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U. S. Nuclear Regulatory Commission
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South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Fire Hazards Analysis Report, Amendment 13

Pursuant to 10CFR50.71, STP Nuclear Operating Company submits Amendment 13 to the South Texas Project Fire Hazards Analysis Report (FHAR) as Attachment 3. Attachment 2 includes a summary of changes in FHAR Amendment 13 that were made under the provisions of 10CFR50.59.

Copies of the Fire Hazards Analysis Report, Amendment 13 are provided in accordance with the distribution requirements of 10CFR50.4 (b) (1). A copy of this transmittal is attached to each Fire Hazards Analysis Report, Amendment 13.

If you should have any questions on this submittal, please contact Mr. S.M. Head at (361) 972-7136 or me at (361) 972-8757.

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MKJ

Attachment 1: Affidavit

Attachment 2: Fire Hazards Analysis Report, Changes Made under the Provisions of 10CFR50.59

Attachment 3: Fire Hazards Analysis Report, Amendment 13

IE 47

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ATTACHMENT 1

AFFIDAVIT

ATTACHMENT 2

CHANGES MADE UNDER THE PROVISIONS OF 10CFR50.59

Fire Hazards Analysis Report Summary of Changes Made under the Provisions of 10CFR50.59

Chapter 1, "Introduction and Methodology"

1. Designated Resumes as Historical Information.
[Appendix 1A] (CN-2484) {NEI 98-03}

Chapter 3, "Fire Hazards Analysis"

1. Corrected typographical error on Page 3.10-3 and deleted two blank pages.
[3.10.4] (CN-2484) {NEI 98-03}
2. Corrected editorial error in Figure 3-34. (CN-2496)

Chapter 4, "Comparison to 10CFR50 Appendix R and APCS 9.5-1 Appendix"

1. Editorial change to clarify statement regarding frequency of meetings for fire brigade on Page 4.1-23. [Table 4.1] (CN-2318)
2. Corrected typographical error on Page 4.2-14. [Table 4.2] (CN-2484)
{NEI 98-03}

ATTACHMENT 3

SOUTH TEXAS PROJECT FIRE HAZARDS ANALYSIS REPORT

Instruction Sheet for
STP Final Hazards Analysis Report – Amendment 13)

Remove Pages/Figures

Insert Pages

Volume 1

Insert in Front of FHAR Volume 1

FHAR Summary of Changes -
[1 page]
FHAR List of Effective Pages -
[12 pages]

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1A-i

1A-i

1A-1 through 1A-10

1A-1 through 1A-8

Chapter 3

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Figure 3-34

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APPENDIX 1A

RESUMES

HISTORICAL INFORMATION

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STP FHAR

WAYNE VARNELL Reviewed STP FHAR thru Amendment 2

POSITION Engineering Group Leader, Fire Protection

EDUCATION B.S., Nuclear Engineering, Texas A&M University

SUMMARY Present: Engineering Group Leader

1 Year: Senior Mechanical Engineer

2 Years: Area Engineering Supervisor

2 Years: Systems Engineer

3 Years: Mechanical Engineer

1 Year: Mechanical Maintenance Engineer

EXPERIENCE Mr. Varnell has 5 years of design experience in fire protection engineering on nuclear power projects. Mr. Varnell joined Bechtel in April 1982 as an Engineering Group Leader in the Mechanical group. He is responsible for the South Texas Project fire protection and detection system design, and the overall coordination of the fire protection design program. Other responsibilities as Engineering Group Leader include technical direction for system design of a majority of the safe-shutdown systems.

As Senior Mechanical Engineer, with Brown & Root, Mr. Varnell was responsible for providing technical input and direction for reevaluation of the South Texas Project fire hazard analysis for compliance with Appendix R requirements. He was also responsible for providing technical input and coordination of the analysis of the effects on essential plant equipment of postulated high-energy line breaks and postulated missiles.

While at Texas Utilities Services, Mr. Varnell was an area Engineering Supervisor at Comanche Peak Steam Electric Station in Glen Rose, Texas, responsible for upgrade of fire protection and detection systems to meet Appendix R requirements and for revisions to the fire hazard analysis. He was also responsible for performing field "as-built" verification of pipe whip and jet impingement effects on electrical, mechanical, I&C, and HVAC equipment. Also while working for Texas Utilities, Mr. Varnell worked as a Systems Engineer on field assignment at Comanche Peak, responsible for review and approval of plant system flow diagrams. In addition, he provided technical coordination and contract administration for both the Nuclear Steam Supply System (Westinghouse) and the Turbine-Generator (Allis-Chalmers) vendors. As a Mechanical Engineer in the Engineering and Construction offices of Texas Utilities, Mr. Varnell was responsible for the review and approval of Comanche Peak system flow diagrams, composite piping drawings, plumbing drawings, and mechanical design specification.

HISTORICAL INFORMATION

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STP FHAR

JAMES N. CONWAY Reviewed STP FHAR thru Amendment 5

POSITION Corporate Manager of Fire Protection Services, Impell Corp.

EDUCATION B.S., University of Massachusetts

Sodium Technology, Atomics International

Reliability and Productivity Improvement of Electric Power Plants, University of California, Los Angeles

EXPERIENCE As Corporate Manager of Fire Protection Services at Impell Corporation, Mr. Conway has overall corporate responsibility for the program management and technical quality of fire protection-related projects. Recent fire protection programs which Mr. Conway has managed have included fire hazard analyses, Appendix R evaluations, fire protection component qualifications, fire protection audits, NFPA code compliance evaluations, fire protection commitment analysis and fire protection program definition and implementation. Additionally, Mr. Conway managed the development of Impell's two proprietary computer codes, which are Fire Protection Data System (FPDS) and Fire Rated Assemblies Tracking System (FRATS).

Mr. Conway is a registered Fire Protection Engineer and presently Chairman of the American Nuclear Society committee on fire hazard analysis for nuclear power plants. Additionally, he is the Chairman of an American Nuclear Society subcommittee on Fire Hazards Analysis.

Mr. Conway has extensive experience in the management, licensing, and design services for both utility clients and architect-engineers. As a Project Manager, he was recently responsible for the overall direction of various plant modification activities for a large steam-electric power plant including regulatory compliance, engineering and design criteria, and design reviews.

Mr. Conway's experience includes the engineering, design, and construction phases of large power plant projects. He held responsible positions on projects including fossil and nuclear power plants and on developmental projects such as the Clinch River Breeder Reactor Project. His responsibilities included project management, technical direction, cost, and schedule control for a wide range of power plant programs.

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EXPERIENCE
(Continued)

Mr. Conway was responsible for sodium fire protection the Clinch River Breeder Reactor Project for over five years. In this position he developed sodium fire mitigation techniques from concept to the final design. These techniques included sodium catch pans, sodium leak detection, sodium drain systems, inerted compartments, compartment overpressure control, sodium aerosol venting, and the interface with heating, ventilation, and air conditioning systems operation. Additionally he was responsible for sodium fire, leak, and pipe break analysis and is intimately familiar with analysis tools such as SOFIRE, SPRAY-3A, and various atmospheric transport models.

Mr. Conway has been responsible for the engineering and design of mechanical, nuclear, and auxiliary systems for several different nuclear power plant complexes. Mr. Conway has had substantial experience in the design, engineering, and construction of heating, ventilating, and air conditioning and fire protection systems on nuclear power plants.

As a part of his responsibilities, he prepared and reviewed SAR sections and participated in various regulatory meetings and presented formal testimony. Earlier he developed system design descriptions, operational procedures, failure modes and effects analyses, and reliability analyses for turbine plant systems.

PROFESSIONAL

Professional Engineer, State of Pennsylvania

DATA

Mechanical Engineer, Tennessee

Professional Engineer Fire Protection Engineering, State of California

Certified Lead Quality Assurance Auditor (N45.2.23)

PROFESSIONAL

American Society of Mechanical Engineers

AFFILIATIONS

American Nuclear Society

Society of Fire Protection Engineers - member grade

COMMITTEES/

American Nuclear Society, Chairman ANS 59.6 committee,

ADVISORY GROUPS "Fire Hazard Analysis for Nuclear Power Plants"

American Nuclear Society, Vice-Chairman ANS 59.4/ANSI 18.10 committee, "Generic Requirements for Light Water Nuclear Power Plant Fire Protection"

Automated Procedures for Engineering Consultants, Past Chairman, Piping Program Committee

Advisory Council on Engineering Education at San Francisco State University

STP FHAR

PUBLICATIONS
AND
PRESENTATIONS
1985

"Fire Suppression & Detection for Electrical Cable
Tray Fires", 12th Annual WATTEC Conference, February

"Evaluation of Control Room Radiation Exposure", 14th Air
Cleaning Conference, August, 1976

HISTORICAL INFORMATION

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STP FHAR

DANIEL J. LOVE

EDUCATION

BSEE - Illinois Institute of Technology
MSEE - Illinois Institute of Technology
Certificate - University of California Business Mgmt.
KBA - California State University Long Beach

SUMMARY

Bechtel Electrical Engineering with a three year assignment as Chief Electrical Engineer in Madrid, Spain, and assignment as Staff Engineering Specialist in Electrical Protection and Fire Protection.

EXPERIENCE

Presently, Mr. Love has staff responsibility for review of project Fire Protection Programs including that of the South Texas Project. This includes activities such as fire hazards analysis, fire detection and protection systems, NFPA Code compliance evaluation, and Appendix R separation reviews. He is also responsible for Electrical Standards for Generating Station Design including fire stops, separation criteria, combustible material calculations, power cable derating, etc.

Previously Mr. Love was the Chief Electrical and Control Systems Engineer in Madrid, Spain, providing support and direction to those Bechtel engineers on four nuclear power plants. Review and direction areas included protection of electrical systems, separation for safety-related systems, hazards analysis, and cable tray fire detection and retardation methods. He was also the Bechtel representative to IAEA Nuclear Power Division.

Prior to Spain, Mr. Love was an Engineering Specialist responsible for development of nuclear/fossil station systems design and protection, including the selection/ setting of all protective devices. He developed two design guides for circuit protection and overcurrent coordination, and was the Chief Electrical Engineer designee for various nuclear/ fossil projects, and responsible for the administration of engineers.

PROFESSIONAL DATA

Registered Professional Engineer - Illinois
Professional Engineer (Electrical) - California, Arizona, Louisiana;
Professional Engineer (Fire Protection) - California
Member, National Society of Professional Engineers
Fellow, Institute for the Advancement of Engineers
Sr. Member - Instrument Society of America
Fellow - IEEE Power Engineering Society
Fellow - IEEE Computer Society
Fellow - IEEE Industry Applications Society
Member - National Fire Protection Association

HISTORICAL INFORMATION

HISTORICAL INFORMATION

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TECHNICAL SOCIETY

Member Working Group revising IEEE Standard 242 (Buff

ACTIVITIES

Book) Protection of Industrial and Commercial Power Systems.

Member Working Group developing IEEE P1015 Application Guide for Low Voltage Molded Case Circuit Breakers and Power Circuit Breakers.

Reviewer and Contributor to International Atomic Energy Agency Guidebooks on Design of Nuclear Power Plants and on Problems of Operating Nuclear Power Plants on Electric Power Grids of Limited Capacity.

Member IEEE Industry Applications Society, Power Systems Protection Committee Secretary.

Mr. Love has authored over fourteen published papers in addition to many lectures on protection.

HISTORICAL INFORMATION

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CARL M. TURNER

POSITION Staff Engineer

EDUCATION B.S., Nuclear Engineering, Mississippi State University
Sodium Technology, Atomics International
Nuclear Reactor Safety, Carnegie-Mellon University

EXPERIENCE Mr. Turner has six (6) years of experience in fire protection on nuclear power plant projects. Mr. Turner has fourteen (14) years experience working on eight (8) nuclear power plant projects involving twelve (12) power plants. His responsibilities include engineering review of major design efforts by outside A/E firm (Bechtel) in preparation of Fire Hazards Analysis, Fire Protection System design, hydraulic calculations, plant inspection/as-built conditions, review of system acceptance tests, review of project scope changes, coordination of NFPA code verification analysis. His responsibilities in six (6) years at Houston Lighting & Power have also included safety grade cold shutdown design modification, TMI upgrades, Essential Cooling Water System (Ultimate Heat Sink), Refueling, Liquid, Solid, and Gaseous Radwaste Processing Systems, Design Assurance Reviews, etc.

Mr. Turner designed and directed design on the liquid waste processing system on Pilgrim 2 Power Station for two (2) years working for Bechtel Power Corporation. He also worked as a licensing engineer on Pebble Springs Nuclear Station while at Bechtel.

Prior to this, Mr. Turner was a lead engineer on the Clinch River Project working for Westinghouse Electric Corporation. His responsibilities during three (3) years at Westinghouse included overall engineering, cost, and scheduling of a portion of the work done by a subcontractor, Atomics International. This work included the Plant Maintenance Equipment and the safety evaluation for the in-containment cleaning of large sodium wetted components.

While in college, Mr. Turner worked four (4) semesters with Southern Company Services doing technical studies on Farley, Hatch, Vogtle, and Central Alabama Nuclear Power Plant Projects. He analyzed the Farley Nuclear Plant Cooling Pond for the loss-of-coolant accident. He also reviewed the design of Vogtle containment, and transients on the Hatch Nuclear Plant.

HISTORICAL INFORMATION

HISTORICAL INFORMATION

CARL M. TURNER

Page 2

PROFESSIONAL
DATA

Registered Fire Protection Engineer, State of California
Registered Mechanical Engineer, State of California
Registered Professional Engineer, State of Texas
Member of the Society of Fire Protection Engineers
Member of the American Nuclear Society

TECHNICAL
PAPERS

"Long- and Short-term Radwaste System Changes at the South Texas Project" by C. M. Turner and G. Kniazcwycz which was presented at Waste Management 184 in Tucson, Arizona.

"Use of Freeze Seals for Barriers Against Liquid Sodium in Stainless Steel Piping" for a Westinghouse Advanced Reactors Division (WARD) Technical Position Paper Rev. 0 in 1975.

HISTORICAL INFORMATION

HISTORICAL INFORMATION

4.1 COMPARISON OF STP UNITS WITH REQUIREMENTS OF APPENDIX R

APPENDIX R REQUIREMENTS

STP POSITION

III.I.1 (Cont'd)

- (9) Detailed review of fire fighting strategies and procedures.
- (10) Review of the latest plant modifications and corresponding changes in fire fighting plans.

NOTE: Items (9) and (10) may be deleted from the training of no more than two of the non-operations personnel who may be assigned to the fire brigade.

- b. The instruction shall be provided by qualified individuals who are knowledgeable, experienced, and suitably trained in fighting the types of fires that could occur in the plant and in using the types of equipment available in the nuclear power plant.
- c. Instruction shall be provided to all fire brigade members and fire brigade leaders.
- d. Regular planned meetings shall be held at least every 3 months for all brigade members to review changes in the fire protection program and other subjects as necessary.

III.I.1 (Cont'd)

- b. Instruction of the fire brigade will be provided by qualified individuals suitably trained in fighting the types of fires that could occur in the plant, using the types of equipment available in the plant.
- c. Instruction will be provided for the brigade members and leaders.
- d. Planned meetings shall be conducted quarterly for all fire brigade members to review changes in the fire protection program and other subjects as necessary.

4.2 COMPARISON TO APPENDIX A OF CPCSB 9.5-1

APPENDIX A OF APCSB 9.5-1

STP POSITION

B.5. (Cont'd)

- (c) To have proper coverage during all phases of operation, members of each shift crew should be trained in fire protection. Training of the plant fire brigade should be coordinated with the local fire department so that responsibilities and duties are delineated in advance. This coordination should be part of the training course and implemented into the training of the local fire department staff. Local fire departments should be educated in the operational precautions when fighting fires on nuclear power plant sites. Local fire departments should be made aware of the need for radioactive protection of personnel and the special hazards associated with a nuclear power plant site.
- (d) NFPA 27, "Private Fire Brigade", should be followed in organization, training, and fire drills. This standard also is applicable for the inspection and maintenance of fire-fighting equipment. Among the standards referenced in this document, the following should be utilized: NFPA 194, "Standard for Screw Threads and Gaskets for Fire Hose Couplings," NFPA 1961, "Standard for Fire

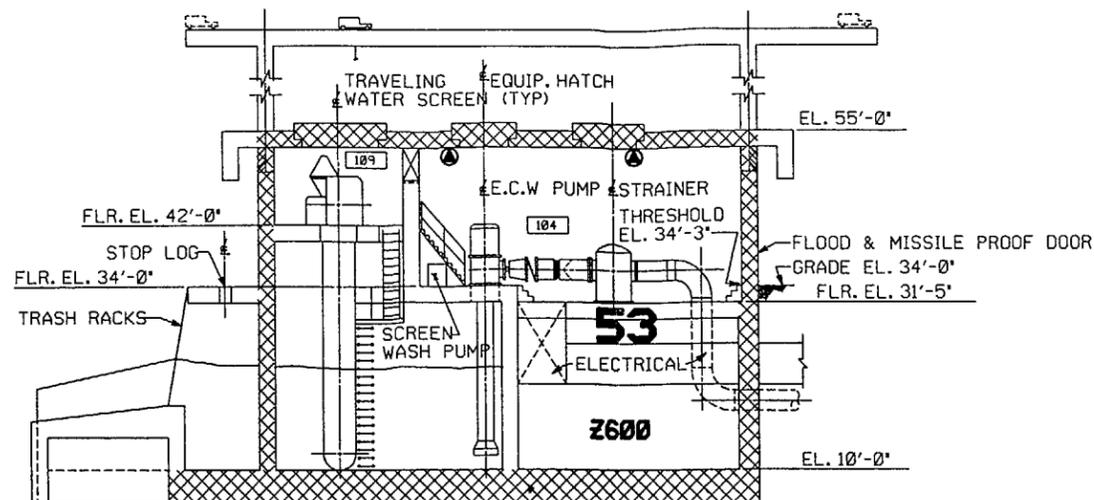
B.5. (Cont'd)

- (c) HL&P will utilize these recommendations to develop a comprehensive fire safety program for the operation of the plant. The organization and training will be an integral part of the operating staff responsibilities. A summary description of the qualifications, training, and functions of the plant staff is provided in FSAR Sections 9.5.1.6, 13.2.3 and 13.5 and the Technical Specifications.
- (d) HL&P reviewed the referenced NFPA Standards for guidance in preparing or revising administrative fire protection procedures for STP. These standards did not contribute substantial information in excess of NRC guidance and are not referenced in program. See FSAR Sections 13.2 and 13.5 for more information regarding fire brigade training.

4.2-14

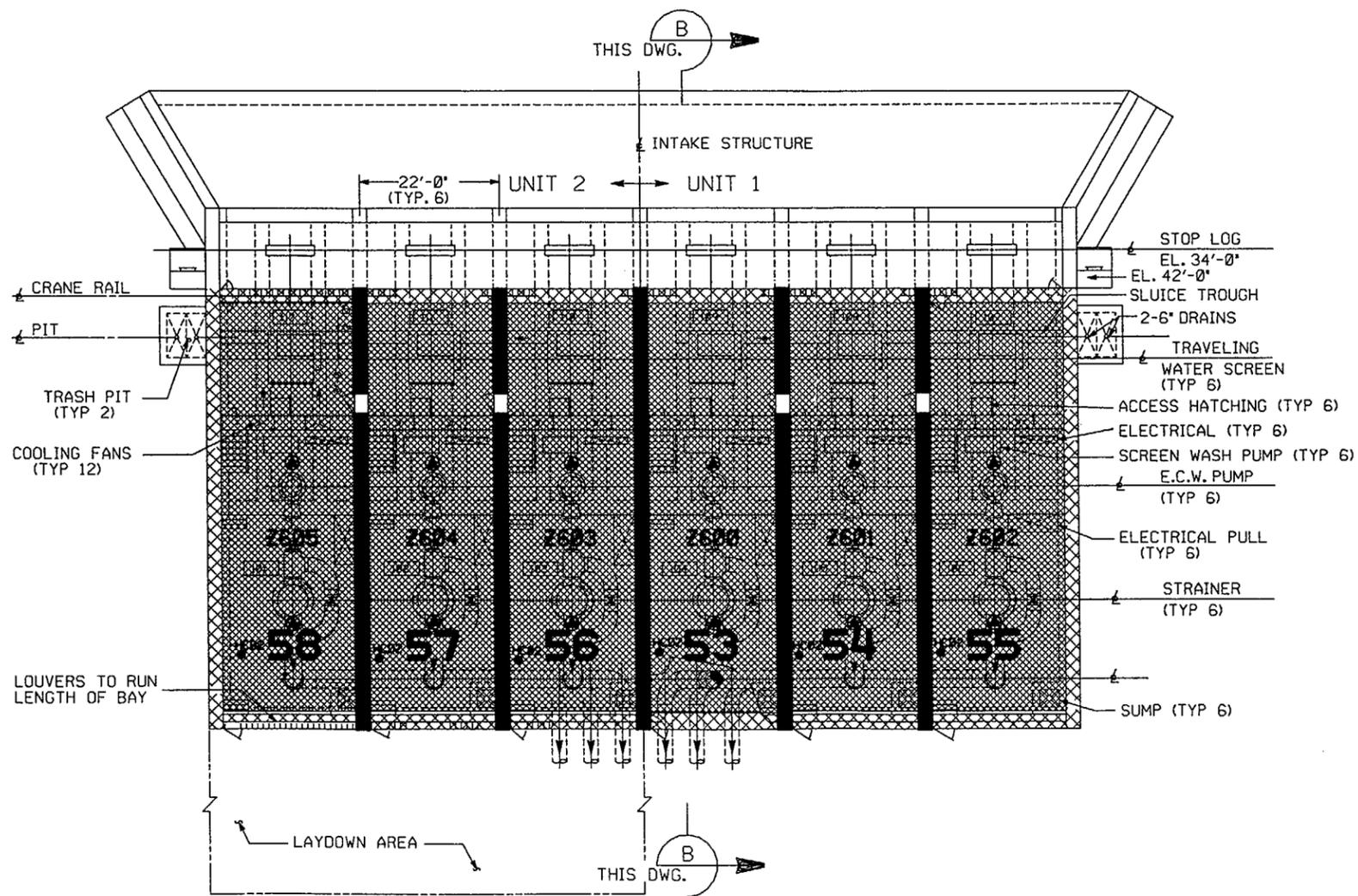
Amendment 13

STP FHAR



SECTION "B-B"

- NOTES:
1. REFER TO DWG 7A-62-9M-24548 FOR LEGEND AND SYMBOLS.
 2. THE FIRE DETECTORS ARE REPRESENTATIVE ONLY. SEE BECHTEL FIRE DETECTION DRAWINGS FOR THE ACTUAL LOCATION AND NUMBER OF FIRE DETECTORS IN EACH FIRE AREA.
 3. DELETED.



PLAN - INTAKE STRUCTURE

SOUTH TEXAS PROJECT
UNIT 1 & 2

FIRE AREAS
ESSENTIAL COOLING WATER
INTAKE STRUCTURE

DWG. NO. 7P-14-9-M-24533 *1 REV.6
DWG. NO. 7P-14-9-M-24533 *2 REV.6

FIGURE 3-34

AMENDMENT 13