

# The Light company

Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

September 14, 1995  
ST-HL-AE-5165  
File No.: G09.07  
10CFR50 App R

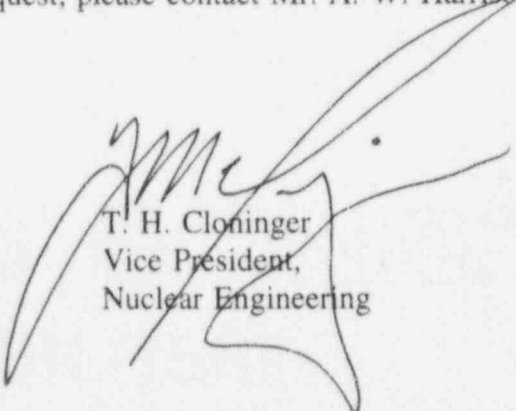
U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

South Texas Project  
Units 1 and 2  
Docket Nos. STN 50-498, STN 50-499  
Request for Deviation from 10CFR 50, Appendix R

Reference: Correspondence from T. H. Cloninger to Document Control Desk, dated  
April 13, 1995 (ST-HL-AE-5016)

Pursuant to a phone conversation between Mr. A.W. Harrison of South Texas Project and Mr. T.W. Alexion of the Nuclear Regulatory Commission, South Texas Project hereby submits a clarification to a plant-specific deviation from our commitment to certain technical requirements of Appendix R to 10CFR50. This letter replaces the original deviation request submitted by the referenced letter. Attached is a technical basis that demonstrates the alternate approach of the plant-specific deviation will maintain the ability to perform safe shutdown functions in the event of a fire.

If there are any questions regarding this request, please contact Mr. A. W. Harrison at (512) 972-7298 or me at (512) 972-8787.



T. H. Cloninger  
Vice President,  
Nuclear Engineering

KJT/lf

Attachment: Request for Deviation from Commitment to 10CFR50, Appendix R,  
Section III.G.2.c for Lack of Suppression in Fire Area 07, South Texas  
Project Units 1 and 2

100051

MISC-955165

Project Manager on Behalf of the Participants in the South Texas Project

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Houston Lighting & Power Company  
South Texas Project Electric Generating Station

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File No.: G09.07  
Page 2

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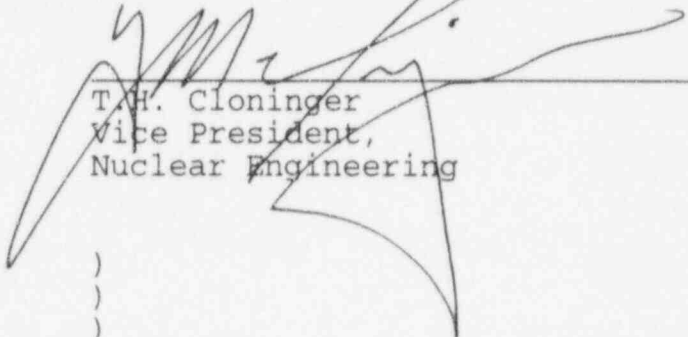
\* Above copies distributed without Enclosure 1 to the Attachment

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of )  
 )  
Houston Lighting & Power ) Docket Nos. 50-498  
Company, et al., ) 50-499  
 )  
South Texas Project )  
Units 1 and 2 )

AFFIDAVIT

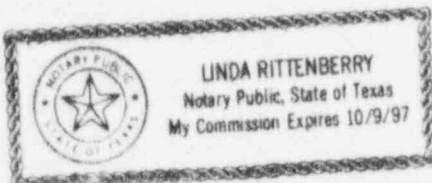
I, T. H. Cloninger, being duly sworn, hereby depose and say that I am Vice President, Nuclear Engineering, of Houston Lighting & Power Company; that I am duly authorized to sign and file with the Nuclear Regulatory Commission the attached request for deviation from 10CFR50 Appendix R; that I am familiar with the content thereof; and that the matters set forth therein are true and correct to the best of my knowledge and belief.

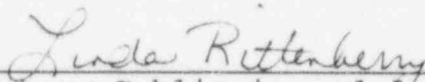
  
\_\_\_\_\_  
T.H. Cloninger  
Vice President,  
Nuclear Engineering

STATE OF TEXAS )

COUNTY OF MATAGORDA )

Subscribed and sworn to before me, a Notary Public in and for the State of Texas, this 14<sup>th</sup> day of September, 1995.



  
\_\_\_\_\_  
Notary Public in and for the  
State of Texas

**REQUEST FOR DEVIATION FROM COMMITMENT TO  
10 CFR 50 APPENDIX R, SECTION III.G.2.c  
FOR LACK OF SUPPRESSION IN FIRE AREA 7**

**SOUTH TEXAS PROJECT  
UNITS 1 AND 2**

**Attachments:**

**Figure 1: Unit 1 Auxiliary Shutdown Area Plan View**

**Figure 2: Unit 2 Auxiliary Shutdown Area Plan View**

**Enclosure 1: Thermo-Lag Assessment Report, Fire Area 07**

**I. PURPOSE**

This evaluation provides the basis for a deviation from South Texas Project's commitment to the requirements of 10 CFR 50, Appendix R, Section III.G.2.c. The deviation is for Fire Area 07 in the Auxiliary Shutdown Area of the Mechanical and Electrical Auxiliary Building (MEAB) elevation 10 feet. Safe shutdown cabling in this area is protected by a 3-hour configuration of Thermo-Lag 330-1 which has recently been re-evaluated to qualify for a fire rating of 1-hour. The Auxiliary Shutdown Area currently contains an area-wide ionization fire detection system in the vicinity of the Thermo-Lag 330-1 of concern in Fire Area 07 of the MEAB. This area is not provided with automatic fire suppression systems, therefore, the requirements of Appendix R, Section III.G.2.c are not fully satisfied.

This evaluation will demonstrate that application of automatic fire suppression in the particular circumstances of Fire Area 07 of the MEAB is not necessary to achieve the underlying purpose of the rule.

**II. DISCUSSION**

The lack of automatic fire suppression precludes compliance with the requirement of Appendix R, Section III.G.2.c. Section III.G.2.c requires that an automatic fire suppression system be installed in fire areas outside containment where the means of ensuring that one of the redundant trains for achieving safe shutdown is free of fire damage is enclosure of the redundant train in a fire barrier having a 1-hour fire protection rating. A detailed fire hazards analysis performed by South Texas Project demonstrates that existing protection in Fire

Area 07 of the MEAB provides a level of safety equivalent to the technical requirements of Section III.G.2c of Appendix R. The alternate fire protection configuration in Fire Area 07 of the MEAB ensures:

- (1) one train of equipment necessary to achieve hot shutdown from either the Control Room or the Auxiliary Shutdown Panel will remain free of fire damage,
- (2) equipment necessary to achieve cold shutdown will remain free of fire damage,
- (3) fire-retardant coatings are not used as fire barriers, and
- (4) that a modification to install automatic fire suppression in Fire Area 07 of the MEAB would not enhance fire protection safety levels above that provided by the existing configuration.

### **III. FIRE HAZARDS ANALYSIS**

**Fire protection requirements:** Criterion 3 of Appendix A to 10CFR50 states, in part, fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Appendix R, Section III.G to 10CFR50 states, in part, the fire protection features shall be capable of limiting fire damage so that one train of systems necessary to achieve and maintain hot shutdown condition from either the control room or emergency control station(s) is free of fire damage. Where redundant trains for achieving safe shutdown are located in the same fire area, a means of ensuring that one of the redundant trains is free of fire damage is providing enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area.

**Cable insulation and combustible materials:** See the attached Figure 1 (Unit 1) and Figure 2 (Unit 2) for the Fire Area layout.

The following combustibles are located in Fire Area 07 on the elevation of concern:

- Class A: 2,000 lbs
- Class B: 1600 lbs
- PVC: Negligible amount

The majority of cable insulation in Fire Area 07 is located in covered trays. However, some cable insulation is located in open cable trays and within 20 feet of the Thermo-Lag wrapped raceways of concern. This cable is qualified in accordance with the requirements of IEEE 383-1974 and, as such, is not considered an ignition source. This cable is considered as a combustible material and is listed above as a Class B combustible.

The required Thermo-Lag quantity (1102 lbs) has been included in the Class A value. The remaining installed Thermo-Lag in this Fire Area has not been included and will be removed. This Thermo-Lag to be removed was previously re-evaluated and determined not to be necessary for protection of circuits required for safe shutdown.

Transient combustibles are limited in Fire Area 07 by plant procedures. Plant procedures virtually eliminate additional transient combustible loading in Fire Area 07 and control ignition sources to limit fire potential from transient conditions.

Ignition sources were identified as electrical cabinets, several junction/pull boxes and a computer source. Walkdowns of Fire Area 07 determined these ignition sources were within 20 feet of the Thermo-Lag 330-1 raceways.

**Fire loading and calculated fire severities:**

- Combustible Load: <40,000 Btu/ft<sup>2</sup> ( Area: 950 ft<sup>2</sup> )
- Fire Severity: < 30 Minutes

**In-situ fire hazards:** Walkdowns of Fire Area 07 found the following combustibles: two bookshelves containing several 3-ring binders with approximately 50 lb. of paper (400,000 BTU), a computer terminal and three additional electrical cabinets each conservatively assumed to be 58,500 BTU per terminal or panel.

**Automatic fire detection and suppression capability:** Area wide ionization smoke detectors are located in Fire Area 07. This system alarms locally and alarms and annunciates remotely in the control room. No automatic fire suppression systems are provided in this area.



**Safety train layout:** See the attached Figure 1 (Unit 1) and Figure 2 (Unit 2) for the Fire Area layout.

The following are safe shutdown components located in Fire Area 07:

Fire Area Zone	Room	System	Component ID	Description
07Z071	015	PN	D1PNZLP680	QDPS APC D - Processor/Sensor I/F
07Z071	015	PN	D1PN1ZLP680/A	QDPS DPU APC D DPU A I/F - Digital Processing Unit
07Z071	015	PN	D1PNZLP680/C	QDPS DPU APC D DPU C I/F - Digital Processing Unit
07Z071	015	PN	5Z341ZLP100	Auxiliary Shutdown Panel

**Fire barrier qualification:** Safe shutdown cabling in Fire Area 07 is protected by a 3-hour configuration of Thermo-Lag 330-1 which has recently been re-evaluated to qualify for a fire rating of 1-hour. This evaluation is included as Enclosure 1. The evaluation assesses the required Thermo-Lag installations and provides the NEI/TUE tests that bound the installed configurations and provides the basis for qualification of 1-hour fire rating. The results of the evaluation show that the installed configurations in Fire Area 07 qualify to be credited for 1-hour fire rating after minor upgrades to the interfaces with the wall and box.

**Fire area construction:** Fire Area 07 is composed of Fire Zone Z071 which is the Auxiliary Shutdown area on the 10 foot elevation. The dimensions of the area are approximately 19 feet by 50 feet (950 square feet) and extend from the 10 ft elevation to the 34 ft elevation. The walls, floor and ceiling are 3-hour rated fire barriers. Doors and penetrations in the barriers are constructed such that their ratings are equivalent with that of the barrier. Ventilation duct penetrations in fire barriers are provided with 3-hour rated dampers. The fire dampers installed in the heating, ventilation and air conditioning (HVAC) duct systems serving the Qualified Display Processing System were not installed per the manufacturer's instructions, in that they were not installed in concrete wall. This condition was previously addressed in the Fire Hazards Analysis in a Deviation from BTP APCSB 9.5-1 Appendix A, Section D.1.j. Smoke and heat removal are accomplished with portable exhaust fans and flexible ductwork. Drains are provided for firewater removal in the adjacent hallway.

**Manual fire fighting equipment:** Manual fire suppression is provided by a hose cabinet and portable hand-held carbon dioxide extinguishers located in the corridor just outside the entrance to the room.

Fire detection actuation and alarm both locally and remotely in the control room would ensure rapid response (within 10 minutes) by the Fire Brigade. Fire Brigade drill records, for fires in the general area of Fire Area 07, show that the area can be reached within 10 minutes. After this rapid response by the Fire Brigade, sufficient time would exist for control and suppression of the fire before the 1-hour protective barrier would be challenged.

**Potential disabling effects of fire suppression systems on shutdown capability:**

The Auxiliary Shutdown Panel is provided as an alternate shutdown area when required due to inaccessibility of the control room. As such, it is required only when an inaccessible condition precludes safe shutdown from the control room. In addition, all power, control and instrumentation cables satisfy the flame test of IEEE 383-1974. These cables are designed to allow wetting with fire suppression water without faulting. Therefore, there are no disabling effects of fire suppression on safe shutdown capability.

**Availability of oxygen:** The HVAC supply and return ducts to Fire Area 07 are provided with fire dampers. These fire dampers are closed by thermal links actuated by fire. Oxygen would be available from the ventilation system until actuation of the thermal links and subsequent closure of the fire dampers.

**Alternate shutdown capability:** Since the fuel loads in this area are low, a fire of significant magnitude or duration is not expected to occur. If a fire should occur, there is reasonable assurance that it would be detected early by the fire detectors located in the area and alarmed in the control room when the Fire Brigade would be summoned by the plant operators. Until the Fire Brigade arrives, the location and arrangement of the combustible material, the construction of the fire area, and the 1-hour protective fire barrier would limit fire spread and damage. Upon arrival, the Fire Brigade would use the hose cabinet and/or the portable fire extinguishers located in the corridor just outside the entrance to the room to control, suppress and extinguish the fire before the 1-hour fire barrier would be breached. There is reasonable assurance that the fire protection features in Fire Area 07 are capable of limiting fire damage so that at least one train of systems necessary to achieve and maintain hot shutdown is free of fire damage.



#### IV. CONCLUSION

The existing area wide ionization detection system, in conjunction with protecting safe shutdown cabling with Thermo-Lag 330-1 barriers evaluated to a fire rating of at least 1-hour and low fuel loads, will provide the capability of limiting fire damage in Fire Area 07 so that one train of systems necessary to achieve and maintain hot standby condition from the Auxiliary Shutdown Panel or control room is free of fire damage. Based on the preceding evaluation, South Texas Project concludes that the proposed deviation is justified and that the proposed configuration meets the underlying purpose of 10CFR50, Appendix R, Section III.G.2.c

#### V. CONFIRMATORY REVIEW USING FIVE METHODOLOGY

The preceding evaluation provides adequate justification for the proposed deviation. South Texas Project performed a confirmatory review utilizing the Fire Induced Vulnerability Evaluation (FIVE) methodology, as described below.

To validate conclusions on re-evaluating the Thermo-Lag 330-1 raceways as 1-hour fire protection barriers, a number of FIVE models were developed. The methodology for development of these FIVE models identified five creditable ignition sources for each Unit to be evaluated:

##### Unit 1:

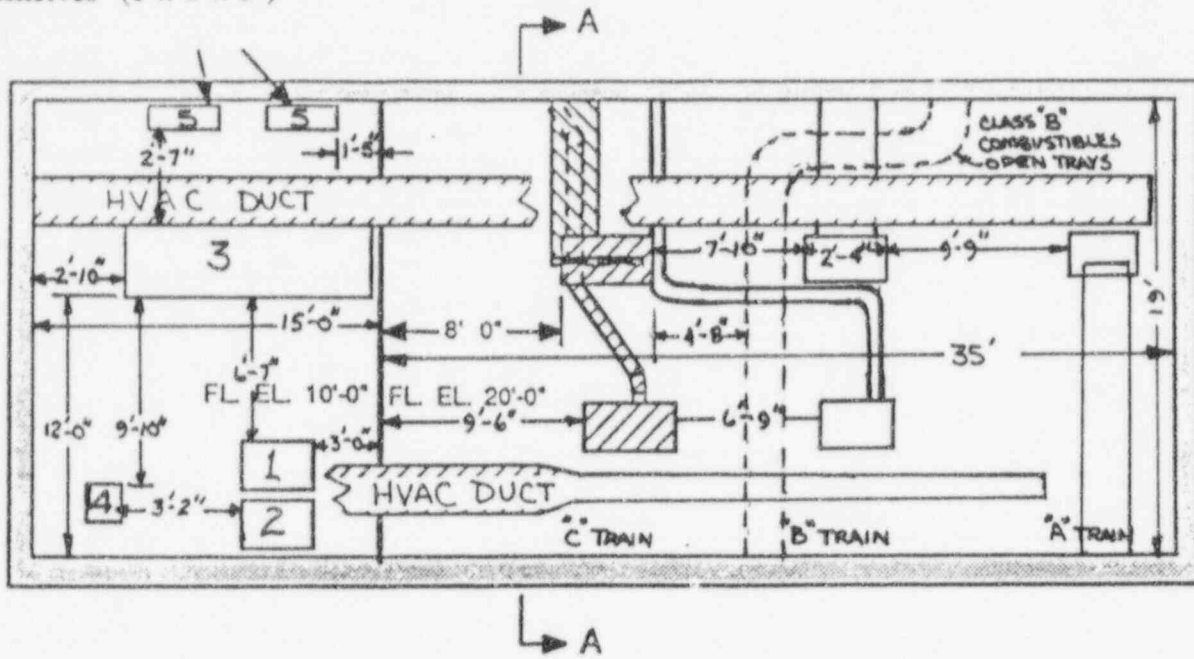
Auxiliary Shutdown Panel (5Z351ZLP100)  
QDPS Train D Cabinets (4Z551ZLP680)  
QDPS Train D Cabinets (4Z551ZLP680-1)  
Computer Terminal  
Bookshelves (Transient Combustible)

##### Unit 2:

Auxiliary Shutdown Panel (5Z352ZLP100)  
QDPS Train D Cabinets (4Z552ZLP680)  
QDPS Train D Cabinets (4Z552ZLP680-1)  
Computer Terminal  
Bookshelves (Transient Combustible)

Each of the above ignition sources located in the Units 1 and 2 Auxiliary Shutdown Area was evaluated using the FIVE fire modeling techniques. In all scenarios evaluated, the critical damage temperature of the target, safe shutdown cabling, was not approached. Each ignition source was modeled by Ceiling Jet Damage Analysis and Plume Damage Analysis. These models each contained several conservatisms and assumptions that show that the actual fire damage potential in these areas is very low. This effectively analyzes for damage without taking into account any protection provided by the Thermo-Lag 330-1 material covering the protected cables. It was concluded based on these fire models that the Thermo-Lag 330-1 protected safe shutdown cables in Fire Area 07 will remain free from fire damage.

Bookshelves (1' x 3' x 5')



UNIT 1 AUXILIARY SHUTDOWN AREA  
PLAN VIEW

Class A & Class B Combustibles:

1. QDPS Train "D" Cabinet (4Z551ZLP680)
2. QDPS Train "D" Cabinet (4Z551ZLP680-1)
3. Aux. Shutdown Panel (5Z351ZLP100)
4. Computer Terminal
5. Bookshelves

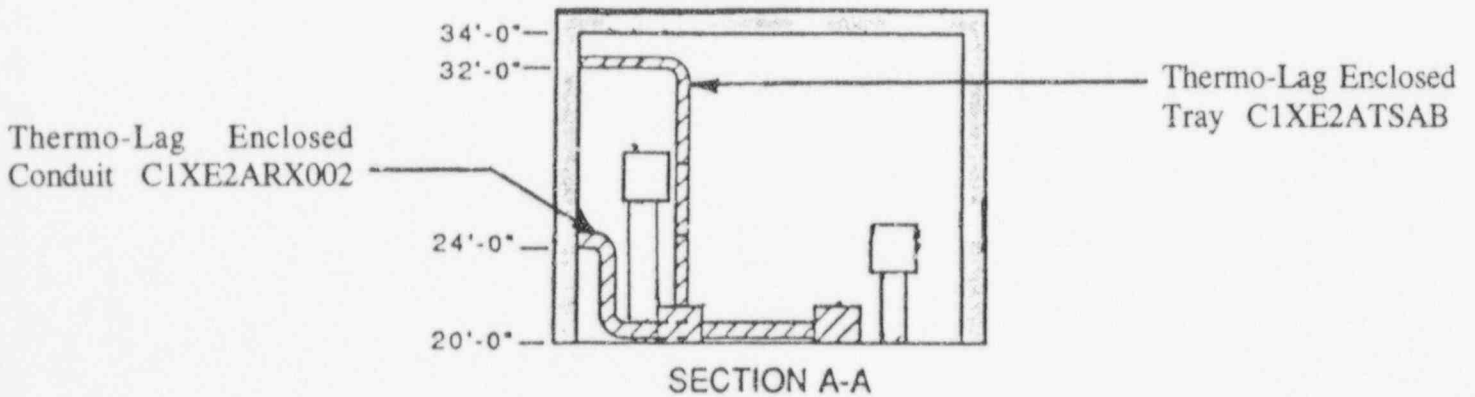
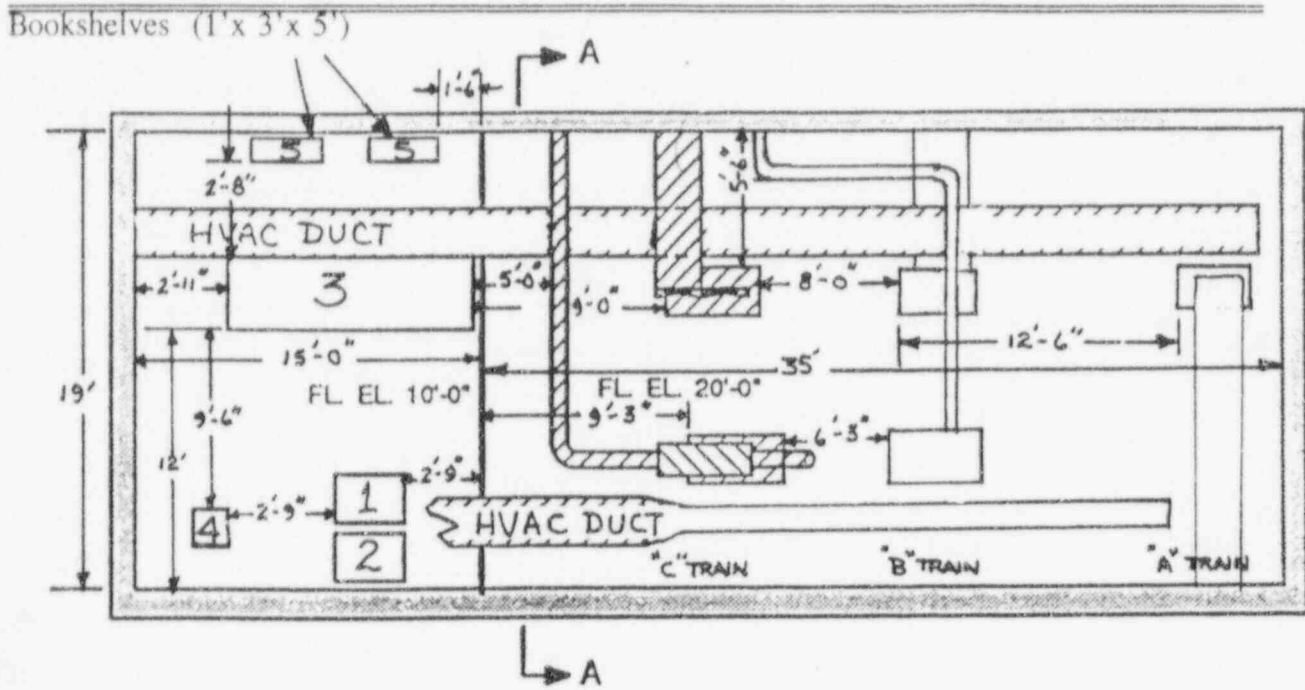


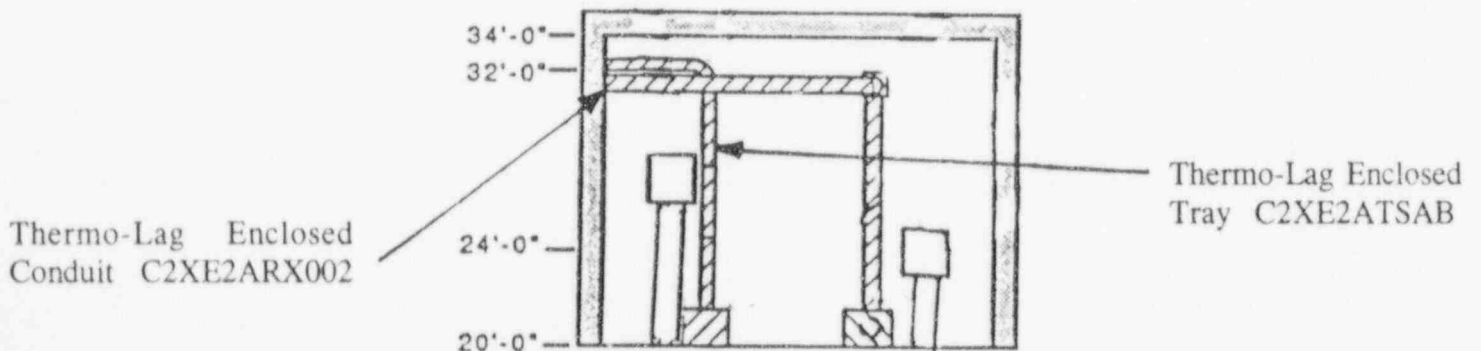
Figure 1



UNIT 2 AUXILIARY SHUTDOWN AREA  
PLAN VIEW

Class A & Class B Combustibles:

1. QDPS Train "D" Cabinet (4Z552ZLP680)
2. QDPS Train "D" Cabinet (4Z552ZLP680-1)
3. Aux. Shutdown Panel (5Z352ZLP100)
4. Computer Terminal
5. Bookshelves



SECTION A-A

Figure 2

ST-HL-AE-5165  
Enclosure 1

**THERMO-LAG ASSESSMENT REPORT**  
**FIRE AREA 07**