Commonwealth Edison
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Downers Grove, Illinois 60515

February 24, 1993

Dr. T.E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Byron Station Units 1 and 2
Braidwood Station Units 1 and 2
Proposed Exception to Regulatory Guide 1.93
NRC Docket Numbers 50-454/455, 50-456/457

Dear Dr. Murley:

Commonwealth Edison (CECo) proposes to change its UFSAR commitment by taking exception to a provision of Regulatory Guide 1.93 which limits the unavailability of required electric power sources to situations involving corrective maintenance only. This exception would apply to the Byron and Braidwood Nuclear Stations. The purpose of this letter is to request NRC concurrence with the proposed exception.

The purpose for the revision of the commitment to the subject Regulatory Guide is to permit CECo the option of performing periodic maintenance for the System Auxiliary Transformers at Byron and Braidwood with the affected unit at power. Currently, this preventive maintenance is constrained to those periods when the affected unit is in Cold Shutdown or Refueling. The impact of the required periodic maintenance on the opposite unit is unchanged, regardless of when the maintenance is performed. Performance of the maintenance will require that the alternate AC power source for the opposite unit be rendered temporarily unavailable.

The ability to perform this maintenance at power provides some significant advantages, among them are optimized scheduling, a reduction in the level of concurrent activities, and an improved shutdown risk profile. CECo has evaluated the impact of performing these activities at power and has determined that the proposed relief is both appropriate and advantageous.

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A detailed description of the electrical power configuration, the proposed configuration during the maintenance, and the procedural controls is presented in Attachment 1 to this letter. Attachment 2 contains an assessment of the safety consequences associated with the proposed relief.

Please direct any questions to this office.

Respectfully,

Terrence W. Simpkin
T.W. Simpkin
Nuclear Licensing Administrator

Attachment 1 - Description of Proposal
Attachment 2 - Safety Assessment

cc: S.G. DuPont, Senior Resident Inspector - Braidwood
H. Peterson, Senior Resident Inspector - Byron
J.B. Hickman, NRR Project Manager -Byron/Braidwood
B. Clayton, RIII Branch Chief

ZNLD/2496/2

ATTACHMENT 1

DESCRIPTION OF PROPOSAL

The function of the System Auxiliary Transformers (SAT) installed at Byron and Braidwood is to provide the preferred power supply to the onsite distribution network, including the Engineered Safeguards Features (ESF) AC equipment. The SATs transform the 345 kV transmission voltage to 4 kV and 6.9 kV for use in the plant. The SATs provide the AC power to all ESF and non-ESF loads when the main generator is offline. Figure 1 depicts the salient features of the switchyard and distribution system for the Byron Station. The Braidwood Station configuration is essentially identical, except that Braidwood has six offsite power lines serving its switchyard, and additional switchyard breakers to facilitate the switching of the offsite lines.

The electrical system at Byron and Braidwood is designed to meet General Design Criteria (GDC) 5, 17, and 18 of 10CFR50, Appendix A. The most significant requirements are embodied in GDC 17. In summary form, they are:

- The design must provide for at least two physically independent offsite power circuits.
- The design must assure that fuel design limits and design conditions of the Reactor Coolant pressure boundary are not exceeded as a result of anticipated operational occurrences.
- The design must assure core cooling, containment integrity, and other vital functions are maintained in the event of postulated accidents.
- One of the two offsite power circuits must be available within seconds after a loss of coolant accident (LOCA) to assure vital safety functions are maintained.
- Each circuit must be available in sufficient time, following the loss of all other AC sources, to assure fuel and Reactor Coolant pressure boundary limits are met.

It should be noted that the GDC address only design requirements, and are not intended to address operational considerations.

Compliance with GDC 5, which addresses the sharing of structures, systems, and components between units remains assured. The design of the onsite power distribution system will accommodate the proposed activity without alteration, and redundant protection schemes exist which ensure that a transient on one unit will not affect the ability of the other unit to safely shut down and cooldown.

The operational limitations for the offsite power sources for the conditions of interest are specified by Technical Specification 3/4.8.1, AC Sources. These controls require that both offsite circuits be operable while the affected unit is in Modes 1 through 4. An allowed outage time (AOT) of 72 hours is specified for one source inoperable, while an AOT of 24 hours is prescribed for two inoperable offsite circuits. In addition to the AOTs, other conditions, such as Diesel Generator runs, are imposed to provide greater assurance that the remaining power sources are intact. The AOTs specified are derived from NRC Regulatory Guide (RG) 1.93, Revision 0, issued in 1974. The Regulatory Guide bases the restrictions in AOT on two considerations:

1) GDC 17 compliance is achieved only when the LCO is met without reliance on the Action Statements, and

2) Under certain conditions, it may be safer to continue operation at full or reduced power for a limited time than to effect an immediate shutdown upon the loss of the required electric power sources.

The second consideration is only addressed qualitatively in the Regulatory Guide.

The reasoning utilized in the development of the AOTs in RG 1.93 incorporated the following points:

- The intent of the regulatory position is to implement the safest operating mode whenever the available electric power sources number less than the LCO.

- GDC 17 specifies design requirements and not operating requirements. Accordingly, operational restrictions due to the loss of one or more power sources are not stipulated by the GDC.

- The course of action chosen should be based on an assessment of the risk involved and if, on balance, continued power operation is the safer course, the AOT should be used to restore the full complement of power sources or to prepare for an orderly shutdown. Among the considerations are grid stability, reserve capacity, and the effect of a unit shutdown on grid stability.

- The use of the AOT to prepare for a shutdown, schedule replacement power, and the flexibility to judiciously choose the timing of the shutdown (within the limits of the AOT) will serve to enhance the safety of the shutdown by allowing it to progress in an orderly and pre-planned manner.

- With the loss of a single offsite source, the full redundancy of available offsite sources is lost, but the full capability of the remaining offsite source is available, in addition to the fully redundant onsite power sources.

- With the available AC power sources one less than required, power operation may continue for up to 72 hours if the system stability and reserves are such that a subsequent single failure (including the trip of the unit's generator) would not cause a total loss of offsite power.

- "The operating time limits delineated in the Regulatory Guide are explicitly for corrective maintenance activities only. The operating time limits should not be construed to include preventive maintenance activities which require the incapacitation of any required electric power source. Such activities should be scheduled for performance during cold shutdown and/or refueling periods."

The SATs require a certain degree of preventive maintenance to ensure a high degree of availability. Routine maintenance activities and their currently scheduled frequencies are as follows:

- Switchyard disconnect maintenance - 5 years;

- Transformer bushing and insulator cleaning - whenever SAT is out of service (OOS);

- Protective relay calibration, setpoint verification, and actuation - one of two SATs each 18 months;

- Bus duct inspection, testing, and cleaning - staggered such that 100% of bus duct is serviced in a 5 year period;

- Transformer deluge system actuation - one of two SATs each 18 months if the SAT is out of service and the outside air temperature is greater than 36 DEGF; and

- SAT neutral resistor testing - 3 years.

In addition to these planned activities, occasional corrective maintenance for items such as oil leaks, cracked bushings, and other activities requiring access to the top of transformer is also required.

ELECTRICAL DISTRIBUTION SYSYEM DESCRIPTION

The switchyard for each station consists of a double ring bus, with one ring bus feeding each unit (See Figure 1). Each unit is provided with six transformers, arranged in three banks of two transformers each. At Braidwood, a crosstie breaker exists between the ring buses so that either ring bus is capable of supplying power to either unit. The two Main Power Transformers (MPTs) convert the main generator output voltage of 25 kV to the system operating voltage of 345 kV. The two Unit Auxiliary Transformers (UATs) are connected to the main generator output and transform the generator output to 4 kV and 6.9 kV to supply the non-safety related loads of the unit. The two System Auxiliary Transformers (SATs) convert the 345 kV system voltage to 4 kV for the safety related loads and 6.9 kV to supply the non-safety related loads during power operation and all loads when the generator is off line.

The two SATs of a given unit form a SAT bank. Each SAT of the unit's SAT bank supplies power to one of that unit's 4 KV ESF buses, and is capable of being crosstied to the corresponding bus on the opposite unit by the use of installed breakers. Additionally, each SAT of a unit's SAT bank can be aligned to supply the two ESF buses of that unit through the use of removeable links. Each SAT is of sufficient capacity to service all of the DBA loads of both ESF buses for one unit and the safe shutdown loads of the opposite unit. Each SAT serves as the normal power source for it's associated bus and the alternate power source for the corresponding bus on the opposite unit.

The MPTs and UATs are energized by the main generator and are closed into the ring bus when the generator is on line. The two non-ESF 4 kV buses and two of the four 6.9 kV buses are powered from the UAT when the generator is on line. During periods when the generator is off line, all buses (2-4 kV ESF, 2-4 kV non-ESF, and 4-6.9 kV non-ESF) are powered from the SATs. Upon a generator trip, all buses are auto-transferred to the SATs, and the MPTs and UATs are de-energized and isolated from the rest of the system.

As stated previously, during periods of unit outages, all loads are serviced by the SATs. Some or all of the 6.9 kV buses remain de-energized for extended periods of time during planned outages because the large loads served by these buses are not required to support outage activities. These loads include the large secondary system pumps and the Reactor Coolant pumps.

SAT OUTAGE DESCRIPTION - CURRENT METHOD

Due to CECo's commitment to RG 1.93, planned maintenance is conducted during the refueling outages at each unit. There are two basic options available to ensure that all buses have a reliable power supply. The first option entails energizing the outage unit's 4 kV ESF buses from the opposite unit's 4 kV ESF buses, and then crosstieing the outage unit's non-ESF 4 kV buses with unit's ESF buses via separate crosstie breakers. This arrangement requires the defeating of interlocks which normally prevent the closure of the ESF-nonESF crosstie breaker when the unit 1 and unit 2 ESF-ESF crosstie breakers are closed. This essentially powers all outage unit loads from the operating unit's SAT. The second outage option entails energizing the ESF buses from the operating unit's ESF buses, and backfeeding the MPT and UAT to energize the non-ESF 4 kV buses.

A third option entails leaving the affected ESF and non ESF buses de-energized during the course of the maintenance. This option further restricts the equipment available to the operators.

As stated previously, during periods of unit outages, all loads are serviced by the SATs. Some or all of the 6.9 kV buses remain de-energized for extended periods of time during planned outages because the large loads served by these buses are not required to support outage activities. Because crossties between the units do not exist for the 6.9 kV buses, these are de-energized during SAT outages under the first option, and the capability exists to energizes these buses via the backfed transformers under the second configuration.

There are several drawbacks inherent in the conduct of SAT outages under the conditions described above. Among the more significant concerns are:

- High level of cuncurrent activity and distraction,
- Minimal redundant support equipment is available,
- Installed configurations and relaying must be modified with temporary alterations,
- "Windows of opportunity" available for the conduct of SAT outages are very limited due to equipment availability and shutdown risk considerations, and
- The refueling outages during which the SAT outages are conducted typically occur at times when the weather conditions are not optimal. This occurs because CECo's load profile dictates late winter/early spring and fall outages.

SAT OUTAGE DESCRIPTION - AT-POWER OPTION

The option of performing SAT outages with the affected unit at power represents a departure from the approach endorsed by RG 1.93. This departure appears to be justifiable when one considers the recently developed insights regarding the relative risk associated with shutdown activities. The historic assumption has always been that major activities such as SAT outages were most safely conducted while the unit was shutdown for maintenance. More recent analysis has shown that this assumption may not always be valid.

Several aspects of performing the subject maintenance at power are very conducive to the execution of a safe, smooth, well-coordinated outage. By conducting the SAT outage at power, the level of concurrent activities can be easily constrained without incurring the economic penalty of a refueling outage extension. The normal workload is much less than that experienced during a refueling outage, and more flexibility exists in the scheduling of these activities. The normal surveillance activities can be adjusted to ensure that all required surveillance which would affect the outage or other power sources would be within frequency for the duration of the SAT maintenance, thus further minimizing the level of activity relative to the remaining power sources.

During a refueling outage, the available personnel resources are limited by the volume of work to be accomplished. The availability of the necessary personnel during a non-refueling period is greatly increased. In addition to the increased availability of the proper people, an at-power SAT outage would allow the station to perform the maintenance activities at a time when the weather conditions and thus grid stability are optimal for this work.

The at-power option will significantly enhance the shutdown risk profile at the affected stations. The availability of an additional offsite power source at a time when redundancy is minimized and overall equipment availability is greatly reduced is viewed as a key safety benefit.

There exists an economic incentive for CECo to pursue the subject proposal. By moving the SAT maintenance outside of the scope of a refueling outage, conservative estimates indicate that at least 1.5 days of critical path time could be avoided. This could correspond to approximately $500,000 of replacement power costs that could be averted, depending on the overall outage scope. Additionally, adoption of this proposal would introduce a greater amount of flexibility in the scheduling of remaining outage activities, thus providing the opportunity to achieve additional safety and economic benefits.

CECo has evaluated the option of performing the SAT maintenance at power and has determined that the activity can be safely accomplished within the constraints of the current Technical Specifications. Very few new controls would be required, and the evolution would be accomplished using existing procedures which are well-developed, trained upon, and routinely used.

The performance of the SAT isolation and restoration is a straightforward evolution, comprised of seven major sequences:

1. Align all 6.9 kV buses and the non-ESF 4 kV buses to the UAT;
2. Start and parrallel one Diesel Generator to the SAT for one of the 4 kV ESF buses;
3. Open the SAT feed to the bus;
4. Crosstie the bus fed from the Diesel Generator to the opposite unit;
5. Open the diesel generator feed and secure the diesel;
6. Repeat steps 2-5 for the other 4 kV ESF bus; and
7. De-energize and remove the SAT from service.

Once the required maintenance activity is accomplished, the SAT is re-energized and the sequences described above are performed in reverse order.

CECo's evaluation has shown that it would be prudent to reduce and limit power on the affected unit for the duration of the SAT outage. This would be administratively done to minimize the probability of a unit trip from secondary system initiators (e.g. trip of a main feedwater pump) and to limit the consequences of a Reactor Trip. Upon a Reactor Trip, offsite power would be initially unavailable to the affected unit. The 4 kV ESF buses would be powered from the Diesel Generators, and the reactor would be in natural circulation conditions. The power reduction will ensure that the pressure response of the Reactor Coolant System to this transient remains below the safety valve setpoint. Simulator demonstrations indicate that the plant response to a unit trip would be no more severe than a loss of offsite power event which, due to equipment malfunction, results in a unit trip.

TRANSIENT RESPONSE

If the affected unit were to experience a trip, the unit response is predictable and recovery actions are straightforward. As previously stated, the 6.9 kV and 4 kV non-ESF buses would be de-energized, while the 4 kV ESF buses would remain powered from the opposite unit. The unit would be in a natural circulation condition until offsite power were restored.

In this situation, the Digital Rod Position Indication system would become de-energized. Per CECo policy, the operators would enter Functional Restoration Procedure FR-S.1, "Subcriticality". Reactor subcriticality is verified in the first five steps, and then a transition to procedure EP-O, "Reactor Trip and SI" is made to continue recovery actions.

The desirable non-ESF loads could be energized from the ESF buses via an installed crosstie. This would necessitate powering the ESF bus from it's respective Diesel Generator. Offsite power restoration would be accomplished by restoring the out-of-service SAT.

The trip of the opposite unit's SAT would have little impact on the SAT-outage unit. All 4 kV ESF buses on both units would be powered by their respective Diesel Generators. The 4 kV ESF crosstie breaker providing power to the SAT-outage unit 4 kV ESF buses would trip open on an undervoltage signal. The non-ESF buses on the SAT-outage unit would remain energized by the UAT, and no reactor trip will occur.

The opposite unit's non-ESF buses powered from the SAT would auto-bus-transfer to the UAT, while those loads powered from the UAT would remain energized. Again, no reactor trip will occur. The transient will be terminated upon restoration of offsite power to one or both of the units.

SUMMARY EVALUATION

CECo's evaluation of the impact of SAT outages at power on nuclear safety have yielded favorable results. Although a unit trip with the SAT out-of-service would result in a natural circulation cooldown, this condition is well within the design of the plant and the operators are trained to respond to this situation. The current accident analyses remain bounding for all casualties, recognizing that the impact of a planned SAT outage is, in principle, identical to that of an unplanned outage.

Performing the periodic maintenance with the unit at power allows CECo to optimize the reliability of the offsite power sources. The availability of the equipment necessary to respond to a transient is maximized with the unit at power, contrary to the prevalent situation when the unit is in cold shutdown. Although there is a higher decay heat load to remove after a transient with the unit at power, more options exist to effect the removal of this decay heat.

The human factors considerations of performing SAT outages weigh in favor of performing the maintenance with the unit at power. The operational distractions are minimized due to the steady-state nature of routine power operations. With the unit at power, off-normal indications are much more readily recognized due to the implementation of a dark board/green board philosophy. The required actions for recovery from a transient are straightforward, and the probability of a manipulation error is judged to be reduced because the at-power control board configuration is the one most familiar to the operators. Additionally CECo believes that the safety of its personnel can be enhanced by scheduling the required maintenance at a time when the weather conditions are conducive to this activity.

The evolution of removing from service and restoring a SAT is relatively simple. All required actions are directed by well-developed procedures with no temporary alterations required. Little additional training will be required to support this evolution. The ability to isolate a SAT with the unit at power in accordance with Technical Specifications is a design feature that CECo would like to utilize.

CONCLUSION

CECo believes the preferred option for the completion of required transformer maintenance is with the affected unit at power. The reduction in shutdown risk, although not specifically quantified, is judged to be significant. The risk associated with the at-power maintenance has been acceptably evaluated, and can be controlled and minimized to the maximum extent possible. The relief from the applicable provision of Reg Guide 1.93 has been determined to be beneficial from both an overall safety and an economic viewpoint.

ATTACHMENT 2

ASSESSMENT OF THE SAFETY CONSEQUENCES OF AT-POWER SAT MAINTENANCE

The function of the System Auxiliary Transformers (SAT) installed at Byron and Braidwood is to provide the preferred power supply to the onsite distribution network, including the Engineered Safeguards Features (ESF) AC equipment. The SATs transform the 345 kV transmission voltage to 4 kV and 6.9 kV for use in the plant. The SATs provide the AC power to all ESF and non-ESF loads when the main generator is offline.

The electrical system at Byron and Braidwood is designed to meet General Design Criteria (GDC) 5, 17, and 18 of 10CFR50, Appendix A. The most significant requirements are embodied in GDC 17. It should be noted that the GDC address only design requirements, and are not intended to address operational considerations.

The operational limitations for the offsite power sources are specified by Technical Specification 3/4.8.1, AC Sources. These controls require that both offsite circuits be operable while the affected unit is in Modes 1 through 4. An allowed outage time (AOT) of 72 hours is specified for one source inoperable, while an AOT of 24 hours is prescribed for two inoperable offsite circuits. In addition to the AOTs, other conditions, such as diesel generator runs, are imposed to provide greater assurance that the remaining power sources are intact. The AOTs specified are derived from NRC Regulatory Guide (RG) 1.93, Revision 0, issued in 1974. The Regulatory Guide bases the restrictions in AOT on two considerations:

1) GDC 17 compliance is achieved only when the LCO is met without reliance on the Action Statements, and

2) Under certain conditions, it may be safer to continue operation at full or reduced power for a limited time than to effect an immediate shutdown on the loss of the required electric power sources.

The second consideration is only addressed qualitatively in the Reg Guide.

The reasoning utilized in the development of the allowed outage times (AOT) endorsed by RG 1.93 incorporated the following points:

- The intent of the regulatory position is to implement the safest operating mode whenever the available electric power sources number less than the LCO.

- GDC 17 specifies design requirements and not operating requirements. Accordingly, operational restrictions due to the loss of one or more power sources are not stipulated by the GDC.

- The course of action chosen should be based on an assessment the risk involved and if, on balance, continued power operation is the safer course, the AOT should be used to restore the full complement of power sources or to prepare for an orderly shutdown. Among the considerations are grid stability, reserve capacity, and the effect of a unit shutdown on grid stability.

- The use of the AOT to prepare for a shutdown, schedule replacement power, and the flexibility to judiciously choose the timing of the shutdown (within the limits of the AOT) will serve to enhance the safety of the shutdown by allowing it to progress in an orderly and pre-planned manner.

- With the loss of a single offsite source, the redundancy of available offsite sources is lost, but the full capability of the remaining offsite source is available, in addition to the fully redundant onsite power sources.

- With the available AC power sources one less than required, power operation may continue for up to 72 hours if the system stability and reserves are such that a subsequent single failure (including the trip of the unit's generator) would not cause a total loss of offsite power.

- "The operating time limits delineated in the Regulatory Guide are explicitly for corrective maintenance activities only. The operating time limits should not be construed to include preventive maintenance activities which require the incapacitation of any required electric power source. Such activities should be scheduled for performance during cold shutdown and/or refueling periods."

The SATs require a certain degree of preventive maintenance to ensure a high degree of availability. Routine maintenance activities and their currently scheduled frequencies are as follows:

- Switchyard disconnect maintenance - 5 years;

- Transformer bushing and insulator cleaning - whenever SAT is out of service (OOS);

- Protective relay calibration, setpoint verification, and actuation - one of two SATs each 18 months;

- Bus duct inspection, testing, and cleaning - staggered such that 100% of bus duct is serviced in a 5 year period;

- Transformer deluge system actuation - one of two SATs each 18 months if the SAT is out of service and the outside air temperature is greater than 36 DEGF; and

- SAT neutral resistor testing - 3 years.

In addition to these planned activities, occasional corrective maintenance for items such as oil leaks, cracked bushings, and other activities requiring access to the top of transformer is also required.

The option of performing SAT outages with the affected unit at power represents a departure from the approach endorsed by RG 1.93. This departure appears to be justifiable when one considers the recently developed insights regarding the relative risk associated with shutdown activities. The historic assumption has always been that major activities such as SAT outages were most safely conducted while the unit was shutdown for maintenance. More recent analysis has shown that this assumption may not always be valid.

Several aspects of performing the subject maintenance at power are very conducive to the execution of a safe, smooth, well-coordinated outage. By conducting the SAT outage at power, the level of concurrent activities can be easily constrained without incurring the economic penalty of a refueling outage extension. The normal workload is much less than that experienced during a refueling outage, and more flexibility exists in the scheduling of these activities. The normal surveillance activities can be adjusted to ensure that all required surveillances which would affect the outage or other power sources would be within frequency for the duration of the SAT maintenance, thus further minimizing the level of activity relative to the remaining power sources.

CECo has evaluated the option of performing the SAT maintenance at power and has determined that the activity can be safely accomplished within the constraints of the current Technical Specifications. Very few new controls would be required, and the evolution would be accomplished using existing procedures which are well-developed, trained upon, and routinely used.

Performing the periodic maintenance for the SAT with the unit at power could render one offsite source unavailable to the unit for the duration of the maintenance activity. This scenario would prevail if both SATs from a given SAT bank were removed from service. The maximum duration of this configuration is limited to 72 hours pursuant to the Technical Specifications. Due to the adequate sizing of the SATs, it is possible to isolate one SAT of a given bank and provide offsite power to both of the 4 kV ESF buses from the remaining SAT by use of removable disconnects. Unit operation can be maintained indefinitely in this configuration.

The proposed configuration would require the affected unit's 4 kV ESF buses to be powered from the opposite unit via installed crossties. This represents the alternate offsite AC power supply required by the Technical Specifications.

The conduct of routine transformer maintenance while the affected unit remains at power will not adversely affect the frequency or type of equipment failures. By optimizing the maintenance practices and judiciously choosing the timeframe for the activity considering weather conditions, system status, and manpower availability, the continued integrity of the preferred offsite power source will be assured.

The design of the electrical distribution system is such that the isolation and restoration of the transformers can be accomplished utilizing installed equipment, obviating the need for temporary alterations. The SATs are sized such that one of the two SATs in each SAT bank is capable of providing the accident mitigation power requirements of both ESF buses for the affected unit, and the safe shutdown loads of both divisions of the other unit simultaneously.

The effects of offsite power availability are applicable to all accident analyses. The analyses of record, however, remain bounding because the transient of interest is assumed to occur concurrent with a loss of offsite power to the affected unit. While accident mitigation is facilitated by the availability of offsite power, it has been demonstrated that mitigation can be successfully achieved absent the preferred power source.

CECo's evaluation has shown that it would be prudent to reduce and limit power on the affected unit for the duration of the SAT outage. This would be done under administrative control to minimize the probability of a unit trip from secondary system initiators (e.g. trip of a main feedwater pump) and to limit the consequences of a Reactor Trip. Upon a Reactor Trip, offsite power would be initially unavailable to the affected unit. The 4 kV ESF buses would be powered from the Diesel Generators, and the reactor would be in natural circulation conditions. The power reduction will ensure that the pressure response of the Reactor Coolant System to this transient remains below the safety valve setpoint. Simulator demonstrations indicate that the plant response to a unit trip would be no more severe than a loss of offsite power event involving a unit trip.

If the affected unit were to experience a trip, the unit response is predictable and recovery actions are straightforward. As previously stated, the 6.9 kV and 4 kV non-ESF buses would be de-energized, while the 4 kV ESF buses would remain powered from the opposite unit. The unit would be in a natural circulation condition until offsite power was restored to the non-ESF buses. In this situation, the Digital Rod Position Indication system would become de-energized. Per CECo policy, the operators would enter Functional Restoration Procedure _FR-S.1, "Subcriticality". Reactor subcriticality is verified in the first five steps via indications other than DRPI, and then a transition to the normal post-trip recovery procedure, _EP-O, "Reactor Trip and SI" is made to continue recovery actions.

The desirable 4kV non-ESF loads could be energized from the ESF buses via an installed crosstie between the ESF and non-ESF buses. This would necessitate powering the ESF bus from its respective Diesel Generator. Offsite power restoration would be accomplished by restoring the out-of-service SAT.

The trip of the opposite unit's SAT has been evaluated and determined to have little impact on the SAT-outage unit. All 4 kV ESF buses on both units would be powered by their respective diesel generators. The 4 kV ESF crosstie breaker providing power to the SAT-outage unit 4 kV ESF buses would trip open on an undervoltage signal. The non-ESF buses on the SAT-outage unit would remain energized by the UAT, and no reactor trip will occur.

The opposite unit's non-ESF buses powered from the SAT would auto-bus-transfer to the UAT, while those loads powered from the UAT would remain energized. Again, no reactor trip will occur. The transient will be terminated upon restoration of offsite power to one or both units.

The probability of a design basis transient occurring will not be increased by the implementation of the proposed maintenance option. The bounding transients (Loss of Feedwater, Main Steamline Break, LOCA, etc.) are assumed to occur concurrent with a loss of offsite power. The loss of offsite power is not explicitly assumed to initiate the transient.

The probability of losing the remaining offsite power source to the affected unit while under the proposed configuration has been assessed and is essentially unchanged from the probability of a unit experiencing a loss of offsite power under a normal power alignment.

The consequences of an accident, in terms of offsite dose, remain unchanged from the current analyses of record primarily due to the assumption of offsite power unavailability during the design basis transient. The offsite dose consequences of a loss of offsite power assuming no design basis transient is in progress is likewise unchanged because the principal fission product barriers are designed to remain intact under these conditions.

The probability of safety related equipment malfunctioning during the conduct of transformer maintenance is not impacted. Required safety related equipment is capable of being automatically powered from the Diesel Generators if the normal power source is unavailable. The probability of the equipment failing to load onto the bus after the bus has been energized by the Diesel Generator is likewise unchanged because, as previously stated, the probability of losing offsite power under both a normal configuration of the proposed configuration are essentially the same. This would indicate that the likelihood of an increased number of challenges to the safety related equipment does not exist.

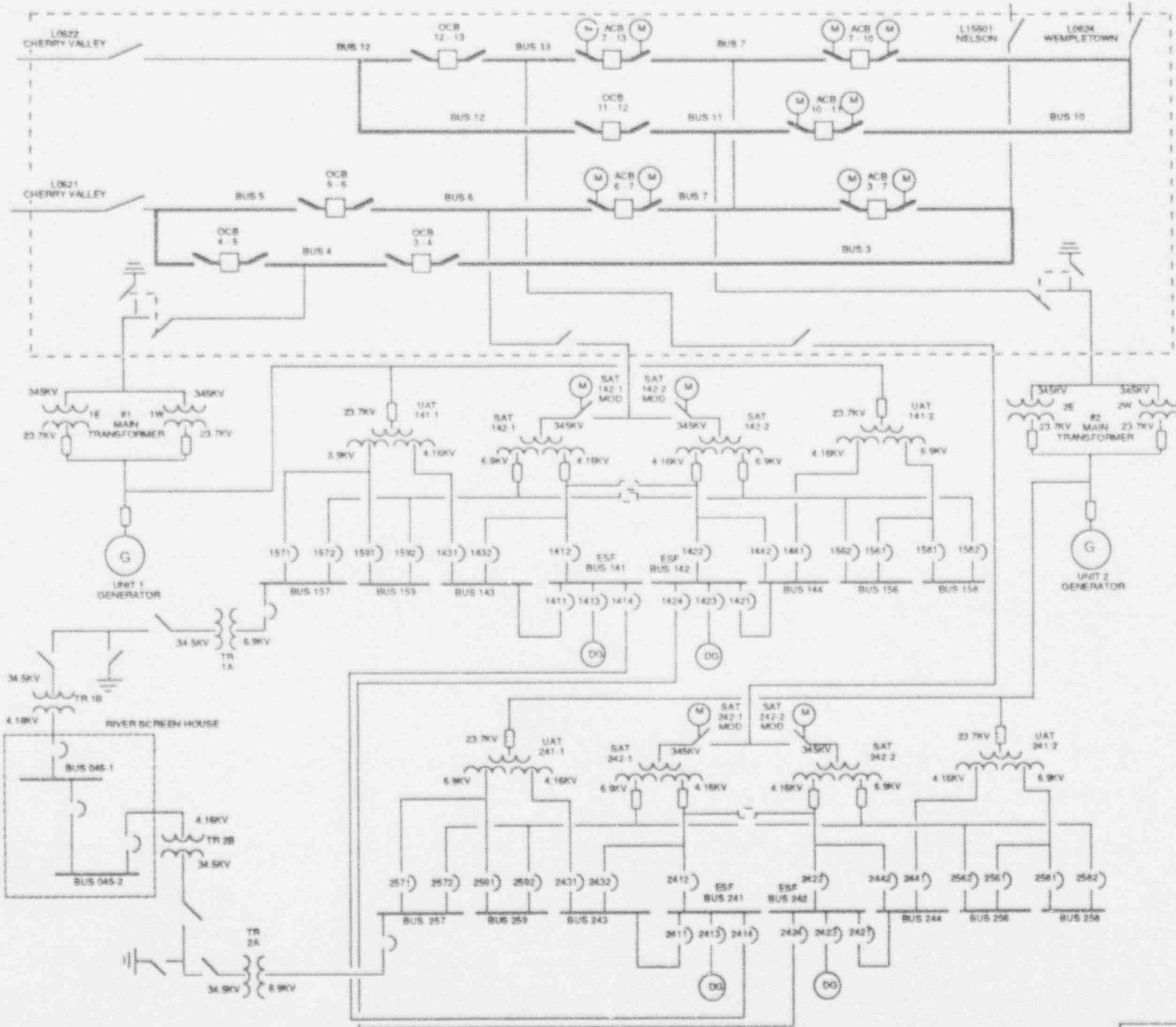
The probability of a malfunction of the equipment used to reconfigure the power sources for the affected buses is also not increased. This equipment is being used for the evolutions it was designed to support. It is not being operated in a new or different manner. Additionally, the capability of the equipment to perform is routinely demonstrated by the successful performance of the established surveillances.

The consequences associated with the malfunction of safety related equipment are not increased. A higher degree of redundancy is required of the equipment necessary to mitigate an accident with the unit at power. The normal complement of equipment available during power operation better enables the unit to withstand the effects of random equipment failure without safety impact. Additionally, due to the required backup power sources, the proposed configuration has no impact on the consequences of equipment failure.

The possibility of a new or different kind of accident being created is not increased. All required equipment is designed to be provided with power from a variety of available sources. Performing required maintenance the transformers associated with one of these power sources will not impact the ability of the required equipment to respond to a transient condition. Sufficient onsite and offsite power sources remain to assure that a high degree of diverse power availability is retained. No new failure modes have been introduced, nor have any new transient initiators been identified which are not bounded by the current analyses.

The margin of safety as defined in the bases for any Technical Specification is not affected by this proposal. No specified parameters or limits are being changed. The necessary maintenance will be performed within the constraints of the current allowed outage time. By performing the proposed activity under reduced power conditions, assurance is provided that a transient resulting in natural circulation conditions will not challenge the primary system safety valves. This has a positive effect on the margin of safety.

FIGURE 1



AC Distribution Sys.