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January 25, 1985
84056.050

Mr. Vince Noonan
U. S. Nuclear Regulatory Commission
7920 Norfolk ANC
Bethesda, Maryland 20814

Subject: Status of IAP Conclusions
Texas Utilities Generating Company
Comanche Peak Steam Electric Station
Independent Assessment Program, all phases
Job No. 84056

Reference: N. H. Williams (Cygna) letter to V. Noonan (U.S. NRC), "Open Items Associated with Walsh/Doyle Allegations," 84042.22, dated January 18, 1985

Dear Mr. Noonan:

As follow-up to the above referenced letter statusing Cygna review open items associated with the Walsh/Doyle allegations, we are transmitting a summary scope of potential revisions to previously published observations and conclusions. These changes are due to: 1)information obtained through later reviews which affect the closure of earlier review observations, and 2) conclusions affected by a cumulative effects assessment across all phases of the Independent Assessment Program (IAP).

Attachment A is an updated Observation Log for Phases 1 through 3 of the IAP. The two right columns indicate whether Cygna anticipates making revisions to either the "Probable Cause" or "Resolution" sections of previously signed-off observations. Although an individual observation may be statused as "closed," the probable cause of that observation will be reviewed for any significant cumulative effects which indicate trends in the adequacy of the design quality assurance programs being implemented on the Comanche Peak project. Attachment B summarizes the status of Cygna's conclusions associated with each discipline within the IAP review scope.

Cygna proposes to provide the updated conclusions considering all phases of the IAP as part of the Phase 4 Final Report. The estimated completion date is May 3, 1985, based on closure of the open items discussed in the reference letter.

Ltr S. Burwell
2222 See Attached
1/1 Dist

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Conclusions dealing with areas of particular interest to the NRC may be scheduled for submittal prior to Phase 4 Final Report if desired. Please advise us of any priorities at your convenience.

Very truly yours,

N.H. Williams

N.H. Williams
Project Manager

Attachments

cc: Mrs. J. Ellis
Mr. S. Treby
Mr. S. Burwell
Mr. J. B. George
Mr. D. Wade
Mr. D. Pigott
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NHW/ajb

ATTACHMENT A

Observation Log

1/25/85

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
DC-01-01	The CPSES Document Control Center (DCC) does not maintain an accurate listing of design changes generated against drawings and specifications. This was substantiated upon review of eighteen drawings, seven specifications and approximately 112 associated design changes. These discrepencies are as follows: Affected Document — Design Change Missing from DCC Log Dwg. 2323-S-0800 — DCA-12534 (Rev. 1) Dwg. 2323-E1-0018-01 — DCA-16858 Dwg. 2323-S-0801 — DCA-713 Dwg. 2323-S-0825 — DCA-7850 (Rev. 4)	X			X	X			X	X	
DC-01-02	The Design Change Log Books maintained by site file custodians did not include the posting of all design changes. This was substantiated upon review of the Document Control Center list of design changes against affected documents versus the site file custodian Design Change Log Books.	X			X	X			X	X	

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
	AFFECTED DOCUMENT / MISSING DESIGN CHANGE / LOCATION										
	SPEC MS-208.1 — DCA-14781 — Purchasing										
	SPEC MS-20B.1 — DCA-14026 (Rev. 2) — Purchasing										
	DWG 2323-E1-0018-01 — DCA-9222 (Rev. 1) — Electrical										
	SPEC MS-46A — DCA-11193 (Rev. 2) — Purchasing										
	SPEC MS-46A — DCA-11939 (Rev. 1) — Purchasing										
	SPEC MS-46A — DCA-14349 (Rev. 1) — Purchasing										
	SPEC MS-46A — DCA-16383 (Rev. 1) — Purchasing										
	SPEC MS-46A — DCA-17620 — Purchasing										
	SPEC MS-46A — DCA-13037 — Purchasing										
	SPEC MS-46A — DCA-18073 — Purchasing										
	SPEC MS-605 — DCA-10413 (Rev. 3) — Purchasing										
	SPEC MS-605 — DCA-17849 — Purchasing										
	SPEC MS-605 — DCA-17852 — Purchasing										
DC-01-03	An initial review of fourteen drawings disclosed that one (Gibbs & Hill drawing 2323-S-0801) was not stamped "THIS DOCUMENT AFFECTED BY DESIGN CHANGES." A further sample of 20 drawings disclosed that four drawings lacked the required stamp.	X			X	X			X	X	
DC-01-04	The Field Design Change and Review Status Log, as maintained by the Design Change Tracking Groups (DCTG) was reviewed for compliance to Procedure CP-EP-4.7 "Control of Engineering/ Design Review of Field Design Changes." The review disclosed:	X			X	X			X	X	

ATTACHMENT A

Observation Log

1/25/85

PHASE 2 Observation No.	Description	Classification						To Be Changed			
		Valid		Potential Finding		Closed		Probable Cause		Resolution	
		Y	N	Y	N	Y	N	Y	N	Y	N
	1. The DCTG status log did not accurately reflect all outstanding design changes listed (e.g. Specification 2323-ES-100, DCA-9695; 2323-S-0800, DE/CD's, DCDDA's, FICR's). 2. The DCTG status log does not accurately reflect the status of design change documents to be incorporated versus design changes not to be incorporated (e.g. DWG. 2323-S-0801, DCA-81 and DCA-92). 3. The DCTG status log contains design changes entered against the incorrect affected document. (DCA-1803 was listed against another specification when it should have been listed against MS-20B.1.) 4. The DCTG status log identifies design changes as applicable to certain documents when in fact they have been voided.										
DC-02-01	A review of specifications MS-13, 15, 29A, and 64, and associated revisions and addenda, disclosed that several revisions of specifications MS-13 and MS-15 for safety-related mechanical equipment were apparently issued to the owner prior to performance of design review and/or resolution of design review comments as follows:		X			X	X		X		X

Observation Log

1/25/85

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
DC-02-02	Gibbs & Hill Design Specification MS-200 specifies ASME III, 1974 edition, through Summer 1974 Addenda as a design basis. However, the computer code (ADLPIPE Version 2C) used for pipe stress calculations AB-1-69 and AB-1-70 incorporates the requirements of ASME III, 1974 edition, through Winter 1975 Addenda.	X			X	X			X		X
DC-02-03	Pipe stress problems AB-1-69 and AB-1-70 were analyzed using the computer program ADLPIPE Version 2C dated 4/77. However, the ADLPIPE version dated 9/72 is specified in the CPSES FSAR.	X			X	X			X		X
PI-00-01	Gibbs and Hill does not specify any weld mismatch (δ) when determining stress intensification factors for butt welds.	X			X	X		X			X
PI-00-02	Gibbs & Hill uses a 20% increase in the upset and emergency condition allowables when considering welded attachment stresses in combination with general piping stresses.	X			X	X			X		X

Spec.	Rev.	Date Issued to TUSI	Date Design Reviewed	P.O. Issue	Date Resolution of Design Review Comments
MS-13	0	2/19/75	2/14/75	N/A	2/24/78
MS-13	1		1/1/76	5/27/76	9/11/79
MS-51	ADD 1	10/30/74	12/11/75	N/A	No comments
MS-51	1	9/9/75	12/31/75	N/A	3/19/76
MS-51	2	11/19/75	3/23/76	3/20/75	8/2/78

Observation Log

1/25/85

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PI-00-03	Gibbs & Hill has no procedure for checking that an adequate number of modes are considered in the dynamic analysis. All modes up to 33 Hz are included in the analysis.	X			X		X	X		X	
PI-01-01	The wall thickness used for the computer analysis piping segments 16"-SI-074-151R-2 and 16"-SI-073-151R-2 was 0.5 inches. The correct value is 0.375 inches.	X			X	X		X			X
PI-02-01	The response spectra for the containment structure at elevations 805.5' and 860.0' were not included in the analysis for problem 1-70. These are needed to envelope the attachment at penetration MII-5 (elevation 820'-1-9/16"). Cygna did note that the SAM for the containment building were included in the proper analysis.	X			X	X			X		X
PI-02-02	Support RH-1-064-010-S22R (previous tag number RH-1-062-001-S22R) is modelled 14 inches downstream from its correct, as-built location on piping segment 8"-RH-1-064-601R-2.	X			X	X			X		X
PI-02-03	In the welded attachment analysis for the restraints in Problems 1-70, the analyst used the maximum thermal expansion loads for the equation 11 check, rather than the range of the loads.	X			X	X		X			X
PI-02-04	The reinforcing pad used in the welded attachment analysis for anchor SI-1-037-005-S32A was 10" long rather than the 8" shown in the latest drawing. Cygna did note that the loads used were a conservative set from a previous revision of the piping analysis.		X		X	X		X			X

Observation Log

1/25/85

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PI-02-05	The incorrect pipe schedule (80 instead of 40) was used in calculating the allowable forces and moments for the RHR heat exchanger tubeside nozzles. The correct schedule produced lower allowables.	X			X	X		X			X
PI-03-01	In the finite element analysis for penetration MS-1, 2, 3, 4, the geometry below the lower taper (for ≈2") was modeled incorrectly, due to an error in element generation. The error resulted in an area of the model with triangular holes adjacent to triangular steel.	X			X	X		X			X
PS-02-01	The embedment lengths shown on the drawing (6-1/2" and 3-1/2") do not match those in the calculation (7-3/4" and 5")	X			X	X		X			X
PS-09-01	The working range for spring hanger SI-1-042-002-S22K (i.e. top up or bottom out) was not checked to ensure that the travel due to seismic movement was within the working range of the hanger.	X			X	X		X			X
PS-10-01	The design input data for support RH-1-064-010-S22R contained an error in the X displacement sign (+.395 " vs. -.395"). This error appears on the form transmitted from the pipe stress group to the pipe support group for use in the design.	X			X	X		X			X
PS-12-01	The allowables for a "PUH" style U-bolt were used in the design calculation. The bill of materials calls out a "PUS" style U-bolt.	X			X	X		X			X
CTS-00-01	Self-weight excitation due to the weight of the support was not considered in the tray support design.	X			X		X	X			X

PHASE 2 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
CTS-00-02	Gibbs & Hill performed the calculation of total resultants for component loads as follows: a. For anchor bolts, Gibbs & Hill included the dead load in the square root of the sum of the squares (SRSS) combination of component seismic forces. This resultant is 9% less than the actual combination where the dead load effects are added absolutely to the SRSS of the seismic forces. b. Combined component member loads were calculated from static and dynamic loads (i.e., dead, live and seismic) using the algebraic summation method for the following cable tray supports: Standard Details A_i, B_i, C_i, and D_i (where i = 1 to 5, depending on the number of tray levels), details A, B, C, and D of drawing no. 2323-E1-0601-01-S, which are based on Standard Detail D_i, and Standard Details 4, 5 and 7. Further review has disclosed that component loads were combined to obtain the worst case loading using the algebraic summation.	X			X		X	X			X

PHASE 2		Classification						To Be Changed			
		Valid		Potential Finding		Closed		Probable Cause		Resolution	
Observation No.	Description	Y	N	Y	N	Y	N	Y	N	Y	N
CTS-00-03	In the review of cable tray support calculations, Cygna discovered the following deficiency in the modeling assumptions for frame analyses: Cable tray Standard Details A_i, B_i, C_i and D_i, where i = 1 to 5 depending on the number of tray levels, and Details A, B, C and D on Gibbs & Hill drawing 2323-E1-0601-01-S which are based on Standard Detail D_i, are modeled as plane frames. Two basic configurations are analyzed. The first configuration consists of two vertical members, called hangers, connected by horizontal members, called beams, which support the cable trays. This configuration is typical for Standard Details A_i, B_i and C_i. The second configuration consists of one vertical hanger and one to four beams which are attached to the hanger at one end and a concrete surface at the other. This second case it typical of Standard Detail D_i and the related Details A, B, C and D. All anchorage points were modeled as pinned in the plane of the frame. End connections consisting of angles anchored to concrete by either one or two bolts were modeled as hinges in the cable tray support frame analysis. The assumption of a fixed joint is more appropriate considering the rigidity of the base angle connection.	X			X	X			X	X	

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
CTS-00-04	Cable tray Standard Details A_i, B_i, C_i and D_i, where i = 1 to 5, depending on the number of tray levels, Details A, B, C and D on Gibbs & Hill drawing 2323-E1-0601-01-S which are based on Standard Detail D_i, and and Standard Details 4, 5 and 7 were modeled as plane frames. Frame analysis and design were based upon a single ratio of height to width, whereas the ratio varies over the range of frames installed. Tray loads were placed in various directions in an attempt to simulate the worst case combination for the frame members. For Standard Detail D_i and Details A, B, C and D, an analysis of the base plate/angle and the anchor bolts included only loads with the largest acceleration factors. The above analysis procedures are deficient for the following reasons: 1. Selection of height to width ratio for the frames does not provide a proper insight into the behavior of all frame members when the ratio varies over such a wide range. For example, the hangers (vertical members) would be subject to larger bending stresses when the ratio is low.	X			X		X		X	X	

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
	2. The use of loads with the largest acceleration values in the analysis of the base plate/angle and anchor bolt system is unconservative it precludes the possibility of vertical loads being directed upward, i.e. opposite gravity. The imposition of upward forces on one beam and downward forces on an adjacent beam coupled appropriately with other forces could result in anchor bolts with higher loads than as originally calculated. Further review disclosed that the worst case aspect ratio was used in the analysis. Also due to the magnitude of the maximum possible vertical seismic acceleration opposite gravity (1.0 g) no vertical acceleration opposite gravity is possible. Therefore, no upward forces can exist.										
CTS-00-05	The anchor bolts, base plate/angle and channel of cantilever support Detail "E" were originally designed as two-way restraints to resist axial loads on the channel and moments about its major axis. In order to use Detail "E" on a cable tray riser, where it must act as a three-way restraint, the channel section was modified to resist moments about its weak axis. The ability of this configuration to function as intended, i.e., to also resist moments about the weak axis, could not be guaranteed since the anchor bolts and the base plate/angle were not evaluated for such a load.	X			X		X	X		X	

ATTACHMENT A

Observation Log

1/25/85

PHASE 2 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
CTS-00-06	The analysis and design of Details A, B, C and D on Gibbs & Hill drawing 2323-E1-0601-01-S was based upon the analysis and design of Standard Detail D_i, where i = 1 to 5 depending on the number of tray levels. The orientation of the major axis of the C6 x 8.2 section, used as a hanger for both support series, differs by 90 degrees. The major axis for Standard Detail D_i is out of the plane of the frame while for Details A, B, C and D it is in the plane of the frame. As a consequence, Details A, B, C and D are more flexible than Standard Details D_i. This was not considered in the analysis. In addition the changes in the design of the beam connections to the hanger were not evaluated.	X			X		X		X	X	
CTS-00-07	Details A, B, C and D on Gibbs & Hill drawing 2323-E1-0601-01-S utilize base plates with concrete expansion anchor bolts to attach the beam members to vertical concrete surfaces. In the initial base plate analysis, the plate was evaluated as a pinned-pinned beam. The resulting plate stresses exceeded allowables. A second check of plate stresses was made, assuming that the plate acted as a fixed-fixed beam. The calculated stresses were then found to be acceptable. The use of a fixed-fixed assumption is not necessarily representative of the actual situation.	X			X		X	X		X	

Observation Log

1/25/85

PHASE 2

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
CTS-00-08 (PFR-01)	The cumulative effect of the following analysis techniques and/or procedures may have a potential impact on plant safety:	X		X			X	X			X

Observation No.	Description	Checklist No.
CTS-00-01	Neglect of self-weight excitation of Cable Tray Support.	CTS-11, -13, -24, -25, -32, -33, -34, -35, -37, -38, -39
CTS-00-02	Improper load combination by the SRSS method	All
CTS-00-03	Errors in computer modeling a rigid one- or two-bolt base angle as a pinned rather than a fixed connection.	CTS-2, -3, -10, -11, -13, -24, -25, -26, -27, -28, -29, -30, -32, -33, -34, -35, -36, -37, -38, -39
CTS-00-05	Cantilever member with a two-bolt base connection used as a three-way restraint.	CTS-6, -14, -15, -16, -17, -18, -19 -20, -21, -22
CTS-00-06	Improper extraplolation of generic design to a specific detail.	CTS-11, -13,
CTS-00-07	Unconservative assumption for base plate behavior.	CTS-11, -13

ATTACHMENT A

Observation Log

1/25/85

PHASE 2 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
WD-01-01	The upper locknut on the strut for pipe support SF-X-001-015-F43R is not tightened.	X			X	X			X		X
WD-02-01	The gap between the clamp on support SF-X-007-014-F43R and the strut on support SF-X-003-003-F43K varies from 1/4" to 7/16".	X			X	X			X		X
WD-02-02	The following snubbers were installed 180° from the configuration shown on the support drawings: 1) SF-X-003-003-F43K 2) SF-X-003-005-F43K 3) SF-X-003-006-F43K 4) SF-X-005-017-F43K	X			X	X		X			X
WD-03-01	The gap between the pipe and the structural steel for restraint SF-X-033-007-F43R is 0" and 1" in the unrestrained direction. The support drawing indicates a required gap of 1/2" on both sides of the pipe in that direction.		X		X	X			X		X
WD-07-01	The spent fuel pool cooling pump is single grounded.		X		X	X			X		X
WD-07-02	Temperature indicator X-TI-4837 was not installed.	X			X	X			X		X
WD-07-03	Of the six conduits checked, one instance was found where the Cable and Raceway Schedule identified the conduit between Spent Fuel Cooling Panel XLV-06 and T130FCZ33 as C-03015123-2. The installation and routing drawing identified this as Conduit No. C-13015123.	X			X	X			X		X

PHASE 3 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PI-00-01	The review of the pipe stress analyses identified the following items related to Stress Intensification Factors (SIFs): 1.1 Main Steam Inside Containment (Stress Problems AB-1-1 through AB-1-4) 1.1.1 No SIF was input for the butt welds at the containment penetration tapered transition joints (TTJs). 1.2 Main Steam Outside Containment (Stress Problems AB-1-23A through AB-1-23D) 1.2.1 In stress problems AB-1-23A and AB-1-23D, an SIF of 1.0 was used at the run location of the 32 x 4 sweepolet. The correct value is 1.5. 1.2.2 The SIF at the weld end connection (Stress Problem AB-1-23C) to piece no. 9 (8" valve) was 1.4, whereas the correct value is 1.59. 1.2.3 For problem AB-1-23D, no SIF was considered at the connection between the sweepolet and 6" safety valve. A value of 1.5 for a TTJ is appropriate.	X			X	X		X			X

PHASE 3 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
	1.3 Component Cooling Water (Stress Problem AB-1-061A)										
	1.3.1 The SIF input for one reducing elbow was 2.9 (using 18" sectional properties) at nodes 20-21; for an identical elbow at nodes 2-3, the SIF was 4.3 (using 24" properties).										
	1.3.2 The SIF for the weldolets at nodes 105 and 125 on the run pipe used a later Code than the Code of Record. There is no documentation showing the later Code is acceptable and that all related conditions have been met.										
PI-00-02	The stress evaluation of the break exclusion zones for the Main Steam piping outside containment does not consider the effects of the welded attachments when comparing stresses to $0.8 \times (1.2S_h + S_a)$.	X			X	X		X			X
PI-00-03	The seismic analyses of the Main Steam piping outside Containment used response spectra curves at 2% and 3% damping for 1/2 SSE and SSE, respectively. The modal analyses for these systems show that the primary response is located in the 8" relief lines. This size piping requires the use of curves at 1% and 2% damping.	X			X	X		X			X

PHASE 3

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PI-00-04	The weight of water and insulation (if applicable) was not added to vendor supplied valve and/or flange weights before input to the stress analysis.	X			X	X		X			X
PI-00-05 (PFR-01)	Review of the seismic analyses for the nine systems identified the following percentage of mass participation for each calculation:	X		X			X	X			X

Prob. No.	Mass Participation (%) X	Y	Z
AB-1-1	85	63	66
AB-1-2	81	91	76
AB-1-3	85	92	82
AB-1-4	87	88	70
AB-1-23A	36	0	89
AB-1-23B	50	0	80
AB-1-23C	67	4	92
AB-1-23D	29	0	83
AB-1-61A	51	18	21

G&H does not perform any additional analyses or calculations to ensure that the inclusion of additional modes does not significantly increase the response of the piping system and result in higher pipe stresses and support loads.

Observation Log

1/25/85

PHASE 3

Observation No.	Description	Classification						To Be Changed			
		Valid		Potential Finding		Closed		Probable Cause		Resolution	
		Y	N	Y	N	Y	N	Y	N	Y	N
PI-00-06	Cygna's review of the pipe support calculations for the main steam inside containment revealed that in numerous instances the support loads used in design did not match the values obtained by examining the computer output.	X			X	X			X		X
PI-00-07 (PFR-02)	The Fisher Main Steam relief valves have not been qualified for the as-built loads on the snubbers attached to the actuator.	X		X		X			X		X
PI-06-01	The review of Gibbs & Hill stress problem no. AB-1-23B revealed that the combined effects of supports MS-1-240-001-S72K and MS-1-240-002-S72K were not considered in the local stress evaluation for welded attachments. Both of these supports are attached to the same trunnion.	X			X	X		X			X
PI-06-02	The emergency/faulted load combinations for G&H problem no. AB-1-23B do not include the loads and stresses due to safety valve thrust loading.		X		X	X		X			X
PI-09-01	The review of the Component Cooling Water system revealed that no mass point was input between two same-direction supports for two spans (nodes 10 and 6; nodes 50 and 47) in the seismic analyses.	X			X		X	X		X	

PHASE 3

Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PS-01	The design calculation for Main Steam support MS-1-001-006-C72K contains the following input errors in the STRUDL computer analysis model. 1.1 The moment of inertia and section modulus for members 5 and 6 and members 8 to 11 are incorrect. Member: 5 & 6 — Correct Value: Iy = 359.9, Su = 71.9 — Input in STRUDL: Iy = 681.5, Sy = 136.3 Member: 8 to 11 — Correct Value: Iy = 642.7, Sy = 107.2 — Input in STRUDL: Iy = 1213.1, Sy = 202.1 1.2 The assumption of a fixed support at joints 4, 8, 14 and 17 is not appropriate for rotation about the vertical axis. 1.3 The input data calculations for the STRUDL model were not checked or approved.	X			X	X		X			X
PS-02	The stability of two Main Steam supports is maintained by providing horizontal "bumper" frame members to limit the support horizontal movement to approximately 1/8". There was no derivation of design load for these "bumper" frame members, nor were there any design calculations. The remainder of the support was designed properly.	X			X		X	X		X	

ATTACHMENT A

Observation Log

1/25/85

PHASE 3 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PS-03	When a pipe is rigidly attached to the trapeze beam by cinching up a U-bolt, the designers do not consider the effects of pipe rotation. In standard designs, the U-bolt is not tightened, which permits the pipe to rotate freely. Similarly, when two trunnions or a riser clamp are used to allow installation of two snubbers or struts, the designs do not consider the rotational effect on load distribution.	X			X		X		X		X
PS-04	The fillet weld size specified on the following drawings is smaller than the minimum fillet weld size required by the ASME B&PV Code: Support CC-1-028-725-S33R, fillet weld between items 1 and 4. Support CC-1-031-009-S33R, fillet weld at support nodes 6 and 11.	X			X	X			X		X
PS-05	In checking 3-sided welds (" ["), the designers do not transfer the loads on the member from its center of gravity to the center of rigidity of the weld.	X			X	X			X		X
PS-06	The bearing connection, in which the tubesteel is both welded to an embedded plate and bolted to the concrete, was not designed assuming the welds must resist the total shear load.	X			X		X	X		X	

ATTACHMENT A

Observation Log

1/25/85

PHASE 3 Observation No.	Description	Classification: Valid Y	Valid N	Potential Finding Y	Potential Finding N	Closed Y	Closed N	To Be Changed: Probable Cause Y	Probable Cause N	Resolution Y	Resolution N
PS-07	For certain Main Steam supports in which cover plates are welded to structural tube steel to form a composite section, the weld design method is incorrect. In some cases where a concentrated load is applied to the composite beam (e.g., where the rear bracket is attached), the local tensile stress is not included in the weld stress calculation. This local tensile stress may be a significant weld stress component.	X			X	X		X			X
PS-08	In supports designed by the CPSES Pipe Support Engineering (PSE) organization, loads due to friction are neglected if the piping thermal movement is less than 1/16".		X		X	X			X		X
DC-01-01	A review of 367 unsatisfactory Inspection Reports (IRs) at Comanche Peak Steam Electric Station identified that Inspection Report Nos. BP-00258, BP-00341 and ME-25096 were filed in the Permanent Plant Record Vault (PPRV) without evidence of closure.	X			X	X			X		X
DC-01-02	Objective evidence could not be found indicating that TUGCO had received corrective action responses to audit findings 2 and 3 from TUGCO Audit TCP-47.	X			X	X			X		X
DC-01-03	Objective evidence could not be found indicating the status of corrective action for the audit findings reported in TUGCO audit reports TCP-18, TCP-32, TCP-43, TCP-47, TCP-49, and TCP-70.	X			X	X		X			X
DC-02-01	Evidence was not found indicating that G&H had performed surveillance activities between 1973 and 1977 as required.	X			X	X		X			X

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Observation No.	Description	Classification						To Be Changed			
		Valid		Potential Finding		Closed		Probable Cause		Resolution	
		Y	N	Y	N	Y	N	Y	N	Y	N
PHASE 3											
DC-02-02	G&H Management Review Evaluation Reports could not be found for 1974 through 1976.	X			X	X		X			X
DC-02-03	Evidence was not available indicating that G&H verified corrective actions to G&H Audit No. 9, Finding No. 5A.	X			X	X			X		X
DC-02-04	Evaluations of G&H designated design reviewers were not performed on an annual basis by the G&H Chief Engineer.	X			X	X			X		X

1. Pipe Stress (Phase 2, 3 and 4)

In the pipe stress area, Cygna has reviewed the observations and conclusions from Phases 1, 2 and 3. In addition, Cygna has considered the Phase 4 review scope (Problem AB-1-60), in which no additional issues were identified. Cygna's present assessment of overall technical adequacy assumes the successful completion of the Mass Participation/Mass Point Spacing Study. In particular, Gibbs & Hill must show that they have considered the effects on:

- Valve acceleration generic study
- Flange loads generic study
- Welded attachments in break exclusion zones
- Welded attachments in general
- Areas with stress intensification factor errors as noted in Phase 3 Observation PI-00-01
- Functional capability for stainless steel elbows

Cygna is reassessing the probable cause and resolution for each observation as part of the cumulative effects evaluation across all phases. The observations which are likely to be revised are shown in Attachment A. In the case of the pipe stress observations, only PI-00-03 (Phase 2 - Mass Participation) and PI-09-01 (Phase 3 - Mass Point Spacing) have been opened due to our present knowledge gained from the Mass Participation Study. Otherwise, none of the technical resolutions have changed on any individual observations taken by themselves. That is, those which were closed remain closed from a technical basis. Cygna is now, however, reassessing the cumulative impact of each observation for both overall quality assurance implications and overall technical adequacy of the piping. As stated above, a cumulative technical assessment must wait for the final Mass Participation/Mass Point Study results. In addition, any conclusions regarding appropriate stress analysis procedures and implementation of procedures must be reassessed in light of the complete Phase 1 through 4 reviews.

2. Pipe Supports (Pase 2, 3 and 4)

As in the pipe stress area, Cygna has reviewed the pipe support observations from Phases 1, 2 and 3 and assessed our position on each resolution. As noted in the original Phase 3 conclusions, the nature of pipe support design is such that cumulative effect of individual errors is easier to trace within each support, since each support is a design unto itself. In the support area, however, there remains a number of open issues, identified in the Phase 3 final report, which have not been closed. These issues are generic in nature and consist of:

- Stability of support components (item "e" in Section 5.2 of the Phase 3 report)
- Use of a 50/50 load split for double struts/snubbers (item "f" in Section 5.2 of the Phase 3 report)
- Use of U-bolts as clamping devices (item "g" in Section 5.2 of the Phase 3 report)

In addition to the above items, Cygna realizes that the results of the Gibbs & Hill Mass Participation/Mass Point Spacing study must be considered in any reassessment of support adequacy. Also, as noted in our letter 84042.022 dated January 18, 1985, there are additional issues, such as Phase 3 Observation PS-06, which have been reopened as a result of Cygna's overall assessment of the Phase 1 through 4 results. With the above in mind, Cygna has reviewed each observation in Phase 1 through 3 and has determined that the status of each individual observation, except Observation PS-02 and PS-06 in Phase 3, remains as shown in the current revision to the observations. That is, those which were closed remain closed. This status, however, is only for each observation taken by itself. The cumulative impact of all the observations on design quality assurance and overall adequacy can be assessed only when all open items are satisfactorily resolved. At this time, Cygna has insufficient data to make such an assessment of the overall technical adequacy; we are beginning to assess the design quality assurance ramifications with the data we presently have from the 226 supports reviewed in Phase 2 through 4.

3. Cable Tray/Conduit Supports (Phase 2 and 4)

Cygna reviewed cable tray support design as part of the Phase 2 work scope and is currently reviewing both cable tray and conduit support designs as part of the Phase 4 work scope. As a result of the Phase 4 reviews, Cygna is withdrawing all Phase 2 conclusions for both technical adequacy and design quality assurance of cable tray support design.

4. Equipment Qualification (Phase 2)

As part of Phase 2 of the CPSES IAP, Cygna performed an assessment of the equipment qualification procedures as implemented by Westinghouse. This review did not result in any observations. The scope of Phase 3 and 4 did not include any further reviews in this area and thus Cygna has found no cause to change any of the conclusions presented in the Phase 2 report regarding equipment qualification.

5. Electrical/I&C (Phase 2 and 4)

The Phase 2 review in the electrical area assessed both the adequacy of the design documents as well as the design calculations performed by Gibbs & Hill. No observations were identified as a result of this review. As part of the Phase 4 effort, a similar review was performed for a different system. This Phase 4 review has not resulted in any additional information which would cause Cygna to alter the conclusions presented in the Phase 2 report regarding the electrical design at CPSES.

6. Mechanical Systems (Phase 4)

The scope of Phases 1, 2 and 3 of the CPSES IAP did not include any reviews in the mechanical systems area. An assessment of this discipline was performed as part of Phase 4 and will be discussed in the final report for that scope of work.

7. Walkdown (Phase 1 and 4)

Cygna performed a walkdown of the Spent Fuel Pool Cooling System during the Phase 1 review. This was not the same system that was used in the Phase 2 design review, so Cygna could not draw conclusions concerning the match up between design calculations/assumptions and the actual construction. In Phase 4, Cygna is performing such a review on the Component Cooling Water System. However, that review has not brought out any concerns which alter the conclusions of each individual Phase 2 observation. As with the other disciplines, Cygna is now assessing the cumulative impact of the Phase 2 observations along with Phase 4 and will make its findings known as part of the Phase 4 report.

8. Design Change Control (Phase 1)

During the Phase 1 review, Cygna assessed the design change control systems and its implementation on the Comanche Peak Project. Several problems were identified with the document control logs and the method of controlled distribution. TUGCO has addressed these problems through their implementation of a more effective satellite document control system. After summarizing the technical findings from all phases, Cygna will assess whether any design impact may have resulted from any breakdowns in the old document control system. This judgement will be based on the adequacy of the designs within Cygna's technical review scope.

9. Design Analysis Control (Phase 2)

For the Phase 2 design analysis control evaluation, Cygna focused its activities on the Gibbs & Hill design of the Residual Heat Removal System - Train B. The calculations within the review scope included two pipe stress problems, some electrical calculations and some cable tray support calculations. These evaluations were performed at the Gibbs & Hill offices both in New York and at the Comanche Peak job site. Using checklists, the Cygna personnel reviewed calculations, computer programs and their references to ensure that the procedures noted in the program review had been implemented. The results of this review are documented in checklists DC-02-08 through DC-02-12. Any deficiencies found were considered to be minor with no resulting design impact or programmatic implications. Given the considerably larger sample of Gibbs & Hill calculations reviewed in Phase 3 and 4, Cygna is assessing whether or not the Phase 2 conclusions are still valid for the Gibbs & Hill organization. In addition, Cygna is reviewing the Phase 1 through 4 technical results to assess the effectiveness of the iterative design process at CPSES.

10. Interface Control (Phase 1)

As part of the Phase 1 review scope, Cygna performed an interface control implementation evaluation for TUGCO and Gibbs & Hill. The interface control activities by Texas Utilities and Gibbs & Hill were found to be effective, with no observations identified. Further evidence of proper interface control was established by the Cygna technical reviews. This was exhibited by the accurate transfer of design data between groups. An example of this was found in Cygna's verification that the pipe stress analysts used the appropriate pressures and temperatures which were generated by a different discipline. Two Phase 3 observations, PI-00-06 and PI-00-07, and some of the Phase 4 yet unpublished observations may be indications of some weaknesses in TUGCO's interface control system. Cygna will evaluate these technical findings for programmatic implications and will provide the results as part of the Phase 4 conclusions.

11. Criterion I, Organizational Control (Phase 3)

The Phase 3 reviews concluded that the ANSI N45.2.11 requirements for organizational structure, responsibility and independence were satisfactorily implemented by TUGCO, Gibbs & Hill, NPSI and ITT Grinnell. Cygna finds that these conclusions are still valid at this time.

12. Criterion XVI, Corrective Action (Phase 3)

As part of the Phase 3 review, Cygna performed an assessment of the Corrective Action System as it pertains to design. Cygna did not identify any significant breakdowns in the program as a result of this review. However, whatever conclusions Cygna reaches on the effectiveness of the iterative design process may impact previous conclusions on the Corrective Action System.

13. Design Verification Control (Phase 4)

Cygna has conducted an implementation evaluation of design verification control systems used by TUGCO and Gibbs & Hill as part of the Phase 4 review. Cygna will comment on the effectiveness of the verification activities on the Comanche Peak Project in the Phase 4 final report.

14. Design Input Control (Phase 4)

Cygna has conducted an implementation evaluation of design input control systems used by TUGCO and Gibbs & Hill as part of the Phase 4 review. Cygna will comment on the effectiveness of the systems established within these organizations in the Phase 4 final report.