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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Additional Information Supporting the License Amendment Request to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations

References: (1) Letter from J. M. Heffley (AmerGen Energy Company, LLC) to U.S. NRC, "Request for License Amendment to Technical Specifications to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations," dated April 2, 2001

(2) Letter from K. R. Jury (Exelon Generation Company, LLC) to U.S. NRC, "Response to Request for Additional Information Regarding Risk Aspects of Inclined Fuel Transfer System License Amendment Request for Clinton Power Station," dated January 15, 2002

In Reference 1, AmerGen Energy Company (AmerGen), LLC submitted a request for changes to the Facility Operating License No. NPF-62 and Appendix A to the Facility Operating License, Technical Specifications (TS), for Clinton Power Station (CPS) to permit Inclined Fuel Transfer System (IFTS) blind flange removal during power operations. The proposed changes in Reference 1 requested the addition of a conditional note before the Actions for TS Section 3.6.1.3, "Primary Containment Isolation Valves (PCIVs)," which will identify the controls required for allowing the IFTS blind flange to be removed during Modes 1, 2, or 3. Additional information concerning the risk aspects of the proposed change was provided in Reference 2. The NRC, in a conference call, requested additional followup information regarding the information provided in the above references. The attachment to this letter provides the requested information.

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Should you have any questions related to this information, please contact Mr. Timothy A. Byam at (630) 657-2804.

Sincerely,

T. W. Simpkin

T. W. Simpkin
Manager – Licensing

Attachments:

Affidavit
Attachment: Additional Information Supporting the License Amendment Request to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)	
COUNTY OF DUPAGE	)	
IN THE MATTER OF	)	
AMERGEN ENERGY COMPANY, LLC	)	**Docket Number**
CLINTON POWER STATION, UNIT 1	)	**50-461**

SUBJECT: **Additional Information Supporting the License Amendment Request to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations**

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

T. W. Simpkin
T. W. Simpkin
Manager – Licensing

Subscribed and sworn to before me, a Notary Public in and for the State above named, this 23rd day of August, 2002.

Timothy Byam
Notary Public

"OFFICIAL SEAL"
NOTARY PUBLIC STATE OF ILLINOIS
TIMOTHY A. BYAM
COMMISSION EXPIRES 12/04/05

ATTACHMENT

Additional Information Supporting the License Amendment Request to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations

Question 1
Describe the manual actions that are required to remove the blind flange and replace the flange with the gasketed ring assembly. Describe the conditions under which the actions would be performed, e.g., are there harsh environmental factors such as radiation, excessive heat, noise, limited lighting, etc., that would hamper an individual from performing the required manual valve realignment and, if there are impediments, have they been considered in determining whether a dedicated individual can perform the required actions? Describe the basis for determining that an individual can successfully and reliably accomplish the required actions in the allowable time under conditions that simulate the real event.

Response 1
The manual actions required to remove the blind flange and replace the flange with the gasketed ring assembly are described in Clinton Power Station (CPS) procedure 8109.01, "Inclined Fuel Transfer System Blank Flange Rotation." Prerequisites to performing this activity include ensuring that the Inclined Fuel Transfer System (IFTS) tube drain isolation valve, 1F42-F301, and IFTS drain valve, 1F42-F003, are closed. Another prerequisite is to close the manual gate valve, 1F42-F002, that is located just above the blank flange. A sketch of the IFTS tube and its appurtenances is provided as Figure 1 in Reference 1. In addition, the steam dryer pool to reactor cavity pool gate in the upper containment pool must be installed with the seal inflated and a backup air supply provided. Reference 1 states that installation of this gate separates the volume of water above the IFTS transfer tube from the volume of water available for the Suppression Pool Makeup System ensuring the required makeup water volume is available.

Once the manual gate valve is closed, the water is drained above the flange by opening a pipe plug just above the flange. The flange is then rotated by loosening all of the pipe spool bolts connecting the pipe spool above the flange to a height of approximately $1^5/_8$ inches from the torqued position. Eleven of the spool bolts and the lock plates are removed. A hydraulic hand pump is connected to the fittings to allow the pipe reducing spool to be compressed and the flange to be rotated. A gasketed ring is then inserted into place left vacant by the rotated flange and the pipe spool bolts are reinstalled. Rotating the blind flange normally takes approximately four hours. The necessary actions required for removing the blind flange and replacing the flange with the gasketed ring assembly are performed under normal plant operating conditions in the containment. There are no harsh environmental conditions that would prevent an individual from performing these required actions.

In the event of a Loss of Coolant Accident (LOCA), the following actions would need to be taken to reinstall the flange. The manual gate valve would need to be closed and the IFTS drain isolation valve and the IFTS drain valve would need to be opened. The pipe plug is removed to allow the water to drain below the gasketed ring. The spool bolts are then loosened and the eleven (11) spool bolts are removed. After connecting the hydraulic hand pump to the fittings to allow the pipe-reducing spool to be compressed, the gasketed ring is removed and the blind flange is rotated back into place. As described in Reference 1, a LOCA would result in elevated temperatures and pressures in the containment. For example, during a small break LOCA with bypass of the suppression pool, this area would become inaccessible within the first several minutes following the accident. Since containment pressure could exceed 9 psig for approximately 2 hours, rotating the flange during these conditions would not be feasible.

In Reference 1, it was stated that maintaining a high level of water above the lower end of the IFTS tube effectively seals the tube and precludes it from becoming a potential leak path for containment atmosphere into the fuel building in the event of a large break LOCA. The evaluation performed in support of this amendment request, and documented in Reference 1, demonstrated that the structure can withstand the design basis pressures and that the water seal is capable of withstanding the 9 psig pressure associated with the large break LOCA.

For the IFTS drain line, the IFTS tube drain valve, 1F42-F003, is verified to be leak tight by performing a leak test (see response to Question 3 below). In addition, as documented in Reference 1, CPS plans to station a dedicated individual in the vicinity of the IFTS drain line isolation valves to manually close the drain line isolation valve at the direction of the control room or upon loss of offsite power (LOOP). As noted in the safety evaluation prepared for CPS Amendment 107 (Reference 2), this individual, in continuous communication with the control room, will ensure the drain line is rapidly isolated. The actions associated with closing the IFTS drain line are discussed in the response to Question 2. Therefore, the drain line does not constitute a leakage path from the containment with the blind flange removed.

As discussed above, as long as the water seal remains in the IFTS, the tube will not constitute a containment leakage path. It has been shown that the water seal is able to withstand the containment pressure of 9 psig (i.e., peak pressure associated with the large break LOCA) and still maintain the IFTS tube penetration isolated. However, the pressure associated with the small break LOCA assuming drywell bypass has been shown to generate an equivalent head of water in excess of the static head associated with the normal water level in the fuel building fuel transfer pool. In the event this was to occur, the dedicated individual in the Fuel Building would notice any significant change in water level and would take action to address the condition. If the bottom gate valve were open, this action would include closing this valve.

If the bottom valve is open at the initiation of a LOCA, the IFTS operator will take action, in accordance with CPS procedure 3702.01, "Inclined Fuel Transfer System (IFTS)," to isolate the bottom valve using the hydraulic actuator. If the fuel transfer carriage or cables are part way through the open valve, the operator will raise the carriage to a point above the fill/drain position and then close the valve. In a LOCA with offsite power available all of these actions can be performed from the IFTS control panel located in the Fuel Building. Contingency actions will be provided in approved station procedures to enable the manual closure of the IFTS bottom gate valve during a LOOP. These contingencies include the actions necessary to manually operate the IFTS upender, the IFTS winch, and the bottom gate valve. Equipment and tools necessary to perform these contingency actions, including lighting sufficient to perform the tasks during LOOP conditions and a hydraulic supply to operate the IFTS bottom valve, will be staged in the area prior to operation of the lower gate valve while in Modes 1, 2, or 3. The equipment and tools will be demonstrated to be capable of supporting the function they are intended to perform prior to the removal of the IFTS blind flange in Modes 1, 2, or 3. In addition, personnel required to perform these actions will be trained on the actions and associated procedures prior to operation of the IFTS bottom valve in Modes 1, 2, or 3 (see response to Question 4 below).

Question 2

Describe the manual actions that are required by the dedicated individual at the IFTS control panel in the fuel building to initiate closure of the IFTS transfer tube drain line, motor operated isolation valve (1F42-F003) and the IFTS transfer tube drain line manual isolation valve (1F42-F301) if there is a need for primary containment isolation. For example, where is the IFTS control panel located in relation to the manual isolation valve? What is the minimum amount of time that the individual is allowed to manipulate both valves under LOCA conditions? During LOCA, are there harsh environmental factors such as radiation, excessive heat, noise, etc., that would hamper an individual from performing the required manual valve realignment and, if there are impediments, have they been considered in determining whether a dedicated individual can perform the required actions? Describe the basis for determining that an individual can successfully and reliably accomplish the required actions in the allowable time under conditions that simulate the real event.

Response 2

As contained in CPS procedure 3702.01, the following manual actions will be taken to isolate the IFTS transfer tube drain line following an accident. The dedicated individual in the fuel building, who is in continuous communication with the Main Control Room, will attempt to close the IFTS drain valve, 1F42-F003, from the IFTS control panel by taking the MANUAL-LOCAL-REMOTE switch to MANUAL, and then position the 1F42-F003 control switch to close the valve. This individual will then close the IFTS drain line manual isolation valve, 1F42-F301, by traversing from the IFTS control panel to the 1F42-F301 valve located approximately 100 feet away on the same elevation north of the Spent Fuel Pool. The 1F42-F003 and 1F42-F301 valves are readily accessible through an open floor plate at the 755' elevation of the Fuel Building. The 1F42-F003 valve will then be checked to confirm it is closed and, if still open, the valve will be manually closed. Supplemental portable lighting will be staged in the immediate location of the drain valves prior to rotating the blind flange. The environmental conditions (i.e., temperature, radiation levels, lighting, noise, etc.) are not severe enough to impede the dedicated individual from performing this activity. The dedicated individual can perform these operations quickly, nominally within two minutes. Since the peak containment pressure will occur approximately 8-12 minutes from the onset of a small break LOCA (Reference Updated Safety Analysis Report (USAR) Figure 6.2-20, "Containment Pressure Following a Small Break with Steam Bypass"), the dedicated individual will have sufficient time to isolate the IFTS drain line.

Additional Information Supporting the License Amendment Request to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations

Question 3

In the event that, under LOCA conditions, primary containment atmosphere was introduced into the fuel building (mentioned in the April 2, 2001 submittal as an unlikely event), what are the adverse effects that could occur to the dedicated individual at the IFTS control panel in the fuel building? What measures have been determined to adequately protect the individual under this condition?

Response 3

As stated in Reference 1, an analysis had been performed to evaluate the impact of a LOCA on the ability of the IFTS to prevent communication between the primary containment atmosphere and the fuel building. The large break LOCA containment internal pressure, P_a, is 9.0 psig or approximately 21.7 feet of water. With the blind flange removed, the normal water level maintained in the fuel building spent fuel pool serves as a water seal for the containment. The available column of water (754.0 ft - 728.9 ft) that would exist following an accident is 25.1 ft. The 3.4 ft (25.1 ft - 21.7 ft) of water remaining assures that following a large break LOCA, the water column will provide an adequate water seal. However, under worst-case assumptions following a small break LOCA with steam bypass of the drywell, the maximum calculated containment pressure is approximately 15 psig. The small break LOCA results are presented in the USAR Figure 6.2-20, to demonstrate that the containment design pressure limit is not exceeded during an accident. In the event of a small break LOCA with steam bypass of the drywell, the calculated containment pressure corresponds to about 34.6 ft of water. As discussed in References 1 and 3, even though the containment pressure is higher than the available column of water to maintain a seal, leakage through the IFTS tube into the spent fuel pool in the fuel building will be scrubbed by the upper containment pool and the spent fuel pool. The consequences of a small break LOCA is not limiting since no fuel damage is expected to occur for this event. That is, there is a minimal release of radioactive material inside containment. Therefore, a large break LOCA would remain as the bounding event with regard to radiological consequences.

As stated in Reference 3, the estimated containment release frequency through the open IFTS drain line valves is less than 1 E-7/yr. This is based on the assumption that the IFTS drain line valves are open at the time of the event and not closed following the event. Station procedures have been revised to require closure of the drain valves in the event of an accident. The IFTS transfer tube drain valve (1F42-F003) will be leakage tested prior to IFTS operations each refueling cycle to ensure that the drain valve is sufficiently leak tight. A modification will be installed to allow leakage testing to be performed. This will ensure that containment atmosphere leakage will not bypass the spent fuel pool if the blind flange is removed during an event requiring containment isolation. For the short time period required to recognize the LOCA has occurred and the drain valves are closed, the consequences will be limited by the scrubbing from the suppression pool.

There are no adverse affects on the dedicated individual stationed at the IFTS control panel in the Fuel Building following a large break LOCA due to the water seal provided by the spent fuel pool. In addition, there are no immediate effects on the dedicated individual at the IFTS control panel in the Fuel Building following a small break LOCA. Should a high pressure exist in the containment building, the dedicated individual in the Fuel Building would notice any significant change in water level. The dedicated individual in the Fuel Building, through constant communications with the Main Control Room, will be cognizant of any significant events and can initiate action to isolate the IFTS drain line.

Question 4
Describe changes to any current operator actions covered by emergency operator procedures (EOPs) or abnormal procedures that may occur as a result of the amendment. Describe evaluations performed of these potential modifications.

Response 4
No changes to any EOPs will occur as a result of this amendment. However, station procedures will be revised to provide direction to station personnel as to the need to close the IFTS bottom valve should an accident occur. As described above, if the IFTS carriage becomes stuck at a position other than the fill/drain position or below the bottom gate valve (1F42-F004) following a LOOP, the IFTS carriage can be manually raised, and the bottom gate valve, 1F42-F004, closed in approximately 1 to 1½ hours. The IFTS carriage must be moved manually using the instructions that are contained in the vendor technical manual noted in CPS 3702.01. The equipment necessary for moving the winch will be staged for ready access during IFTS operations. The equipment necessary for hydraulically closing the 1F42-F004 valve (e.g., temporary lighting, nitrogen supply bottle, etc.) will be staged in the Fuel Building. Workers tasked with the activities associated with contingency plan actions involving closing the IFTS bottom gate valve, manual winch operations, or IFTS drain valve closure will be trained by means of walk-throughs prior to rotating the IFTS blind flange. This training will also confirm that the individual can perform the required actions with the supplemental portable lighting provided. Procedure revisions will be made to describe the actions necessary to close the bottom gate valve. In addition, the nitrogen bottle staged to support hydraulically closing the bottom gate valve will be sized and tested to confirm that it is capable of performing this function.

Question 5
In the March 28, 2002 conference call the NRC requested information on the ultimate pressure capacity of the structures and components comprising the IFTS pressure boundary.

Response 5:
The following table was provided in the January 15, 2002 RAI response (Reference 3, Response 2.a). It has been revised to include a basis for why the increase in pressure due to the small break LOCA pressure is not a concern for the identified components.

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Component	Safety Class	Design Pressure	Basis for Acceptance
Transfer Tube			
1F42D001	Safety related	40 psig	The design pressure of the IFTS tube is 40 psig. Its structural capability was analyzed and it was determined that there is sufficient margin to maintain the pressure retaining capacity of the components at the small break LOCA containment pressure of 15 psig. The stresses in the tube will remain below ASME Code allowable stresses for a containment pressure of 15 psig. In addition, there are margins of safety included in the Code allowable stresses and generally there are margins available between the minimum required and actual material properties. Based on this, it is concluded that the pressure retaining capacity will be maintained in the event a containment pressure of 15 psig occurs when the IFTS flange is rotated.
Bellows			
1F42G001	Safety related	20 psig	Rotation of the IFTS flange does not impact the pressure on these items. [Reference: Drawing M05-1080 Sht. 1, Rev. K, Fuel Transfer Piping]
1F42G002	Non-safety related	27' H_2O	(same as for 1F42G001)
Expansion Joints			
1F42D300	Non-safety related	50 psig	The centerline elevation for this expansion joint is approximately 755'-7" (755.58 ft) [Reference: Drawing M06-1080, Sht. 1, Rev. J, P&ID Fuel Transfer System (FH)] The maximum possible hydrostatic head pressure is 31.5 psig. A 15 psig containment building pressure does not represent a concern for 1F42D300 since the total pressure remains below 50 psig design pressure when the hydrostatic head is accounted for (15 psig + 31.5 psig = 46.5 psig).
1F42D301	Non-safety related	15 psig	Rotation of the IFTS flange does not impact the pressure on these items. [Reference: M05-1080 Sht. 1, Rev. K, Fuel Transfer Piping]

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Gate Valves			
1F42F002	Non-safety related	50 psig	The valve is an Anchor Darling double disc gate valve with ANSI Class 150-psi flanges welded to each end. Its specified primary service rating is 75 psig and design pressure is 50 psig. The valve was hydrostatically tested at 113 psig. The allowable pressure for the flanges at 100°F is 275 psig. This valve is subject to a maximum hydrostatic head pressure of 43 psig. A 15 psig containment building pressure does not represent a concern for this valve since the total pressure remains below the indicated 75 psig valve pressure and is well within the hydrostatic test pressure. In addition, the pressure would be well within the allowable pressure for the flanges. The total pressure when accounting for 15 psig building pressure and hydrostatic head would only be 58 psig (15 psig + 43 psig).
1F42F004	Non-safety related	50 psig	(same as for 1F42F002)
Drain Line			
1FH07A	Non-safety related	100 psig	The design pressure for this line is 100 psig. The maximum normal operating pressure is 50 psig. This provides more than adequate margin to accommodate the potential containment building pressure of 15 psig and the head of water.
Drain Line Isolation Valves			
1F42F003	Non-safety related	50 psig	This valve is a Hills-McCanna ball valve with a design process pressure of 50 psig and a maximum normal operating pressure of 50 psig. The valve has a primary service rating of 150 psi per ANSI B16.5. The construction material for the body and bonnet has a pressure class rating of 240 psig for temperatures as high as 200°F. As a result, this pressure far exceeds any pressure that could be applied from the upper pool side of the valve. As a result, the potential containment building pressure

			of 15 psig is not a concern for this valve.
1F42F301	Non-safety related	285 psig	This valve has a 285 psig design pressure at 100°F. This corresponds with a 150 psi ANSI classification for normal carbon steel. For a temperature of 200°F, the allowable pressure would be 260 psig. The centerline elevation for this valve is 752'-3" [Reference: Drawing M05-1080 Sht. 1, Rev. K, Fuel Transfer Piping]. It is not possible for a containment building pressure of 15 psig in conjunction with the elevation head to pressurize the valve to these values. As a result, the potential containment building pressure of 15 psig does not represent a concern for this valve.

Question 6:
Considering the combined head of water from the upper containment pool and the containment accident pressure, what is the impact from this pressure on the IFTS components? Are the design or ultimate capacity values for any components exceeded by this pressure? Is it necessary to close the upper flap valve to reduce the pressure the IFTS components are exposed to? Is there procedural guidance on how to do this and do we demonstrate the capability to perform these actions?

Response 6:
The additional pressure resulting from the LOCA does not significantly add to the pressure the IFTS components are exposed to due to the head of water in the upper containment pool. The IFTS tube is exposed to the water head whenever the carriage is lowered into the tube prior to the draining of the tube to support opening the lower gate valve (i.e., when the flap valve is open). The system is designed for this pressure. The capability of these components is identified in the response to Question 5 above. The addition of the LOCA pressure, which does not exceed 15 psig, does not represent a concern to any of the IFTS components. Therefore, there is no benefit to closing the flap valve to reduce this pressure.

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Additional Information Supporting the License Amendment Request to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations

References:

1. Letter from J. M. Heffley (AmerGen Energy Company, LLC) to U. S. NRC, "Request for Amendment to Technical Specifications to Permit Inclined Fuel Transfer System Blind Flange Removal During Power Operations," dated April 2, 2001
2. Letter from U. S. NRC to R. F. Phares (Illinois Power Company), "Issuance of Amendment No. 107 to Facility Operating License No. NPF-62 – Clinton Power Station, Unit 1 (TAC No. M95826)," dated October 3, 1996
3. Letter from K. R. Jury (Exelon Generation Company, LLC) to U. S. NRC, "Response to Request for Additional Information Regarding Risk Aspects of Inclined Fuel Transfer System License Amendment Request for Clinton Power Station, dated January 15, 2002

PACKAGE DIVIDER

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