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SOUTHERN COMPANY
Energy to Serve Your World℠

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Edwin I. Hatch Nuclear Plant
Supplemental Information on Technical Specification Change Request for Refueling
Interlocks Limiting Condition for Operation

Ladies and Gentlemen:

By letter dated September 2, 2003, Southern Nuclear Operating Company (SNC) submitted to NRC a Technical Specifications (TS) change request concerning the Refueling Interlocks Limiting Condition for Operation (LCO) 3.9.1. The specific change proposed an allowance for fuel movement with the refueling interlocks inoperable provided that all control rods remain fully inserted with a control rod withdrawal block in effect.

Since the TS change request was submitted, several teleconferences have been held between NRC and SNC personnel concerning the amendment request. Additionally, the NRC asked several questions via E-mail regarding the submittal and Plant Hatch refueling practices in general.

The enclosure provides a transcription of each NRC question in italics, followed by the SNC response.

(Affirmation and signature are on the following page).

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Mr. H. L. Sumner, Jr. states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

This letter contains no NRC commitments. If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Lewis Sumner

H. L. Sumner, Jr.

Sworn to and subscribed before me this 27 *day of* February, *2004.*

Valerie A. O'Brien

Notary Public

My commission expires: 4-28-07

HLS/OCV/sdl

Enclosure: Response to NRC Questions

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley, Jr., Executive Vice President
Mr. G. R. Frederick, General Manager – Plant Hatch
Document Services RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission
Mr. L. A. Reyes, Regional Administrator
Mr. C. Gratton, NRR Project Manager – Hatch
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

State of Georgia
Mr. L. C. Barrett, Commissioner – Department of Natural Resources

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Response to NRC Questions

NRC Question:

Discuss the reliability records of Hatch Unit 1 and 2 refueling equipment interlocks and the one-rod out interlocks. Are the refueling interlocks and the one-rod out interlocks reliable? Base your response on plant specific operating history data and experience.

State the purpose and the reasons for the proposed changes – in-vessel fuel movement with inoperable refueling interlocks. If the refueling interlocks are reliable, state why Southern Nuclear Operating Company (SNC) needs to perform fuel movement with inoperable refueling interlocks.

SNC Response:

Specific refueling interlock data packages were reviewed for 1994, 1996, 1997, 1999, and 2000. The data packages show that the refueling interlocks, including the one-rod out interlock, are reliable. Only minor problems were noted, for example, failure of the grapple full up light to illuminate.

Accordingly, Plant Hatch does not need the alternate actions because of problems meeting the surveillance. Granting the Tech Spec change would provide Plant Hatch with additional flexibility to perform fuel movements more efficiently since stopping the fuel movement because of a suddenly inoperable interlock, which has occurred, or for performance of the interlock surveillance, would not be necessary. Fuel movement could thus proceed unhindered by implementation of the alternate actions.

This is acceptable and justified since use of the alternate actions places the plant in the safe condition for refueling. The alternate actions would fully insert all control rods, insert a control rod block, and place an administrative hold tag on the rod movement switch. In this condition, no control rods may be withdrawn at anytime during the refueling. In contrast, when relying upon the refueling interlocks, a single control rod may be withdrawn and a rod block is not always in effect. The proposed actions represent a more conservative configuration than that produced by reliance on the automatic system (refuel interlocks). It is not possible to have an inadvertent criticality when all control rods are fully inserted.

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NRC Question:

With the refueling interlocks operable, fuel loading is prevented unless there is an all-rod-in indication. Under the proposed change, state how it would be verified that all control rods are inserted. The PIP provides all the readings of the CR position. A malfunctioning PIP does not provide reliable means to ensure the CR is inserted. Therefore, if a PIP is suspected to be malfunctioning or providing false position indication reading, explain how it can be positively verified that all the control rods are inserted. Describe different redundant ways that it can be verified that all the control rods are inserted.

SNC Response:

With the refueling interlocks operable, fuel loading is prevented unless there is an all rods-in indication. The all rods-in indication is received from the full-in reed switches of the rod position indicating system (RPIS) probe. Under the proposed alternate actions, all control rods must be fully inserted for in-vessel fuel movement to commence. The rod position indicating probe contains 53 magnetic reed switches which are designated 00 to 52, with 00 being the full-in position and 48 being full-out. Two of the switches, 00 and 52, provide a full-in indication (a green light) on the full core display. Switch 51 provides a full-in overtravel position indication. When a control rod is at its normal full-in position, the '00' and full-in switches are made up. Thus, either of these two reed switches gives positive indication that the control rod is full-in. The overtravel full in position is not made-up with the control rod in its normal full-in position.

The RPIS supplies the indication of control rod full in position. When the refueling interlocks are operable and in effect, the RPIS supplies that information to the refueling interlock control system. Under the proposed alternate action, the RPIS would provide that information to the plant operator. Whether or not a reed switch malfunctions is independent of the status of the refueling interlocks. If the reed switch fails in such a manner as to provide a false full-in signal, the refueling interlocks will not provide protection. If the full-in indication fails in such a manner that a full-in control rod loses its full-in indication, then the refuel interlocks will prevent fuel movement. Under the proposed TS alternate actions, fuel movement would not be automatically prevented. However, in the unlikely event that this same control rod was to begin drifting out, an annunciator and the operable reed switches would provide such information to the operator. If the full-in reed switches fail, it is possible to give the control rod an insert signal to take it to its overtravel position, thus making up the overtravel reed switch and verifying the control rod's position.

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Current Tech Spec LCO 3.9.4 allows in-vessel fuel movement to continue with an inoperable full-in reed switch provided that the control rod with the inoperable switch is verified to be fully inserted and electrically disarmed at the full-in position. Once this has been done, the full-in reed switch may be bypassed to allow continued fuel movement. Other than as allowed by the provisions of the Special Operations specifications, this is the only situation where bypassing of the reed switches is allowed during in-vessel fuel movement. Technical Specifications LCO 3.9.4 will not change as a result of the proposed TS, and therefore, in-vessel fuel movements must be suspended until the rod is verified to be at the full-in location and electrically disarmed, even under the proposed LCO 3.9.1 alternate actions.

If the entire position indicating probe fails, that is a failure in which none of the reed switches function for an individual rod, then position indication is lost and there is no alternate method of determining the position of the rod. Again, LCO 3.9.4 would require suspension of fuel movement until the position indicating probe is returned to service in such a manner that the rod's full-in position can be verified.

NRC Question:

Explain how SR 3.9.1.1 requires that the refueling equipment interlocks are functionally tested before starting the in-vessel fuel movement. How long does performing SR 3.9.1.1 take?

Based on the Hatch units refueling history, explain how long the in-vessel fuel movements take.

For safe refueling management, the refueling equipment interlocks should remain operable whenever fuel movement or CR withdrawals are being performed. The proposed alternative action is not intended to minimize the duration of the refueling outage time or to delay or avoid performing necessary maintenance work. Therefore, explicitly state in your submittal and in your bases the intent of the proposed change.

SNC Response:

SR 3.9.1.1 requires that the refueling interlocks functional tests be performed every 7 days. If fuel movement is to begin, and the surveillance has not been performed within the previous 7 days (per the provisions of SR 3.0.2) it must be performed prior to the beginning of fuel movement. This is standard practice with TS surveillances. The complete surveillance takes approximately 4 hours, and is usually scheduled for about 6 hours during refueling outages.

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Presently, refueling the Plant Hatch cores is done in two parts. The first part involves removing the fuel bundles that will not be reloaded. This takes about two days. The second part involves loading the fresh bundles and shuffling some of the already loaded bundles into new core locations. This part takes from 4 to 5 days, not including the core verification.

The reason for the request is provided in the response to the first listed NRC question. Assuming use of the alternate actions, Plant Hatch intends to perform the interlock surveillance before beginning the fuel movement operation, as written into the proposed Bases of the September 2, 2003, submittal. It is intended that subsequent operation of the SR may be deferred, however, by using the alternate actions.

NRC Question:

Based on your plant specific needs and objectives, explain which of the following changes would be more suitable for your needs.

a. *Increasing the SR interval from 7 to 31 days or*
b. *Implementing the A2.1 and A2.2 action statements.*

SNC Response:

Implementing the A2.1 and A2.2 actions statements would be more suitable for SNC/Hatch needs. As mentioned previously, if the interlocks were to become inoperable after the initial performance of the surveillance, refuel activities could continue provided all control rods were inserted and a rod block maintained in effect. Increasing the interlock surveillance frequency would help, but would not provide relief against inoperable interlocks, should they occur during fuel movement.

NRC Question:

The applicability statement in LCO 3.9.1 states, "During in-vessel fuel movement with equipment associated with the interlocks", as oppose to, "During in-vessel fuel movement with equipment associated with the interlocks when the reactor mode switch is in the refuel position." The refueling interlocks are activated only when the reactor mode switch is in the refuel position. Revise the applicability statement and limit the in-vessel fuel movement to the reactor mode switch in the refuel position.

State if the Hatch units are equipped with a switch that allows all the PIPs to be bypassed. Switch that allows bypassing of all the PIPs would circumvent the partial protection provided by the refueling interlocks for those loaded control cells that are not selected for maintenance.

SNC Response:

LCO 3.9.1 states that the refueling interlocks must be operable during in-vessel fuel movement with equipment associated with the interlocks. If the mode switch is in the Shutdown position, the refueling interlocks are not operable and therefore, fuel movement cannot proceed. Fuel movement with the mode switch in Shutdown would thus represent a violation of the TS. Therefore, there is no need to revise the applicability to prevent the movement of fuel with the mode switch in Shutdown.

Under the proposed TS alternate actions, movement of fuel would be permitted with the interlocks inoperable provided all control rods are fully inserted and a rod block is in effect. Therefore, the safe condition with respect to inadvertent criticalities is in place. Since the alternate condition allows fuel movement with the refueling interlocks inoperable, there is no need to require the mode switch in the Refuel condition for this case. Currently, Hatch procedures prohibit the movement of fuel with the mode switch in Shutdown; however, the mode switch in Shutdown would enforce the rod block and would actually be an additional redundancy in the proposed TS alternate case.

Plant Hatch does not have a switch that bypasses all RPIS probes. Individual rods can have their full-in switches bypassed, but there is no switch that will do this for all 137 control rods. It is possible to bypass all the control rods full-in, but since no switch is available, this action could only be done by placing jumpers in the logic.

NRC Question:

Evaluate your integrated Hatch refueling LCOs and demonstrate that in-vessel fuel movement can only be performed under LCO 3.9.1, with LCO 3.9.3 restrictions applicable.

SNC Response:

LCO 3.9.1, which states that the refueling interlocks must be operable, is applicable during in-vessel fuel movements. That is an unequivocal statement. Under the current Tech Specs, in-vessel fuel movement may only be performed with the refueling interlocks operable. Anything less would be a violation of the Tech Specs. The same applies to LCO 3.9.3, which is concerned with the loading of fuel bundles. It unequivocally states that all control rods must be fully inserted when loading fuel assemblies into the core. The Hatch Tech Specs do allow an exception for multiple control rod removal in mode 5, but this is a special exemption and can be done only if the fuel assemblies around each withdrawn control rod are removed, and bundles are being loaded in a spiral pattern. Currently, Plant Hatch does not use spiral reloading patterns.

Otherwise, all control rods must be fully inserted during fuel loading. Again, anything less would be a violation of the Tech Specs.

NRC Question:

The applicability statement in the multiple control rod LCO states, "Mode 5 with LCO 3.9.3, LCO 3.9.4, or LCO 3.9.5 not met." According to the Hatch TS, the reactor mode switch can be in the refueling or shutdown position, when in mode 5:

LCO 3.10.6: According to your interpretation of your TS, can you perform in-vessel fuel movement with the reactor mode switch not in the refueling position? For example, can multiple CRs be removed or the control rods withdrawn for CRD removal from defueled cells with the reactor mode switch in the refuel position? Subsequently, place the mode switch in the shutdown position with multiple uncontrolled defueled cells and start in-vessel fuel movement? The described refueling practice may minimize the refueling outage, but it would not represent safe refueling practice, because inadvertent fuel loading into defueled cell can occur. If your TS allows such a refueling practice, although not necessarily conducted at your plant, revise your applicability statement in LCO 3.10.6 limit the multiple CR maintenance to the reactor mode switch in the refuel position.

To perform multiple control rod or CRD maintenance the position indication probes would have to be bypassed for those control rods or CRDs selected for maintenance. However, with the reactor mode switch in the refuel position, and the refueling interlocks operable, the interlocks (refueling equipment and the one-rod-out interlocks) provide partial protection for those control cells not undergoing maintenance. Or preventing movement of load indicative of fuel (sic), if one CR (with PIP not bypassed) is withdrawn inadvertently. Note that for safe refueling practice, fuel loading should not be allowed under the multiple CR LCO. However, LCO 3.10.6 does not seem to ensure that PIP is bypassed only for those defueled cells selected for maintenance. Moreover, the LCO's requirement is subject to interpretation and does not clearly restrict in-vessel fuel movement while under the multiple CR LCO.

> *Explain how your current multiple CR LCO ensures that the refueling interlocks provide partial protection while performing multiple CR maintenance. Alternatively, propose changes that ensure the PIP are Operable for all other fueled CR cells. While the Hatch LCO 3.10.6 is consistent with the STS for this part of the LCO, however, minor modifications are required to remove ambiguity in the LCO.*

Evaluate the requirements in LCO 3.10.6 c and state if in-vessel fuel movement is restricted to only fuel loading after core offload. If the LCO 3.10.6 a is interpreted differently, propose fuel loading restrictions. Otherwise, add a clarifying statement in the bases that in-vessel fuel movement are not allowed under the multiple CR LCO.

Evaluate the Hatch multiple CR LCO and state if inadvertently a single CR can be withdrawn from a loaded fuel cell (as allowed by the one-rod-out interlock), while performing multiple CR maintenance work.

SNC Response:

LCO 3.9.1 states that the refueling interlocks must be operable during in-vessel fuel movements with equipment associated with the refueling interlocks. With the mode switch in Shutdown, not all refueling interlocks are in effect. Therefore, the mode switch must be in Refuel during in-vessel fuel movement.

Multiple control rod removal would, of course, be performed under LCO 3.10.6. This LCO requires that the fuel assemblies be removed from the cells corresponding to the control rods to be removed, and that all additional control rods be fully inserted. The applicability is in mode 5 with LCO 3.9.3, 3.9.4, and 3.9.5 not met. Since no special exemption is given for LCO 3.9.1, it would still apply. As previously noted, this LCO requires operability of the refueling interlocks. Therefore, fuel movement could not commence with the mode switch in the Shutdown condition as this would make the refueling interlocks inoperable. Therefore, no changes to LCO 3.10.6 are necessary.

However, under the proposed TS alternate actions, fuel movement could proceed with the refueling interlocks inoperable provided all rods are inserted and a rod block is in effect. Therefore, fuel movement could proceed with no chance of an inadvertent criticality since all control rods would be required to be inserted by the Tech Specs. Hatch procedures currently prohibits moving fuel with the mode switch in Shutdown. Nonetheless, if the mode switch were to be placed in the Shutdown condition, two things would happen. First, any control rod withdrawn in any fueled cells would be automatically scrammed, and second, a rod block would be inserted. These actions ensure the safe refueling condition.

LCO 3.10.6, as written for the Hatch Tech Specs, only allows the position indicating probes for the control rods to be removed to be bypassed in the full-in position. The LCO reads "... the full-in position indicators may be bypassed for any number of control rods in MODE 5, to allow withdrawal of these control rods,...". The word 'these' in the LCO clearly means the control rods to be withdrawn. Also, the LCO explicitly requires conditions *a, b* and *c* of the LCO to be met. For example, condition *a* requires that any

control rod with a bypassed full-in switch has the four fuel assemblies removed from the associated cell. There has never been any ambiguity with this part of the specification at Plant Hatch. Therefore, Plant Hatch does not believe the LCO needs to be changed.

The earlier discussion concerning LCO 3.10.6 explains how the current integrated LCOs provides protection during multiple control rod withdrawal.

Under LCO 3.10.6, fuel movement is permitted. Fuel loading, however, can only be performed if a spiral reloading sequence is used. Currently at Plant Hatch, spiral reloads are not used and therefore, reloading fuel assemblies is not performed at Hatch while under the multiple control rod removal LCO. Although it has not previously been a standard operating practice, Plant Hatch plans to use this specification during fuel offloads, but not reloads. The LCO applies a restriction to fuel loading and not to fuel unloading because the concern is the possibility of mistakenly loading a fuel assembly into a cell without reactivity controls. There is no such concern when off-loading the fuel, and accordingly, LCO 3.10.6 places no restrictions on fuel off-loading.

Assuming all the requirements of 3.10.6 are met, a single control rod could be withdrawn as permitted by the one rod out interlock. Of course, fuel movement could not occur since fuel grapple operation over the core is prevented by the interlocks with a control rod withdrawn. Also, a second rod could not be withdrawn since a rod block would engage upon selection of the second control rod. Under the proposed alternate actions to LCO 3.9.1, a control rod could not be withdrawn during fuel movement because a rod block would be enforced at all times during the refueling operations.