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January 27, 1988
84056.125

Mr. W. G. Counsil
Executive Vice President
TU Electric
Skyway Tower
400 North Olive Street, LB 81
Dallas, TX 75201

Subject: *Electrical/Instrumentation and Controls*
Review Issues List - Revision 4
Comanche Peak Steam Electric Station
Independent Assessment Program - All Phases
Job No. 84056

Dear Mr. Counsil:

Please find enclosed Revision 4 of the Electrical/Instrumentation and Controls Review Issues List (RIL). This revision statuses the issues as of 01/18/88. All changes from Revision 3 are indicated by revision bars in the right margin.

Of the eight Electrical/Instrumentation and Controls Review Issues, four remain open. These are Issue Numbers 5, 6, 7, and 8.

Associated with the RIL are 11 specific review items that still require resolution. These items were previously identified in Cygna letter 84056.090. A brief summary of these items is provided here for your convenience.

* Item # 2, "System Short Circuit." Cygna follow-up is required to verify that calculation 16345-EE(B)-046 has been revised to reflect the appropriate feeder cable length for an MCC. (Review scheduled for the week of February 1, 1988, in SWEC Boston Office.)

* Item # 6, "AC Distribution System Voltages." SWEC is currently responding to Cygna's concerns resulting from a review of the latest AC system calculations (16345-EE(B)-073 and 076). Major concerns include: evaluation of worst-case configuration, computer program validation, and load modeling.

* Item # 7, "480 Volt System Voltages." Evaluation of this issue is continuing in conjunction with Item # 6.

* Item # 8, "Offsite grid voltages." Cygna follow-up is required to verify the TUEC/SWEC interface concerning grid load conditions. (Review scheduled for January 27-28, 1988, in Texas.)

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* Item # 9, "Overcurrent Protective Device Setting." SWEC response on containment spray pump acceleration time pending.

* Item # 14, "Mismatch of ranges for FI/FT 4536B." Cygna follow-up required to verify compatibility of instruments in the loop. (Review scheduled for January 27-28, 1988, in Texas.)

* Item #16, "Inconsistencies Between Instrument Data Sheets and Calibration Cards for LT 4500 and LT 4501." Cygna to verify consistency between data sheets and calibration cards. (Review scheduled for January 27-28, 1988, in Texas.)

* Item # 17, "AC and DC Control Circuit Voltage Drop." SWEC is providing further justification for momentary DC voltages and AC starter coil drop-out. Diesel Generator field flashing current requires further SWEC evaluation.

* Item # 18, "Tracking of Raceway Fill for Maintained Space Trays." Cygna follow-up to verify implementation of the field verification method. (Review scheduled for January 27-28, 1988, in Texas.)

* Item # 19, "Cable Ampacity Calculations." Cygna investigation into the bases of the loads used for MCC feeder is continuing.

* Item # 20, "Inconsistencies Between Calibration Cards and Set-point Calculations." Cygna to verify consistency between data sheets and calibration cards. (Review scheduled for January 27-28, 1988, in Texas.)

If you have any questions or require further information, please contact Cygna at your convenience.

Very truly yours,

N. H. Williams
Project Manager

Encl

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T. Sarver
Project File

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ELECTRICAL
(Power and I&C)
Review Issues List

1. Instrumentation Pressure/Temperature Ratings

References:

1. N.H. Williams (Cygna) letter to J.B. George (TUGCO), 84056.010, dated July 30, 1984
2. L.M. Popplewell (TUGCO) letter to N.H. Williams (Cygna), dated August 11, 1984, Cygna Log No. 3, File 2.1.1, Job No. 84056.
3. Transcript of meeting between TUGCO and Cygna, at Glen Rose Texas, on April 21, 1987, Cygna Log No. 1922, File 15.3.1, Job No. 84042.
4. Communications Reports from Cygna audit, October 19-23, 1987, at SWEC Boston Office.
5. Communications Reports from Cygna audit, December 7-11, 1987, at SWEC Boston Office.

Summary: Out of 24 instruments sampled, two instances were noted by Cygna where the pressure-temperature ratings for instruments installed in the Component Cooling Water System (CCWS) were lower than the maximum pressure or temperature of the system as indicated in the Gibbs & Hill analyses. The instruments in question were later shown to be qualified for the higher design conditions or protected by interlocks. Cygna was concerned, however; whether the CCW Radiation Monitors (RE) which were isolated when the CCW temperature exceeded 120°F, would meet their intended function.

Response: During a review conducted the week of October 19, 1987, Reference 4, SWEC provided details of plans and procedures to be used to verify the set points of instruments. These procedures will also ensure the installed instruments are qualified for the designed system temperatures as determined by CCW system calculations as the bases of the instrument setpoints are the revised system calculations.

In a December 11, 1987 Cygna review, Reference 5, SWEC provided details of a control scheme for these monitors which would remove them from the system whenever the temperature is above the

qualification temperature of 120° F. A review of the FSAR revealed that this design is consistent with CPSES licensing commitments. These REs are non-safety related.

Status: Closed–The Mechanical RIL No. 1 included a review at the CCW system temperatures. The REs are provided to identify radioactive system leaks into the CCW system. They are not the release point monitors. The CCW temperature could exceed the 120° F isolation temperature only under abnormal events and even then not be above 120° F for lengthy periods of time.

2. Cable Tray Thermolag Fire Protection

References:

1. N.H. Williams (Cygna) letter to J.B. George (TUGCO), 84056.010, dated July 30, 1984
2. L.M. Popplewell (TUGCO) letter to N.H. Williams (Cygna), dated August 11, 1984, Cygna Log No. 3, File 2.1.1, Job No. 84056.
3. N.H. Williams (Cygna) letter to J.B. George (TUGCO), 84056.024, dated August 21, 1984
4. L.M. Popplewell (TUGCO) letter to N.H. Williams (Cygna), dated September 4, 1984, Cygna Log No. 15, File 2.1.1, Job No. 84056.
5. Communications Report between J. Van Amerongen (TUGCO) and R. Hess (Cygna) dated 9/11/84, 11:00 AM

Summary: During the Cygna walkdown of July 16-20, 1984, it was noted that cable tray segment T130ACA43 was not covered with Thermolag fire protection material. Cygna reinspected the area in August and September, and the proper material was installed. However, the documentation supplied by TUGCO for the removal and reinstallation of the fire lag insulation indicates that the work was completed and signed off on 7/14/84. This is prior to the Cygna walkdown. While the reinspection showed the tray to be properly covered, the documentation is not consistent with the noted sequence of events.

Status: Closed.

3. Temperature Indicator X-TI-4837 Not Installed

References: 1. Cygna Phase 1 and 2 Final Report, TR-83090-01, Revision 0, Observation WD-07-02.

Summary: During the walkdown of the Spent Fuel Pool Cooling System, it was noted that a temperature indicator was not installed. Further investigation revealed that some instrumentation is not installed by construction in order to prevent it from being damaged by additional construction activities. When the system is turned over for operation, a set of instruments is provided for final installation. This area was not yet turned over.

Status: Closed.

4. Incorrect Cable Identification Number

References: 1. Cygna Phase 1 and 2 Final Report, TR-83090-01, Revision 0, Observation WD-07-03.

Summary: One of six cable identification tags checked during the walkdown had an incorrect unit identification number on the tag. An additional 32 safety-related cable identification tags were checked and found to be correct. Since the only discrepancy was in the unit number, no safety impact was involved, and the observation was closed as an isolated error.

Status: Closed.

5. System Short-Circuit Currents

References:

1. Communications Report between P. Lalaji (Gibbs and Hill) and J. Oszewski, K. Zee (Cygna), dated 8/1/85, 10:30 a.m.
2. Communications Report between P. Lalaji (Gibbs and Hill) and K. Zee (Cygna), dated 8/6/85, 3:30 p.m.
3. N.H. Williams (Cygna) letter to J. Redding (TUGCO), 84056.081, dated August 13, 1985.
4. N.H. Williams (Cygna) letter to W.G. Counsil (TUGCO), 84056.090, dated October 16, 1985.
5. W.G. Counsil (TUGCO) letter to R.J. Stuart (Cygna), Cygna Log No. 91, File 2.1.1 (TUGCO Log No. TXX-5001, File 2260), dated September 2, 1986.
6. Transcript of meeting between TU Electric and Cygna, Glen Rose, Texas, April 21, 1987, Cygna Log No. 1922, File 15.3.1, Job No. 84042.
7. Communications Reports from Cygna audit, July 15-17, 1987, at SWEC Boston office.
8. Communications Reports from Cygna audit, August 17-21, 1987, at SWEC Boston office.
9. Communications Reports from Cygna audit, October 19-23, 1987, at SWEC Boston Office.

Summary: Gibbs and Hill short-circuit Calculations IV-3 and IV-4 were reviewed by Cygna as part of the CAP. It was noted during the review that the design margin between the equipment rating and the calculated short-circuit current is less than 2% on several 480V buses. In addition, several non-conservative assumptions were used in the Gibbs & Hill calculations:

- Cable impedances based upon 75°C are used to reduce the short-circuit currents, when actual operating temperatures will probably be lower.
- The subtransient reactance assumed for large 480V loads is 25%, when typical values are less than 17%.

- The 480V short-circuit calculation is based upon a maximum available momentary symmetrical 6.9KV short-circuit current of 36,000A, when calculated values are 38,000A.

- The 6.9KV short-circuit calculation is based upon grid capacities determined in 1974.

- The diesel generator's short-circuit contribution during breaker interrupting is based upon the transient reactance only.

TU Electric responded to each item. Their responses are as follows:

- The system short circuit calculations are or will be revised to reflect a cable temperature of 25°C, Reference 5. During the meeting on April 21, 1987, Reference 6, it was indicated that other changes to the calculation had been made.

- The calculations for the 480V system short circuit study are or will be revised to reflect the actual motor reactances. These calculations will use the lowest 480V unit substation transformer tested impedance. Reference 5. During the meeting on April 21, 1987, Reference 6, it was indicated that other changes to the calculation had been made to reduce the short circuit currents.

- The 480V system calculation will be revised using a 6.9KV system current of 41,836A, Reference 5. However, at the April 21, 1987 meeting, Reference 6, it was indicated that the calculation will use a value of 43,750A and that other changes had been made to the calculation.

- The current estimate of grid capacity was provided and this new grid capacity is less than the value assumed in the calculation, Reference 5.

- The calculation will be revised to include the additional current contribution due to the diesel generator's subtransient time constant, Reference 5. During the April 21, 1987 meeting, Reference 6, SWEC indicated that a new calculation for the diesel generator short circuit contribution has been completed.

Response: SWEC calculations 16345-EE(B)-046, Revision 0, dated July 6, 1987, 16345-EE(B)-025, Revision 0, dated April 17, 1987, and G&H calculation 2323-IV-3A, Revision 0, dated February 26, 1987, were reviewed by Cygna during the week of August 17, 1987, Reference 8.

The subject SWEC calculations included a table of cable impedances based on 90°C with a statement in the methodology section requiring the use of 80% of the listed resistance. The use of this factor corrects the resistance for 25°C.

The review found that the maximum symmetrical momentary short circuit current at the 6.9KV bus, including those cases with diesel generator contribution, is less than 43,750A, which is the maximum 6.9KV breaker momentary rating with an X to R ratio (X/R) multiplying factor of 1.6. The 480V study used this value with the proper correction for the 5% boost tap position.

The 6.9KV short circuit calculations included the diesel generator reactances in the computer model for the system short circuit study. The actual revision was made in the G&H calculation. Cygna reviewed Deleval letter DET-091 and TUEC letter TSG-19171 and found that the proper diesel generator and offsite impedances were used in the calculation.

The subject SWEC calculations used the actual motor subtransient reactances for only those motors directly connected to the load center bus. The current contribution from motors at the MCCs are still based on an equivalent group reactance of 25%. The KVA of the group was determined using reasonable demand factors. The reactance used for the MCC loads is acceptable since the cable impedances for the individual load feeder cables are neglected, and the current source is smaller. The calculation also uses actual tested impedance for each transformer rather than the lowest tested value as stated at an earlier meeting in Texas, Reference 6. However, the use of actual impedances does not adversely affect the results.

The results of the calculation showed that the current at MCC 1EB3-4 is 37,491A versus an equipment rating of 25,000A. However, the calculation conclusion states that the "actual" feeder cable length associated with this MCC is 14% longer than needed to limit the current to below 25,000A. No justification, calculation, or reference was provided to support this statement. Discussions with the SWEC engineers indicated that a calculation

During the week of October 19, Reference 9 SWEC provided a calculation and documentation showing the short circuit current at MCC would be less than 25,000 A. This calculation was only supplemental; however, SWEC provided assurance that it would be incorporated into the formal SWEC short circuit calculations.

Status:

MCC Short Circuit Rating--Open.

This item is open until the calculation showing the current at 1EB3-4 is less than 25,000A is incorporated into the official calculation.

Cable Temperature--Closed.

The review of the subject calculations found that an acceptable conservative temperature is now being used.

6.9KV Short Circuit Current--Closed.

The review found that the 6.9KV system was properly modelled for the 480V study.

Grid Capacity--Closed.

The response provided current estimates of grid capacities. These new values are less than the values assumed in the calculation.

Diesel Generator Contribution--Closed.

The review of the calculations found that the proper values were used.

6. AC Distribution System Voltages

References:

1. Communications Report between P. Lalaji (Gibbs and Hill) and J. Oszewski, K. Zee (Cygna), dated 8/1/85, 10:30 a.m.
2. Communications Report between P. Lalaji (Gibbs and Hill) and K. Zee (Cygna), dated 8/6/85, 3:30 p.m.
3. N.H. Williams (Cygna) letter to J. Redding (TUGCO), 84056.081, dated August 13, 1985.
4. N.H. Williams (Cygna) letter to W.G. Counsil (TUGCO), 84056.090, dated October 16, 1985.
5. W.G. Counsil (TUGCO) letter to R.J. Stuart (Cygna), Cygna Log No. 91, File 2.1.1 (TUGCO Log No. TXX-5001, File 2260), dated September 2, 1986.
6. W.G. Counsil (TUGCO) letter to R.J. Stuart (Cygna), Cygna Log No. 92, File 2.1.1 (TUGCO Log No. TXX-5001, File 2260), dated September 5, 1986.
7. Transcript of meeting between TU Electric and Cygna, Glen Rose, Texas, on May 19, 1987, Cygna Log No. 2015, File 15.3.1, Job No. 84042.
8. Communications Reports from Cygna audit, July 15-17, 1987, at SWEC Boston Office.
9. Communications Reports from Cygna audit, August 17-21, 1987, at SWEC Boston Office.
10. Communication Report, Telecon, between Cygna and SWEC, dated October 7, 1987, 10:45 a.m. PDT.
11. Communications Reports from Cygna audit, October 19-23, 1987, at SWEC Boston Office.
12. Communications Reports from Cygna audit, December 7-11, 1987, at SWEC Boston Office.

Summary: The Gibbs & Hill system voltage calculations III-7 and III-8 were reviewed by Cygna as part of the IAP. It was noted during the review that certain operating conditions will result in bus voltages below the specified operating range. During postulated events as

discussed in paragraph 8.3.1.1.1 of the FSAR concurrent with normal grid voltage variations, the voltage on the safety buses is more than 10% below the rated voltage of the connected loads. During minimum loading conditions, the 480V bus voltages are more than 10% above the rated voltage of the connected load. The source of the assumed grid voltage variations is not indicated in the Gibbs & Hill calculation.

The Gibbs & Hill calculations studied the starting of 6.9KV motors, but did not study the starting of 480V loads.

Additionally, the voltage regulation study for the medium voltage system states that the adequacy of voltages during DBA conditions is not in Gibbs & Hill's scope. Consequently, cases of undervoltage conditions appear to remain uncorrected.

TU Electric responded to each item. Their responses are as follows:

- The CPRT responses, Reference 6, indicated that the medium voltage system regulation study calculations were intended to establish the required range of offsite grid voltages and that a design deficiency report, (TDDR) EE-86-901, had been issued to address the different minimum and maximum voltages used in the study versus the FSAR values. During the May 19, 1987 meeting, Reference 7, SWEC stated that a new calculation and design basis/criteria document will be issued. Discussions included the value of minimum expected offsite grid voltage being used in the new calculation.

- The CPRT response, Reference 5, indicated that the 480V system voltage calculation is considered acceptable and that no revisions were planned. However, during the May 19, 1987 meeting, Reference 7, it was determined that the status of this calculation is dependent on the results of the medium voltage analysis.

- The CPRT response, Reference 6, to the issue of offsite grid voltage variations stated that the TDDR had been issued and that the CPRT program will provide the overall resolution of the offsite grid voltage variations issue. However, during the May 19, 1987 meeting, Reference 7, it was determined that the status of this issue is dependent on the results of the medium voltage analysis.

Response: The Design Basis Document (DBD) and associated procedure for the system voltages were audited during the week of July 13, 1987, Reference 8. Cygna reviewed PP-217, Revision 0, dated June 16, 1987, DBD-EE-038, Revision 0, dated June 8, 1987, DBD-EE-040, Revision 0, dated June 8, 1987, and DBD-EE-041, Revision 0, dated June 8, 1987.

SWEC calculation 16345-EE(B)-016, Revision 0, dated August 5, 1987, was audited during the week of August 17, 1987, Reference 9. This calculation did not evaluate the worst case loading as discussed in the FSAR, and did not determine whether a 480V load would have adequate voltage to start. However, the results of the cases that were studied found that the system voltages were below acceptable levels. The calculation conclusion states that additional studies/analysis is required.

Discussions with the SWEC engineers found that they were currently evaluating the problem and that they intended to revise the appropriate calculations and documents following the resolution of the problem. SWEC indicated concurrence with the Cygna issue.

In a telephone conference on October 7, 1987, Reference 10, SWEC informed Cygna that the onsite AC distribution system will be redesigned to include two additional station transformers. SWEC indicated that the supporting calculations were in progress.

During an audit conducted the week of October 19, 1987, Reference 11, SWEC provided, for Cygna review, these calculations and an Design Engineering Package (DEP). This DEP contained the analysis performed to determine the best system modification and provided and implementation strategy. Cygna's review revealed that the calculations were too preliminary to establish the acceptability of the revised AC system design.

SWEC provided a new AC system calculation, 16345-EE(B)-073, for review during the review conducted the week of December 7, 1987, Reference 12. This calculation did not evaluate the worst case loading as discussed in the FSAR. Numerous other issues were raised regarding the calculation assumptions and methodology. In addition, one instance of an apparent computer program anomaly was identified.

Status: Open--Pending SWEC response to Cygna concerns regarding the AC system calculation.

7. Overcurrent Protection

References:

1. Communications Report between P. Lalaji (Gibbs and Hill) and J. Oszewski, K. Zee (Cygna), dated 8/1/85, 10:30 a.m.
2. Communications Report between P. Lalaji (Gibbs and Hill) and K. Zee (Cygna), dated 8/6/85, 3:30 p.m.
3. N.H. Williams (Cygna) letter to J. Redding (TUGCO), 84056.081, dated August 13, 1985.
4. N.H. Williams (Cygna) letter to W.G. Counsil (TUGCO), 84056.090, dated October 16, 1985.
5. W.G. Counsil (TUGCO) letter to R.J. Stuart (Cygna), Cygna Log No. 91, File 2.1.1 (TUGCO Log No. TXX-5001, File 2260), dated September 2, 1986.
6. Transcript of meeting between TU Electric and Cygna, at Glen Rose, Texas, on May 19, 1987, Cygna Log No. 2015, File 15.3, Job No. 84042.
7. Communications Reports from Cygna audit, July 15-17, 1987, at SWEC Boston office.
8. Communications Reports from Cygna audit, August 17-21, 1987, at SWEC Boston office.
9. Communication Report, Telecon, between Cygna and SWEC, dated October 7, 1987, 10:45 a.m. PDT.
10. Communications Reports from Cygna audit, October 19-23, 1978, at SWEC Boston office.

Summary: During Cygna's review of the component cooling water pump motor overcurrent protection, the following items were noted with regard to overcurrent protection, in general:

- The motor thermal limit was not used to determine the maximum allowable tripping delay during stalled conditions. The setting was based only upon the acceleration time, which is the minimum allowable tripping delay.
- The settings of transformer overcurrent devices did not consider the transformer's ANSI point. Again, the maximum

allowable tripping delay is based upon the thermal limit, with minimum delay based upon coordination with downstream devices.

- It was not clear that the 6.9KV safety bus feeders were coordinated with the diesel generator's short-circuit capability and protective devices.

- It appears that the primary and back-up protective devices for the reactor coolant pump motor electrical penetration conductors are connected to the same current transformer. It also appears that the breakers have a common control power source.

The CPRT response to the overcurrent protective device setting issue, Reference 5, stated that the motor and transformer thermal limits were adequately protected. The motor safe stall times for four of the seven listed motors and the transformer ANSI points were provided. However, during the May 19, 1987 meeting, Reference 6, it was indicated that SWEC is preparing a new coordination calculation and that they are using ANSI Standard C37.91-1985.

The response to the coordination of protective devices issue, Reference 5, acknowledged the inability instantaneously trip the 480V unit substation transformer feeder on a bolted fault condition, but stated that this is acceptable since the protective device is coordinated with the diesel generator breaker. During the May 19, 1987 meeting, Reference 6, SWEC indicated that short circuit coordination and instantaneous tripping was not a requirement.

The response to the issue of protection of the RCP electrical penetration conductors, Reference 5, indicated that the DC power supply for the primary and backup breakers are from different supply panels and that the use of common current transformers does not prevent at least the one current transformer from detecting potentially damaging currents. However, the response failed to address the common power supply source for the two panels. During the meeting on May 19, 1987, Reference 6, SWEC indicated that three new current transformers will be added to the protection circuit and the adequacy of the common distribution bus is being assessed for regulatory compliance.

Response: The Design Basis Document (DBD) and associated calculations for the protective relaying and coordination were audited during the week of July 13, 1987, Reference 7. Cygna reviewed DBD-EE-051, Revision 0, dated July 10, 1987, TNE-EE-CA-0008-265, Revision 0, and the associated SWEC calculation validation record, dated May 21, 1987, and Calculation 16345/6-EE(B)-031, Revision 0.

The review of the documents found that the calculation validation record listed the DBD as the applicable criteria document. However, the validation was completed before the DBD was issued.

Section 5.1.1.3.c of the DBD required that the 50/51 device on the primary side of XST1/2 be set at 120% of rated load current. This appeared to conflict with the statement in FSAR section 8.3.1.1.1, page 8.3-4, Amendment 30, where one winding of the transformer is shown as carrying a 49% overload.

The review of the DBD and discussions with the SWEC engineers found that the correct ANSI C37 and C57 standards were referenced, and that the method for determining the ANSI point was appropriate for the installed equipment.

During the review of 16345/6-EE(B)-031, an overload condition was identified for the Containment Spray Pump Motors. The motors are rated 700 HP while a memo from the mechanical group states that initial flow requirements corresponds to an 810 HP load. The motor acceleration time was calculated based on a 700 HP load. In addition, the statement provided in the calculation to justify the acceptability of the overload was based solely on the service factor of the motor.

The review of the documents and discussions with the SWEC engineers found that the methodology used by SWEC for the 480V transformer's protective device setpoint is the same as that used by G&H. However, SWEC was unable to respond to questions regarding the response of the bus undervoltage relays and the other energized safety-related pump motors, during the delay in tripping on a bolted fault on the 6.9KV side of the transformer. There were indications that SWEC may consider this fault as a single failure of that division's power system.

A follow-up review was conducted during the week of August 17, 1987, Reference 8, where SWEC provided their responses to the issues. SWEC indicated that they intended the 120% factor in the DBD to be 120% of the maximum expected load current. SWEC did

not provide a definite resolution; that is, they did not state that they were revising the DBD. The issue regarding the Containment Spray Pump Motor acceleration time and loading was deferred. SWEC is still waiting for vendor information.

The SWEC response to the coordination issue was that the existing setpoint is adequate and that if this fault were to occur during a loss of offsite power condition concurrent with a LOCA, the result would not be worse than failure of the diesel generator to start; that is to say, no worse than the most limiting single failure.

During the week of October 19, 1987, Reference 10, another audit was conducted. SWEC committed to the revision of DBD-EE-051 to indicate the minimum set point of the 50/51 device for transformers XST1/2 as 120%. SWEC asserted that this would provide guidance and allow latitude for higher values if dictated by system requirements. SWEC also stated that the FSAR would be revised to show the new transformer loading after the new system design and analysis is completed.

A review of the FSAR Chapter 8 FMEA conducted during the October audit found the SWEC claim of single failure for the coordination of the 6.9KV safety buses with the diesel generator to be consistent with CPSES licensing commitments.

The penetration protection issue was discussed with SWEC engineers during the audit of the week of July 13, 1987, Reference 7. SWEC indicated at that time that new current transformers will be added and that the power supply for the primary and back-up protective devices will be separated. Specifically, the two power supplies will not have any common distribution components. Cygna asked for evidence that the change process was initiated.

Evidence that the change was in progress was presented for review during the audit on the week of August 17, 1987, Reference 8. PSCI No. E0009, dated May 29, 1987, was reviewed. The proposed change encompassed the current transformers and power supply changes as discussed earlier.

The transformer protection issue is resolved in that the proposed DBD revision will provide a minimum setpoint consistent with industry practice and allow the latitude necessary to set the device higher should the system design/requirements dictate. In

addition, it is expected that the modified distribution system design will eliminate any overload condition on the transformers.

Status: Containment Spray Pump–Open.

SWEC is waiting for vendor information.

120% Setpoint–Closed.

The transformer protection issue is resolved in that the proposed DBD revision will provide a minimum setpoint consistent with industry practice and allow the latitude necessary to set the device higher should the system design/requirements dictate. In addition, it is expected that the modified distribution system design will eliminate any overload condition on the transformers.

Coordination–Closed.

Review of the FSAR, Chapter 8, FMEA found this failure to be equal to failure of that division of the onsite power system.

Motor and Transformer Thermal Limits–Closed.

The review of the DBD and associated calculations found that the equipment thermal limits were used.

Penetration Protection–Closed.

Sufficient evidence has been presented to indicate that the protection devices will be modified to be consistent with the requirements of Regulatory Guide 1.63.

8. Cable Sizing

References:

1. Communications Report between P. Lalaji (Gibbs and Hill) and J. Oszewski, K. Zee (Cygna), dated 8/1/85, 10:30 a.m.
2. Communications Report between P. Lalaji (Gibbs and Hill) and K. Zee (Cygna), dated 8/6/85, 3:30 p.m.
3. N.H. Williams (Cygna) letter to J Redding (TUGCO), 84056.081, dated August 13, ,1985.
4. N.H. Williams (Cygna) letter to W.G. Counsil (TUGCO), 84056.090, dated October 16, 1985.
5. W.G. Counsil (TUGCO) letter to R.J. Stuart (Cygna), Cygna Log No. 91, File 2.1.1 (TUGCO Log No. TXX-5001, File 2260), dated September 2, 1986.
6. Transcript of meeting between TU Electric and Cygna, Glen Rose, Texas, April 21, 1987. Cygna Log No. 1922, File 15.3.1, Job No. 84042.
7. Communications Reports from Cygna audit, July 15-17, 1987, at SWEC Boston office.
8. Communications Reports from Cygna audit, August 17-21, 1987, at SWEC Boston office.
9. Communications Reports from Cygna audit, October 19-23, 1987, at SWEC Boston office.

Summary: During Cygna's review of Gibbs and Hill calculations, it was noted that the power cables were derated for a 40°C ambient outside containment and a 50°C ambient inside containment. Paragraph 8.3.1.2.4 of the FSAR shows the long term post accident temperature inside containment as approximately 65°C.

Response: The CPRT response indicated that only one circuit inside containment must be energized for post accident conditions. This circuit is for the Electric Hydrogen Recombiner Heaters. The ampacity of this cable was analyzed for the higher temperatures and found to have sufficient ampacity.

In a follow-up review conducted during the week of Aug. 17, 1987, Reference 8, SWEC Calculation 16395-EE(B)-009 Rev. 0, which

supplements Gibbs & Hill Calculation VII-5, Rev. 15, was reviewed. This calculation establishes the use of a 65°C derating factor for those cables inside containment. SWEC stated that the Gibbs & Hill calculation, which SWEC calculation 16345-EE(B)-009 supplements, contains the actual analysis for the hydrogen recombiner cable routed inside containment, and the Gibbs & Hill calculation had been revised to reflect a 65°C ambient.

During Cygna's review conducted the week of October 19, 1987, Reference 9, the Gibbs & Hill calculation was reviewed and found to appropriately derate the hydrogen recombiner cable for both temperature and conduit grouping.

Also, during this review SWEC provided copies of IOM's showing inter-discipline review for required post LOCA loads. These IOM's confirmed the hydrogen recombiner as the sole long-term post LOCA load requiring derating for the higher ambient temperature. A Cygna review of the FSAR revealed no additional long-term post-LOCA loads.

During the review of calculation 16345-EE(B)-009 (and other SWEC cable sizing calculations), it was noted that these calculations specifically exclude derating factors for all fire barrier materials. Discussions with SWEC, Reference 8, revealed that SWEC is currently working to establish these derating factors and subsequently will assess the impact on previously completed calculations.

In discussion held the week of October 19, 1987, Reference 9, SWEC stated that cables having and/or requiring Thermolag have been identified and tabulated. Further, these cables are being evaluated for ampacity and loss of life due to overloads. Where this analysis would be documented was not stated.

Status: Open--Pending verfication of inclusion of fire barrier materials in cable derating calculations as necessary.