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October 4, 1996

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Document Control Desk  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: Clinton Power Station Revision to Proposed Amendment  
of Facility Operating License No. NPF-62 (LS-94-013)

Dear Madam or Sir:

By letter dated February 22, 1996 (letter number U-602554), Illinois Power (IP) Company proposed an amendment to the Clinton Power Station Technical Specifications (TS) to revise the setpoint for the 4.16 kV safety bus degraded voltage relays, and to revise or delete other Loss of Power Instrumentation TS requirements, due to planned modifications to replace the degraded voltage relays at CPS. For related reasons, IP also proposed to change the minimum required diesel generator voltage specified in certain diesel generator surveillance requirements within the Technical Specifications.

Following discussion with the NRC subsequent to IP's submittal, IP has determined that the proposed amendment should be revised. The changes to the proposed amendment are to add an Action statement and an accompanying note to Technical Specification 3.3.8.1 to require restoration of an inoperable degraded voltage relay(s) within seven days, to revise Table 3.3.8.1-1, "Loss of Power Instrumentation," by incorporating the word "reset" into the Function description for the degraded voltage relays, and also to revise Table 3.3.8.1-1 to specify an upper limit (along with the previously submitted reset lower limit) for the Allowable Value for these functions to thus provide a range for the Allowable Value for the relay reset points. IP is also proposing additional changes to the Technical Specification Bases to support the above changes.

Several attachments are included with this letter. The attachments provide the details of the above changes and include information requested by the NRC staff reviewer needed to support evaluation of the above changes. The proposed Technical Specification changes are discussed in detail and justification for the changes is given within

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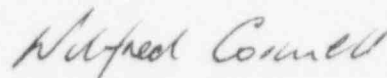
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Attachment 2. Marked-up pages of the TS reflecting the changes to the proposed License Amendment are provided as Attachment 3. Double revision bars indicate what specific changes are being made to the marked-up pages previously included in Attachment 3 to IP letter U-602554. Calculation 19-AN-19 (Revision 2, Volume D), which is the calculation used to establish the setpoints for the new degraded voltage relays, and which was revised in response to discussion with the NRC subsequent to IP's February 22, 1996 submittal, is attached as Attachment 5. In addition, the text of IP Calculation 19-AQ-02 Revision 3 Volume V (used to support the relay setpoint calculation) is attached as Attachment 6. A letter from the architectural engineer for CPS, i.e., Sargent & Lundy letter dated June 23, 1986 from M. S. Zar to J. H. Greene, is attached as Attachment 7. Two Data Sheets from IP Calculation 19-AQ-02 are attached as Attachment 8. Also, please find Attachment 4 which contains marked-up pages of the TS Bases reflecting additional changes to the affected TS Bases pages. Double revision bars indicate what specific changes are being made to the marked-up pages previously provided as Attachment 4 to IP letter U-602554. Finally, in addition to Attachments 2 through 8, an affidavit supporting the facts set forth in this letter and its attachments is provided in Attachment 1.

The changes contained in this revision do not alter IP's determination that the proposed changes meet the criteria given in 10CFR50.22(c)(9) for a categorical exclusion from the requirement for an Environmental Impact Statement. In addition, IP has also concluded that the Basis for No Significant Hazards Consideration, as provided in IP's February 22, 1996 submittal, remains unchanged.

As noted in IP's February 22, 1996 submittal, the implementation schedule for the degraded voltage relay modifications calls for installing new relays for the Division 2 4.16 kV safety bus during the forthcoming outage (RF-6) at CPS. IP is therefore requesting that the application for amendment, as supported by this letter, continue to be reviewed on a schedule sufficient to support planned work activities for RF-6 currently scheduled to begin October 13, 1996.

Sincerely yours,



Wilfred Connell  
Vice President

AJP/csm

Attachments

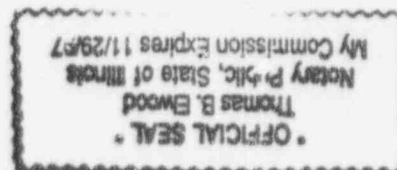
cc: NRC Clinton Licensing Project Manager  
NRC Resident Office, V-690  
Regional Administrator, Region III, USNRC  
Illinois Department of Nuclear Safety

Wilfred Connell, being first duly sworn, deposes and says: That he is Vice President of Illinois Power; that this revision to the proposed amendment of Facility Operating License NPF-62 has been prepared under his supervision and direction; that he knows the contents thereof; and that to the best of his knowledge and belief said letter and the facts contained therein are true and correct.

Date: This 4<sup>th</sup> day of October 1996.

Signed: Wilfred Connell  
Wilfred Connell

STATE OF ILLINOIS } SS.  
DEWITT COUNTY }



Subscribed and sworn to before me this 4<sup>th</sup> day of October 1996.

Thomas B. Edwood  
(Notary Public)

### Discussion/Description of Changes

As noted in the cover letter, Illinois Power (IP) submitted a proposed License Amendment for incorporating changes to Technical Specification (TS) 3.3.8.1, "Loss of Power Instrumentation," and TS 3.8.1, "AC Sources - Operating," by letter dated February 22, 1996. The changes originally proposed in IP's February 22, 1996 submittal would delete Surveillance Requirement (SR) 3.3.8.1.1 which requires performance of a channel check for the Loss of Power instrumentation, revise TS Table 3.3.8.1-1 to change the Allowable Value for the Degraded Voltage Function (items 1.c and 2.c) from " $\geq 3762$  V and  $\leq 3832$  V" to " $\geq 3876$  V" and to change the required number of channels for the Division 3 degraded voltage protection (item 2.c) from 3 to 2, and revise SR 3.8.1.2, SR 3.8.1.7, SR 3.8.1.11, SR 3.8.1.12, SR 3.8.1.15, SR 3.8.1.19 and SR 3.8.1.20 to change the minimum steady-state voltage identified in these SRs from " $\geq 3740$  V" to " $\geq 3870$  V."

During the review of IP's proposed License Amendment, several issues or questions regarding the proposed amendment were identified. The NRC issued a Request for Additional Information (RAI) to docket the identified questions, and IP responded via IP letter U-602613 dated July 24, 1996. Following review of IP's response to the RAI there was additional discussion of the proposed amendment. From that discussion, and following further NRC review of the proposed amendment, IP resolved to revise the submittal with respect to some of the proposed changes to Technical Specification 3.3.8.1. These changes are as follows:

- (1) Under the Limiting Condition for Operation (LCO) of Technical Specification 3.3.8.1, incorporate a new, additional Action for an inoperable degraded voltage protection channel(s) to require (in addition to tripping an inoperable channel within one hour) restoring the inoperable channel(s) to OPERABLE status within seven days. Specifically, within the Limiting Condition for Operation section of Technical Specification 3.3.8.1, "Loss of Power (LOP) Instrumentation," the Required Action for Condition A will be modified to add an additional action (Action "A.2") for Functions 1.c, 1.d, 2.c, and 2.d, along with an accompanying note. The proposed action A.2 will be to "Restore channel to OPERABLE status," and the proposed note will read "Only applicable for Functions 1.c, 1.d, 2.c, and 2.d after Release for Operations (RFO) of the corresponding plant modification." A completion time of seven days will be specified for the new required action A.2 by specifying "7 days" in the associated "Completion Time" column for this Technical Specification.

- (2) Incorporate the word "Reset" into the Function description for the degraded voltage protection channels (Functions 1.c and 2.c) on associated Table 3.3.8.1-1, "Loss of Power Instrumentation." That is, for the Function description for Function 1.c and 2.c, replace "Degraded Voltage - 4.16kV basis" with "Degraded Voltage Reset - 4.16kV basis."
- (3) Revise the proposed Allowable Value to be specified for the degraded voltage relay channels (Function 1.c and 2.c) on Table 3.3.8.1-1 to include an upper limit (in addition to the currently proposed lower limit) so that a range is specified for the Allowable Limit (in lieu of a single limit) relative to the "Reset" function of the degraded voltage relays. To effect this change, IP proposes to change the proposed Allowable Value for Function 1.c. from " $\geq 3876V$ " to " $\geq 3876V$  and  $\leq 3901V$ ."

The above changes are shown on marked-up pages of the present TS, which are attached as Attachment 3. The changes are indicated by double revision bars in the right margin.

Justification for each of the above changes is provided below. Changes to the associated Technical Specification Bases supporting the above changes are provided in Attachment 4 and are further discussed later in this attachment. It should be noted that the proposed changes in IP's original submittal regarding the channel check requirement, the required number of channels for the Division 3 degraded voltage protection, and the minimum steady-state voltage specified in the diesel generator surveillances (SR 3.8.1.2, etc.) are unaffected.

#### Justification for Proposed Changes

The basis and justification for each of the above changes is provided as follows:

- (1) As described above, IP proposes to add a new required action (and an accompanying note) for Condition A under LCO 3.3.8.1, i.e., when one or more degraded voltage protection channels is inoperable. The present required action for Condition A is Required Action A.1, "Place channel in trip," with a specified Completion Time of 1 hour. The proposed new action would apply to the degraded voltage protection Functions 1.c, "Division 1 and 2 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Reset - 4.16 kV basis," 1.d, "Division 1 and 2 - 4.16 Emergency Bus Undervoltage, Degraded Voltage - Time Delay," 2.c, Division 3 - 4.16 kV Emergency Bus Undervoltage, Degraded Voltage Reset - 4.16 kV basis," and 2.d "Division 3 - 4.16 kV Emergency Bus

Undervoltage, Degraded Voltage - Time Delay." The proposed action A.2 would require restoring an inoperable channel(s) to operable status in seven days. This action would be required in conjunction with Required Action A.1 for each of the above Functions.

The intent of this Required Action is to limit continued operation when, with one channel in trip, the degraded voltage protection function is relying on the single remaining operable relay for the initiation of the safety feature. The reason for imposing this time limit is that the setpoint calculation (iP Calculation 19-AN-19) assumes a one-out-of-two relay logic relative to the reset function for the relays. Reliability is therefore somewhat reduced with one relay in the tripped condition (such that resetting the degraded voltage protection function is dependent on the remaining operable relay). The required action and completion time are similar to other required actions and completion times for instrumentation presently in the TS (e.g., Specification 3.3.6.5, "Relief and Low-Low Set Instrumentation").

As indicated previously (in the cover letter and in IP's February 22, 1996 submittal), the proposed changes are needed to support installation of new degraded voltage relays as part of a planned modification to enhance Clinton Power Station's degraded voltage protection instrumentation. New, proposed Required Action A.2 is only required for the new relays and thus is not applicable until the new relays are installed and "released for operation." Therefore, a note accompanying Action A.2 is proposed to explain that required action A.2 only applies after implementation of the corresponding plant modification.

- (2) With respect to inserting the word "Reset" in the Function description for the degraded voltage relays within Table 3.3.8.1-1 the change is intended to more clearly specify the function of these relays with respect to the fact that the Allowable Value specified in Table 3.3.8.1-1 is based on the relay reset point and not on the drop-out. As IP noted in its February 22, 1996 submittal the licensing basis for the degraded voltage protection function places special emphasis on the reset function of the degraded voltage relative to the concern for ensuring that LOCA loads are operated at sufficient voltage. The revised Function description would prevent confusing the reset function with the drop-out function for these relays which will be specified within the CPS Operational Requirements Manual (ORM).
- (3) As noted previously, IP also proposes to change the Allowable Value shown in Table 3.3.8.1-1 for Functions 1.c and 2.c (Degraded Voltage Reset - 4.16 kV basis) such that both a lower limit and upper limit are specified. Consistent with the emphasis placed on the reset function of the degraded voltage relays, as discussed above, IP proposed in its February 22, 1996 submittal to specify only a



Undervoltage, Degraded Voltage - Time Delay." The proposed action A.2 would require restoring an inoperable channel(s) to operable status in seven days. This action would be required in conjunction with Required Action A.1 for each of the above Functions.

The intent of this Required Action is to limit continued operation when, with one channel in trip, the degraded voltage protection function is relying on the single remaining operable relay for the initiation of the safety feature. The reason for imposing this time limit is that the setpoint calculation (IP Calculation 19-AN-19) assumes a one-out-of-two relay logic relative to the reset function for the relays. Reliability is therefore somewhat reduced with one relay in the tripped condition (such that resetting the degraded voltage protection function is dependent on the remaining operable relay). The required action and completion time are similar to other required actions and completion times for instrumentation presently in the TS (e.g., Specification 3.3.6.5, "Relief and Low-Low Set Instrumentation").

As indicated previously (in the cover letter and in IP's February 22, 1996 submittal), the proposed changes are needed to support installation of new degraded voltage relays as part of a planned modification to enhance Clinton Power Station's degraded voltage protection instrumentation. New, proposed Required Action A.2 is only required for the new relays and thus is not applicable until the new relays are installed and "released for operation." Therefore, a note accompanying Action A.2 is proposed to explain that required action A.2 only applies after implementation of the corresponding plant modification.

- (2) With respect to inserting the word "Reset" in the Function description for the degraded voltage relays within Table 3.3.8.1-1 the change is intended to more clearly specify the function of these relays with respect to the fact that the Allowable Value specified in Table 3.3.8.1-1 is based on the relay reset point and not on the drop-out. As IP noted in its February 22, 1996 submittal the licensing basis for the degraded voltage protection function places special emphasis on the reset function of the degraded voltage relative to the concern for ensuring that LOCA loads are operated at sufficient voltage. The revised Function description would prevent confusing the reset function with the drop-out function for these relays which will be specified within the CPS Operational Requirements Manual (ORM).
- (3) As noted previously, IP also proposes to change the Allowable Value shown in Table 3.3.8.1-1 for Functions 1.c and 2.c (Degraded Voltage Reset - 4.16 kV basis) such that both a lower limit and upper limit are specified. Consistent with the emphasis placed on the reset function of the degraded voltage relays, as discussed above, IP proposed in its February 22, 1996 submittal to specify only a

minimum Allowable Value relative to the reset point for the new relays, based on the minimum voltage needed for LOCA-mitigating loads to perform their intended safety function. The basis for the upper limit proposed now is to ensure the degraded voltage relays will only switch to the on-site source when the off-site source has not recovered sufficiently within the time delay to supply required loads (as required by 10CFR50, Appendix A, General Design Criterion 17).

As noted above, the drop-out function for the new degraded voltage relays will be addressed entirely within the CPS ORM. The drop-out function is safety-related, but because bus voltage falls so low during a block start of LOCA loads and because the drop-out must be set near the actual reset setpoint, the Allowable Value (and setpoint) for the drop-out is more appropriately specified within the ORM. Accordingly, IP has therefore specified a lower limit of  $\geq 3847.62\text{V}$  and an upper limit of  $\leq 3876.12\text{V}$  for the drop-out Allowable Value on a 4.16 kV basis. The setpoint specified in the ORM shall be in the range of  $\geq 110.26$  and  $\leq 111.08$  on a 120V basis. The degraded voltage drop-out setpoint shall be controlled in accordance with IP procedures and in compliance with 10CFR50.59.

#### Additional Information and Changes

Because of the additional TS changes, additional TS Bases changes are being proposed. IP has revised the proposed changes to the TS Bases to discuss the addition of the new required action for Specification 3.3.8.1, including the accompanying note and completion time. IP has also revised the proposed changes to the TS Bases to include discussion of the notes within the TS which address that the modification will be implemented on a divisional basis such that each division will be scheduled for modification during a different refueling outage. IP intends to start implementing the proposed modification for one division during the next refueling outage, continuing with the remaining divisions during following refueling outages until all three divisions have had the modification implemented. The TS Bases are thus being changed to describe how the TS apply prior to the implementation of any of these modifications versus how the TS apply after release for operation of the corresponding modification in a division.

As indicated in the cover letter, IP has revised IP Calculation 19-AN-19 which was included as Attachment 2 with IP's response (IP letter U-602613) to the NRC RAI. Based on discussion with the NRC following IP's response to the RAI, IP revised IP Calculation 19-AN-19 to specifically identify the Degraded Voltage reset upper limit and the Degraded Voltage drop-out lower limit. The revised calculation is thus provided consistent with the NRC's original request for information.



It should be noted that the Degraded Voltage drop-out upper limit is not stated in IP calculation 19-AN-19 because the nature of the reset relay is such that the practical drop-out upper limit is the reset lower limit. The value for the Degraded Voltage drop-out upper limit that IP intends to specify in the ORM is identical to the value established as the Degraded Voltage reset lower limit within calculation 19-AN-19.

During further review and discussion of IP's proposed changes to the Allowable Value specified for the degraded voltage relay setpoints (reset points), the NRC noted that the proposed TS change indicates an Allowable Value for the Degraded Voltage Function that is identical for Division 1, Division 2, and Division 3. As discussed previously in IP's response to the NRC RAI (Attachment 1, response to question 3), while the Division 3 electrical power distribution system is different from Division 1 and 2, the present and the proposed setpoint were both determined by a calculation that is based on the worst case voltage demand with all divisions considered. In the RAI response, IP stated that the present setpoint for Division 3 differed from the setpoint for Division 1 and 2. For the current (unmodified) degraded voltage protection scheme, the present TS allowable value for Division 1, 2, and 3 is the dropout allowable value. While the present dropout allowable value for Division 1, 2, and 3 is identical within Table 3.3.8.1-1, because Division 3 use a different relay from Division 1 and 2, Division 3 has a different reset than Division 1 and 2. After installation of the planned modification all three divisions will have the same type of relay for the degraded voltage trip function and all three divisions have the same proposed degraded voltage function reset allowable value.

#### Discussions Regarding Assumptions for MOVs

During the review process for the proposed amendment the NRC raised several questions regarding movement and overcurrent protection of motor-operated valves (MOVs) during a LOCA accident scenario. Several fundamental issues were addressed, and these have been documented in the paragraphs below. It should be noted that within IP calculation 19-AQ-02 expected minimum voltages are determined and then utilized as input to valve calculations. The following paragraphs describe the methodology and assumptions under which the results of calculation 19-AQ-02 are utilized to show the proper operation of MOVs.

For the LOCA accident scenario, there are four normally closed valves that are required to change from closed to open. Within IP calculation 19-AQ-02 it is assumed that the operator motors for these valves may be in a locked-rotor condition for a period of time during a block start transient. The NRC reviewer asked if IP takes credit for the "hammer blow" effect in the MOV thrust calculations. The hammer blow effect is momentum developed by a MOV due to internal inertia effects, as described within EPRI-NMAC, "Application Guide for Motor Operated Valves in Nuclear Power Plants," NP-6660-D

The IP thrust calculations consider only the motor torque capability under degraded conditions. Therefore, the IP thrust calculations do not take credit for momentum that is due to the hammer blow effect.

The NRC also discussed the Protective Relay/Overload Relay Evaluation performed in the LOCA Block Start transient calculation for Motor Operated Valve 1E22-F004. The LOCA Block Start transient voltage calculation, 19-AQ-02, models the MOV motor as having locked-rotor current for the entire 13 seconds of the transient. Further, within 19-AQ-02 it is stated that the breaker size for 1E22-F004 is adequate if the valve unseats in approximately seven seconds following a LOCA signal. As related below, the valve is expected to unseat in less than seven seconds or the breaker will not trip because the bus would trip. The data from the MOV thrust calculation which models valve 1E22-F004 indicates that the MOV motor develops sufficient torque to unseat the valve if the voltage is above 78 percent of rated voltage. This includes considerable conservatism, e.g., reduced torque due to motor heating caused by locked rotor current at rated voltage. IP Calculation 19-AQ-02 Rev. 3, Volume V, shows that the MOV will receive voltage greater than 80 percent of rated voltage about four seconds into the transient and unseat at that time. Therefore, the valve will unseat and begin to move in less than seven seconds. In addition, valve testing (under static head) has shown that the actual valve unseating thrust requirement is less than half the calculated design thrust requirement. The actual thrust required by the valve to extract the disk from the seat can be developed by the motor at about 50 percent of rated voltage or almost immediately upon receiving the LOCA signal. Furthermore, if the voltage on the Division 3, 4kV bus were to remain at 56 percent of rated voltage (the Loss Of Voltage Relay actuation point) and the MOV motor remained locked rotor, the breaker would not trip because the related bus would transfer in 2.5 seconds. Based on this data IP has concluded that even if the voltage at the safety related buses did not recover above 3.87kV, the MOV 1E22-F004 breaker would not trip, because the valve would either unseat and the current would be significantly below the breaker trip value, or the bus would trip on a Loss Of Voltage relay actuation.

**Attached Marked-Up  
Pages of the Technical Specification**