Lewis Sumner
Vice President
Hatch Project Support

Southern Nuclear Operating Company, Inc.
40 Inverness Parkway
Post Office Box 1295
Birmingham, Alabama 35201

Tel 205.992.7279
Fax 205.992.0341

SOUTHERN COMPANY
Energy to Serve Your World℠

February 20, 2002

Docket Nos. 50-321
50-366

HL-6186

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information on
Technical Specifications Revision Request:
Diesel Generator Change

Ladies and Gentlemen:

This letter transmits Southern Nuclear Company's (SNC's) responses to NRC requests for additional information concerning our proposed change to the diesel generator Technical Specifications for Edwin I. Hatch Nuclear Plant Unit 1 and Unit 2. The proposed change increases the diesel generator allowed out-of-service time from 3 to 14 days.

The original Technical Specifications change request was submitted on August 31, 2001, and was followed by a response to an earlier NRC Request for Additional Information on November 15, 2001.

The latest NRC questions were transmitted to SNC via two separate electronic correspondences, one on January 18, 2002, and the other on February 6, 2002. Enclosure 1 addresses the January 18 correspondence; Enclosure 2 addresses the questions sent to us on February 6, 2002. A transcription of each NRC question is followed by SNC's response.

Should you have any further questions, please contact this office.

Respectfully submitted,

Lewis Sumner

H. L. Sumner, Jr.

OCV/eb

Enclosures:
1. Response to NRC Request of January 18, 2002
2. Response to NRC Request of February 6, 2002

A-001

cc: (See next page.)

cc: Southern Nuclear Operating Company
Mr. P. H. Wells, Nuclear Plant General Manager
SNC Document Management (R-Type A02.001)

U.S. Nuclear Regulatory Commission, Washington, D.C.
Mr. L. N. Olshan, Project Manager - Hatch

U.S. Nuclear Regulatory Commission, Region II
Mr. L. A. Reyes, Regional Administrator
Mr. J. T. Munday, Senior Resident Inspector - Hatch

Enclosure 1

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information on
Technical Specification Revision Request:
Diesel Generator Change

Response to NRC Request of January 18, 2002

This RAI is concerned only with the risk-informed aspect of the LAR and consists of two parts; introductory comments and specific requests. The former is to aid in preparing the response to the latter.

Comments:

1. In evaluating the risk associated with changes to an LCO CT the NRC staff considers both the average risk of normal operation after the change compared to that before, and the risk of operation during the new CT outage (or allowed outage time, AOT) compared to average risk of normal operation. In the former, the impact of the change in CT is incorporated into the quantitative risk estimate through the change in unavailability of affected equipment. In the latter, which is more important to the evaluation, the impact is incorporated into the estimate by considering the plant risk configuration during the specific CT outage. The risk of operation during the CT outage is estimated by setting the unavailabilities of all equipment out of service (EOOS) to one.

2. Maintenance associated with LCO CT outages falls essentially into two categories, preventative or planned maintenance and corrective or unplanned maintenance. AOTs (or CTs) for LCOs were initially set to reasonably accommodate corrective maintenance of inoperable equipment important to plant safety, and entering LCOs for preventative maintenance at power was discouraged. The development of comprehensive risk assessment techniques have changed matters by allowing licensees to identify specific conditions under which preventative maintenance would be done, analyze the risk associated with these conditions before hand and, if the risk is small for the planned CT, to voluntarily enter an LCO with confidence of safe operation. However, corrective maintenance on the same equipment, which by definition is unplanned, is another matter. Assuming preventative is planned for - and performed with - the plant in the minimum risk configuration, the corrective maintenance will have a risk equal to or greater than that for preventative maintenance; how much greater depends on the unavailability of other risk significant equipment when the LCO is entered. A licensee cannot specify the risk configuration of a plant for corrective maintenance before hand since there is no way to anticipate when specific equipment will become inoperable, consequently, no way to predict the risk for an associated CT. Hence, the difficulty with using risk assessment, quantitative or qualitative, to justify or extend allowed outage times of LCOs ahead of time.

NRC Question No. 1:

According to Enclosure 1 of the plant Hatch LAR "The CDF(New AOT) and LERF(new AOT) are obtained by setting maintenance to True on the specific DG in question and False on the other two, ..." This does not help the NRC staff appreciate the risk of operating the plant with any of the diesel generators (DGs) in maintenance, i.e., out of service, for the proposed CT. In this and subsequent requests, our requests for risk estimates refers to EOOS risks.

SNC Response:

ΔCDF and ΔLERF calculations (see Table 4: Results, in Enclosure 1 of the original submittal) include the present diesel generator maintenance unavailabilities as well as the proposed maintenance unavailabilities. This allows the reader to see a conservative estimate of the potential increase in risk based on a proposed change in average maintenance unavailabilities. Due to the short AOTs presently allowed for the diesels the bulk of on-line maintenance is unplanned, which is reflected in CDF(Base) and LERF(Base). The proposed maintenance numbers used for CDF(New Base) and LERF(New Base) include these values as well the estimated planned maintenance due to the extended AOT.

CDF(New AOT) and LERF(New AOT) are used to demonstrate the change in risk associated with actually removing a diesel from service for corrective and pre-planned maintenance. CDF(New Base) and LERF(New Base) are then subtracted from these two items, respectively. The resulting differences account for the increase in risk, due to a diesel being taken out of service, over the average risk for the operating unit.

EOOS risk is based on a no maintenance model that is modified by removing the particular item in question (i.e. a diesel generator) from service. It represents an instantaneous risk, reflecting the actual plant configuration, where the quantified result is compared to a preset value of risk to determine a color change for prioritizing and evaluating the present maintenance based situation. EOOS usage is described in Enclosure 1 on page E1-27 item 3 of the original submittal.

Setting flag file arrangements in the CAFTA model for the two diesels that will not be failed by the planned maintenance condition (i.e., FALSE condition for the corresponding maintenance basic events) and one arrangement for the diesel that will be failed due to pre-planned maintenance (i.e., TRUE for the corresponding maintenance event) is acceptable and essentially identical to EOOS.
The previously discussed information briefly summarizes what was considered for the risk situation. These cases are fair in their consideration of a diesel being out of service for pre-planned maintenance. The case where one diesel is out of service for planned maintenance then another diesel or some other component randomly fails is considered by the fact that random failure for all components is maintained in the models. There is a list of equipment, which will be generated, that if inoperative will prohibit placing a diesel in preplanned maintenance beyond three days. This is referenced to the statement in Enclosure 1 page E1-29, Item 2 of the original submittal.

If a diesel is in pre-planned maintenance under the proposed AOT and another diesel fails, a Technical Specification shutdown condition exists. This is a high-risk situation, which is reduced by the forced shutdown. For the case of a diesel being out of service for planned maintenance and some other component randomly failing (i.e., random failure is modeled) a Technical Specification course of action may or may not take precedence. In either case as with today's case all efforts will be made to restore to operable status that component which will eliminate the situation. EOOS can be used to identify the highest risk components in these cases, but for typical on-line maintenance it tends to be fairly obvious which is more significant and what drives the situation is which can be repaired first.

This submittal is performed as per NRC comment 1 in these RAIs as well as Regulatory Guides 1.174 and 1.177 by using average risk over the entire operating cycle for reference as opposed to an instantaneous risk calculated by EOOS. The EOOS result does not represent the true average risk as required in the base case for comparison. Because maintenance is assumed to be all pre-planned, or in the case of random failure, at the time of occurrence only, maintenance unavailability values where modeled are set to zero in the calculations of EOOS instantaneous risks. Components of the model are mapped to equipment and this mapping controls the items set to failure within.

The cases presented in the initial submittal were not only used to calculate risk changes and probabilities, but to generate a list of equipment that will not be placed in planned maintenance during the time frame a diesel is out of service. Random failure numbers for various equipment in the models demonstrate the risk of failure of components other than that in planned maintenance. The actual time out of service for randomly failed items not being known, made it difficult to estimate probability changes for such cases.

NRC Question No. 1a:

Estimate the EOOS risk for each of the generators including the risk to both units when the B DG is under maintenance.

SNC Response:

The current EOOS model used at Plant Hatch still includes some conservative aspects pertaining to the diesel AOT considerations. Due to this overconservatism and the fact that not all maintenance is omitted in the AOT models for a diesel out of service, EOOS estimates for instantaneous risk were not directly used initially to calculate ICCDP and ICLERP.

Instead, the CAFTA PRA model was manipulated to simulate the calculation performed by EOOS for the instantaneous risks associated with the plant configuration with a diesel generator removed from service. This was accomplished by (1) setting the maintenance unavailability event associated with the diesel removed from service to TRUE, thereby rendering the corresponding diesel unavailable in the relevant portion of the risk model, (2) setting the maintenance unavailability events associated with the two diesels remaining in service to FALSE which represents that these two diesels are not out of service due to maintenance, however, the hardware failure basic events still permit random failures of these two diesels, (3) setting all of the other significant maintenance events to 0.0 (with the exception of battery swapping and ATTS surveillance) to reflect that no other maintenance would be performed while a diesel is under maintenance.

As such, in the derivation of ICCDP and ICLERP, the instantaneous risks associated with the removal of a diesel from service were calculated essentially the same way as how it is done in the EOOS evaluation of the configuration-specific risks. The average risks associated with the new AOT [i.e., CDF(New AOT) and LERF(New AOT)] were then subtracted from the instantaneous risks thus calculated to eventually derive the ICCDP and ICLERP values. These ICCDP/ICLERP values, therefore, represent the increase in risks due to the removal of a diesel over the average risks during a normal operating cycle. This appears to be in close agreement with the statement made in Comment 1 of this RAI "... the NRC staff considers ... the risk of operation during the new CT outage (or allowed outage time, AOT) compared to average risk of normal operation." However, Request 1 of this RAI indicates "the CDF (New AOT) and LERF (New AOT) are obtained by setting maintenance to TRUE on the specific DG in question and FALSE on the other two ... does not help the NRC staff appreciate the risk of operating the plant with any of the diesel generators (DGs) in maintenance, i.e., out of service, for the proposed CT." It is therefore not certain as to what is meant by the comments in this request, but all attempts were made to respond to this RAI.

Therefore, as per your request, ICCDP and ICLERP for each diesel case are provided herein as calculated with an EOOS model. These values, as per the submittal, are for 14 days out of service for the diesel in question.

ICCDP (EOOS-A Diesel) = 1.57E-07

ICCDP (EOOS-B Diesel) = 2.03E-07

ICCDP (EOOS-C Diesel) = 2.5E-07

ICLERP (EOOS-A Diesel) = 1.078E-07

ICLERP (EOOS-B Diesel) = 1.13E-07

ICLERP (EOOS-C Diesel) = 1.3 E-07

These ICCDP/ICLERP values were derived by first comparing the EOOS calculated instantaneous risk values (CDF/LERF) associated with the removal of a diesel and the EOOS no-maintenance risk values for CDF/LERF (i.e., subtracting the no-maintenance risk values from the instantaneous risk values). This represents the increase in risks from a no-maintenance plant configuration (as opposed to the average risks over an operating cycle) to a configuration with a diesel removed from service. The above estimates, however, have accounted for a diesel recovery and a modification to the LERF grid recovery factors. These estimates are higher than those shown in the original submittal for this application. These differences are mainly due to the following reasons:

- The reference values used for comparison (i.e., the no-maintenance CDF/LERF risk values) are significantly lower than the average CDF/LERF values. This makes the ICCDP/ICLERP values presented in this response significantly higher than those given in the original submittal. This one reason contributes to most of the differences.

- The EOOS model excludes the possibility of Battery Charger Swapping and ATTS surveillance, while the AOT model used in the original submittal permits these unavailability contributions.
- The EOOS model zeros out all of the average maintenance unavailability terms, while the AOT model used in the original submittal only zeros out those relevant cutsets with a value greater than 5.0E-10.

Because of the similarity between the two Plant Hatch units, the Unit 1 risk model is used to represent both units. As such, the risk to each of the Hatch plant units when the B DG is under maintenance is the same as:

ICCDP (EOOS-B Diesel) and

ICLERP (EOOS-B Diesel) referenced above.

NRC Question No. 1b:

Since B DG is affixed to Unit 2 (1) when Unit 2 (1) diesels are under maintenance, estimate the resulting risk to Unit 1 (2) for the EOOS during the CTY.

SNC Response:

The risk for the unit that will not have the B diesel available for power because the proposed AOT is being exercised is the same as the B diesel being unavailable.

ICCDP (EOOS-B Diesel) = 2.03E-07

ICLERP (EOOS-B Diesel) = 1.13E-07

The average numbers are in Table 4, Enclosure 1, page E1-20 of the original submittal.

NRC Question No. 1c and 1d:

Estimate the maximum risk associated with the second CT for restoration of a required offsite circuit to OPERABLE status in connection with Required Action A.3; and if the estimated risks (ICCDP or ICLERP) exceed the staff's definition of what constitutes a small increase, discuss the factors responsible for the estimated values and what could be done to reduce the risk.

SNC Response:

The change to specification 3.8.1.A.3 is done for consistency with the entire 3.8.1 specification. The purpose of the specification is to, as stated in the Bases, establish a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet LCO 3.8.1.a, b, or c. If, for example, condition A is entered while the swing diesel has been inoperable for a period of 12 days, the A.3 completion time would already be exceeded (assuming it is left at 10 days). Thus for consistency, the CT should be changed to 17 days.

The ICLERP terms exceed the guidance for small risk increases. In the original submittal, Section F, pages E1-7 through E1-8 and section a.5, pages E1-20 through E1-21 discuss causes for the higher risk for LERF. Five items discussed on page E1-29 of Enclosure 1 describe what was done for the AOT submittal and what will be done at the plant to keep risk within the range of that predicted in the submittal.

Long-term changes depend on changes to the PSA models and the actual maintenance numbers associated with the diesels. With regard to PSA model changes there is the potential addition of an operator action associated with the hardened vent which will tend to offset some of the reliance on electric power. There are also certain conservatisms with regards to battery power that will be reviewed for potential remodeling. In addition equipment performance has improved at Hatch which will be reflected in future PSA data update.

NRC Question No. 2:

Enclosure 1 makes almost no mention of corrective maintenance and provides no discussion of associated risks.

SNC Response:

Corrective maintenance is included in the average maintenance numbers used in the Hatch PSA average risk models. The EOOS version of these models has maintenance zeroed out for all cases except what is input by the user, be it pre-planned or not. The calculation results shown in Enclosure 1 of the original submittal reviewed equipment which if out of service simultaneously with a diesel would increase risk. Five items discussed on page E1-29 of Enclosure 1 describes what was done for the AOT submittal and what will be done at the plant to keep risk within the range of that predicted in the submittal.

The following responses with regards to risk increase numbers deals with the absolute (i.e., diesel out of service) case as opposed to the difference used for ICLERP or ICCDP, and as such have no time multiplier applied such as 14 days out of service.

NRC Question No. 2a and 2b:

Discuss the risks associated with the proposed CTs - and in order to get some estimate of a bounding condition, for each DG out of service for maintenance, prepare a table showing the estimated risk importances of remaining risk significant equipment.

***SNC Response*:**

The top cutsets for the LERF case show that failure of both of the remaining diesels for each case drive the risk. Common cause failure of the remaining operable two diesels on a plant unit would raise risk into the E-03 range.

In the majority of these cases the initiating event is Loss of Offsite Power (LOSP). Single failures show a large single component contribution to be a failure of a 600VAC Emergency Bus. This would place absolute numbers in the E-03 range. The next largest failure would be a loss of the remaining two operable diesels, either directly or indirectly which likewise would place the risk in the E-03 range. Both cases result in shutdown LCOs of short magnitude. Failure of one of two instrument buses would place risk in the E-04 range as would failure of either station service battery bus A or B. The driving factors for bounding risk cases are the LOSP initiator and large electrical failures, not necessarily one out of two operable diesels. The next failure considerations are primarily those items that would fail an individual diesel or its capability to tie to an emergency bus when called upon, such as diesel battery systems or relays. In general, these items tend to raise risk by an order of magnitude.

The Core Damage Frequency (CDF) case for a single diesel out of service shows, as expected, that LOSP initiated events are the dominant cutsets. The larger single failures are the B station service battery system, the A station service battery system, and the 600VAC Emergency Buses. Any single failure of these items would have an extreme risk contribution because of its plant function. Failure of the remaining two operable diesels for a plant unit has a significant risk (E-03 range) when considered from the common cause standpoint. Individual failures of the remaining two diesels contribute risk in the range, high E-05 to low E-04. Instrument bus failures make contributions similar to the Large Early Release Fraction (LERF) cases.

The previous discussion estimates the high risk cases and as expected most of these involve short term shutdown LCOs. The risk range estimates are based on RAW values for conservatively selected failures. As mentioned previously the ranges do not consider the difference between base case and a diesel out of service; instead, they are strictly associated with the EOOS diesel out of service values. The following discussion for Item b will provide a more detailed view of equipment failures during diesel maintenance.

The tables created herein are based on Importance Measure Reports for the cutsets generated in the EOOS, diesel out of service runs. The reports have component failure importances based on common cause failure as well as individual failure. In many cases certain items would cause either a short term shutdown LCO or in some instances a plant transient and automatic scram. The following tables will be constructed primarily from a single component failure criteria (this can include singleton common cause failure). In addition, the input to the tables in general will not include the short term LCO items such as loss of a division of Reactor Building Service Water, or failure of the DC system for one of the remaining operable diesels, or those items that cause a plant transient or trip. The tables will likewise not include items which are corrected by a standard, proceduralized operator action—such as swapping strainers due to high differential pressure or plugging. Failures of equipment that would have already been detected while the unit is in operation such as cooling water flow to PSW pumps are not included. Some of the higher worth instrumentation is included along with some relays to show the significance of their failure, however, these are easily replaced and would be out of service only a matter of a few hours. Components are not mentioned which are more easily included in failure of a single device of higher worth. The case in point would be all the equipment that would fail a diesel in the long run or by Tech Specs being estimated by an individual diesel failure of higher worth. The complete set of Importance Reports are available for view if required. The Risk Achievement Worth (RAW) will be used for the importance measure of the tabulated components. The risk values are CDF and LERF for each EOOS diesel out of service case.

Importance Table for the A Diesel Generator Out of Service	
Core Damage Frequency = 1.06E-5	
Component	**RAW**
Primary Containment Hardened Vent Capability	14.4
TUFD1B21N690B or D (transmitter trip cards used for low pressure permissive for low pressure injection)	14.55
RLFD1B21K307D or 309D(relay for low pressure permissive for low pressure ECCS)	14.39
PXOR1B21N090B or N090D (transmitters for used for low pressure permissive for low pressure ECCS	14.31
Diesel Generator C fails to run	8.55
Diesel Generator B fails to run	7.29
P6SR1E41C001 (HPCI fails to run)	5.82
MVFO1E11F068B (This is the outlet for Division II of RHR Service Water)	4.03
P7SR1E51C001 (RCIC fails to run)	3.91
MVFO1E11F068A (RHRSW Division I outlet valve)	3.59
MVFO1E11F028A (RHR Torus Cooling Valve – Division I)	3.53
MVXC1E11F003B (Division II RHR Heat Exchanger Valve)	3.47
MVXC1E11F047B (Division II RHR Heat Exchanger Valve)	3.47

Importance Table for the A Diesel Generator Out of Service	
MVXC1E11F003A (Division I RHR Heat Exchanger Valve)	2.81
MVXC1E11F047A (Division I RHR Heat Exchanger Valve)	2.81
PMSS1E11C002A (A RHR pump fails to start)	2.67
MVFO1E21F005B (B Loop of Core Spray Injection Valve fails to open)	2.09

Importance Table for the A Diesel Generator Out of Service	
Large Early Release Frequency = 3.9E-06	
Component	**RAW**
Diesel Generator C fails to run	15.71
Diesel Generator B fails to run	14.51
Primary Containment Hardened Vent Capability	8.02
MVFO1E11F068B (This is the outlet for Division II of RHR Service Water)	2.48
MVXC1E11F003B (Division II RHR Heat Exchanger Valve)	2.25
MVXC1E11F047B (Division II RHR Heat Exchanger Valve)	2.25
MVFO1E11F068A (RHRSW Division I outlet valve)	2.13
MVFO1E11F028A (RHR Torus Cooling Valve – Division I)	2.13

Importance Table for the B Diesel Generator Out of Service	
Core Damage Frequency = 1.18E-5	
Component	**RAW**
TUFD1B21N690B or D (transmitter trip cards used for low pressure permissive for low pressure injection)	13.2
RLFD1B21K307D or 309D (relay for low pressure permissive for low pressure ECCS)	13.05
PXOR1B21N090B or N090D (transmitters for used for low pressure permissive for low pressure ECCS	12.98
Primary Containment Hardened Vent Capability	12.9
Diesel Generator C fails to run	10.98
MVFO1E11F068A (RHRSW Division I outlet valve)	8.05
MVFO1E11F028A (RHR Torus Cooling Valve – Division I)	8.02
PMSS1E11C002A (A RHR pump fails to start)	7.71
Diesel Generator A fails to run	6.70
MVXC1E11F003A (Division I RHR Heat Exchanger Valve)	6.57
MVXC1E11F047A (Division I RHR Heat Exchanger Valve)	6.57
MVXC1E11F007A (Division I RHR Minimum Flow Valve)	6.52

Importance Table for the B Diesel Generator Out of Service	
PMOS1P41C001A (A PSW Pump fails to start—normally all 4 pumps are running)	6.48
PMSS1E11C001A (A RHRSW Pump fails to start)	6.43
MVFC1E11F017A (Division I RHR LPCI injection valve fails to close)	5.71
P6SR1E41C001 (HPCI fails to run)	5.34
P7SR1E51C001 (RCIC fails to run)	3.96
MVFO1E11F068B (This is the outlet for Division II of RHR Service Water)	3.68
MVXC1E11F003B (Division II RHR Heat Exchanger Valve)	3.22
MVXC1E11F047B (Division II RHR Heat Exchanger Valve)	3.22
MVXC1E21F004A (A Loop of Core Spray Injection Valve transfers closed)	2.14
MVFO1E21F005A (A Loop of Core Spray Injection Valve fails to open)	2.10

Importance Table for the B Diesel Generator Out of Service	
Large Early Release Frequency = 4.03E-06	
Component	**RAW**
Diesel Generator C fails to run	16.23
Diesel Generator A fails to run	14.14
Primary Containment Hardened Vent Capability	7.77

Importance Table for the B Diesel Generator Out of Service	
MVFO1E11F068A (RHRSW Division I outlet valve)	4.3
MVFO1E11F028A (RHR Torus Cooling Valve – Division I)	4.3
PMOS1P41C001A (A PSW Pump fails to start) Typically all 4 PSW pumps are in operation	4.12
PMSS1E11C002A (A RHR Pump fails to start)	3.83
PMSS1E11C001A (A RHRSW Pump fails to start)	3.54
MVXC1E11F007A (Division 1 RHR Minimum Flow Valve transfers closed)	3.28
MVXC1E11F003A (Division II RHR Heat Exchanger Valve)	3.28
MVXC1E11F047A (Division II RHR Heat Exchanger Valve)	3.28
MVFC1E11F017A (Division I RHR LPCI injection valve fails to close)	3.21
MVFO1E11F068B (This is the outlet for Division II of RHR Service Water)	2.42

Importance Table for the C Diesel Generator Out of Service	
Core Damage Frequency = 1.30E-5	
Component	**RAW**
Primary Containment Hardened Vent Capability	12.68
TUFD1B21N690B or D (transmitter trip cards used for low pressure permissive for low pressure injection)	12.05
RLFD1B21K307D or 309D(relay for low pressure permissive for low pressure ECCS)	11.92
PXOR1B21N090B or N090D (transmitters for used for low pressure permissive for low pressure ECCS	11.85
Diesel Generator A fails to run	8.91
Diesel Generator B fails to run	6.85
MVFO1E11F068B (This is the outlet for Division II of RHR Service Water)	6.81
MVXC1E11F003B (Division II RHR Heat Exchanger Valve)	6.12
MVXC1E11F047B (Division II RHR Heat Exchanger Valve)	6.12
MVFO1E11F028B (RHR Torus Cooling Valve – Division II)	5.21
P6SR1E41C001 (HPCI fails to run)	4.85
P7SR1E51C001 (RCIC fails to run)	3.72
MVFO1E21F005A (A Loop of Core Spray Injection Valve fails to open)	2.55

Importance Table for the C Diesel Generator Out of Service	
PMSS1E21C001A (A Core Spray Pump)	2.53
MVFO1E11F068A (RHRSW Division I outlet valve)	2.35

Importance Table for the C Diesel Generator Out of Service	
Large Early Release Frequency = 4.48E-06	
Component	**RAW**
Diesel Generator A fails to run	14.81
Diesel Generator B fails to run	13.14
Primary Containment Hardened Vent Capability	7.38
MVFO1E11F068B (This is the outlet for Division II of RHR Service Water)	4.31
MVFO1E11F028B (RHR Torus Cooling Valve – Division II)	3.38
MVXC1E11F003B (Division II RHR Heat Exchanger Valve)	2.96
MVXC1E11F047B (Division II RHR Heat Exchanger Valve)	2.96

NRC Question No. 2c and 2d:

From the list of equipment that could cause the change in risk associated with the change in CT to significantly exceed what the staff considers small for a single TS AOT change, select the most important (from those permitted to be inoperable by LCO CT for, say, more than a day) which plant experience (e.g., as observed in the plant log) shows to have some out of service frequency (attempt to make the choice realistic and bounding), and with it and the DG out of service, re-estimate the risk for the CT; and provide assurances that the risks associated with the LCO CT for corrective maintenance will be kept comparable with that which the staff considers small for a single TS AOT for preventative maintenance.

SNC Response:

For the year 2001 the predominant on-line maintenance was replacement of a Plant Service Water Pump motor and an RHR Service Water Pump motor. The remainder of the maintenance was primarily balance of plant such as the case with Turbine Building Chillers. The B Diesel Generator had problems with its crankcase vacuum, but was not inoperable for its LOSP function. ECCS equipment such as room coolers and RHR and Core Spray pumps only had normal surveillance and planned maintenance. HPCI and RCIC experienced only normal planned maintenance as well. Despite this, HPCI will be considered for the equipment out of service for this evaluation. The HPCI required action statement (RAS) is fourteen (14) days, but only five (5) days are used herein.

Instrumentation RAWs for CDF for each diesel show much higher RAW values, but this equipment is readily replaced and in stock at the plant. The LCO out of service time for one device is longer than a day, but, replacement time is a matter of hours and as such would not present a very significant case. The Containment Hardened Vent devices essentially consist of an air operated valve and a blow-out plug. Its simplicity, lack of use, and low maintenance do not make this a very realistic choice. HPCI primarily affects CDF and has minimal affect on LERF (i.e.; RAW less than 2.0).

Arbitrary times out of service for HPCI is selected for this analysis.

Diesel A (RAW and CDF values are from the Importance Table for the A Diesel Generator Out of Service)

RAW (P6SR1E41C001-HPCI fails to run) = 5.82

CDF with the A Diesel removed from service = 1.06E-05

ICCDP = [(5.82 × 1.06E-05) – 1.06E-05] × (3Days÷365Days) = 4.19E-07

(5Days÷365Days) = 6.99E-7

Arbitrary times out of service for HPCI is selected for this analysis.

Diesel B (RAW and CDF values are from the Importance Table for the B Diesel Generator Out of Service)

RAW (P6SR1E41C001-HPCI fails to run) = 5.34

CDF with the B Diesel removed from service = 1.18E-05

ICCDP = [(5.34 × 1.18E-05) – 1.18E-05] × (3Days÷365Days) = 4.20E-07

(5Days÷365Days) = 7.0E-7

Arbitrary times out of service for HPCI is selected for this analysis.

Diesel C (RAW and CDF values are from the Importance Table for the C Diesel Generator Out of Service)

RAW (P6SR1E41C001-HPCI fails to run) = 4.85

CDF with the C Diesel removed from service = 1.30E-05

ICCDP = [(4.85 × 1.30E-05) – 1.30E-05] × (3Days÷365Days) = 4.11E-07

(5Days÷365Days) = 6.85E-7

With regards to the previous situation (a diesel inoperative for planned maintenance with a subsequent HPCI failure) it is difficult to predict the exact time out of service. As described, a three day out of service time for HPCI would be below the risk metric for ICCDP. Even a five day out of service time does not produce results which are significantly over 5E-07. It is believed that HPCI emergency repairs could be done in this time frame.

The calculated results presented in Enclosure 1 of the submittal, as well as the results of these RAIs already include items that will reduce the risk. LERF results presented in Enclosure 1 of the submittal as well as in response to these RAIs tend to be driven by the Station Blackout portions of the LOSP case. The reasons are failures of the other diesels to start or run for the required mission time. This is the case with the present diesel LCOs or with the 14 day proposed case. Pages E1-27 through E1-29 of Enclosure 1 to the submittal discusses other items which will be used to maintain risk at a minimum.

NRC Question No. 3:

Enclosure 1 makes reference to a configuration risk management site procedure and states that a formal Configuration Risk Management Program (CRMP) is not proposed in connection with the controlling and minimizing risk during CT outages.

SNC Response:

Regulatory Guide 1.177 implies a type of formal program in the discussion of Tier-3: Risk-Informed Configuration Risk Management within the Reg. Guide. At the time of the submittal, it was not clear that the program used to support the maintenance rule as referenced in Enclosure 1 of the submittal (page E1-27 Item 3) sufficed to manage the risk of a diesel removed from service. The program as stated in Enclosure 1 as opposed to a special program (i.e.; Configuration Risk Management Program) will be used.

NRC Question No. 3a and 3b:

Discuss the difference between a site procedure and a formal program and provide us a copy of the site procedure.

SNC Response:

The site procedure used to manage risk during maintenance promotes one aspect of the Maintenance Rule implementation (or program) at Plant Hatch. This procedure, by itself, does not makeup the entire program as there are other procedures to control other aspects of the maintenance rule. However, within this particular procedure will be placed the specifics regarding removal of a diesel for the extended AOT (reference the discussion in Enclosure 1 of the submittal, pages E1-27 through E1-29). This procedure governs the direct application of the Hatch on-line risk monitoring tool, EOOS, as well as other techniques used to manage risk when performing maintenance. With regards to the submittal, the intent is to use the Maintenance Rule Program in conjunction with Technical Specifications as opposed to a special Configuration Risk Management Program to govern the risk. This will be implemented with the aid of a procedure.

This procedure, entitled SCHEDULING MAINTENANCE, 90AC-OAM-002-0S, will be sent. This is an informal transmittal for information purposes and the request of Southern Nuclear is that this procedure not be placed on the docket regarding this AOT extension. Due to the size of the procedure, it will be E-Mailed separately to the NRC Hatch Project Manager as opposed to being attached to this response.

NRC Question No. 3c:

If not dealt with in the procedure, discuss the controls that limit at power preventative maintenance outage times and frequencies.

SNC Response:

There is discussion on the standard method of control within Enclosure 1 of the submittal as well as throughout the informally transmitted procedure, 90AC-OAM-002-0S. The 90AC procedure, if the submittal is approved, will be revised to also include a particular list of equipment that will not be in planned maintenance at the same time as a diesel is scheduled to be in maintenance. The planned maintenance at Hatch is controlled with a multi-week rolling schedule that goes through several stages of review and evaluation before it is implemented. It is not the practice of Plant Hatch to simultaneously take multiple risk-significant systems intentionally out of service for maintenance.

As discussed in the procedure and in conjunction with what is practiced at Plant Hatch, maintenance is focused on not degrading the operational status of the plant. This means that the plan for removing items from service is strictly adhered to and monitored daily for finish dates. There is on-line planned maintenance activities that cover such items as HPCI, RCIC, as well as divisional outages on low pressure ECCS systems. These are never planned to occur in combination with one another. Technical Specification LCO time would make this impractical and the color codes would show this to be a non-desirable condition. The color codes referenced in the procedure and Enclosure 1 to the submittal, page E1-27, govern items to the degree that plant management is well cognizant of any item that is not Green. The color codes are based on numerical input, but final approval is referred to management. This allows maintenance to be performed preferably in the safest and most operationally efficient manner. Yet, the color code concept still allows the necessary flexibility for governing the high risk condition that could possibly occur should certain corrective maintenance become necessary.

The color concept also provides flexibility in the maintenance program in order to perform on-line surveillance and routine planned maintenance. If a limit of its use for pre-planned maintenance had to be defined, it would typically be the YELLOW condition. The rationale behind this statement is that the level of approval for the weekly on-line work schedules requires a step up to next higher approval level—in other words—something is out of the ordinary. This does not mean that work will stop beyond YELLOW. It means instead that more scrutiny and understanding of the problems involved from a qualitative as well as a quantitative standpoint will be given. Maintenance cases that are not GREEN, although some YELLOW cases do occur, have not been what one would consider typical at Hatch, however.

NRC Question No. 3d and 3e:

If the procedure does not contain quantitative criteria used by Plant Hatch in making decisions on when a risk is small, and what level of risk (not color codes) triggers specific operational actions (not managerial levels of approval) together with the action associated with each level (e.g., discuss the point at which plant Hatch would voluntarily reduce the maintenance time to less than the LCO CT or shut down the plant), provide the information, and include discussion of qualitative considerations used by plant Hatch; and since significant increases in LCO CTs, such as those proposed, significantly increase the window during which other risk significant equipment can become inoperable, discuss the potential risk from overlapping equipment outages based on the plant log and current CTs and planned or proposed CT extensions.

SNC Response:

The EOOS color codes, RED, ORANGE, YELLOW, and GREEN are actually driven by numerical input to the code. However, while such input is visible to the user, Plant Hatch uses the color codes to guide maintenance activities in the most efficient manner possible. This guidance takes the form of managerial input which also controls the daily functions and operation of Plant Hatch. Maintenance activities are directed in a blended manner that include the EOOS input, managerial input (this includes operational input), plant needs, plant safety, costs, manpower, equipment needs, equipment performance criteria, and so on. As time passes, enough historical information may be available to provide reliable numerical information for controlling maintenance on an instantaneous risk number, but not at this time.

There are no risk number criteria which would trigger a specific operator action such as a plant shutdown. However, Plant Hatch would not intentionally place themselves in high risk situations. It is to be assured that Plant Hatch management (this begins with Operations personnel), if such actions occurred, would direct plant activities towards eliminating the situation in the safest most efficient and expedient means possible.

Maintenance time is not viewed as a luxury item. When equipment is out of service, priorities—through the scheduling process previously discussed in item 3.c—are established for returning equipment to service in an expedient manner.

The potential risk from overlapping equipment outages was discussed in our response to question #2c.

NRC Question No. 4 and 4a:

Attachment 2 contains comments on the PSA peer review and certification. Provide a copy of the review report.

SNC Response:

The PEER Certification Report comments of significance to this submittal are addressed in Enclosure 1, Attachment 2 of the original submittal.

NRC Question No. 4b:

It is not clear which revision was reviewed. Clarify.

SNC Response:

The Hatch Unit 1 PSA "At Power" model--Revision 1 was reviewed for the certification. Units 1 and 2 are sufficiently similar to allow one plant unit to suffice for both in cases such as this or licensing submittals.

Enclosure 2

Edwin I. Hatch Nuclear Plant
Response to Request for Additional Information on
Technical Specification Revision Request:
Diesel Generator Change

Response to NRC Request of February 6, 2002

NRC Question No. 1:

With regard to request 1(a), the ICCDP(EOOS-B Diesel) and ICLERP(EOOS-B Diesel) provided stem from delta-CDF and delta-LERF values that are apparently considerably smaller (by factors of about 1.2 to 1.4 and 1.8 to 2, respectively) than the values provided to us on Dec 4, 2002 (in connection with a one-time CT extension for an emergent problem with EDG-B that never developed into an actual inoperable condition; then, separate values were provided for Units 1 and 2). In both cases, the estimates were for the plant with only the B diesel generator out of service. Explain the differences and identify the unit for which the values in the current response were obtained.

SNC Response:

The values presented in the January RAI question 1a. are based on the EOOS model with certain items included that are referenced in the submittal, Enclosure 1 page E1-13-section a.2 (Methodology). These items are a diesel recovery and a modification to the LERF grid recovery factors. For the one-time submittal we were instructed to supply EOOS numbers as opposed to using those in the original submittal. The plant EOOS system was used and does not include these items, because the diesel AOT has not yet been approved. For submittals, one unit is used for both because of the similarity between the units. For this response and the original response, Unit 1 is used.

NRC Question No. 2:

With regard to request 1(c), according to the proposed TS modification, the maximum risk associated with failure to meet the LCO (Condition A) would occur in connection with the CT of 17 days for Required Action A.3. According to the TS, at any time during the (14 day) maintenance interval to restore an inoperable EDG, one required offsite circuit may be declared inoperable for up to 3 days. Even though the change was made for consistency, increasing the EDG CT from 3 days to 14 days increases considerably the likelihood of concurring events. For this reason, Hatch is requested to estimate the maximum EOOS risk associated with the 2nd A.3 CT (i.e., that for a 14 day EDG CT with concurring 3 day offsite circuit CT) for restoration of required AC sources to OPERABLE status.

***SNC Response*:**

Specification A.3 does not allow a diesel generator to be inoperable concurrent with inoperability of an offsite power source. In fact, if an offsite power source is inoperable at the same time as a diesel generator, one or the other must be made operable within 12 hours or the unit must be shutdown. This is clearly stated in TS 3.8.1.E.

The change to specification 3.8.1.A.3 is done for accuracy with the entire 3.8.1 specification. The risk associated with this subject has been taken into account with the risk-supplied information. The purpose of the specification is to establish a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet LCO 3.8.1.a, b, or c associated with the diesel generators. If, for example, condition A is entered while the swing diesel has been inoperable for a period of 12 days, the A.3 completion would already be exceeded (assuming it is left at 10 days). Thus for accuracy the CT should be changed to 17 days.

NRC Question No. 3:

With regard to request 1(d), it is noted that every time an LCO is entered taking an EDG in either unit out of service to perform maintenance, by procedure, the B EDG is out of service for the other unit, hence, the risk to the plant of a single LCO entry effectively doubles. For this reason, Hatch is requested to estimate how large the impact on ICLERP(EOOS-EDG) would be of upgrading the station battery life from 2 hours to 4 hours.

***SNC Response*:**

When the A or C diesel is removed from service from a plant unit for this proposed Tech Spec change, the B diesel will be affixed to this unit, thereby providing two diesels per unit. The risk to each unit is the loss of the B diesel on the unit with A and C operable, and the loss of either A or C on the other unit. The risk numbers provided in the RAIs and the original submittal are applicable to each unit separately. The risk is not multiplied times two.

The battery life, as explained in the RAIs and in Enclosure 1 of the original submittal, page E1-20-section a.5 is conservative. It is based on present calculations which govern a much larger case than those considered for PSA. Unfortunately, it is a considerable undertaking to make changes regarding battery life, and implement these in the model. The mention regarding this item is only provided to demonstrate that a conservatism exists and we are aware of it. It would be very difficult to provide a realistic estimate without initiating the necessary changes. The submittal numbers stand on 2 hours of battery life.

NRC Question No. 4:

With regard to request 3(a-b), if the Maintenance Rule Program is to be used for controlling corrective maintenance risks in connection with Technical Specifications, provide a copy of the guidance document used to implement the Maintenance Rule Program. (Neither this document nor 90AC-OAM-002-OS need to be docketed.)

SNC Response:

The maintenance rule program does have an initial document which describes the portions of the overall program. It does not get into the scheduling and planning side which is governed by its own procedures, however. In addition, other than providing guidance for determining risk significant structures, systems, and components, it does not discuss the risk from removal of equipment from service. Discussion of equipment performance criteria and what to do when it is not met is discussed instead. This submittal deals with maintenance risk and the procedure previously submitted, 90AC-OAM-002, is how it is governed. This is the simplest most direct insight into the Hatch program that can be provided, and as such, stands as the best response to the question.

NRC Question No. 5:

With regard to request 4(a), the NRC staff does not have the resources to review licensee PRAs and industry wide standards have yet to be established, hence, the owners group sponsored peer reviews are currently the only independent assessments of the PRAs. Without seeing at least the summary and conclusions sections (or the equivalent) of the report there is not much the staff can say to justify its acceptance of the results from the Hatch analyses.

SNC Response:

Attachment 2 to Enclosure 1 of the original submittal provides your responses. NRC personnel were invited to, and were present during, the entire certification process of the Hatch PSA. Additionally, the entire certification document was provided to NEI for the specific purpose of NRC review.