.2111	634.58	9.22	628.22
55	23V21DE(new)	754.9	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	626.89
56	23V22DE	742.3	701	89	0	35	7.8764	0.1	7.7764	419.93	-205.43	626.08
57	23V23DE	747.1	662	90	0	1	7.3556	0.1	7.2556	645.74	20.38	625.76
58	23V24DE	736	661	90	0	5	7.3444	0.1	7.2444	615.78	-9.58	626.28
59	23V25(new)	758.23	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	625.62
60	23V26(new)	758.2	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	625.35
61	23V27	758.23	708	90	0	2	7.8667	0.1	7.7667	683.47	58.11	624.78
62	23V28(new)	745.38	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	623.85
63	23V29	751.87	667	90	0	35	7.4111	0.1	7.3111	402.11	-223.25	623.45
64	23V30(jack)	758.24	700	90	0	2	7.7778	0.55	7.2278	636.04	10.68	622.72
65	23V31	745.42	706	90	0	2	7.8444	0.1	7.7444	681.51	56.15	622.52
66	23V32	738.97	701	90	0	2	7.7889	0.1	7.6889	676.62	51.26	621.62

ENCLOSURE (2)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
67	23V33	732.6	687	89	0	5	7.7191	0.1	7.6191	640.00	14.64	620.58
68	23V34	758.24	677	90	0	2	7.5222	0.1	7.4222	653.16	27.80	619.32
69	34V01	726.11	658	90	0	2	7.3111	0.1	7.2111	634.58	9.22	617.45
70	34V02	758.23	672	90	0	2	7.4667	0.1	7.3667	648.27	22.91	615.36
71	34V03(new)	743.12	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	613.76
72	34V04	745.42	691	90	0	35	7.6778	0.1	7.5778	416.78	-208.58	612.89
73	34V05	738.97	677	90	0	35	7.5222	0.1	7.4222	408.22	-217.14	611.71
74	34V06	724.47	680	90	0	1	7.5556	0.1	7.4556	663.54	38.18	612.29
75	34V07(new)	732.61	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	613.33
76	34V08	758.23	710	90	0	2	7.8889	0.1	7.7889	685.42	60.06	615.39
77	34V09(new)	758.23	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	616.50
78	34V10	745.42	679	90	0	10	7.5444	0.1	7.4444	595.56	-29.80	616.64
79	34V11(new)	758.23	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	617.30
80	34V12	738.97	692	90	0	35	7.6889	0.1	7.5889	417.39	-207.97	617.84
81	34V13DE	742.4	655	90	0	2	7.2778	0.1	7.1778	631.64	6.28	618.75
82	34V14DE(new)	748.7	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	620.04
83	34V15(new)	751.8	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	622.20
84	34V16	758.23	692	90	0	2	7.6889	0.1	7.5889	667.82	42.46	622.78
85	34V17(jack)	745.42	700	90	0	5	7.7778	0.55	7.2278	614.36	-11.00	622.99
86	34V18(new)	758.24	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	622.75
87	34V19	738.97	704	90	0	2	7.8222	0.1	7.7222	679.56	54.20	621.11
88	34V20	751.83	667	90	0	10	7.4111	0.1	7.3111	584.89	-40.47	619.80
89	34V21	758.23	666	90	0	10	7.4000	0.1	7.3000	584.00	-41.36	618.50
90	34V22(new)	751.83	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	617.25
91	34V23(new)	751.83	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	616.00
92	34V24	758.23	695	90	0	35	7.7222	0.1	7.6222	419.22	-206.14	615.75
93	34V25(new)	745.38	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	615.37
94	34V26	745.42	681	90	0	2	7.5667	0.1	7.4667	657.07	31.71	614.23
95	34V27	758.23	682	88	0	5	7.7500	0.1	7.6500	634.95	9.59	613.58
96	34V28	751.87	670	90	0	2	7.4444	0.1	7.3444	646.31	20.95	613.25
97	34V29	758.23	683	90	0	35	7.5889	0.1	7.4889	411.89	-213.47	613.31
98	34V30	745.42	654	90	0	2	7.2667	0.1	7.1667	630.67	5.31	614.39
99	34V31	738.97	663	90	0	10	7.3667	0.1	7.2667	581.33	-44.03	615.55

ENCLOSURE (2)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
100	34V32	738.97	673	89	0	2	7.5618	0.1	7.4618	649.18	23.82	617.55
101	34V33	726.11	684	87	0	1	7.8621	0.1	7.7621	667.54	42.18	618.62
102	34V34	758.23	696	90	0	1	7.7333	0.1	7.6333	679.37	54.01	619.44
103	45V01	738.97	664	90	0	5	7.3778	0.1	7.2778	618.61	-6.75	618.89
104	45V02	758.23	716	90	0	4	7.9556	0.1	7.8556	675.58	50.22	618.88
105	45V03	751.87	688	90	0	2	7.6444	0.1	7.5444	663.91	38.55	618.87
106	45V04	758.23	698	90	0	35	7.7556	0.1	7.6556	421.06	-204.30	618.65
107	45V05(jack)	758.23	700	90	0	2	7.7778	0.55	7.2278	636.04	10.68	618.43
108	45V06(jack)	745.38	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	618.97
109	45V07(new)	745.42	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	619.58
110	45V08DE(jack)	742.3	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	619.72
111	45V09(jack)	732.61	700	90	0	5	7.7778	0.55	7.2278	614.36	-11.00	620.07
112	45V10DE(jack)	734.2	700	90	0	10	7.7778	0.55	7.2278	578.22	-47.14	621.36
113	45V11	745.42	687	90	0	10	7.6333	0.1	7.5333	602.67	-22.69	621.54
114	45V12DE(jack)	748.6	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	621.73
115	45V13(jack)	719.75	700	90	0	2	7.7778	0.55	7.2278	636.04	10.68	621.92
116	45V14(jack)	745.38	700	90	0	7	7.7778	0.55	7.2278	599.91	-25.45	622.35
117	45V15	732.61	686	90	0	2	7.6222	0.1	7.5222	661.96	36.60	623.57
118	45V16(jack)	745.38	700	90	0	2	7.7778	0.55	7.2278	636.04	10.68	623.83
119	45V17	758.23	688	90	0	10	7.6444	0.1	7.5444	603.56	-21.80	624.24
120	45V18(jack)	758.24	700	90	0	2	7.7778	0.55	7.2278	636.04	10.68	624.54
121	45V19(new)	755.05	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	623.97
122	45V20DE	748.7	700	90	0	35	7.7778	0.1	7.6778	422.28	-203.08	624.70
123	45V21	758.23	688	90	0	2	7.6444	0.1	7.5444	663.91	38.55	625.89
124	45V22DE	747.1	656	90	0	1	7.2889	0.1	7.1889	639.81	14.45	627.36
125	45V23	758.24	652	90	0	1	7.2444	0.1	7.1444	635.86	10.50	629.07
126	45V24DE	735.7	698	90	0	10	7.7556	0.1	7.6556	612.44	-12.92	631.96
127	45V25(new)	722.93	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	633.64
128	45V26	751.87	688	90	0	2	7.6444	0.1	7.5444	663.91	38.55	635.25
129	45V27(jack)	745.4	700	89	0	2	7.8652	0.55	7.3152	636.42	11.06	636.36
130	45V28	732.61	690	90	0	2	7.6667	0.1	7.5667	665.87	40.51	637.31
131	45V29	755.05	678	90	0	1	7.5333	0.1	7.4333	661.57	36.21	637.61
132	45V30	716.48	678	90	0	2	7.5333	0.1	7.4333	654.13	28.77	637.98

ENCLOSURE (2)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
133	45V31	758.23	663	90	0	2	7.3667	0.1	7.2667	639.47	14.11	637.93
134	45V32(jack)	758.23	700	90	0	7	7.7778	0.55	7.2278	599.91	-25.45	637.03
135	45V33(new)	726.11	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	636.25
136	45V34	758.23	698	90	0	2	7.7556	0.1	7.6556	673.69	48.33	635.40
137	56V01(new)	726.12	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	633.61
138	56V02	758.23	682	90	0	2	7.5778	0.1	7.4778	658.04	32.68	631.98
139	56V03(new)	738.97	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	630.79
140	56V04	745.42	692	89	0	35	7.7753	0.1	7.6753	414.47	-210.89	629.78
141	56V05	751.87	683	90	0	1	7.5889	0.1	7.4889	666.51	41.15	629.20
142	56V06(jack)	732.48	700	90	0	7	7.7778	0.55	7.2278	599.91	-25.45	630.01
143	56V07(jack)	732.48	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	629.84
144	56V08(jack)	748.59	700	90	0	7	7.7778	0.55	7.2278	599.91	-25.45	630.39
145	56V09(new)	713.3	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	630.93
146	56V10	745.42	684	90	0	7	7.6000	0.1	7.5000	622.50	-2.86	631.71
147	56V11(new)	745.38	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	631.79
148	56V12	745.42	669	90	0	2	7.4333	0.1	7.3333	645.33	19.97	631.56
149	56V13(new)	771.18	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	631.71
150	56V14	751.83	675	90	0	14	7.5000	0.1	7.4000	562.40	-62.96	631.73
151	56V15	758.23	673	90	0	2	7.4778	0.1	7.3778	649.24	23.88	631.66
152	56V16	758.23	666	90	0	2	7.4000	0.1	7.3000	642.40	17.04	631.88
153	56V17DE	742.2	674	90	0	14	7.4889	0.1	7.3889	561.56	-63.80	632.27
154	56V18DE(new)	745.5	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	631.94
155	56V19(new)	758.24	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	632.36
156	56V20	755.05	678	90	0	14	7.5333	0.1	7.4333	564.93	-60.43	633.06
157	56V21(jack)	745.38	700	90	0	5	7.7778	0.55	7.2278	614.36	-11.00	633.79
158	56V22(new)	758.24	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	634.35
159	56V23(new)	735.75	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	635.02
160	56V24(new)	758.24	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	636.17
161	56V25(new)	732.57	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	635.05
162	56V26	745.38	691	90	0	14	7.6778	0.1	7.5778	575.91	-49.45	634.74
163	56V27(new)	755.06	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	634.27
164	56V28	726.12	674	90	0	5	7.4889	0.1	7.3889	628.06	2.70	633.85
165	56V29(new)	726.11	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	633.17

ENCLOSURE (2)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
166	56V30	751.87	680	90	0	10	7.5556	0.1	7.4556	596.44	-28.92	632.49
167	56V31(jack)	742.24	700	90	0	10	7.7778	0.55	7.2278	578.22	-47.14	631.61
168	56V32(new)	758.23	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	630.96
169	56V33(new)	758.23	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	630.13
170	56V34	751.87	660	90	0	2	7.3333	0.1	7.2333	636.53	11.17	629.64
171	61V01(new)	726.11	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	628.80
172	61V02	758.23	707	90	0	7	7.8556	0.1	7.7556	643.71	18.35	628.26
173	61V03	745.38	705	87	0	35	8.1034	0.1	8.0034	416.18	-209.18	628.36
174	61V04	745.42	702	90	0	4	7.8000	0.1	7.7000	662.20	36.84	627.99
175	61V05	745.42	697	90	0	1	7.7444	0.1	7.6444	680.36	55.00	627.97
176	61V06	745.42	681	90	0	1	7.5667	0.1	7.4667	664.53	39.17	628.07
177	61V07	738.97	674	90	0	5	7.4889	0.1	7.3889	628.06	2.70	628.33
178	61V08	758.23	687	90	0	1	7.6333	0.1	7.5333	670.47	45.11	627.34
179	61V09	758.23	673	90	0	5	7.4778	0.1	7.3778	627.11	1.75	627.53
180	61V10	758.23	708	90	0	35	7.8667	0.1	7.7667	427.17	-198.19	627.86
181	61V11(jack)	732.61	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	629.03
182	61V12(new)	732.61	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	630.35
183	61V13DE(new)	737.6	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	631.62
184	61V14DE	747.1	698	90	0	2	7.7556	0.1	7.6556	673.69	48.33	632.95
185	61V15DE	747.1	701	90	0	10	7.7889	0.1	7.6889	615.11	-10.25	634.06
186	61V16DE	754.9	712	90	0	10	7.9111	0.1	7.8111	624.89	-0.47	635.17
187	61V17DE(new)	750.2	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	636.24
188	61V18DE	745.5	676	90	0	4	7.5111	0.1	7.4111	637.36	12.00	636.59
189	61V19DE	750.2	681	88	0	4	7.7386	0.1	7.6386	641.65	16.29	635.56
190	61V20DE(jack)	742.3	700	90	0	1	7.7778	0.55	7.2278	643.27	17.91	635.20
191	61V21DE(new)	723.2	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	634.13
192	61V22DE	754.9	701	90	0	1	7.7889	0.1	7.6889	684.31	58.95	633.00
193	61V23	732.61	674	90	0	5	7.4889	0.1	7.3889	628.06	2.70	632.55
194	61V24	758.23	684	90	0	1	7.6000	0.1	7.5000	667.50	42.14	630.71
195	61V25	751.87	671	93	0	14	7.2151	0.1	7.1151	562.09	-63.27	629.39
196	61V26(new)	739	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	628.23
197	61V27	726.11	668	90	0	35	7.4222	0.1	7.3222	402.72	-222.64	627.97
198	61V28(new)	758.23	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	628.06

ENCLOSURE (2)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF PLANT LIFE (2036)

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires Over Plant Life	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 or 2002 to 2036 Per Wire	Force/ Wire - End of Plant Life	Tendon Force 8/13/2036	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
199	61V29(jack)	751.87	700	90	0	5	7.7778	0.55	7.2278	614.36	-11.00	628.86
200	61V30	758.23	747	90	0	1	8.3000	0.1	8.2000	729.80	104.44	630.60
201	61V31	729.43	682	89	0	10	7.6629	0.1	7.5629	597.47	-27.89	631.35
202	61V32	758.23	708	90	0	5	7.8667	0.1	7.7667	660.17	34.81	630.80
203	61V33	751.87	671	90	0	2	7.4556	0.1	7.3556	647.29	21.93	629.52
204	61V34(new)	751.83	742	90	0	0	8.2444	0.82	7.4244	668.20	42.84	628.48
		152081.61		18322	1	1228				127573.43		127573.30
							(Based on 204 tendons) Mean Average:			625.36		625.36
	Note: Shaded Tendon ID means it is or was a corroded tendon											
	Shaded line across page means tendon is new or re-stressed (jacked)											
	average force per wire in 2036 =			7.4635								
								Minimum required gross prestress =		123620		
								Minimum required mean average force per tendon based on 201 tendons =		615.025		
								Minimum required running force based on 204 tendons/sheaths =		606		

ENCLOSURE (3)

Vertical Tendon Forces at End of 2002

Unit 1

Calvert Cliffs Nuclear Power Plant, Inc.
April 4, 2001

ENCLOSURE (3)

Based on Calculated Prestress Losses

Unit 1 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
1	12V01	748.5	712	90	0	0	7.9111	0.02	7.8911	710.20	0.48	728.65
2	12V02(new)	724.76	742	90	0	0	8.2444	0	8.2444	742.00	32.28	726.21
3	12V03(new)	739.12	742	90	0	0	8.2444	0	8.2444	742.00	32.28	723.66
4	12V04	757.85	662	90	0	0	7.3556	0.02	7.3356	660.20	-49.52	721.70
5	12V05	757.85	692	90	0	0	7.6889	0.02	7.6689	690.20	-19.52	719.63
6	12V06(jack)	745.34	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	718.05
7	12V07(new)	754.73	742	90	0	0	8.2444	0	8.2444	742.00	32.28	716.37
8	12V08	754.73	714	90	0	0	7.9333	0.02	7.9133	712.20	2.48	714.83
9	12V09(new)	726.67	742	90	0	0	8.2444	0	8.2444	742.00	32.28	713.44
10	12V10	729.78	707	90	0	0	7.8556	0.02	7.8356	705.20	-4.52	712.21
11	12V11DE	743.4	669	90	0	0	7.4333	0.02	7.4133	667.20	-42.52	711.12
12	12V12	740.16	665	89	0	0	7.4719	0.02	7.4519	663.22	-46.50	710.51
13	12V13(new)	723.55	742	90	0	0	8.2444	0	8.2444	742.00	32.28	710.06
14	12V14	723.55	697	90	0	0	7.7444	0.02	7.7244	695.20	-14.52	710.23
15	12V15	757.85	691	89	0	0	7.7640	0.02	7.7440	689.22	-20.50	710.46
16	12V16	736.02	668	90	0	0	7.4222	0.02	7.4022	666.20	-43.52	711.13
17	12V17(new)	754.73	742	90	0	0	8.2444	0	8.2444	742.00	32.28	712.09
18	12V18(jack)	735.97	700	89	0	0	7.8652	0	7.8652	700.00	-9.72	713.23
19	12V19	757.85	710	90	0	0	7.8889	0.02	7.8689	708.20	-1.52	714.30
20	12V20	748.5	734	90	0	0	8.1556	0.02	8.1356	732.20	22.48	715.30
21	12V21(new)	736.02	742	90	0	0	8.2444	0	8.2444	742.00	32.28	716.09
22	12V22	739.14	725	90	0	0	8.0556	0.02	8.0356	723.20	13.48	716.84
23	12V23(new)	748.5	742	90	0	0	8.2444	0	8.2444	742.00	32.28	717.34
24	12V24	739.14	716	90	0	0	7.9556	0.02	7.9356	714.20	4.48	717.87
25	12V25DE(new)	745	742	90	0	0	8.2444	0	8.2444	742.00	32.28	718.11
26	12V26	742.26	705	90	0	0	7.8333	0.02	7.8133	703.20	-6.52	717.95
27	12V27	745.38	684	90	0	0	7.6000	0.02	7.5800	682.20	-27.52	717.80
28	12V28	757.85	720	89	0	0	8.0899	0.02	8.0699	718.22	8.50	717.73
29	12V29	751.62	730	90	0	0	8.1111	0.02	8.0911	728.20	18.48	717.62
30	12V30(new)	736.02	742	90	0	0	8.2444	0	8.2444	742.00	32.28	717.72
31	12V31	729.78	726	90	0	0	8.0667	0.02	8.0467	724.20	14.48	717.89
32	12V32	736.02	693	90	0	0	7.7000	0.02	7.6800	691.20	-18.52	718.01

(NI) = Never Installed
Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (3)

Based on Calculated Prestress Losses

Unit 1 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
33	12V33(new)	742.26	742	90	0	0	8.2444	0	8.2444	742.00	32.28	717.32
34	12V34	736.02	733	90	0	0	8.1444	0.02	8.1244	731.20	21.48	716.80
35	23V01	742.26	716	90	0	0	7.9556	0.02	7.9356	714.20	4.48	716.16
36	23V02	748.5	725	89	0	0	8.1461	0.02	8.1261	723.22	13.50	715.40
37	23V03	748.5	725	90	0	0	8.0556	0.02	8.0356	723.20	13.48	714.19
38	23V04	736.02	738	90	0	0	8.2000	0.02	8.1800	736.20	26.48	712.99
39	23V05	742.26	709	90	0	0	7.8778	0.02	7.8578	707.20	-2.52	711.55
40	23V06DE	730.9	659	90	0	0	7.3222	0.02	7.3022	657.20	-52.52	710.08
41	23V07(new)	736.02	742	90	0	0	8.2444	0	8.2444	742.00	32.28	708.56
42	23V08	754.73	723	89	0	0	8.1236	0.02	8.1036	721.22	11.50	707.22
43	23V09	739.14	706	88	0	0	8.0227	0.02	8.0027	704.24	-5.48	705.89
44	23V10	754.73	704	90	0	0	7.8222	0.02	7.8022	702.20	-7.52	704.98
45	23V11DE	741.8	650	89	0	0	7.3034	0.02	7.2834	648.22	-61.50	704.02
46	23V12DE	745	707	90	0	0	7.8556	0.02	7.8356	705.20	-4.52	703.33
47	23V13	748.5	685	90	0	0	7.6111	0.02	7.5911	683.20	-26.52	702.92
48	23V14	757.85	708	90	0	0	7.8667	0.02	7.8467	706.20	-3.52	702.66
49	23V15	748.5	724	90	0	0	8.0444	0.02	8.0244	722.20	12.48	702.16
50	23V16	754.73	721	90	0	0	8.0111	0.02	7.9911	719.20	9.48	701.63
51	23V17(new)	748.5	742	90	0	0	8.2444	0	8.2444	742.00	32.28	701.13
52	23V18	739	650	89	0	0	7.3034	0.02	7.2834	648.22	-61.50	700.56
53	23V19DE(jack)	748.1	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	699.93
54	23V20	736.02	704	90	0	0	7.8222	0.02	7.8022	702.20	-7.52	699.53
55	23V21DE(jack)	729.4	700	89	0	0	7.8652	0	7.8652	700.00	-9.72	699.14
56	23V22DE(jack)	749.7	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	699.00
57	23V23DE	741.9	689	90	0	0	7.6556	0.02	7.6356	687.20	-22.52	698.87
58	23V24DE	738.7	672	90	0	0	7.4667	0.02	7.4467	670.20	-39.52	695.78
59	23V25DE(jack)	729.4	700	89	0	0	7.8652	0	7.8652	700.00	-9.72	695.22
60	23V26	748.5	690	90	0	0	7.6667	0.02	7.6467	688.20	-21.52	695.34
61	23V27	748.5	709	90	0	0	7.8778	0.02	7.8578	707.20	-2.52	694.98
62	23V28(jack)	739.14	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	694.60
63	23V29(new)	739.14	742	90	0	0	8.2444	0	8.2444	742.00	32.28	693.93
64	23V30	748.5	696	90	0	0	7.7333	0.02	7.7133	694.20	-15.52	693.20

(NI) = Never Installed
Finite Element Running Avg.
System's Solution Approach

ENCLOSURE (3)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
65	23V31	748.5	678	90	0	0	7.5333	0.02	7.5133	676.20	-33.52	692.60
66	23V32	714.19	698	89	0	0	7.8427	0.02	7.8227	696.22	-13.50	691.26
67	23V33(new)	736.02	742	90	0	0	8.2444	0	8.2444	742.00	32.28	689.72
68	23V34	745.44	680	90	0	0	7.5556	0.02	7.5356	678.20	-31.52	687.81
69	34V01(jack)	732.57	700	89	0	0	7.8652	0	7.8652	700.00	-9.72	685.50
70	34V02(jack)	739	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	682.88
71	34V03	755.08	678	90	0	0	7.5333	0.02	7.5133	676.20	-33.52	679.84
72	34V04	758.29	720	90	0	0	8.0000	0.02	7.9800	718.20	8.48	676.62
73	34V05(new)	745.44	742	90	0	0	8.2444	0	8.2444	742.00	32.28	672.92
74	34V06(jack)	751.87	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	668.95
75	34V07(new)	758.29	742	90	0	0	8.2444	0	8.2444	742.00	32.28	665.42
76	34V08	758.29	698	89	0	0	7.8427	0.02	7.8227	696.22	-13.50	662.76
77	34V09(NI)	0	0	0	0	0	0.0000	0	0.0000	0.00	-709.72	661.82
78	34V10	723.5	682	90	0	0	7.5778	0.02	7.5578	680.20	-29.52	662.50
79	34V11(new)	726.6	742	90	0	0	8.2444	0	8.2444	742.00	32.28	664.60
80	34V12	758.29	704	90	0	0	7.8222	0.02	7.8022	702.20	-7.52	667.86
81	34V13DE(jack)	743.5	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	671.71
82	34V14DE	745	662	90	0	0	7.3556	0.02	7.3356	660.20	-49.52	675.65
83	34V15	745.44	699	90	0	0	7.7667	0.02	7.7467	697.20	-12.52	679.42
84	34V16(new)	758.29	742	90	0	0	8.2444	0	8.2444	742.00	32.28	683.08
85	34V17	759.29	681	90	0	0	7.5667	0.02	7.5467	679.20	-30.52	686.22
86	34V18	758.29	688	90	0	0	7.6444	0.02	7.6244	686.20	-23.52	689.03
87	34V19	745.44	699	90	0	0	7.7667	0.02	7.7467	697.20	-12.52	691.55
88	34V20	758.29	702	90	0	0	7.8000	0.02	7.7800	700.20	-9.52	693.90
89	34V21	751.87	690	90	0	0	7.6667	0.02	7.6467	688.20	-21.52	695.89
90	34V22	758.29	736	90	0	0	8.1778	0.02	8.1578	734.20	24.48	697.49
91	34V23(new)	745.44	742	90	0	0	8.2444	0	8.2444	742.00	32.28	698.72
92	34V24(new)	748.65	742	90	0	0	8.2444	0	8.2444	742.00	32.28	699.13
93	34V25(jack)	751.87	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	699.33
94	34V26	745.44	720	90	0	0	8.0000	0.02	7.9800	718.20	8.48	699.05
95	34V27	751.87	697	90	0	0	7.7444	0.02	7.7244	695.20	-14.52	698.07
96	34V28	751.87	738	90	0	0	8.2000	0.02	8.1800	736.20	26.48	697.30

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System's Solution Approach

ENCLOSURE (3)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
97	34V29	755.08	694	90	0	0	7.7111	0.02	7.6911	692.20	-17.52	698.66
98	34V30	751.87	689	89	0	0	7.7416	0.02	7.7216	687.22	-22.50	697.02
99	34V31	751.87	682	90	0	0	7.5778	0.02	7.5578	680.20	-29.52	695.16
100	34V32	751.87	698	90	0	0	7.7556	0.02	7.7356	696.20	-13.52	693.60
101	34V33	751.87	680	90	0	0	7.5556	0.02	7.5356	678.20	-31.52	692.09
102	34V34	758.29	689	90	0	0	7.6556	0.02	7.6356	687.20	-22.52	690.81
103	45V01	732.59	708	90	0	0	7.8667	0.02	7.8467	706.20	-3.52	689.58
104	45V02	748.65	674	90	0	0	7.4889	0.02	7.4689	672.20	-37.52	688.15
105	45V03	751.87	670	90	0	0	7.4444	0.02	7.4244	668.20	-41.52	687.43
106	45V04(jack)	732.59	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	686.87
107	45V05	751.83	665	90	0	0	7.3889	0.02	7.3689	663.20	-46.52	686.45
108	45V06	745.44	686	90	0	0	7.6222	0.02	7.6022	684.20	-25.52	686.20
109	45V07	739.01	684	90	0	0	7.6000	0.02	7.5800	682.20	-27.52	686.26
110	45V08DE	746.7	680	90	0	0	7.5556	0.02	7.5356	678.20	-31.52	686.17
111	45V09	742.23	654	89	0	0	7.3483	0.02	7.3283	652.22	-57.50	686.27
112	45V10DE(new)	746.8	742	90	0	0	8.2444	0	8.2444	742.00	32.28	686.25
113	45V11	739.01	686	90	0	0	7.6222	0.02	7.6022	684.20	-25.52	686.79
114	45V12DE	740.5	652	89	0	0	7.3258	0.02	7.3058	650.22	-59.50	687.37
115	45V13	739.01	679	90	0	0	7.5444	0.02	7.5244	677.20	-32.52	688.51
116	45V14	739.01	663	89	0	0	7.4494	0.02	7.4294	661.22	-48.50	689.55
117	45V15	744.8	694	90	0	0	7.7111	0.02	7.6911	692.20	-17.52	690.86
118	45V16	745.44	686	90	0	0	7.6222	0.02	7.6022	684.20	-25.52	692.53
119	45V17(jack)	739.01	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	694.50
120	45V18	745.44	680	90	0	0	7.5556	0.02	7.5356	678.20	-31.52	696.50
121	45V19	732.59	683	89	0	0	7.6742	0.02	7.6542	681.22	-28.50	698.82
122	45V20DE	743.5	705	90	0	0	7.8333	0.02	7.8133	703.20	-6.52	701.49
123	45V21	732.59	659	88	0	0	7.4886	0.02	7.4686	657.24	-52.48	704.04
124	45V22DE(new)	746.6	742	90	0	0	8.2444	0	8.2444	742.00	32.28	706.53
125	45V23(new)	739.01	742	90	0	0	8.2444	0	8.2444	742.00	32.28	708.67
126	45V24DE	743.5	737	90	0	0	8.1889	0.02	8.1689	735.20	25.48	710.64
127	45V25	739.01	738	89	0	0	8.2921	0.02	8.2721	736.22	26.50	712.11
128	45V26	745.44	760	90	0	0	8.4444	0.02	8.4244	758.20	48.48	712.87

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System's Solution Approach

ENCLOSURE (3)

Based on Calculated Prestress Losses

Unit 1 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
129	45V27	758.29	726	90	0	0	8.0667	0.02	8.0467	724.20	14.48	713.26
130	45V28	732.59	738	90	0	0	8.2000	0.02	8.1800	736.20	26.48	713.02
131	45V29	745.44	673	90	0	0	7.4778	0.02	7.4578	671.20	-38.52	712.63
132	45V30	758.29	737	90	0	0	8.1889	0.02	8.1689	735.20	25.48	711.63
133	45V31	745.44	715	89	0	0	8.0337	0.02	8.0137	713.22	3.50	710.46
134	45V32	745.44	775	90	0	0	8.6111	0.02	8.5911	773.20	63.48	709.06
135	45V33	758.29	710	90	0	0	7.8889	0.02	7.8689	708.20	-1.52	707.65
136	45V34	732.57	671	90	0	0	7.4556	0.02	7.4356	669.20	-40.52	706.09
137	56V01	758.29	702	90	0	0	7.8000	0.02	7.7800	700.20	-9.52	704.57
138	56V02(jack)	745.44	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	703.08
139	56V03	758.29	666	90	0	0	7.4000	0.02	7.3800	664.20	-45.52	701.86
140	56V04	755.08	692	90	0	0	7.6889	0.02	7.6689	690.20	-19.52	700.82
141	56V05(new)	758.29	742	90	0	0	8.2444	0	8.2444	742.00	32.28	699.86
142	56V06	739.01	707	90	0	0	7.8556	0.02	7.8356	705.20	-4.52	698.91
143	56V07	745.44	679	90	0	0	7.5444	0.02	7.5244	677.20	-32.52	698.27
144	56V08	758.29	660	90	0	0	7.3333	0.02	7.3133	658.20	-51.52	697.18
145	56V09(new)	758.29	742	90	0	0	8.2444	0	8.2444	742.00	32.28	696.38
146	56V10	751.87	691	90	0	0	7.6778	0.02	7.6578	689.20	-20.52	695.77
147	56V11	732.59	676	90	0	0	7.5111	0.02	7.4911	674.20	-35.52	695.06
148	56V12(jack)	759.29	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	694.68
149	56V13	783	657	91	0	0	7.2198	0.02	7.1998	655.18	-54.54	694.75
150	56V14(jack)	759.29	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	694.91
151	56V15(jack)	758.29	700	88	0	0	7.9545	0	7.9545	700.00	-9.72	695.59
152	56V16	739.01	663	90	0	0	7.3667	0.02	7.3467	661.20	-48.52	696.44
153	56V17DE	746.7	650	88	0	0	7.3864	0.02	7.3664	648.24	-61.48	697.61
154	56V18DE	746.7	717	90	0	0	7.9667	0.02	7.9467	715.20	5.48	699.12
155	56V19	751.87	680	86	0	0	7.9070	0.02	7.8870	678.28	-31.44	701.15
156	56V20	745.44	722	90	0	0	8.0222	0.02	8.0022	720.20	10.48	703.31
157	56V21	758.29	696	90	0	0	7.7333	0.02	7.7133	694.20	-15.52	705.54
158	56V22(new)	751.87	742	90	0	0	8.2444	0	8.2444	742.00	32.28	707.43
159	56V23	758.29	717	90	0	0	7.9667	0.02	7.9467	715.20	5.48	709.41
160	56V24	758.29	721	90	0	0	8.0111	0.02	7.9911	719.20	9.48	711.19

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System's Solution Approach

ENCLOSURE (3)

Based on Calculated Prestress Losses **Unit 1 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
161	56V25	758.29	715	90	0	0	7.9444	0.02	7.9244	713.20	3.48	712.57
162	56V26(new)	758.29	742	90	0	0	8.2444	0	8.2444	742.00	32.28	713.91
163	56V27(jack)	758.29	700	90	0	0	7.7778	0	7.7778	700.00	-9.72	715.14
164	56V28(new)	745.44	742	90	0	0	8.2444	0	8.2444	742.00	32.28	712.86
165	56V29(new)	751.87	742	90	0	0	8.2444	0	8.2444	742.00	32.28	712.53
166	56V30	745.44	693	90	0	0	7.7000	0.02	7.6800	691.20	-18.52	712.40
167	56V31(new)	745.44	742	90	0	0	8.2444	0	8.2444	742.00	32.28	712.07
168	56V32(new)	751.87	742	90	0	0	8.2444	0	8.2444	742.00	32.28	711.58
169	56V33(jack)	751.87	700	89	0	0	7.8652	0	7.8652	700.00	-9.72	710.71
170	56V34	751.87	700	90	0	0	7.7778	0.02	7.7578	698.20	-11.52	709.70
171	61V01	745.44	718	89	0	0	8.0674	0.02	8.0474	716.22	6.50	708.43
172	61V02	758.28	685	89	0	0	7.6966	0.02	7.6766	683.22	-26.50	707.36
173	61V03(new)	751.87	742	90	0	0	8.2444	0	8.2444	742.00	32.28	706.08
174	61V04	758.28	729	90	0	0	8.1000	0.02	8.0800	727.20	17.48	704.42
175	61V05	751.87	694	90	0	0	7.7111	0.02	7.6911	692.20	-17.52	702.75
176	61V06(new)	745.44	742	90	0	0	8.2444	0	8.2444	742.00	32.28	700.99
177	61V07	751.87	673	88	0	0	7.6477	0.02	7.6277	671.24	-38.48	698.69
178	61V08	739.01	708	90	0	0	7.8667	0.02	7.8467	706.20	-3.52	695.82
179	61V09(new)	739.01	742	90	0	0	8.2444	0	8.2444	742.00	32.28	692.89
180	61V10(new)	757.32	742	93	0	0	7.9785	0	7.9785	742.00	32.28	690.31
181	61V11(new)	745.44	742	90	0	0	8.2444	0	8.2444	742.00	32.28	688.12
182	61V12(new)	751.87	742	90	0	0	8.2444	0	8.2444	742.00	32.28	686.86
183	61V13(NI)	0	0	0	0	0	0.0000	0	0.0000	0.00	-709.72	687.22
184	61V14DE(new)	722.8	742	90	0	0	8.2444	0	8.2444	742.00	32.28	689.28
185	61V15DE(new)	754.6	742	90	0	0	8.2444	0	8.2444	742.00	32.28	692.83
186	61V16DE	756.2	748	90	0	0	8.3111	0.02	8.2911	746.20	36.48	697.41
187	61V17DE	735.7	782	90	0	0	8.6889	0.02	8.6689	780.20	70.48	702.35
188	61V18DE	756.2	691	90	0	0	7.6778	0.02	7.6578	689.20	-20.52	707.34
189	61V19DE(new)	759.3	742	90	0	0	8.2444	0	8.2444	742.00	32.28	712.04
190	61V20DE(jack)	740.2	700	89	0	0	7.8652	0	7.8652	700.00	-9.72	716.34
191	61V21DE(new)	740.2	742	90	0	0	8.2444	0	8.2444	742.00	32.28	720.12
192	61V22DE	740.2	723	90	0	0	8.0333	0.02	8.0133	721.20	11.48	723.91

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System's Solution Approach

ENCLOSURE (3)

Based on Calculated Prestress Losses

Unit 1 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Predicted Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
193	61V23(new)	732.59	742	90	0	0	8.2444	0	8.2444	742.00	32.28	726.95
194	61V24	729.38	758	90	0	0	8.4222	0.02	8.4022	756.20	46.48	729.74
195	61V25	763.74	805	93	0	0	8.6559	0.02	8.6359	803.14	93.42	731.99
196	61V26(new)	732.59	742	90	0	0	8.2444	0	8.2444	742.00	32.28	733.31
197	61V27	745.44	747	90	0	0	8.3000	0.02	8.2800	745.20	35.48	734.30
198	61V28	751.87	722	90	0	0	8.0222	0.02	8.0022	720.20	10.48	734.94
199	61V29	745.44	795	90	0	0	8.8333	0.02	8.8133	793.20	83.48	734.82
200	61V30(new)	739.01	742	90	0	0	8.2444	0	8.2444	742.00	32.28	734.22
201	61V31(new)	748.5	742	90	0	0	8.2444	0	8.2444	742.00	32.28	733.13
202	61V32	739.06	730	90	0	0	8.1111	0.02	8.0911	728.20	18.48	732.24
203	61V33	754.73	771	90	0	0	8.5667	0.02	8.5467	769.20	59.48	733.41
204	61V34	736.02	757	90	0	0	8.4111	0.02	8.3911	755.20	45.48	731.07
		150734.79		18149	0	0				143362.52		143362.38
							(Based on 202 tendons) Mean Average:			709.72		709.71
	Note: Shaded Tendon ID means it is or was a corroded tendon						(Based on 204 sheaths) Mean Average:			702.76		702.76
	Shaded line across page means tendon is new or re-stressed (jacked)											
	average force per wire in 2002 =			7.8992								
							Minimum required gross prestress =			123620		
			Minimum required mean average force per tendon based on 199 tendons =							622		
			Minimum required mean average force per tendon based on 202 tendons =							612		
			Minimum required running force based on 204 tendons/sheaths =							606		

ENCLOSURE (4)

Vertical Tendon Forces at End of 2002

Unit 2

Calvert Cliffs Nuclear Power Plant, Inc.
April 4, 2001

ENCLOSURE (4)

Based on Calculated Prestress Losses

Unit 2 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
1	12V01(jack)	732.61	700	89	0	0	7.8652	0	7.8652	700.00	0.72	698.37
2	12V02	751.87	719	90	0	0	7.9889	0.02	7.9689	717.20	17.92	697.00
3	12V03(new)	726.11	742	90	0	0	8.2444	0	8.2444	742.00	42.72	695.60
4	12V04	758.23	677	90	0	0	7.5222	0.02	7.5022	675.20	-24.08	694.55
5	12V05	732.6	668	89	0	0	7.5056	0.02	7.4856	666.22	-33.06	693.40
6	12V06	732.6	664	90	0	0	7.3778	0.02	7.3578	662.20	-37.08	692.30
7	12V07	745.42	666	90	0	0	7.4000	0.02	7.3800	664.20	-35.08	691.45
8	12V08	738.97	675	90	0	0	7.5000	0.02	7.4800	673.20	-26.08	691.05
9	12V09	745.42	687	90	1	0	7.6333	0.02	7.6133	677.59	-21.69	690.98
10	12V10	758.23	707	90	0	0	7.8556	0.02	7.8356	705.20	5.92	691.11
11	12V11DE	731.3	725	88	0	0	8.2386	0.02	8.2186	723.24	23.96	691.36
12	12V12	745.42	676	90	0	0	7.5111	0.02	7.4911	674.20	-25.08	691.33
13	12V13(jack)	726.11	700	90	0	0	7.7778	0	7.7778	700.00	0.72	691.46
14	12V14	732.48	668	90	0	0	7.4222	0.02	7.4022	666.20	-33.08	691.48
15	12V15	758.23	686	89	0	0	7.7079	0.02	7.6879	684.22	-15.06	691.54
16	12V16	745.42	678	90	0	0	7.5333	0.02	7.5133	676.20	-23.08	691.76
17	12V17	766.01	759	89	0	0	8.5281	0.02	8.5081	757.22	57.94	692.12
18	12V18	745.42	707	89	0	0	7.9438	0.02	7.9238	705.22	5.94	692.32
19	12V19	726.11	654	90	0	0	7.2667	0.02	7.2467	652.20	-47.08	692.73
20	12V20	758.23	666	90	0	0	7.4000	0.02	7.3800	664.20	-35.08	693.12
21	12V21	732.61	667	90	0	0	7.4111	0.02	7.3911	665.20	-34.08	693.80
22	12V22	758.23	718	90	0	0	7.9778	0.02	7.9578	716.20	16.92	694.30
23	12V23	751.87	741	90	0	0	8.2333	0.02	8.2133	739.20	39.92	694.66
24	12V24(jack)	758.23	700	90	0	0	7.7778	0	7.7778	700.00	0.72	695.02
25	12V25DE	732.7	692	90	0	0	7.6889	0.02	7.6689	690.20	-9.08	695.50
26	12V26	745.42	713	90	0	0	7.9222	0.02	7.9022	711.20	11.92	695.63
27	12V27	751.87	692	90	0	0	7.6889	0.02	7.6689	690.20	-9.08	695.63
28	12V28	730.76	691	90	0	0	7.6778	0.02	7.6578	689.20	-10.08	695.61
29	12V29	745.42	704	90	0	0	7.8222	0.02	7.8022	702.20	2.92	695.57
30	12V30(jack)	732.61	700	90	0	0	7.7778	0	7.7778	700.00	0.72	695.53
31	12V31	726.11	683	90	0	0	7.5889	0.02	7.5689	681.20	-18.08	695.43
32	12V32	726.11	656	89	0	0	7.3708	0.02	7.3508	654.22	-45.06	695.89
33	12V33(jack)	726.11	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.31

ENCLOSURE (4)

Based on Calculated Prestress Losses

Unit 2 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
34	12V34	745.42	668	90	0	0	7.4222	0.02	7.4022	666.20	-33.08	697.27
35	23V01(new)	726.09	742	90	0	0	8.2444	0	8.2444	742.00	42.72	697.90
36	23V02(jack)	732.59	700	89	0	0	7.8652	0	7.8652	700.00	0.72	698.83
37	23V03	758.23	685	89	0	0	7.6966	0.02	7.6766	683.22	-16.06	699.22
38	23V04	751.87	705	90	0	0	7.8333	0.02	7.8133	703.20	3.92	699.47
39	23V05(new)	742.24	742	90	0	0	8.2444	0	8.2444	742.00	42.72	699.62
40	23V06DE(new)	742.4	742	90	0	0	8.2444	0	8.2444	742.00	42.72	699.72
41	23V07	745.42	706	90	0	0	7.8444	0.02	7.8244	704.20	4.92	699.58
42	23V08	751.87	699	90	0	0	7.7667	0.02	7.7467	697.20	-2.08	698.92
43	23V09	718.05	660	89	0	0	7.4157	0.02	7.3957	658.22	-41.06	698.32
44	23V10	758.23	720	90	0	0	8.0000	0.02	7.9800	718.20	18.92	697.63
45	23V11DE	735.8	672	90	0	0	7.4667	0.02	7.4467	670.20	-29.08	697.20
46	23V12DE	737.6	681	90	0	0	7.5667	0.02	7.5467	679.20	-20.08	696.89
47	23V13	742.24	702	90	0	0	7.8000	0.02	7.7800	700.20	0.92	696.86
48	23V14(jack)	755.05	700	89	0	0	7.8652	0	7.8652	700.00	0.72	696.91
49	23V15(jack)	732.61	700	89	0	0	7.8652	0	7.8652	700.00	0.72	696.97
50	23V16	758.23	667	90	0	0	7.4111	0.02	7.3911	665.20	-34.08	697.06
51	23V17	758.23	717	90	0	0	7.9667	0.02	7.9467	715.20	15.92	697.32
52	23V18	755.05	681	90	0	0	7.5667	0.02	7.5467	679.20	-20.08	697.97
53	23V19DE(new)	748.7	742	78	0	0	9.5128	0	9.5128	742.00	42.72	698.25
54	23V20	732.61	658	90	0	0	7.3111	0.02	7.2911	656.20	-43.08	698.55
55	23V21DE(new)	754.9	742	90	0	0	8.2444	0	8.2444	742.00	42.72	698.54
56	23V22DE	742.3	701	89	0	0	7.8764	0.02	7.8564	699.22	-0.06	699.02
57	23V23DE	747.1	662	90	0	0	7.3556	0.02	7.3356	660.20	-39.08	699.45
58	23V24DE	736	661	90	0	0	7.3444	0.02	7.3244	659.20	-40.08	699.90
59	23V25(new)	758.23	742	90	0	0	8.2444	0	8.2444	742.00	42.72	699.90
60	23V26(new)	758.2	742	90	0	0	8.2444	0	8.2444	742.00	42.72	700.04
61	23V27	758.23	708	90	0	0	7.8667	0.02	7.8467	706.20	6.92	699.94
62	23V28(new)	745.38	742	90	0	0	8.2444	0	8.2444	742.00	42.72	699.44
63	23V29	751.87	667	90	0	0	7.4111	0.02	7.3911	665.20	-34.08	699.23
64	23V30(jack)	758.24	700	90	0	0	7.7778	0	7.7778	700.00	0.72	698.68
65	23V31	745.42	706	90	0	0	7.8444	0.02	7.8244	704.20	4.92	698.09
66	23V32	738.97	701	90	0	0	7.7889	0.02	7.7689	699.20	-0.08	697.55

ENCLOSURE (4)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
67	23V33	732.6	687	89	0	0	7.7191	0.02	7.6991	685.22	-14.06	697.29
68	23V34	758.24	677	90	0	0	7.5222	0.02	7.5022	675.20	-24.08	697.12
69	34V01	726.11	658	90	0	0	7.3111	0.02	7.2911	656.20	-43.08	697.09
70	34V02	758.23	672	90	0	0	7.4667	0.02	7.4467	670.20	-29.08	697.43
71	34V03(new)	743.12	742	90	0	0	8.2444	0	8.2444	742.00	42.72	698.15
72	34V04	745.42	691	90	0	0	7.6778	0.02	7.6578	689.20	-10.08	699.24
73	34V05	738.97	677	90	0	0	7.5222	0.02	7.5022	675.20	-24.08	700.05
74	34V06	724.47	680	90	0	0	7.5556	0.02	7.5356	678.20	-21.08	701.44
75	34V07(new)	732.61	742	90	0	0	8.2444	0	8.2444	742.00	42.72	702.20
76	34V08	758.23	710	90	0	0	7.8889	0.02	7.8689	708.20	8.92	703.02
77	34V09(new)	758.23	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.77
78	34V10	745.42	679	90	0	0	7.5444	0.02	7.5244	677.20	-22.08	704.35
79	34V11(new)	758.23	742	90	0	0	8.2444	0	8.2444	742.00	42.72	704.30
80	34V12	738.97	692	90	0	0	7.6889	0.02	7.6689	690.20	-9.08	704.19
81	34V13DE	742.4	655	90	0	0	7.2778	0.02	7.2578	653.20	-46.08	704.15
82	34V14DE(new)	748.7	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.95
83	34V15(new)	751.8	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.96
84	34V16	758.23	692	90	0	0	7.6889	0.02	7.6689	690.20	-9.08	703.53
85	34V17(jack)	745.42	700	90	0	0	7.7778	0	7.7778	700.00	0.72	703.16
86	34V18(new)	758.24	742	90	0	0	8.2444	0	8.2444	742.00	42.72	702.57
87	34V19	738.97	704	90	0	0	7.8222	0.02	7.8022	702.20	2.92	701.99
88	34V20	751.83	667	90	0	0	7.4111	0.02	7.3911	665.20	-34.08	701.39
89	34V21	758.23	666	90	0	0	7.4000	0.02	7.3800	664.20	-35.08	700.77
90	34V22(new)	751.83	742	90	0	0	8.2444	0	8.2444	742.00	42.72	700.13
91	34V23(new)	751.83	742	90	0	0	8.2444	0	8.2444	742.00	42.72	698.91
92	34V24	758.23	695	90	0	0	7.7222	0.02	7.7022	693.20	-6.08	697.67
93	34V25(new)	745.38	742	90	0	0	8.2444	0	8.2444	742.00	42.72	696.27
94	34V26	745.42	681	90	0	0	7.5667	0.02	7.5467	679.20	-20.08	694.64
95	34V27	758.23	682	88	0	0	7.7500	0.02	7.7300	680.24	-19.04	692.81
96	34V28	751.87	670	90	0	0	7.4444	0.02	7.4244	668.20	-31.08	691.26
97	34V29	758.23	683	90	0	0	7.5889	0.02	7.5689	681.20	-18.08	689.90
98	34V30	745.42	654	90	0	0	7.2667	0.02	7.2467	652.20	-47.08	689.12
99	34V31	738.97	663	90	0	0	7.3667	0.02	7.3467	661.20	-38.08	688.59

ENCLOSURE (4)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
100	34V32	738.97	673	89	0	0	7.5618	0.02	7.5418	671.22	-28.06	688.66
101	34V33	726.11	684	87	0	0	7.8621	0.02	7.8421	682.26	-17.02	689.27
102	34V34	758.23	696	90	0	0	7.7333	0.02	7.7133	694.20	-5.08	690.00
103	45V01	738.97	664	90	0	0	7.3778	0.02	7.3578	662.20	-37.08	690.85
104	45V02	758.23	716	90	0	0	7.9556	0.02	7.9356	714.20	14.92	691.99
105	45V03	751.87	688	90	0	0	7.6444	0.02	7.6244	686.20	-13.08	692.96
106	45V04	758.23	698	90	0	0	7.7556	0.02	7.7356	696.20	-3.08	693.68
107	45V05(jack)	758.23	700	90	0	0	7.7778	0	7.7778	700.00	0.72	694.65
108	45V06(jack)	745.38	700	90	0	0	7.7778	0	7.7778	700.00	0.72	695.80
109	45V07(new)	745.42	742	90	0	0	8.2444	0	8.2444	742.00	42.72	696.50
110	45V08DE(jack)	742.3	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.68
111	45V09(jack)	732.61	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.66
112	45V10DE(jack)	734.2	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.61
113	45V11	745.42	687	90	0	0	7.6333	0.02	7.6133	685.20	-14.08	696.27
114	45V12DE(jack)	748.6	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.05
115	45V13(jack)	719.75	700	90	0	0	7.7778	0	7.7778	700.00	0.72	695.94
116	45V14(jack)	745.38	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.06
117	45V15	732.61	686	90	0	0	7.6222	0.02	7.6022	684.20	-15.08	695.96
118	45V16(jack)	745.38	700	90	0	0	7.7778	0	7.7778	700.00	0.72	696.12
119	45V17	758.23	688	90	0	0	7.6444	0.02	7.6244	686.20	-13.08	695.93
120	45V18(jack)	758.24	700	90	0	0	7.7778	0	7.7778	700.00	0.72	695.85
121	45V19(new)	755.05	742	90	0	0	8.2444	0	8.2444	742.00	42.72	695.47
122	45V20DE	748.7	700	90	0	0	7.7778	0.02	7.7578	698.20	-1.08	694.96
123	45V21	758.23	688	90	0	0	7.6444	0.02	7.6244	686.20	-13.08	694.65
124	45V22DE	747.1	656	90	0	0	7.2889	0.02	7.2689	654.20	-45.08	694.25
125	45V23	758.24	652	90	0	0	7.2444	0.02	7.2244	650.20	-49.08	694.12
126	45V24DE	735.7	698	90	0	0	7.7556	0.02	7.7356	696.20	-3.08	694.29
127	45V25(new)	722.93	742	90	0	0	8.2444	0	8.2444	742.00	42.72	694.33
128	45V26	751.87	688	90	0	0	7.6444	0.02	7.6244	686.20	-13.08	694.67
129	45V27(jack)	745.4	700	89	0	0	7.8652	0	7.8652	700.00	0.72	694.68
130	45V28	732.61	690	90	0	0	7.6667	0.02	7.6467	688.20	-11.08	695.25
131	45V29	755.05	678	90	0	0	7.5333	0.02	7.5133	676.20	-23.08	695.72
132	45V30	716.48	678	90	0	0	7.5333	0.02	7.5133	676.20	-23.08	696.32

ENCLOSURE (4)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
133	45V31	758.23	663	90	0	0	7.3667	0.02	7.3467	661.20	-38.08	697.08
134	45V32(jack)	758.23	700	90	0	0	7.7778	0	7.7778	700.00	0.72	697.91
135	45V33(new)	726.11	742	90	0	0	8.2444	0	8.2444	742.00	42.72	699.03
136	45V34	758.23	698	90	0	0	7.7556	0.02	7.7356	696.20	-3.08	700.10
137	56V01(new)	726.12	742	90	0	0	8.2444	0	8.2444	742.00	42.72	700.78
138	56V02	758.23	682	90	0	0	7.5778	0.02	7.5578	680.20	-19.08	701.25
139	56V03(new)	738.97	742	90	0	0	8.2444	0	8.2444	742.00	42.72	701.78
140	56V04	745.42	692	89	0	0	7.7753	0.02	7.7553	690.22	-9.06	702.14
141	56V05	751.87	683	90	0	0	7.5889	0.02	7.5689	681.20	-18.08	702.32
142	56V06(jack)	732.48	700	90	0	0	7.7778	0	7.7778	700.00	0.72	702.70
143	56V07(jack)	732.48	700	90	0	0	7.7778	0	7.7778	700.00	0.72	702.92
144	56V08(jack)	748.59	700	90	0	0	7.7778	0	7.7778	700.00	0.72	703.45
145	56V09(new)	713.3	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.61
146	56V10	745.42	684	90	0	0	7.6000	0.02	7.5800	682.20	-17.08	703.73
147	56V11(new)	745.38	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.39
148	56V12	745.42	669	90	0	0	7.4333	0.02	7.4133	667.20	-32.08	703.30
149	56V13(new)	771.18	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.43
150	56V14	751.83	675	90	0	0	7.5000	0.02	7.4800	673.20	-26.08	703.82
151	56V15	758.23	673	90	0	0	7.4778	0.02	7.4578	671.20	-28.08	704.14
152	56V16	758.23	666	90	0	0	7.4000	0.02	7.3800	664.20	-35.08	705.09
153	56V17DE	742.2	674	90	0	0	7.4889	0.02	7.4689	672.20	-27.08	706.27
154	56V18DE(new)	745.5	742	90	0	0	8.2444	0	8.2444	742.00	42.72	707.47
155	56V19(new)	758.24	742	90	0	0	8.2444	0	8.2444	742.00	42.72	708.65
156	56V20	755.05	678	90	0	0	7.5333	0.02	7.5133	676.20	-23.08	709.99
157	56V21(jack)	745.38	700	90	0	0	7.7778	0	7.7778	700.00	0.72	711.00
158	56V22(new)	758.24	742	90	0	0	8.2444	0	8.2444	742.00	42.72	711.98
159	56V23(new)	735.75	742	90	0	0	8.2444	0	8.2444	742.00	42.72	712.46
160	56V24(new)	758.24	742	90	0	0	8.2444	0	8.2444	742.00	42.72	712.76
161	56V25(new)	732.57	742	90	0	0	8.2444	0	8.2444	742.00	42.72	712.84
162	56V26	745.38	691	90	0	0	7.6778	0.02	7.6578	689.20	-10.08	712.56
163	56V27(new)	755.06	742	90	0	0	8.2444	0	8.2444	742.00	42.72	712.26
164	56V28	726.12	674	90	0	0	7.4889	0.02	7.4689	672.20	-27.08	711.83
165	56V29(new)	726.11	742	90	0	0	8.2444	0	8.2444	742.00	42.72	711.03

ENCLOSURE (4)

Based on Calculated Prestress Losses **Unit 2 (w/new tendons, low jacked)**

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
166	56V30	751.87	680	90	0	0	7.5556	0.02	7.5356	678.20	-21.08	710.46
167	56V31(jack)	742.24	700	90	0	0	7.7778	0	7.7778	700.00	0.72	709.69
168	56V32(new)	758.23	742	90	0	0	8.2444	0	8.2444	742.00	42.72	709.30
169	56V33(new)	758.23	742	90	0	0	8.2444	0	8.2444	742.00	42.72	708.29
170	56V34	751.87	660	90	0	0	7.3333	0.02	7.3133	658.20	-41.08	707.44
171	61V01(new)	726.11	742	90	0	0	8.2444	0	8.2444	742.00	42.72	706.56
172	61V02	758.23	707	90	0	0	7.8556	0.02	7.8356	705.20	5.92	705.82
173	61V03	745.38	705	87	0	0	8.1034	0.02	8.0834	703.26	3.98	704.86
174	61V04	745.42	702	90	0	0	7.8000	0.02	7.7800	700.20	0.92	703.54
175	61V05	745.42	697	90	0	0	7.7444	0.02	7.7244	695.20	-4.08	702.44
176	61V06	745.42	681	90	0	0	7.5667	0.02	7.5467	679.20	-20.08	701.82
177	61V07	738.97	674	90	0	0	7.4889	0.02	7.4689	672.20	-27.08	701.68
178	61V08	758.23	687	90	0	0	7.6333	0.02	7.6133	685.20	-14.08	701.42
179	61V09	758.23	673	90	0	0	7.4778	0.02	7.4578	671.20	-28.08	701.77
180	61V10	758.23	708	90	0	0	7.8667	0.02	7.8467	706.20	6.92	702.20
181	61V11(jack)	732.61	700	90	0	0	7.7778	0	7.7778	700.00	0.72	702.93
182	61V12(new)	732.61	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.54
183	61V13DE(new)	737.6	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.86
184	61V14DE	747.1	698	90	0	0	7.7556	0.02	7.7356	696.20	-3.08	704.05
185	61V15DE	747.1	701	90	0	0	7.7889	0.02	7.7689	699.20	-0.08	704.05
186	61V16DE	754.9	712	90	0	0	7.9111	0.02	7.8911	710.20	10.92	703.98
187	61V17DE(new)	750.2	742	90	0	0	8.2444	0	8.2444	742.00	42.72	703.72
188	61V18DE	745.5	676	90	0	0	7.5111	0.02	7.4911	674.20	-25.08	703.37
189	61V19DE	750.2	681	88	0	0	7.7386	0.02	7.7186	679.24	-20.04	702.77
190	61V20DE(jack)	742.3	700	90	0	0	7.7778	0	7.7778	700.00	0.72	702.46
191	61V21DE(new)	723.2	742	90	0	0	8.2444	0	8.2444	742.00	42.72	701.82
192	61V22DE	754.9	701	90	0	0	7.7889	0.02	7.7689	699.20	-0.08	701.39
193	61V23	732.61	674	90	0	0	7.4889	0.02	7.4689	672.20	-27.08	701.11
194	61V24	758.23	684	90	0	0	7.6000	0.02	7.5800	682.20	-17.08	701.00
195	61V25	751.87	671	93	0	0	7.2151	0.02	7.1951	669.14	-30.14	701.18
196	61V26(new)	739	742	90	0	0	8.2444	0	8.2444	742.00	42.72	701.60
197	61V27	726.11	668	90	0	0	7.4222	0.02	7.4022	666.20	-33.08	701.86
198	61V28(new)	758.23	742	90	0	0	8.2444	0	8.2444	742.00	42.72	702.10

ENCLOSURE (4)

Based on Calculated Prestress Losses

Unit 2 (w/new tendons, low jacked)

VERTICAL TENDON FORCES AT END OF 2002

	Tendon ID	Initial Force	1997 or 2002 Lift-off Force	1997 or 2002 No. of Effective Wires	No. Broken Wires Since 1997	Fut. Pred. Broken Wires By 2002	Force Per Wire (1997 or 2002)	Prestress Losses From 1997 to 2002 Per Wire	Force/ Wire - End of 2002	Tendon Force 2002	Var. w/Avg. Tendon Force	Run. For. Dist. - 39 tendons (19+ & 19-)
199	61V29(jack)	751.87	700	90	0	0	7.7778	0	7.7778	700.00	0.72	702.13
200	61V30	758.23	747	90	0	0	8.3000	0.02	8.2800	745.20	45.92	701.88
201	61V31	729.43	682	89	0	0	7.6629	0.02	7.6429	680.22	-19.06	701.45
202	61V32	758.23	708	90	0	0	7.8667	0.02	7.8467	706.20	6.92	701.05
203	61V33	751.87	671	90	0	0	7.4556	0.02	7.4356	669.20	-30.08	700.37
204	61V34(new)	751.83	742	90	0	0	8.2444	0	8.2444	742.00	42.72	699.47
		152081.61		18322	1	0				142653.41		142653.26
							(Based on 204 tendons) Mean Average:			699.28		699.28
	Note: Shaded Tendon ID means it is or was a corroded tendon											
	Shaded line across page means tendon is new or re-stressed (jacked)											
	average force per wire in 2002 =			7.7863								
									Minimum required gross prestress =	123620		
									Minimum required mean average force per tendon based on 201 tendons =	615.025		
									Minimum required running force based on 204 tendons/sheaths =	606		

ENCLOSURE (5)

Updated Model for Containment Structure Vertical Tendon Degradation for Calvert Cliffs 1 and 2, Revision 1

Calvert Cliffs Nuclear Power Plant, Inc.
April 4, 2001