TEXAS UTILITIES GENERATING COMPANY
SKYWAY TOWER • 400 NORTH OLIVE STREET, L.B. 81 • DALLAS, TEXAS 75201

Log # TXX-4304
File # 10010
903.10 clo

September 20, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION
DOCKET NOS. 50-445 AND 50-446
EQUIPMENT QUALIFICATION AUXILIARY
RELAY RACKS

REF: (1) TXX-4208 of June 29, 1984
(2) TXX-4209 of June 29, 1984
(3) TXX-4301 of September 19, 1984

Dear Sir:

References (1) and (2) provided a group of Justifications for Interim Operation (JIO's) for equipment with incomplete qualification programs. Reference (3) closed one of those JIO's. Attached is a new JIO for the NSSS Auxiliary Relay Rack. This JIO provides the analysis required to show that the Comanche Peak Steam Electric Station can be safely operated until the equipment qualification program for this relay rack is completed.

Respectfully,

D R Woodlan for

J. W. Beck

DRW/grr
Attachment

Distribution: Original plus 40 copies

A048
1/1

ATTACHMENT TO TXX-

JUSTIFICATION FOR INTERIM OPERATION

QUALIFICATION PACKAGE: ESE-XX

EQUIPMENT: NSSS Auxiliary Relay Rack
TBX-ESELAR-01

SUPPLIER/ MANUFACTURER: Westinghouse

SPECIFICATION/ PURCHASE ORDER: P.O. CP-0001

SCHEDULED COMPLETION AND CERTIFICATION: January 31, 1985

FUNCTION/APPLICATION:

The NSSS Auxiliary Relay Rack (ARR) provides the housing for certain control grade circuits and relays. None of the circuitry in this rack is involved in protective functions and none of the equipment serves a safety related function. The design of the rack designated many of the circuits as "train" circuits and, as such, these circuits were routed with and treated as Class 1E. Therefore, the qualification of the ARR and the train designated circuits within the ARR needs to be addressed to show that the integrity of the Class 1E circuits and systems is not compromised.

EQUIPMENT FEATURES:

The ARR itself is a typical relay rack with rows of relays, wireways, and terminal blocks. The equipment of concerned within the rack are the Westinghouse AR440AR and AR880AR relays and the Singer Industrial Timer Division J5406 timers. The rack is located in the mild environment of

the Control Room on the 830 foot elevation of the Electrical and Control Building.

EQUIPMENT QUALIFICATION STATUS:

The integrity of Class 1E wiring may be compromised from any one of three avenues:

1. Failure of the auxiliary relay racks or relays contained within due to the seismic event.

2. Proximity of train wiring to non train wiring within the relay racks.

3. Failure of the AR type relays to function as isolation devices between train and non train wiring.

Each facet is considered separately within the scope of this justification.

A. Seismic qualification of Auxiliary Relay Racks and Relays

Seismic testing has been performed on a typical Auxiliary Relay Rack. The seismic event was simulated by a pulse amplitude modulated sine wave (sine beat) of selected resonant frequencies and preselected frequencies supplied by Westinghouse NES. The test specimen was subjected to five such pulses, uniaxially, in each of three orthogonal directions corresponding to the natural structure of the cabinet. Eighteen accelerometers were used to monitor the test. All testing was completed without physical damage to either the cabinet or relays contained within.

Since the performance of the above testing, single axis sine beat testing has given way to multifrequency, multiaxis testing as the industry standard. Single frequency, uniaxial sine beat testing previously conducted may however, prove to be conservative with

respect to multifrequency, multiaxis testing. The Westinghouse position concerning the applicability of pre 1975 testing is stated in WCAP-8587, "Methodology for Qualifying Westinghouse WRD supplied NSSS safety related electrical equipment."

WCAP-9714 provides a methodology for comparing single frequency test inputs to multifrequency, multiaxis test inputs. Provisions of this document call for the test input peak acceleration to be greater than the zero period acceleration (ZPA) of the required response spectrum. A review of the response spectra for the Comanche Peak electrical building 830.00 ft. level indicate the following:

Direction	ZPA
Horizontal	.3g max.
Vertical	.3g max.

Examining the data in Table 1 (attached), we see that the entire acceleration ranges for the reference accelerometer are significantly greater than the Comanche Peak zero period acceleration. Results are summarized below:

Direction	Accelerometer Frequency Range (g)	CPSES ZPA (g)
Horizontal (side to side)	.8 - 2.1	.3
Horizontal (front to back)	.9 - 2.4	.3
Vertical	.75 - 1.6	.5

Furthermore, the technique of WCAP-9714 was performed on the solid state protection system (SSPS) for Comanche Peak with satisfactory results. The equipment mounting horizontal acceleration vs. frequency for initial testing of the SSPS by sine beat testing is reported in WCAP 7817, "Seismic Testing of Electrical and Control Equipment." The auxiliary relay racks were tested to a higher

level indicating that when the WCAP-9714 analysis is performed on the ARR, a satisfactory analysis will result. The SSPS and ARR share the same building elevation.

It should be noted that the test specimen was constructed solely for the purposes of the test and therefore is not necessarily identical to the CPSES ARR. Engineering judgement is that construction technique, material, physical dimension, weight distribution and mounting configuration exhibit a sufficient degree of similarity to permit interim operation. The complete seismic study will address these issues as well as the WCAP-9714 analysis.

The AR type relays have been seismically tested and found acceptable by generic qualification for use in protection systems. The J5406 timers have received no testing to determine their suitability. They were, however, mounted in the auxiliary rack tested and exhibited no structural damage subsequent to testing. Therefore, they are considered acceptable for interim operation pending completion of seismic analysis.

B. Physical Independence of Electric Systems

The train designated circuitry exists in close proximity to non train designated wiring within the cabinet. It could be postulated that electric faults occuring in the non train wiring may be propogated to Class 1E wireways via the train wiring as a result of this proximity thereby degrading the integrity of legitimate Class 1E circuitry. Though not specifically addressed in the case of instrument cabinets, Reg. Guide 1.75 and IEEE Std. 384-1974 provide the option of employing analytic techniques to demonstrate that the absence of physical separation does not significantly reduce the integrity of Class 1E circuitry.

Westinghouse test programs have demonstrated that Class 1E protection systems (Nuclear Instrumentation, Solid State

Protection and 7300 Process Protection System) are not degraded by non-Class 1E circuits sharing the same enclosures. A discussion of these test programs is provided in Section 7.1.2.2.1 of the CPSES FSAR. Reference is made in that discussion to tests conducted on the Nuclear Instrumentation and Solid State Protection system as built designs of Diablo Canyon and to WCAP-8892-A. Tests on the 7300 Process Protection System are covered in report WCAP-8892-A which was accepted by the NRC in support of Shearon Harris Applications. Tests indicate that adequate separation exists inside the cabinet.

Nevertheless, to achieve the greatest degree of physical separation between train and non train designated circuitry within the ARR, a system similar to that used in the solid state protection system cabinets is employed. Physical separation is provided by separate train and non train wireways and terminal blocks. Relays separating train and non train circuitry are mounted six per row to provide for spacing between the relays in which wires may be routed. These spaces are individually dedicated to the train or non train wire. Wires now lead to dedicated panduits which are located above and below the relays allowing for wiring to be routed to terminal blocks located on the right hand side of the cabinet for non train wiring and left hand side of the cabinet for train wiring.

Thus the greatest degree of physical separation has been achieved commensurate with the as-built design of the ARR and additional wiring changes are scheduled to ensure conformance to plan. These wiring changes shall be completed by FCN number TBXM 106-33 and will be completed prior to fuel load.

C. Suitability of Relays as Isolation Devices

In all instances where electrical separation between train and non train wiring is indicated, a Westinghouse type AR440AR or AR880AR relays have been utilized. The use of an interposing relay to

achieve a requisite degree of electrical isolation is standard industry practice. Although not specifically aimed at concluding the satisfactory performance of relays employed in this capacity, WCAP-8892-A confirms that AR type relays are adequate for faults on the non-Class 1E side up to 550 VAC and 250 VDC. The NRC has accepted the conclusions of this WCAP including the use of relays or isolation devices for credible faults.

The wiring configuration specifically addressed with respect to relay isolation devices is a Class 1E input to coil with a non-Class 1E contact output. To date there has been no known testing confirming performance suitability of an isolator with a wiring configuration of a non-Class 1E input to coil with a Class 1E output from contacts, a wiring scheme utilized frequently in the auxiliary relay racks. It is engineering judgement that the later arrangements will prove satisfactory and therefore is judged to be acceptable for interim operation to be confirmed by a complete study addressing this issue.

CONCLUSION:

Interim operation is justified based on the following:

1. Adequate evidence exists to indicate that the auxiliary relay racks and relays will pass all seismic testing and analyses. This evidence takes the form of previous test data which is compared to Comanche Peak plant specific requirements.

2. The greatest degree of physical independence of train and non train circuits has been achieved. The techniques employed to achieve this independence are those used in higher level systems.

3. Testing and engineering judgement confirm the suitability of relays to act as electrical isolators.

CPSES can be safely operated until this qualification package is completed.