

ORGANIZATION: GIBBS & HILL, INC.
NEW YORK, NEW YORK

REPORT NO.:	99900524/82-02	INSPECTION DATE(S)	6/21-25/82	INSPECTION ON-SITE HOURS:	36
CORRESPONDENCE ADDRESS: Gibbs & Hill, Inc. ATTN: Mr. P. P. DeRienzo, Vice President Quality Assurance 393 Seventh Avenue New York, New York 10011					
ORGANIZATIONAL CONTACT: Mr. N. N. Keddis, QA Manager TELEPHONE NUMBER: (212) 760-5450					
PRINCIPAL PRODUCT: Architect Engineering and Consulting Services					
NUCLEAR INDUSTRY ACTIVITY: The total effort committed to domestic nuclear design activities is approximately 23% of the 2,000 employees of Gibbs & Hill, Inc., at their New York facilities. Major projects include the design of Comanche Peak, Units 1 and 2; Three Mile Island, Unit 1, FSAR update; Beaver Valley, Unit 1, equipment update; and Bellefonte, Unit 1, design studies.					
ASSIGNED INSPECTOR: <u>J. Barnes</u> for D. F. Fox, Reactor Systems Section (RSS)				<u>8/19/82</u> Date	
OTHER INSPECTOR(S):					
APPROVED BY: <u>J. Barnes</u> for C. J. Hale, Chief, RSS				<u>8/19/82</u> Date	
INSPECTION BASES AND SCOPE:					
A. BASES: 10 CFR Part 50, Appendix B and Gibbs & Hill (G&H) Topical Report GIBSAR-17-A.					
B. SCOPE: Inspection of computer codes and a continuation of inspection of items identified for followup during earlier inspections.					
PLANT SITE APPLICABILITY: Comanche Peak Steam Electric Station, Units 1 and 2, Dockets 50-443 and 50-446; Fort Calhoun, Unit 1, Docket 50-285.					

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DESIGNATED ORIGINAL
Certified By Rheanne Smith

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A. VIOLATIONS.

None

B. NONCONFORMANCES:

1. Contrary to the G&H Topical Report and implementing procedure EDP-10, F-736 forms "Request for Data Processing Service or Equipment" were not initiated, reviewed, approved, and distributed for the development of computer programs DLFPW and PDROP version 1, nor for the modification of PDROP, version 1 to version 2.
2. Contrary to the G&H Topical Report and implementing procedure EDP-10, the required "final check" of computer code program descriptions did not ensure that they were accurate descriptions of the official copy of the programs CONVERT, CISRS, and DLFPW in that:
 - a. The independent program review by the cognizant engineer did not assure that the documentation was complete for computer program CONVERT in that the required program description did not exist; and
 - b. The program descriptions for computer programs CISRS and DLFPW did not show the methods, assumptions, and equations used to model the physical system as required.
3. Contrary to the G&H Topical Report and implementing procedure EDP-10, computer program verification was not documented, acknowledged, nor maintained in a permanent file as evidenced by the nonexistence of Computer Program Verification Forms for the CRRS (No. 6025) and the CREED (No. 3037) programs, both of which are listed in the "G&H (Computer) Program Catalog" dated June 11, 1982, and included in the "List of Computer Programs Used on CPSES" dated December 17, 1981.
4. Contrary to the G&H Topical Report and committed ANSI N45.2.11-1974, procedures did not exist, and therefore, were not employed, for:
 - (1) identifying design inputs in computer code program descriptions;
 - (2) approving, releasing, distributing, and revising program descriptions;
 - (3) identifying, maintaining, and retaining program descriptions,

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source listings, and computer test problem input and output data with the status of a quality assurance record; (4) controlling changes to computer codes; (5) taking corrective action when a significant deficiency is detected in a computer code; and (6) making computer code experience reports available to cognizant design personnel.

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Inspection of Computer Codes - The G&H Topical Report and implementing procedures were reviewed to determine the commitments and requirements relative to the development, control, and utilization of digital computer codes developed by G&H, or supplied to G&H by a vendor, that are used in the design or analysis of safety-related structures, systems, and components.

Requests for data processing service or equipment, program descriptions, source coding (program listings), job control cards, sample inputs to computer runs and their corresponding outputs, test problems, code validation/certification data, computer program verification forms and records, and other documentation related to the following computer codes were reviewed to verify implementation of commitments and requirements:

- a. CONVERT (No. 3910) - Extracts a finite element wall or floor, or creates a contour file, from NASTRAN (No. 3030) files;
- b. CISRS (No. 5024, version 2) generates the envelope of multiple seismic response spectra for input to ADLPIPE (No. 5017);
- c. DLFWP (No. 3213) - Calculate dynamic load factors from displacement response spectra;
- d. PDROP (No. 5002, version 1 and 2) - Calculates pressure drops resulting from fluid flow in piping systems;

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<ul style="list-style-type: none">e. ENVELOP (No. 3108) - Envelops the results obtained from SCONV (No. 3075), TIME (No. 3110) and DYNRE5/STARDINE (No. 3224) programs;f. RCFRAM (No. 3222) - Performs a reinforced concrete design for a frame-shear wall structure;g. CRRS (No. 6025) - Routes and schedules cables for a power plant; andh. CREED (No. 3037) - Computes environmental and control room doses from radiation sources.		
<p>The inspector noted that G&H appointed a task force in January 1982 to implement the recommendations generated by the (December) 1981 "QA Program Management Review." The purpose of the task force" is to make operational an improved computer usage control system which will incorporate computer software and hardware security features as well as administrative procedures to assure use of only suitably verified programs." The task force reported that all CPSES programs have been, or will be, verified by May 21, 1982. The CREED Program was reported as being verified and the CRRS program was identified for verification by May 21, 1981, neither of which were verified prior to the NRC inspection. A draft revision of procedure EDP-10 was generated for review and comment. The draft proposes to implement additional administrative and software controls to provide additional assurance against unauthorized modification/use of approved and verified computer programs.</p>		
<p>Four nonconformances were identified in this area of the inspection (see B above).</p>		
<p>2. Followup inspection of a design change control inspection (81-03) to determine if the anomalies noted in the Design Change Authorization Master Index and nonavailability of certain Design Change Authorizations (DCAs), and Design Engineering/Change Deviations (DE/CDs).</p>		
<p>G&H reviewed the Design Change Authorization Master Index and all issued DCAs and DE/CDs for congruency. All needed additions, deletions, and changes have been identified and appropriate corrective action taken.</p>		
<p>3. Followup inspection of a 10 CFR Part 21 report inspection (82-01) to determine the status of actions taken by G&H to correct design defects in the tornado venting systems for Comanche Peak Steam Electric System (CPSES), Units 1 and 2.</p>		

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G&H determined that the following design changes were required to assure that the pressure differential across interior walls, doors, glass panels, electrical equipment cabinets, etc., would not exceed design allowable during a design basis tornado (DBT). Further, additional tornado vents were added in the control room and certain contiguous equipment rooms dampers installed in certain HVAC ducts; replaced selected ceiling tiles in the control room with louvered vents; deleted doors or used open wire mesh in doors that are not needed for fire containment; and required that certain vital interior doors be equipped with latching mechanisms to maintain them in the requisite open or closed position. The needed design changes have been identified in five issued DCAs. Equipment specifications and purchase orders for the additional vents and dampers have been issued and four of the seven affected drawings have already been revised. The remaining three are scheduled for revision by the third quarter of 1982.

4. Followup inspection of a design inspection (82-01) to determine the status of actions taken by G&H to mitigate the consequences of environmental conditions exceeding design allowables in the event of a postulated rupture in certain fluid system piping outside containment.

G&H determined by analysis that certain design changes may be required to mitigate the adverse excursions in compartment temperature and pressure that could result from postulated ruptures in the residual heat removal system, the chemical volume and control system, the auxiliary steam system, the steam generator blowdown system, and the main steam to auxiliary feedwater pump system.

Preliminary studies by G&H indicate that the compartment pressures could be prevented from exceeding design allowable, and the compartment temperatures prevented from exceeding that for which the safety related equipment in the affected compartments is environmentally qualified, by installing temperature, pressure, and/or flow sensors in affected compartments and installing high speed motor operators to automatically close existing manual valves, or slow operating motor operated valves, in the event of a line break. Closing the valves within 10 to 20 seconds after the line break is detected is intended to reduce the total quantity of fluid, and thus the enthalpy, discharged from the ruptured pipe, thus reducing the maximum temperature and pressure experienced within the affected compartments.

This item will be inspected further during subsequent inspections.

DOCUMENTS EXAMINED

VALIDATION OF COMPUTER CODES

1	2	TITLE/SUBJECT	3	4
1	6	F.W. Gettler to K.L. Scheppele - 1981 Mgmt. Review of QA Programs	12-28-81	NA
2	6	K.L.S. to R.B. Gordon - Appoints Computer Usage/Control Task Force	12-30-81	NA
3	6	FWG to KLS - Status report on Computer Usage Control Systems	4-15-82	NA
4	6	M.A. Viviarzo, E.P. DeLorenzo, N.V. Keddus to KLS - First Quarterly Report ^{CUCS}	4-14-82	NA
5	8	CONVERT - 3910; F736 Form; Request for Data Processing Service of ^{Equipment}	6-12-80	NA
6	4	GIBSAR - 17-A, G+H QA Program, Appendix A (RG 1.64, 82); Sect. 2 ^{Computer} (Codes)	June 1981	5
7	3	QAII - B4.2; "Analysis & Calculations Procedure - Structural and ^{Special Analysis Departments}	Nov. 1981	3
8	3	QAII - D; "Engineering and Design Verification Procedure"	Nov. 1981	3
9	3	EDP - 10; "Control of Development of Computer Programs"	June 1980	2
10	3	EDP - 10; "Control of Development of Computer Programs"	Draft	Draft R3
11	8	List of Computer Programs (G+H)/Gibbs Hill Program Catalog	6-11-82	Current
12	8	G+H Program Summary	6-11-82	Current
13	8	CONVERT - NASTRAN POST PROCESSOR - 3910	6-21-82	1
14	8	CISRS - ^{Rev 1} Rev 2 - Composite Instructure ^{Specimen} Requests - 5024	1-4-82 2-1-82	1 2
15	8	DLFPW - ^{orig=1} - DYNAMIC LOAD FACTOR CALCULATOR - 3213	2-19-82	1
16	8	PDRDP - ^{Rev 1} Rev 2 - PRESSURE DAPP CALCULATOR - 5002	3-24-81 6-30-81	1 2
17	8	List of Computer Programs USED ON CPSES - ATTACHMENT A TO 21094AVIS	12-17-81	NA
18	8	SHOCK ^{Rev 1} Rev 2 - RELAP4/MS POST PROCESSOR - 5200	5-4-81 12-10-81	1 2

Document Types:

- 1. Drawing
- 2. Specification
- 3. Procedure
- 4. QA Manual
- 5. Purchas Order
- 6. Internal Memo
- 7. Letter
- 8. Other (Specify-if necessary)

Columns:

- 1. Sequential Item Number
- 2. Type of Document
- 3. Date of Document
- 4. Revision (If applicable)

Scope/Module Design Inspection

DOCUMENTS EXAMINED

Validation of Computer Codes

1	2	TITLE/SUBJECT	3	4
19	8	Rev 1 2 3 PIPERUP - NONLINEAR PLASTIC-ELASTIC PIPING SYSTEM ANALYSIS 5150 DYNRES/STARDINE	3-13-80 4-3-80 8-6-80	1 2 3
20	8	ENVELOP - ENVELOPES RESULTS FROM SCONV, TIME & 3108	2-1-82	1
21	8	KPOSTA - Post Processor of KALVIN SHELL Analysis A 3096 Output	9-27-79	1
22	8	RCFRAM - REINFORCED CONCRETE DESIGN 3222	2-16-82	1
23	8	SPECTRA - RESPONSE SPECTRA COEFFICIENT GENERATOR 3112	9-27-79	1
24	8	TIME - FLOOR RESPONSE SPECTRA GENERATOR 3110	9-27-79	1
25	8	Rev 1 2 3 4 COMPARE - SUBCOMPARTMENT TRANSIENT PRESSURE ANALYSIS 5513	10-1-81 10-6-81 1-4-82 2-8-82 2-22-82	1 2 3 4 5
26	8	CRRS - ROUTE & SCHEDULE ELECTRICAL CABLES 6025	UNVERIFIED	1
27	8	CRED - ENVIRONMENTAL AND CLIMATE ROOM DOSE CALCULATOR RADIATION 3037	UNVERIFIED	1
28	8	SPLIT - PRE PROCESSOR FOR CONTEMPT INPL 5207	5-15-81	1

Document Types:

- 1. Drawing
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- 3. Procedure
- 4. QA Manual
- 5. Purchas Order
- 6. Internal Memo
- 7. Letter
- 8. Other (Specify-if necessary)

Columns:

- 1. Sequential Item Number
- 2. Type of Document
- 3. Date of Document
- 4. Revision (If applicable)

Scope/Module FOLLOWUP OF
PREVIOUS DESIGN INSPECTIONSDOCUMENTS EXAMINED

1	2	TITLE/SUBJECT	3	4
1	9	512-1 "TORNADO VENTILATION ANALYSIS"	6-13-77	1
2	9	512-5 "TORNADO VENTILATION ANALYSIS"	NOT YET ISSUED	0
3	9	512 "CPSES CONTROL ROOM TORNADO VENTILATION ANALYSIS"	4-10-79	0
4	9	512-2 "CPSES CONTROL ROOM TORNADO VENTILATION ANALYSIS"	NOT YET ISSUED	1
5	9	512-7 "TORNADO VENTILATION CABINET ANALYSIS"	NOT YET ISSUED	0
6	10	DCA-9,850 (ADD HVAC DAMPERS)	4-15-82	2
7	10	DCA-13,376 (ADD TORNADO VENTS)	6-4-82	0
8	10	DCA-13,603 (ADD EQUIPMENT ROOM)	6-16-82	0
9	10	DCA-13,713 (MODIFY DOOR OPENINGS)	6-22-82	0
10	10	DCA-13,737 (CONTROL ROOM CEILING MODIFICATION)	6-24-82	
11	1	2323-S-0721 AUX. BLD. EL 830'	NOT YET ISSUED	5
12	1	2323-S-0747 AUX. BLD. SECTION + DETAILS	11-28-78	13
13	1	2323-S-0751 AUX. BLD. SECTION + DETAILS	1-25-82	15
14	1	2323-M1-0766 VENTILATION, AUX. BLD	5-12-82	12
15	1	2323-A1-0507 PRIMARY PLANT, AUX., ETC BLDG.	NOT YET ISSUED	9
16	1	2323-A1-0509 PRIMARY PLANT, AUX., ETC BLDG.	11-21-80	11
17	1	2323-A1-0540 DOOR SCHEDULE	NOT YET ISSUED	5
18	2	2323-MS-96 TORNADO VENTS	12-14-78	0
19	2	2323-MS-84 HVAC DAMPERS	10-20-81	1

Document Types:

1. Drawing
2. Specification
3. Procedure
4. QA Manual
5. Purchas Order
6. Internal Memo
7. Letter
8. Other (Specify-If necessary)
9. CALCULATION
10. DESIGN CHANGE AUTHORIZATION

Columns:

1. Sequential Item Number
2. Type of Document
3. Date of Document
4. Revision (If applicable)

