UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

MAY 0 5 1988

Report No.: 50-395/88-06

Licensee: South Carolina Electic and Gas Company
Columbia, SC 29218

Dcoket No.: 50-395 License No.: NPF-12

Facility Name: V. C. Summer

Inspection Conducted: March 15-18, 1988

Inspector: W. M. Sartor, Jr. — 5/2/88 Date Signed
W. M. Sartor, Jr.

Accompanying Personnel: G. Bethke (Battelle)
G. F. Martin (Battelle)
K. G. McBride (Battelle)

Approved by: T. R. Decker — 5/3/88 Date Signed
T. R. Decker, Section Chief
Emergency Preparedness
Division of Radiation Safety and Safeguards

Summary

Scope: This special, announced inspection was an Emergency Response Facilities (ERF) Appriasal. Areas examined during the Appraisal included a review of selected procedures and representative records, the ERFs and related equipment, and interviews with licensee personnel. Selected activities were observed during the 1988 annual exercise to ascertain the adequacy of the ERFs and related equipment.

Results: No violations or deviations were identified.

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1.0 Assessment of Radiological Releases

1.1 Source Term

There were three primary gaseous effluent release points: the main plant vent, reactor building purge exhaust, and atmospheric steam dumps. The following potential release streams were routed through the main plant vent: waste gas decay tanks, condenser exhaust, fuel handling building exhaust, and auxiliary building exhaust. A review of the FSAR, Section 11.4, indicated that the primary gaseous release pathways were monitored and that the potential release pathways feeding to the main plant vent were also monitored. The only unmonitored release pathway identified was leakage through the containment structure.

Predetermined relationships for estimating core damage were contained in Chemistry Procedure CP-308, "Core Damage Assessment Methodology," Revision 2. The methodology for this procedure was based on the Westinghouse Owner's Group Post Accident Core Damage Assessment Methodology report.

The primary method for performing dose assessment calculations in the EOF and TSC was the Emergency Assessment and Response System (EARS). The backup method was contained in Emergency Plan Procedure EPP-005, "Offsite Dose Calculations," Revision II, May 28, 1986. Procedure EPP-005 also contained the nomographs which were the primary method by which Control Room personnel performed dose calculations. A release source term could be calculated with EARS from the following inputs; post-accident sample analysis, grab samples, plant vent monitor, containment purge monitor, main steam line monitors, containment leakage information, and FSAR based default assumptions. The manual method of Procedure EPP-005 determined a release source term from the following inputs; plant vent monitor, high range containment monitor, steam line monitor, containment leakage, grab sample results, environmental monitoring data, and FSAR based defaults. The nomographs in EPP-005 used by the CR staff could calculate doses based on the following data inputs; grab sample results, steam line monitors, plant vent monitor, and reactor building purge exhaust monitor. Corporate Health Physics Procedure CHP-309, "Emergency Operations Facility Offsite Dose Assessment Guidance and Conduct of Operations," Revision 6 provided a method for EOF dose assessment personnel to calculate a source term from field monitoring data.

During the emergency planning exercise, an inspector observed that the dose assessment personnel in the EOF did not use the dose calculations from the steam line monitor readings to recommend emergency classifications or protective action recommendations. An EARS calculation during the exercise using a steam line monitor reading of .5 mR/h during a release through the steam dumps yielded a whole-body dose rate of 11 R/h at the site boundary. Dose rates at the site boundary reported by field teams were background. The EARS results were approximately 1E4 higher than field monitoring results. The steam line monitors (3) were ion chambers with a range of .1 to 1E7 mR/h gamma. Each monitor was shielded by 2 inches of lead to reduce background and provide collimation The plant FSAR, Section 11.4.2, stated "The anticipated dose response, calculated for the detector due to an equivalent concentration of Xe-133 in the discharge effluent from the steam line is 6.1 X 10^{-1} mR/h/µCi/cc." Discussions with licensee health physics personnel revealed that sensitivity calculations performed by a vendor indicated that even slight increases in steam monitor readings imply major core damage which translated into large site boundary doses. This lack of sensitivity in the monitors (RMG-19a, b, c) makes them ineffective as indicators to classify events or provide input for protective action recommendations until PAGs have been exceeded.

Based upon the above review, the licensee committed to:

° Review the specifications and documentation on the steam line monitors to determine if the monitors can be made effective in providing dose assessment data at lower than PAG limits (IFI 50-395/88-06-01).

1.2 Dose Assessment

The manual dose assessment method used a straight line gaussian plume model while EARS used a segmented gaussian plume model. Both methods used Regulatory Guide 1.23 assumptions for determining stability class from ΔT, Regulatory Guide 1.145 assumptions for atmospheric dispersion from ground level releases, and Regulatory Guide 1.109 assumptions for whole-body and child thyroid inhalation dose conversion. In addition, EARS used Regulatory Guide 1.111 assumptions for dry deposition and simple exponential washout.

The EARS computer code was supplied and supported by a vendor. No documentation supporting the validation and verification (V and V) of this code was readily available in the plant documentation system. Also some of the documentation describing methodologies used in EARS and the manual methods were difficult to locate. Personnel felt that some portion of this documentation might exist onsite in personal files or might be available from the vendor. A new plant procedure (Jan. 88) covering software V and V and maintenance was being applied to existing software in an attempt to gather and record appropriate documentation. The EARS code had not been brought into compliance with this procedure at the time of this inspection.

Some poorly documented cases of calculational comparisons between EARs, State, and NRC dose models were found. The comparisons indicated fair agreement within the limited cases presented. No comprehensive and fully documented calculational comparison between EARS, back-up manual models, State models and NRC models existed.

Based upon the above review, the licensee committed to:

- Locate all available documentation pertaining to validation, verification, and methodology for all dose assessment models (computer and manual) and centralize the maintenance of it into the Plant Record System (PRS) (IFI 50-395/88-06-02).

- Establish a periodic calculational comparison between dose assessment models (e.g., EARS, EPP-005, State, NRC) and document the reasons for significant differences (IFI 50-395/88-06-03).

2.0 Technical Support Center (TSC)

2.1 TSC Variable Availability

2.1.1 Documentation for Regulatory Guide (RG) 1.97 Variables

South Carolina Electric and Gas (SCE&G) received an SER for Regulatory Guide 1.97 variables in November 1987. The November SER contained only three remaining questions concerning SCE&Gs implementation. Two of the questions were related to the environmental qualification of Accumulator valves and Main Steam Line Monitors and the third question concerned a slightly more narrow range on the Containment Temperature Monitors at V. C. Summer than what is specified in RG 1.97 (50 to 250 degrees F vs 40 to 400 degrees F). For the purpose of the Emergency Response Facility (ERF) Appraisal, adequate RG 1.97 variables were available. This does not eliminate the need for SCE&G to resolve the remaining questions in the RG 1.97 SER with the cognizant NRC Division.

2.1.2 RG 1.97 Variable Availability & Sufficiency

Plant variables were available to the TSC and the EOF via the Plant Safety Status Display/Onsite TSC (PSSD/OTSC) computer system. The PSSD/OTSC was the original Westinghouse design for a combination SPDS and ERF data acquisition system. The inspector reviewed the computer system point list against RG 1.97 and found no missing variables.

In addition to the PSSD/OTSC system, the TSC had a functional analog instrument panel which provided a limited set of reactor coolant system and steam generator variables.

2.1.3 Computer Data

The PSSD/OTSC system was operated by licensee and inspection team personnel during the appraisal. Most of the few computer points which were invalid or of poor quality had been removed from scan by the licensee, thus precluding operators and ERF managers from being mislead by erroneous data. The PSSD/OTSC system had a trending capability which allowed plotting 4-hour historical trends of points during normal operation and up to 24-hour trends in the post reactor trip environment.

SCE&G is cautioned that this ERF Appraisal report in no way influences the need to complete SPDS requirements as outlined in the November 1987 SER (e.g., The report on SPDS deficiencies requested by NRC from SCE&G three months prior to the next refueling outage).

2.1.4 Manual Data

Dedicated telephone communicators and status boards were used in the TSC as a backup to the computerized data acquisition system. The TSC was located in the Control Room envelope and had a window which overlooked the Control Room. Data could be passed by hand from the Control Room to the TSC. TSC data could also be passed to the EOF via a telefax machine. The inspector observed all of these manual techniques being used during the annual exercise which was performed concurrent with the ERF Appraisal.

2.1.5 Data Adequacy

All RG 1.97 variables were available in the TSC and adequate.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.2 TSC Functional Capabilities

2.2.1 TSC Power Supplies

All TSC lighting, receptacles, computer systems, printers, and other equipment were supplied with power from a 480/277 VAC distribution panel (APN 4021). APN 4021 was supplied by a battery backed uninterruptable power supply (UPS) which in turn could have been powered from either the A or B train 480 VAC engineered safeguards feature (ESF) buses. Therefore, all TSC power was extremely reliable. Telephone systems in the TSC were of two major types; some were a ROLM system maintained by SCE&G and the others were a SLIC 85 system maintained by Southern Bell. Both categories of telephones were provided with backup power from battery/charger units. The SCE&G microwave system was also battery backed.

2.2.2 TSC Data Analysis

In addition to the data systems previously described, the TSC was supplied with a complete set of plant drawings, reference material, and other aids for data analysis.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.3 TSC Habitability

The TSC was contained in the Control Room environmental envelope and as such was designed to maintain the same level of habitability as the Control Room. An analysis and discussion of radiation doses and exposure rates for the TSC/Control Room was contained in the V. C. Summer Final Safety Analysis Report (FSAR) Sections 15.4 and 12A.4. The gamma radiation shielding provided appeared adequate for the accident conditions discussed in the FSAR.

The TSC was serviced by the same ventilation system as the CR and consisted of redundant trains A and B which each contained a normal air handling unit and an emergency air handling unit. The emergency section of each train contained a series of high efficiency particulate air (HEPA) filters and charcoal adsorbers which were automatically placed in series with the normal section of the train upon detection of gaseous radioactive material in the supply header or upon a Phase A Containment Isolation signal. The inspector reviewed system drawings and test procedures and observed several system actuations. The HVAC system maintained approximately 2 inches of H_2O positive pressure in the Control Room envelope when operating in the emergency mode.

Based upon the above findings, this portion of licensee's program appeared adequate.

2.4 TSC Data Collection, Storage, Analysis and Display

At the time of this Appraisal, computer systems providing ERF support were being upgraded. The upgrade effort was in the conceptual phase and details of the upgrade were not available and will not be discussed in this report. Findings described in this section are based on the evaluation of existing computer systems and their use to support ERF functions.

2.4.1 Methods of Data Collection

Real-time data acquisition, display, and storage to support ERF functions were performed by redundant Digital Equipment Company (DEC) PDP 11-44 minicomputers. Each 11-44 had 1.75 Megabytes (MB) random access memory (RAM), a 67 MB hard disk unit, and two shared 1600 bits per inch (BPI) magnetic tape drives. The bulk of the ERF software was written in FORTRAN 77 with some routines written in assembly language. Supporting documentation (e.g., a user's guide and a programmer's reference manual) were found to be comprehensive and professionally done. Computers gathering and transmitting data to the 11-44s included: 3 DEC PDP 11-03s with 64 KB (kilobytes) RAM and no peripherals (these computers were front ends to the 11-44s and read plant sensors); and 1 Hewlett Packard 1000 linked to the 11-44s via a DEC PDP 11-23 with 128 KBs RAM and no peripherals (the HP 1000 gathered meteorological data).

The V. C. Summer plant also had available a VAX cluster of four VAX computers ranging from the 785 to 8530. These computers did not directly support ERF functions; however, they were available for special purpose data analysis and display of ERF data if needed.

The following is a list of analog (continuously variable) and digital (2 state) plant sensors:

Analog Sensors	Digital Sensors	Rad/Met	Total Sensors
250	440	45	735

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.2 Data Displays in the TSC

Four Aydin 5216 display generators controlled ERF display Cathode Ray Tube's (CRTs). In the TSC there were 5 Aydin display CRTs, 1 Tektronix hard copier, and 1 line printer. Users could display safety parameters or parameter sets of interest. On request a hard copy could be generated.

Display options have been implemented into three basic types:

PSSD (Plant Safety Status Display)

The PSSD displays were designed to provide a quick overview of plant safety status, detect and evaluate abnormal conditions, and provide the ability to monitor and help mitigate abnormal events. One of the PSSD options was the display of an octagon with the vertices displaying the expected values for 8 overview plant safety parameters. When actual plant parameters did not match the ideal the octagon shape would be distorted letting the user know immediately of off-standard conditions. Experienced users were familiar with most distorted octagon possibilities and could relate a specific shape to a specific plant problem. There were some 14 menu choices for PSSD displays, all of which were related functions.

OTSC (Onsite TSC)

OTSC displays have been designed for plant management and technical support personnel. These displays have been designed to provide status of major systems, provide status of support systems, and provide history and trend information. The OTSC did not provide the graphic (iconic) display as did the PSSD but did provide some 22 menu choices for related plant systems, twelve of which were the same as the PSSD.

BISI (Bypassed and Inoperable Status Indicator)

BISI provided the CR operators and ERF personnel with a concise and continuous indication of the status of the ESF systems and their support system. BISI provided a means to evaluate the causes of alarm conditions using a three level hierarchical structure. The top level display, ESF systems, listed ESF systems sequentially along with their availability status. The second level showed the systems as subsystems and support systems. The third level gave component status and position.

PSSD and OTSC displays have been designed to: (1) give a top level summary of plant health; (2) show a second level graphic display of overall plant status; (3) give a third level of plant systems; and (4) provide alphanumeric format displays of sensor data.

Display functions were noted to be impaired by intermittent lockups. Lockups were readily corrected from any available display CRT (re-booting computers was not required). Apparently, licensee personnel have observed lockups but have been unable to correct the problem due to the difficulty of identifying the cause. Because the lockups are rare and can be easily dealt with and because of the availability of several CRTs in each ERF this is not viewed as a serious reliability problem.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.3 Time Resolution

ERF supporting computers read, analyzed, and stored to hard disk data from 735 analog and digital sensors. The sampling rate for data acquisition varied between every two seconds and every 10 seconds for ERF related plant sensors. The rate for RAD data was 35 data points every 2 minutes and for MET data was 9 data points every 15 minutes. The data rate was considered low to moderate speed. The data acquisition tasks were assigned a high priority and even when display tasks were observed to lockup, the system continued to collect and store plant sensor data without apparent data loss.

Based on the above findings, this portion of the licensee's program appeared adequate.

2.4.4 Signal Isolation

At the V. C. Summer plant both optical and magnetic isolation were used to provide isolation sufficient to meet NUREG-0737, Supplement 1 requirements. This was verified by letter "Safety Evaluation Report by the Office of the Nuclear Regulatory Commission Regarding the SPDS South Carolina Electric and Gas Company, Virgil C. Summer Nuclear Plant, Docket No. 50-395." Section IV.5 of this report states "The isolation for the SPDS at Summer meets the requirement of Supplement 1 to NUREG-0737."

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.5 Data Communications

Data communications capabilities were reviewed between the DEC PDP 11-44s and the other DEC processors. These included the 11-03 front ends, the 11-23 collecting RAD/MET data from the HP 1000, and the 11-24 at the EOF. Error checking and correcting was reported to be done by modem firmware and operating system software. Data communications processors used high speed data links (approximately 56,000 bits/second).

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.6 Processing Capabilities

The DEC PDP 11-44s and peripheral computer systems were configured to support plant safety monitoring and reporting needs. Processing was based on multitasking to allow several software functions to be processed concurrently. Data acquisition and storage tasks were high priority tasks and continued to execute even when other tasks were locked up (e.g., display tasks). Licensee contacts reported the 11-44 central processing units to routinely function 75 to 89% loaded. The heavier processing loading during an emergency situation would result in a slower response time. A much faster response time will be available following the installation of a new computer system currently scheduled for calendar year 1990.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.7 Data Storage Capacity

Data storage capacity met NUREG-0696 requirements. Utility personnel interviewed reported that at any time, 4 hours of historical data was available to provide trending information on critical plant parameters. On demand, plant analog sensor data could be stored up to 24 hours on disk. Also, on demand, up to 200 digital sensor full sample set state changes could be saved to disk.

If both PDP 11-44 computers should have to be re-booted because of hardware or software failures, historical data would be lost. Power failure will not cause this problem because the computers use automatic restart on power restore. The automatic restart restored all files and computer states prior to the power failure. The loss of historical data was considered very unlikely because of the redundant configuration and because of the availability of records.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.8 Model and System Reliability and Validity

Documentation for model algorithms described in the Programmer's Manual, written by Westinghouse Electric Corporation on December 6, 1985, were reviewed. The equations and descriptions were professionally documented. Model algorithms were not checked for completeness and correctness during this Appraisal.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.9 Reliability of Computer Systems

Computer system unavailability was reported by the utility for the ERF support computer systems to be .89% for the past year.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.4.10 Environmental Control Systems

Air conditioning was reported by licensee personnel to be functional in the computer room. The air conditioning system was reported to be set to maintain ambient temperature at about 80 degrees Fahrenheit.

Based upon the above findings, this portion of the licensee's program appeared adequate.

2.5 Data Acquisition Systems

The licensee report on the implementation of RG 1.97 variables was available and was used as an appraisal information resource.

Compared to similar electronic data systems reviewed, the PSSD/OTSC system appears to have a very high degree of reliability and a lack of spurious alarms and erroneous data.

The PSSD/OTSC has a very reliable power supply and did not exhibit "lockups" during the course of the Appraisal. In the unlikely event the system would need to be "re-booted" during an accident, the present software configuration causes all historical data on the computer hard disc memory to be erased. The reason given by SCE&G for this feature is that the plotting routine cannot account for missing data points (which would occur during the time of re-boot) by either fairing between pre-boot and post-boot data or by indicating missing data points with some special characters. The licensee agreed to consider eliminating this memory erasing feature during a future software modification.

Based upon the above findings, this portion of the licensee's program appeared adequate.

3.0 Emergency Operations Facility (EOF)

3.1 EOF Variable Availability

The EOF used the same PSSD/OTSC system for electronic data as that used in the TSC. The telephone systems, status boards, telefax equipment, and reference material available in the EOF were essentially identical to that in the TSC. Therefore, this section contained no additional comments.

Based upon the findings previously described, this portion of the licensee's program appeared adequate.

3.2 EOF Location and Habitability

The primary EOF was located in the basement of the Nuclear Training Center (NTC) about 2.5 miles south of the plant power block. Ceiling and wall shielding provided a protection factor of greater than 5.

The EOF was served by a dedicated HVAC system consisting of one normal and one emergency air handling unit, associated condensers (chillers), heaters and filters. The emergency filter train consisted of roughing filters and two HEPA filter banks. No charcoal adsorbers were installed in the system. The system was manually switched to the emergency mode upon activation of the EOF. The inspector reviewed system drawings and test procedures and observed several actuations of the system. The system performed satisfactorily, with all fans and dampers actuating properly to maintain a positive pressure in the EOF envelope. NTC building maintenance records showed that the system was periodically tested and that appropriate preventive maintenance was performed. The cognizant system engineer was in the process of having more formal test and maintenance procedures (e.g., Nuclear Training Center HEPA Filter Test) approved to insure continued reliability of the EOF HVAC System.

Based upon the above findings, this portion of the licensee's program appeared adequate.

3.3 EOF Functional Capabilities

3.3.1 Data Analysis Adequacy

The electronic and manual data systems serving the EOF were identical to those previously described for the TSC, with the exception of the analog instrument panel which was installed in the TSC only.

Based upon the above findings, this portion of the licensee's program appeared adequate.

3.3.2 Backup EOF

The backup EOF was located in Columbia, SC at the SCE&G Corporate offices. The backup EOF was about 25 miles southeast of the plant site. This location was previously approved by the NRC. The inspector reviewed several electrical grid maps and determined that power for the backup EOF was supplied by a portion of the SCE&G grid which is not likely to be affected by any events which would disrupt power at the primary EOF. The backup EOF received power from the NETWORK Substation which is connected to four different incoming 33 and 115 KV lines. The NETWORK substation is separated from the PARR Substation, which supplied the primary EOF, by at least 2 major substations on any possible connecting path.

The backup EOF used a SCE&G maintained Dimension telephone system which was battery backed.

Based upon the above findings, this portion of the licensee's program appeard adequate.

3.3.3 EOF Reliability

The entire NTC was supplied with power from two redundant 23 KV sources. Each of the incoming 23 KV lines had separate sources including 115 KV lines, a hydro station and gas turbines. The incoming 23 KV lines were stepped down to 480 VAC through separate NTC transformers. Either of the sources could be selected to power the building via manual breakers in the basement switchgear room. Within the EOF, sensitive equipment such as computer terminals were supplied with conditioned power via a 15 KVA regulated power supply.

Based upon the above findings, this portion of the licensee's program appeared adequate.

3.3.4 EOF Data Collection, Storage, Analysis and Display

The same computers supporting TSC ERF activities supported the EOF. These systems and details of their functions have already been described. However, the licensee had implemented a DEC PDP 11-24 in the EOF for processing microwave communications from the PDP 11-44s at the plant. The PDP 11-24 also controlled 1 Aydin 5216 display generator which in turn controlled 2 Aydin 8025 and 1 Aydin 8830 display CRTs. Also supported in the EOF were 1 Tektronix hard copier and 1 300 line-per-minute line printer. EOF displays were exactly the same as the CR and TSC displays. Communications between the PDP 11-44s and the PDP 11-24 have been implemented using microwave equipment with a 56KB data link. Error checking and correction were reported in use at the EOF.

The EOF used the same PSSD/OTSC system for electronic data as that used in the TSC. The telephone systems, status boards, telefax equipment, and reference material available in the EOF was essentially identical to that in the TSC. Therefore, this section contained no additional comments.

Based upon the above findings, this portion of the licensee's program appeared adequate.

4.0 Persons Contacted

*W. Baehr, Manager, Chemistry and Health Physics
*E. Baker, Systems Engineer
G. Baker, HVAC Systems Engineer
*R. Barton, Nuclear Computer Services Engineer
*K. Beale, Manager, Nuclear Prot. .ion Services
*R. Bender, Training Simulator Instructor
*L. Blue, Manager, Corporate Health Physics
*O. Bradham, Director, Nuclear Plant Operations
*M. Browne, General Manager, Station Support
*R. Clary, Manager, Design Engineering
C. Coleman, Telecommunications Specialist
*M. Counts, Emergency Services Coordinator
*H. Donnelly, Nuclear Licensing Senior Engineer
*J. Gesn, Engineer, Design Engineering
*G. Higginbotham, Corporate Health Physics
*A. Koon, Manager, Nuclear Licensing
*F. Leach, Manager, Facilities and Administration
*G. Liu, ISEG Engineer
*G. Moffatt, Manager, Maintenance Services
*K. Nettles, General Manager, Nuclear Safety
*J. Proper, Associate Manage, QA
*R. Rusaw, Engineer, Systems Engineering
*J. Skolds, General Manager, Station Operations
*G. Soult, Operations Manager
*S. Summer, Supervisor, Environmental Programs
J. Wactor, Senior Electrical Engineer
*D. Warner, Manager, Core Engineer and Nuclear Computer Services
*B. Williams, Supervisor, Project Controls
*M. Williams, General Manager, Nuclear Services
*W. Williams Jr., Special Assistant, Nuclear Operations

Other licensee employees contacted included engineers, technicians, operators, and security force members.

Other Organizations

J. Easter, Fellow Engineer, Westinghouse Electric Corporation

Nuclear Regulatory Commission

*H. Dance, Section Chief, RII
*T. Decker, Chief, Emergency Preparedness Section, RII
*J. Hayes, Project Engineer, NRR
*P. Hopkins, Resident Inspector, RII
*D. Prevatte, Senior Resident Inspector, RII

*Attended exit interview

5.0 Exit Interview

The inspection scope and findings were summarized on March 18, 1988, with those persons indicated in Paragraph 4.0 above. The inspector described the areas inspected and discussed in detail the inspection findings herein. No dissenting comments were received from the licensee. Although proprietary material was reviewed during the inspection, such material was neither removed from the site nor entered into this report.

6.0 Licensee Action on Previously Identified Findings

a. (Closed) Inspector Followup Item (IFI) 50-395/87-03-01: Provide a method for effectively tracking, documenting, and posting repair and investigative reentry teams dispatched from the OSC. An inspector observed that the licensee had established and used during the exercise an "In-Plant Entry Team Status Log" which corrected this previous finding.

b. (Closed) IFI 50-395/87-03-02: Assure that monitoring and surveillance procedures provided in field team kits are used in implementing field monitoring and surveillance requirements. An inspector noted that exercise observations did not identify any procedural adherence problems with the field monitoring and surveillance teams.

c. (Closed) IFI 50-395/87-EP-01: Verify audibility of alarms in high noise area (79-BU-18). This item was previously closed by the resident inspector in Inspection Report 50-395/85-09.

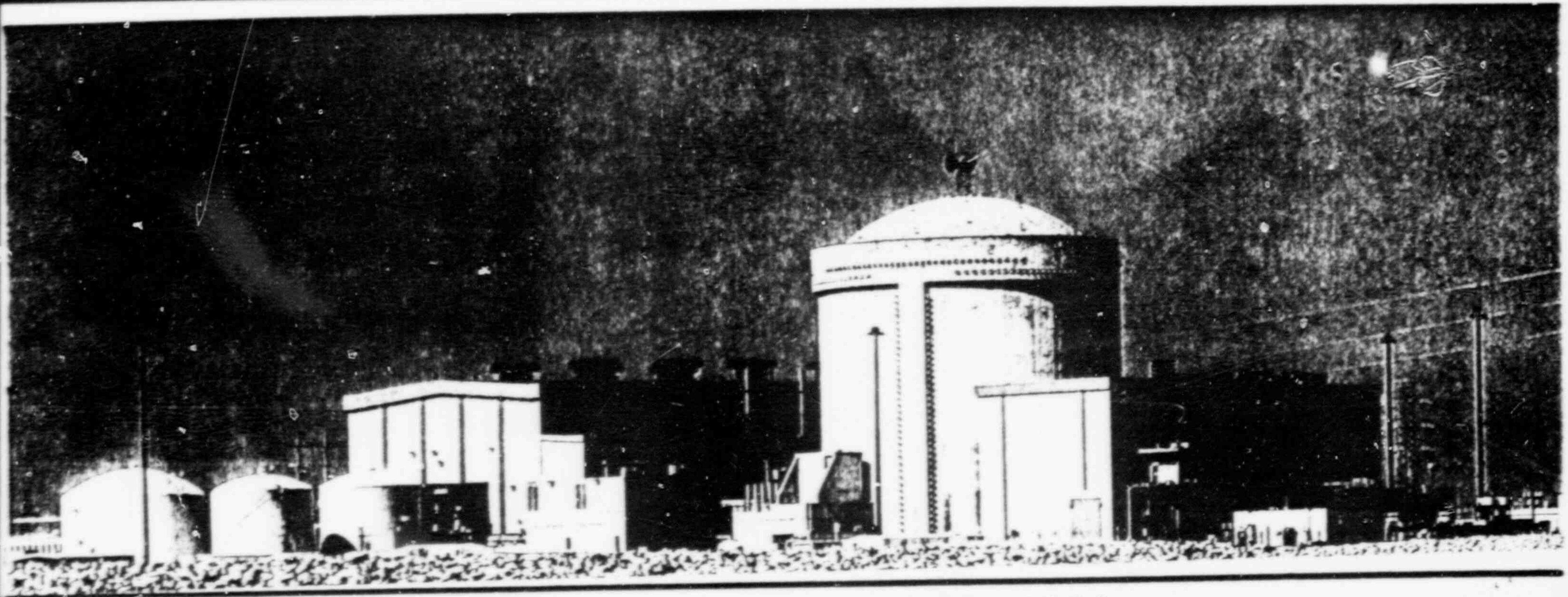
7.0 Glossary of Acronyms and Initialisms

BISI	Bypassed and Inoperable Status Indicator
CHP	Corporate Health Physics Procedure
CR	Control Room
CRT	Cathode Ray Tube
DEC	Digital Equipment Company
EARS	Emergency Assessment and Response System
EOF	Emergency Operations Facilities
EPP	Emergency Plan Procedure
ERF	Emergency Response Facilities
FSAR	Final Safety Analysis Report
HEPA	High Efficiency Particulate Air Filters
HP	Hewlett Packard
HVAC	Heating, Ventilation and Air Conditioning
IFI	Inspector Followup Item (Open Item)
KB	Kilobytes
KV	Kilo Volts
KVA	Kilo Volts Alternating
MET	Meteorology
NRC	Nuclear Regulatory Commission
NTC	Nuclear Training Center
NUREG	Nuclear Regulation
OTSC	Onsite Technical Support Center
PAG	Protective Action Guidelines
PRS	Plant Record System
PSSD	Plant Safety Status Display
RAD	Radiation Absorbed Dose
RAM	Random Access Memory
RG	Regulatory Guide
SCE&G	South Carolina Electric and Gas Company
SER	Safety Evaluation Report
SPDS	Safety Parameter Display System
TSC	Technical Support Center
UPS	Uninterruptable Power Supply
VAC	Volts Alternating Current
V and V	Validation and Verification

Attachment

ATTACHMENT

V. C. SUMMER NUCLEAR STATION



EMERGENCY RESPONSE FACILITY APPRAISAL

MARCH 15 -18, 1988

INTRODUCTION

MEL BROWNE

VCSNS OVERVIEW

DESIGN

V. C. SUMMER NUCLEAR STATION HAS ONE OPERATING NUCLEAR UNIT

- WESTINGHOUSE PRESSURIZED WATER REACTOR
- 2775 MWT (RX POWER)
- GILBERT/COMMONWEALTH WAS THE ARCHITECT ENGINEER

COMMERCIAL OPERATION

- CONSTRUCTION PERMIT ISSUED IN MARCH, 1973
- 5% POWER OPERATING LIMITATIONS MET IN AUGUST, 1982
- 50% POWER OPERATING LIMITATIONS MET IN NOVEMBER, 1982
- 100% POWER OPERATING LIMITATIONS MET IN MAY, 1983
- UNIT 1 WENT COMMERCIAL ON JANUARY 1, 1984

EMERGENCY PLANNING

- INITIAL EMERGENCY EXERCISE ON MAY, 1981
- PERMANENT EOF COMPLETE IN JANUARY, 1983
- NRC PARTICIPATION IN APRIL 1985 EMERGENCY EXERCISE
- FINAL ACCEPTANCE OF SIREN SYSTEM SEPTEMBER, 1986

ERF PRESENTATION

SUBJECT	SPEAKER	TITLE
INTRODUCTION	M. N. BROWNE	GENERAL MANAGER, SUPPORT SERVICES
• V. C. SUMMER NUCLEAR STATION OVERVIEW		
MAJOR MILESTONES AND AUDIT HISTORY	A. R. KOON	MANAGER, NUCLEAR LICENSING
ERF OVERVIEW	K. E. BEALE	MANAGER, NUCLEAR PROTECTION SERVICES
• FUNCTIONAL ORGANIZATION		
• REGULATORY REQUIREMENTS/GUIDELINES AND REVIEWS		
• PHYSICAL FACILITIES		
EMERGENCY RESPONSE DATA SYSTEMS	R. A. BARTON	SUPERVISOR, PROCESS COMPUTER SYSTEMS
• GUIDANCE • DESIGN • INFORMATION DISPLAY		

ERF PRESENTATION (continued)

SUBJECT	SPEAKER	TITLE
DOSE ASSESSMENT	G. E. HIGGINBOTHAM	STAFF HEALTH PHYSICIST
EMERGENCY RESPONSE ORGANIZATION • TSC • OSC • EOF	K. E. BEALE	MANAGER, NUCLEAR PROTECTION SERVICES
ERF DOCUMENTATION OVERVIEW	H. I. DONNELLY	SENIOR ENGINEER, REGULATORY INTERFACE
LOGISTICS	H. I. DONNELLY	SENIOR ENGINEER, REGULATORY INTERFACE

MAJOR MILESTONES
AND
AUDIT HISTORY

AL KOON

INTRODUCTION

SIGNIFICANT ERF PROGRAM ACTIVITIES

- PARTICIPATES IN INPO EMERGENCY PLANNING WORKSHOPS
- PARTICIPATES IN SOUTHEASTERN UTILITY EMERGENCY PLANNING GROUP
- UNDERTAKEN TSC COMPUTER UPGRADE
- MAINTAINS A CONSERVATIVE AND SELF-CRITICAL APPROACH IN EVALUATING THE VCSNS ERF PROGRAM

INTERNAL AUDIT HISTORY

AUDIT DATES	IDENTIFIER	MAJOR FOCUS
3/17 - 31/83	CGSZ-282-SQA	AUDIT OF EMERGENCY PLAN ACTIVITIES
2/25/83	1-RGS-83-B	OBSERVATION OF AN EMERGENCY PLAN DRILL
3/16/83	2-RGS-83-B	OBSERVATION OF A RADIOLOGICAL DRILL
3/14 - 16/83	6-LCN-83-B	OVERVIEW OF ANNUAL EMERGENCY PLAN EXERCISE
7/12 - 15/83	10-LCN-83-B	INPO ASSESSMENT OF EMERGENCY PLAN
3/26 -30/84	CGSZ-389-SQA	ANNUAL AUDIT OF THE EMERGENCY PLAN
8/30/84	CGSS-13010-SQA	QUALIFICATION REQTS. OF THE EMERGENCY COORDINATOR POSITION
1/21 - 29/85	CGSZ-493-SQA	ANNUAL EMERGENCY PLAN AUDIT
5/13/85	CGSS-14051-SQA	EMERGENCY PLAN PROCEDURE INTERFACE
2/20/86	CGSS-628-SQA	ANNUAL AUDIT OF EMERGENCY PLAN
1/7 - 2/4/87	CGSS-16502-SQA	ANNUAL AUDIT OF EMERGENCY PLAN
8/24 - 9/4/87	CGSS-17543-SQA	TRAINING AUDIT (INCLUDES EMERGENCY COORDINATOR)
1/11 - 22/88	CGSS-17708-SQA	ANNUAL EMERGENCY PLAN AUDIT

MAJOR MILESTONES

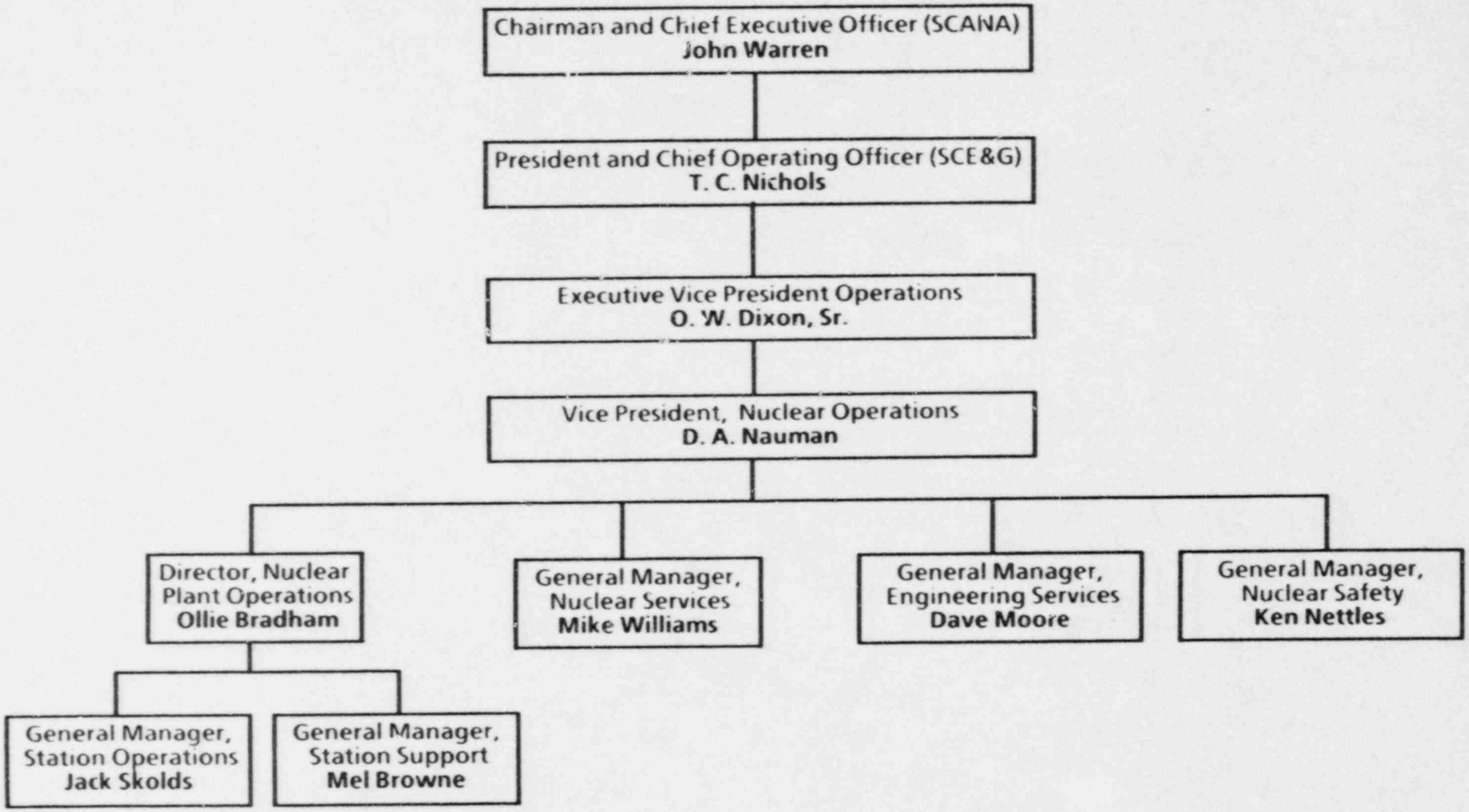
DATE	EVENT
1981	MILESTONES (1) AND (2) OF APPENDIX 2 TO NUREG-0654, DEVELOPMENT OF EMERGENCY RESPONSE PLANS AND SUBMITTAL OF EMERGENCY IMPLEMENTING PROCEDURES, WERE MET AS DESCRIBED IN SSER #2
1982	RECEIVED FINAL NRC AND FEMA APPROVAL OF VIRGIL C. SUMMER NUCLEAR STATION EMERGENCY PREPAREDNESS AS DESCRIBED IN SSER #3
1983	PERMANENT EOF OPERATIONAL
1984	APPROVAL OF BACKUP EOF LOCATED IN COLUMBIA, SC
1985	SUBMITTAL OF RESPONSE TO GENERIC LETTER 82-33, EMERGENCY RESPONSE CAPABILITY SUPPLEMENT 1 TO NUREG-0737
1986	FINAL FEMA ACCEPTANCE OF STATE AND LOCAL PROMPT ALERT AND NOTIFICATION SYSTEM
1987	SAFETY AND TECHNICAL EVALUATION REPORTS RECEIVED RELATIVE TO REGULATORY GUIDE 1.97, REV. 3 REQUIREMENTS
	SAFETY AND TECHNICAL EVALUATION REPORTS RECEIVED ACCEPTING THE VIRGIL C. SUMMER SPDS FOR OPERATION

EMERGENCY RESPONSE FACILITY

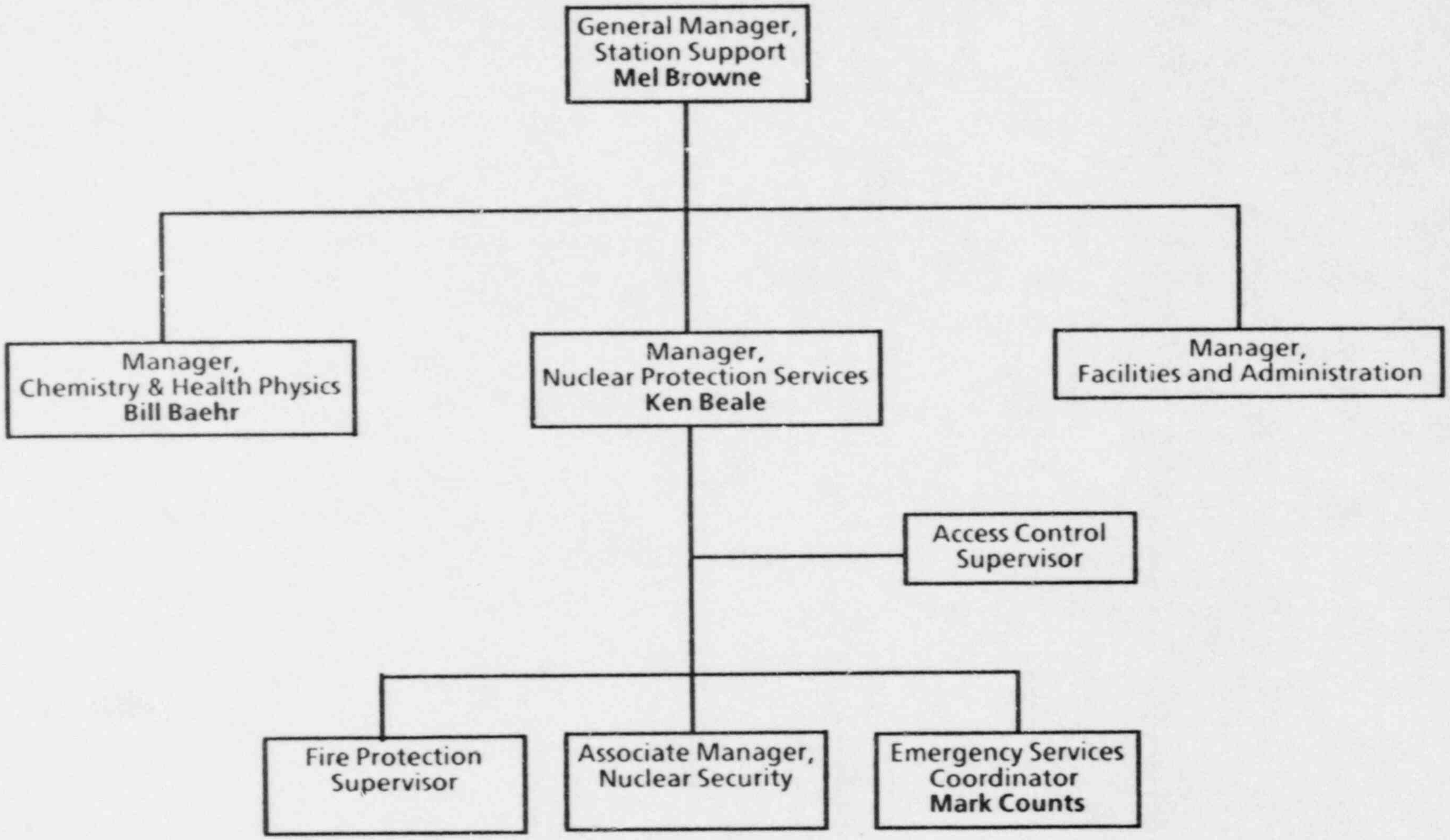
OVERVIEW

KEN BEALE

FUNCTIONAL ORGANIZATION



FUNCTIONAL ORGANIZATION



REGULATORY REQUIREMENTS/GUIDELINES

- NUREG - 0696 - DATED FEBRUARY, 1980
- NUREG - 0654 - DATED NOVEMBER, 1980
- NUREG - 0737, SUPPLEMENT 1 - DATED DECEMBER, 1982

PHYSICAL FACILITIES

TSC

- LOCATION -THE TSC IS LOCATED ADJACENT TO THE CONTROL ROOM
- DESIGN FEATURES

  HABITABILITY - HVAC, HEPA AND CHARCOAL FITLERATION, AUTOMATIC EMERGENCY SYSTEM ACTIVATION ON RECEIPT OF SAFETY INJECTION OR RADIATION MONITORING AND HAS OVER 4100 SQ. FT. OF SPACE

  DATA AVAILABILITY - REGULATORY GUIDE 1.97 VARIABLES ARE AVAILABLE ON THE ERDS CONSOLES. VOICE COMMUNICATION SYSTEMS ARE AVAILABLE .

OSC

- LOCATION - THE OSC IS LOCATED ON THE 448' ELEVATION OF THE CONTROL BUILDING.
- FUNCTIONALITY - A 2700 SQ. FT. AREA WHICH PROVIDES ADEQUATE SPACE AND FACILITIES FOR EMERGENCY RESPONSE PERSONNEL TO SUPPORT EMERGENCY OPERATIONS. VOICE COMMUNICATIONS SYSTEMS ARE AVAILABLE FOR EMERGENCY OPERATIONS.

EOF

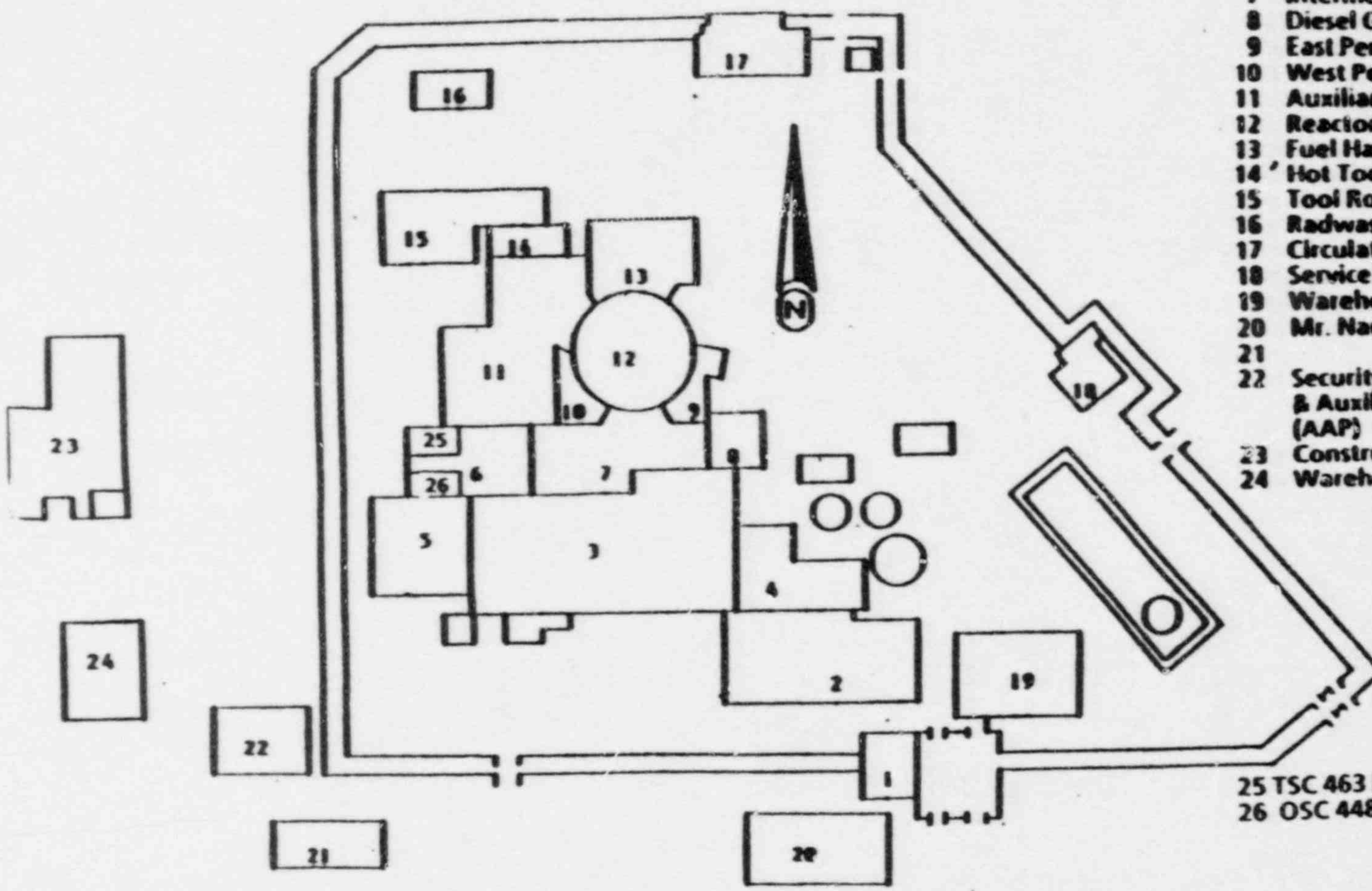
- LOCATION - THE EOF IS LOCATED IN THE BASEMENT OF THE NUCLEAR TRAINING CENTER (NTC). THE NTC IS LOCATED APPROXIMATELY 2.5 MILES FROM THE NUCLEAR STATION.
- DESIGN FEATURES

  HABITABILITY - HVAC, SEPARATE HEPA FILTER TRAIN, BY PASSED DURING NORMAL OPERATIONS AND HAS OVER 8,500 SQ. FT. OF SPACE. RADIATION PROTECTION (SHIELDING) EXCEEDS REQUIREMENTS OF A PROTECTION FACTOR OF 5

  DATA AVAILABILITY - SAME AS TSC. VOICE COMMUNICATIONS SYSTEM AND METEOLOGICAL DATA ARE AVAILABLE.

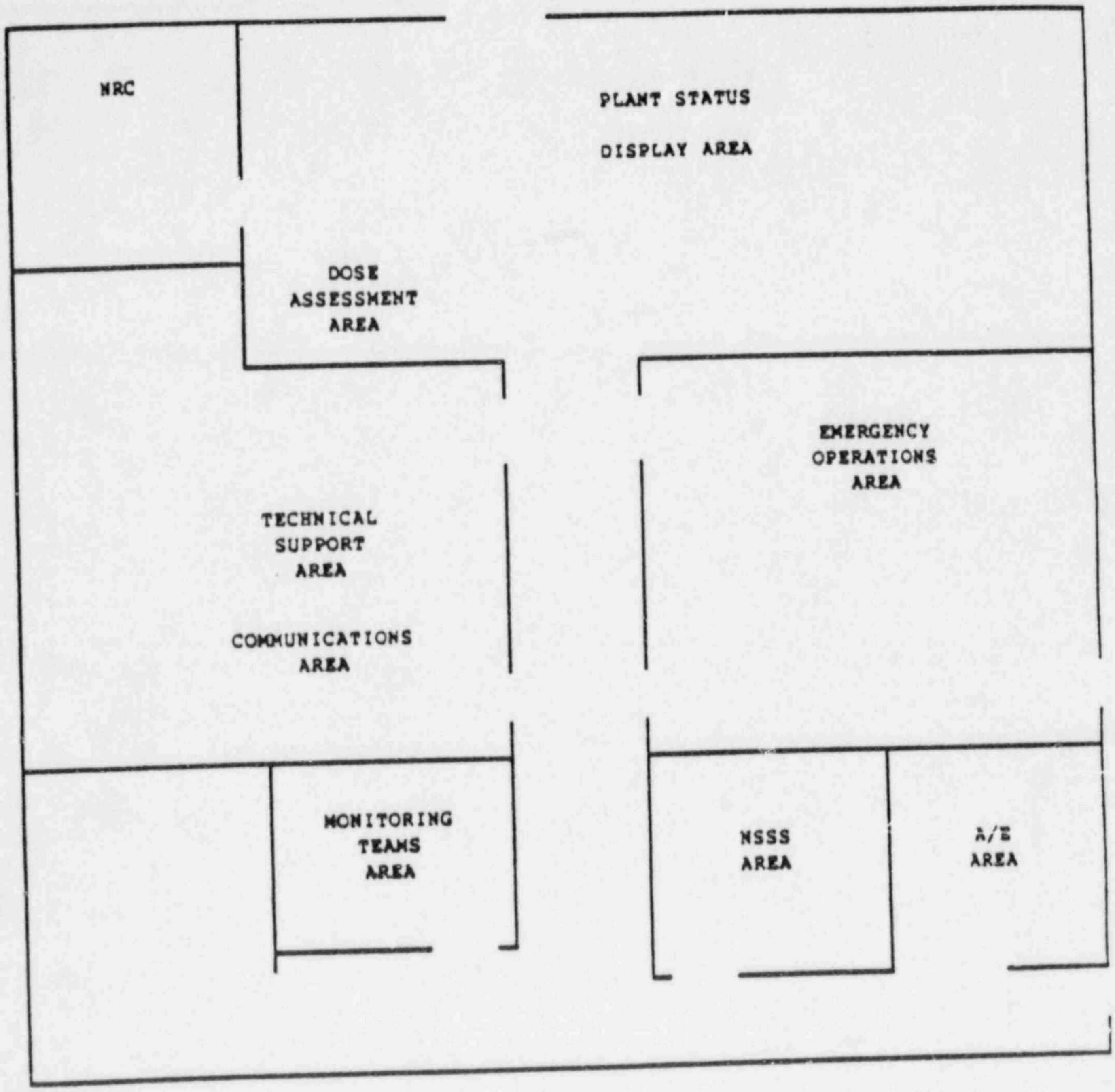
BACK-UP EOF

- LOCATION - THE BACK UP EOF IS LOCATED IN THE COMPANY CORPORATE HEADQUARTERS IN COLUMBIA, S. C. THE BACK UP EOF IS APPROXIMATELY 25 MILES FROM THE NUCLEAR STATION.
- FUNCTIONALITY - A 2000 SQ FT. AREA WHICH PROVIDES ADEQUATE SPACE AND FACILITIES FOR EMERGENCY RESPONSE PERSONNEL. VOICE COMMUNICATION ARE AVAILABLE.

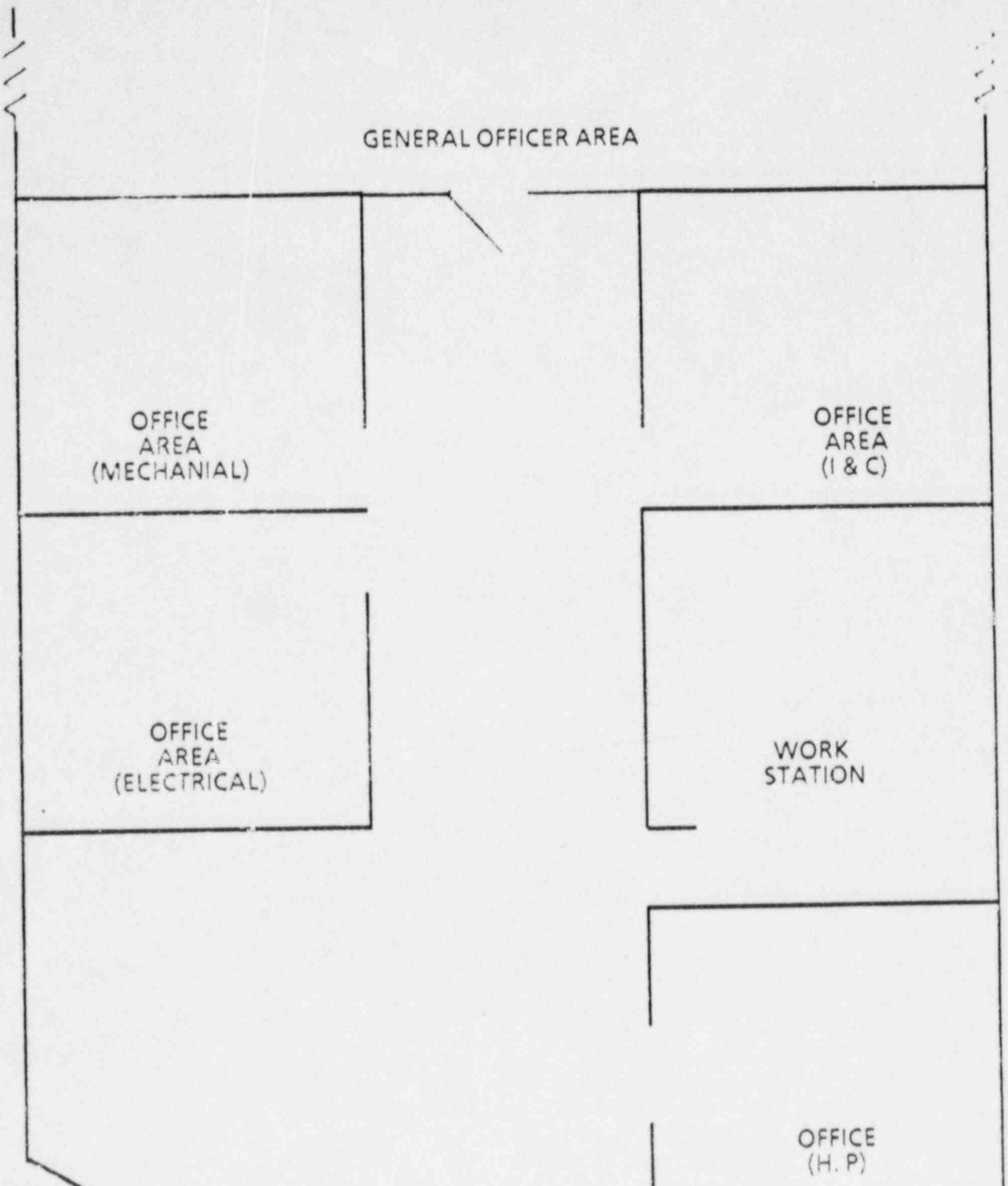


1 Primary Access Portal (PAP)
2 Service Building
3 Turbine Building
4 Water Treatment Building
5 Auxiliary Service Building
6 Control Building
7 Intermediate Building
8 Diesel Generator Building
9 East Penetration
10 West Penetration
11 Auxiliary Building
12 Reactor Building
13 Fuel Handling Building
14 Hot Tool Room
15 Tool Room
16 Radwaste Storage
17 Circulating Water
18 Service Water
19 Warehouse "C"
20 Mr. Nauman's Staff Building
21
22 Security/Craft Training Bldg. & Auxiliary Access Portal (AAP)
23 Construction Building
24 Warehouses "A" & "B"

25 TSC 463 Elevation
26 OSC 448 Elevation

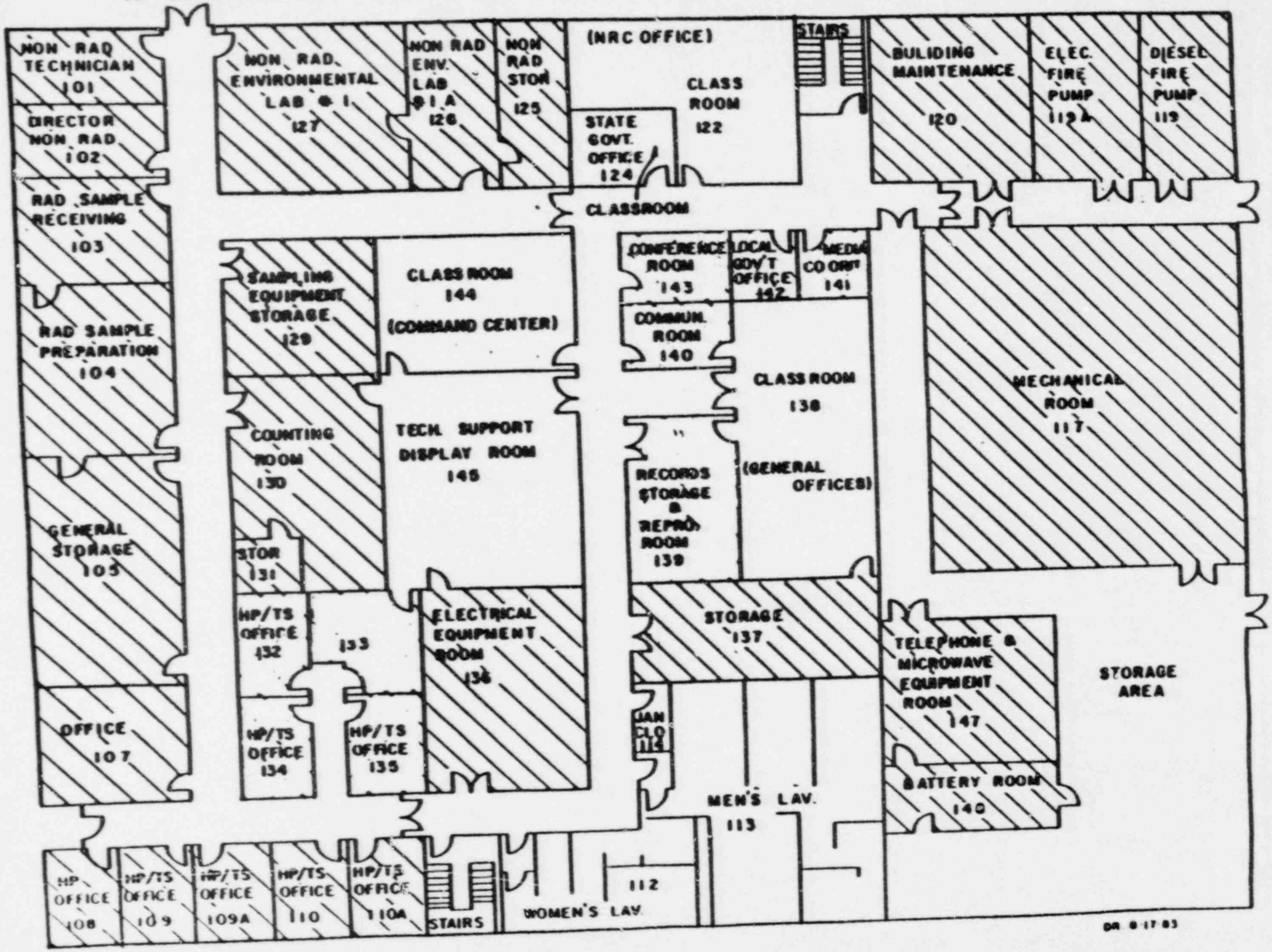


TECHNICAL SUPPORT CENTER


GENERAL OFFICER AREA
OFFICE AREA (MECHANIAL)
OFFICE AREA (I & C)
OFFICE AREA (ELECTRICAL)
WORK STATION
OFFICE (H. P)

OSC LAYOUT

V. C. SUMMER NUCLEAR TRAINING CENTER- EOF



EMERGENCY RESPONSE DATA SYSTEMS

AL BARTON

EMERGENCY RESPONSE DATA SYSTEM

- REGULATORY & DESIGN GUIDANCE
- BASIC SYSTEM CONFIGURATION
- INFORMATION DISPLAY & FUNCTIONALITY
- FUTURE DIRECTIONS

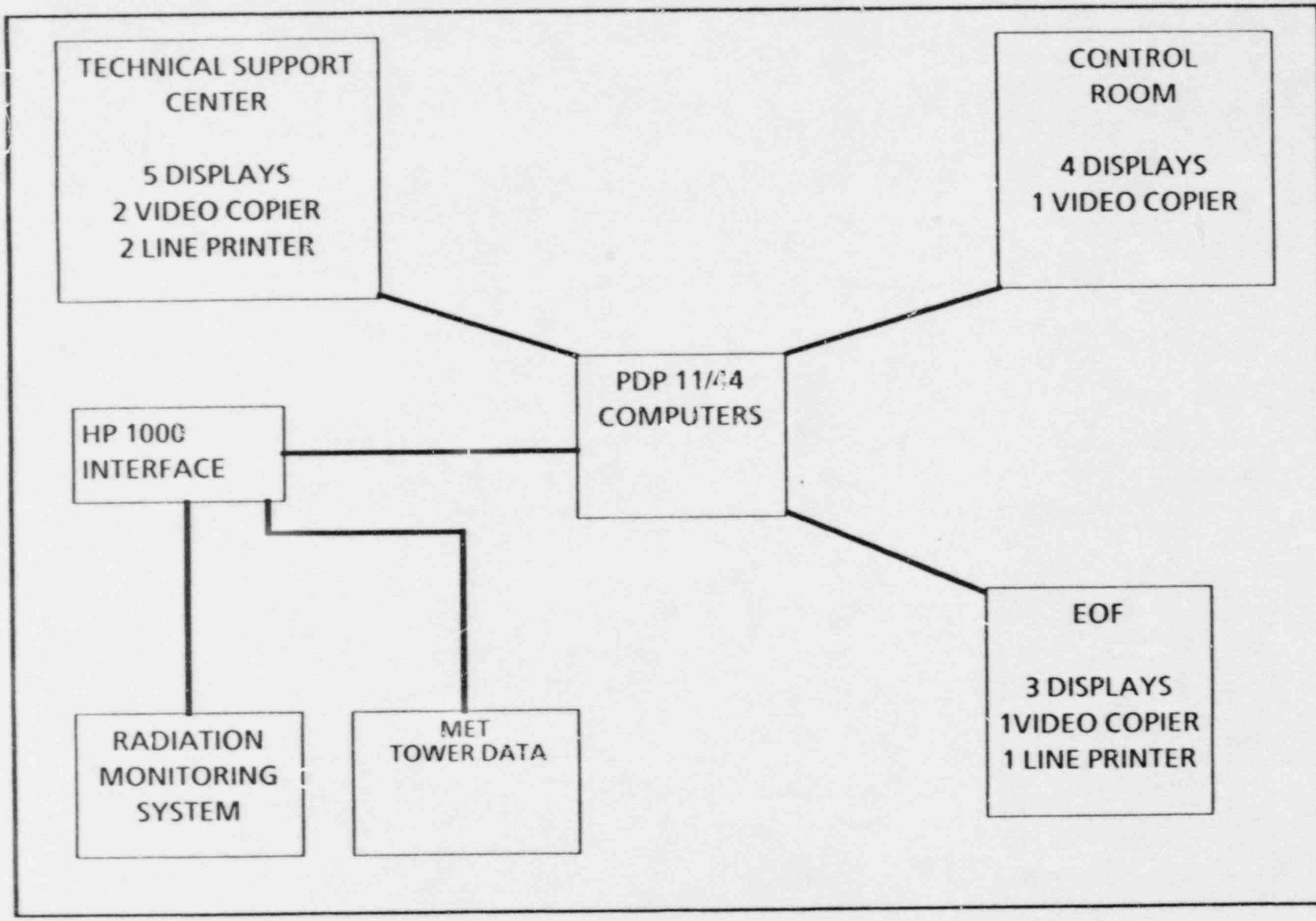
REGULATORY & DESIGN GUIDANCE

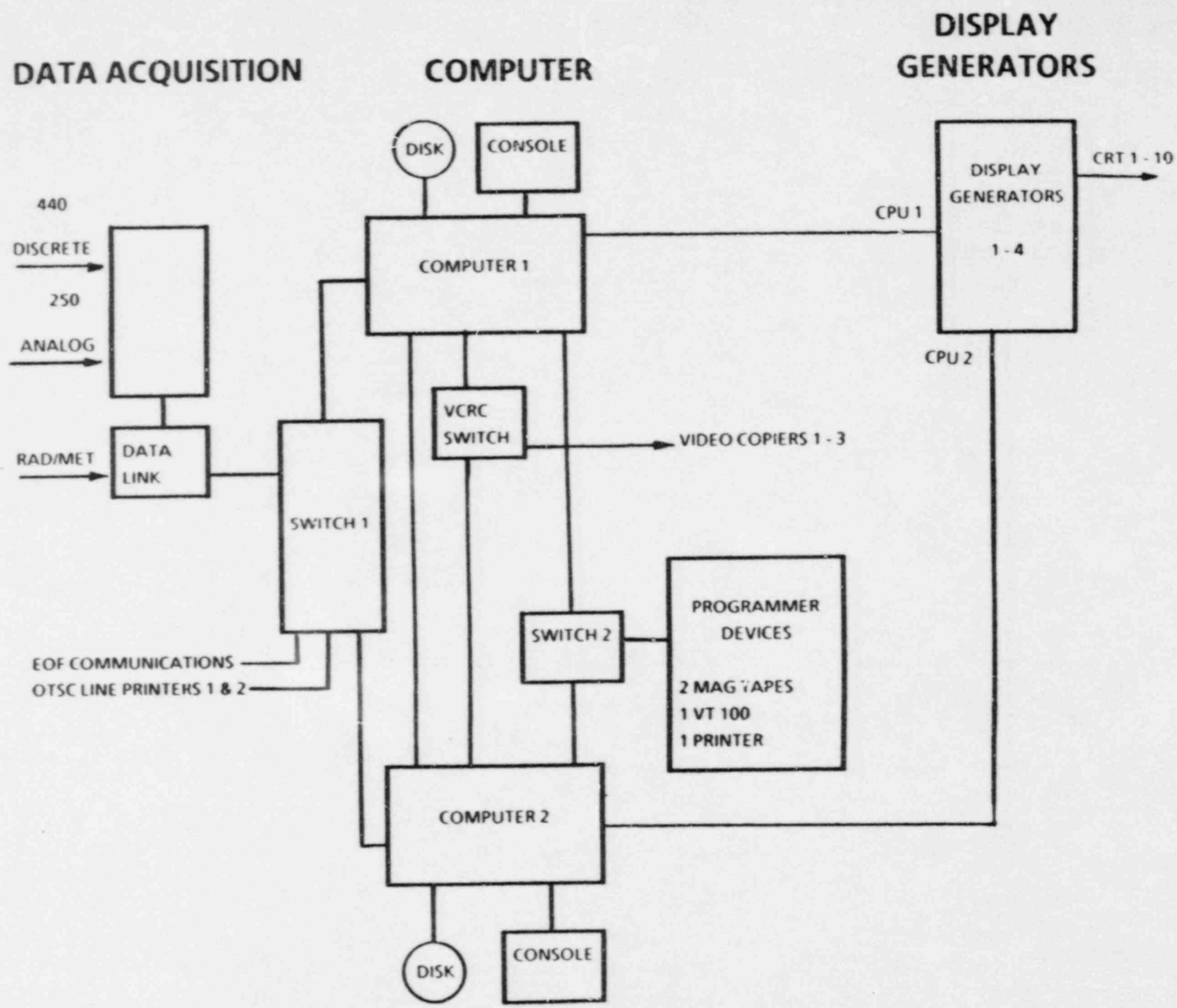
- NUREG 0578, 0585, 0660, 0737
- NUREG 0696
- REG. GUIDE 1.97
- REG. GUIDE 1.47
- IEEE-566
- EPRI

DESIGN BASIS

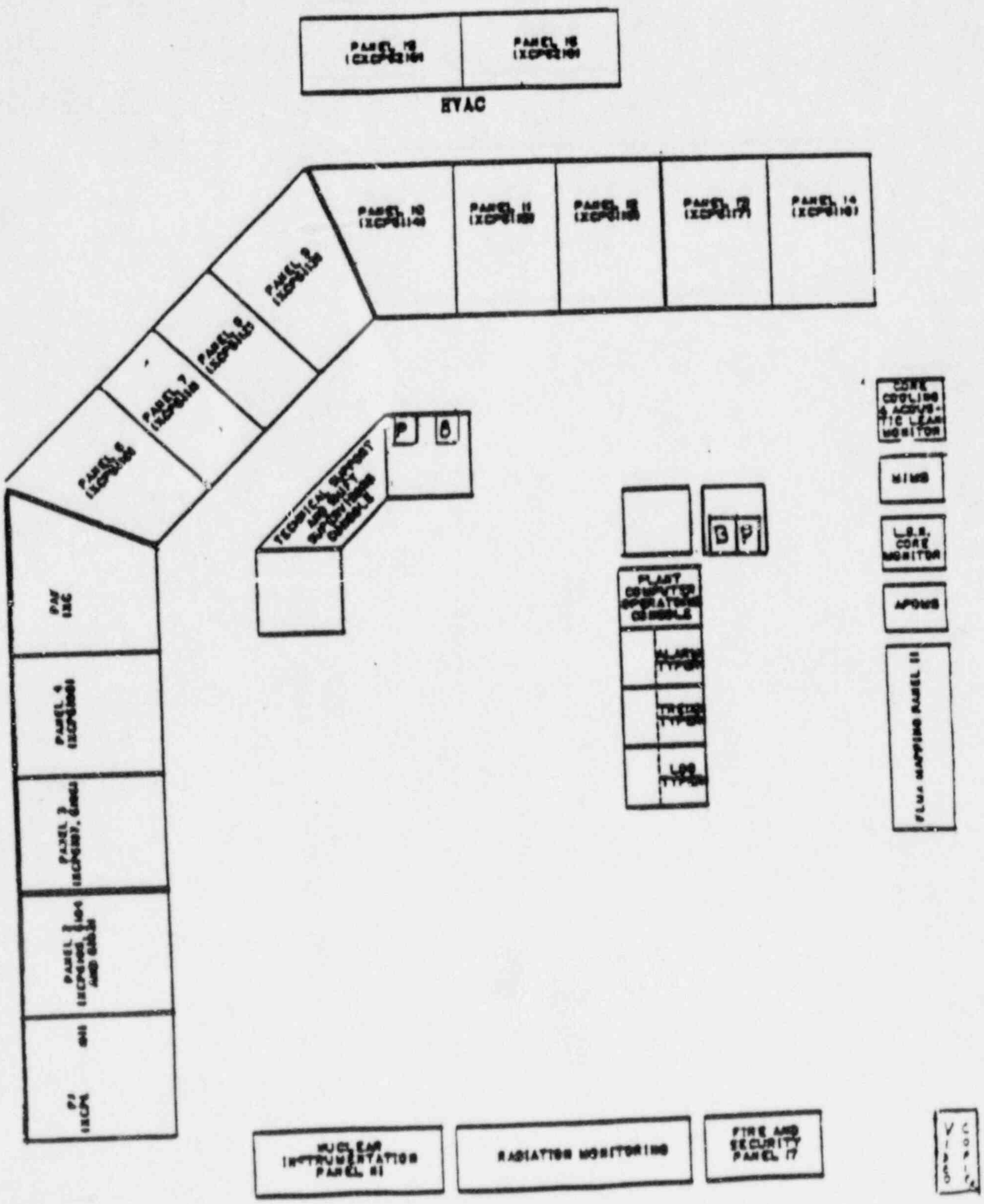
- PROVIDE REAL TIME INFORMATION OF CRITICAL PLANT SYSTEMS AND FUNCTIONS
- PROVIDE HISTORICAL STORAGE AND RETRIEVAL OF DATA
- PROVIDE INDEPENDENT DATA ACCESS AND DISPLAY CAPABILITY
- PROVIDE ISOLATED INTERFACE TO PLANT INSTRUMENTATION
- PROVIDE HUMAN ENGINEERED INFORMATION DISPLAYS

SYSTEM CONFIGURATION

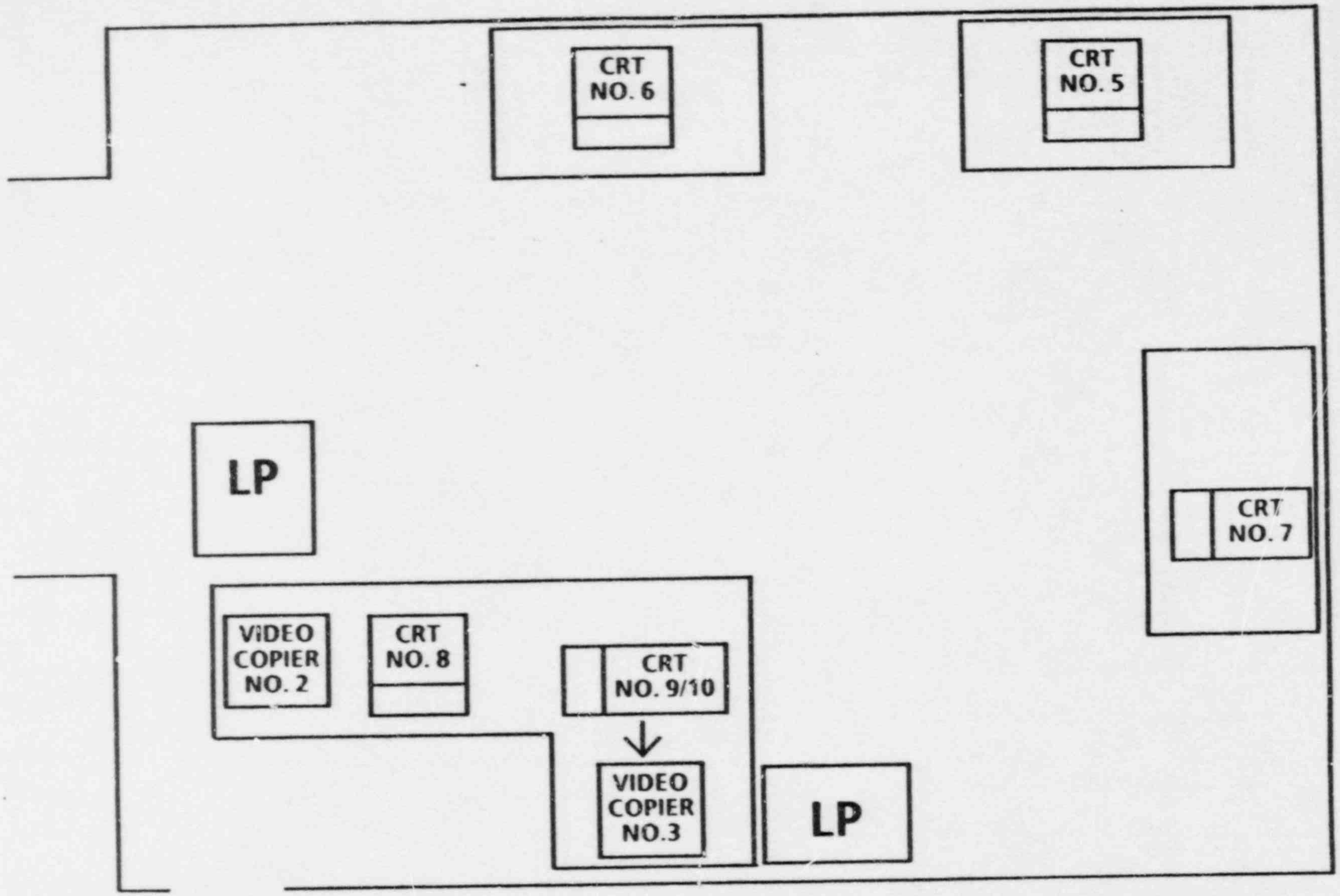




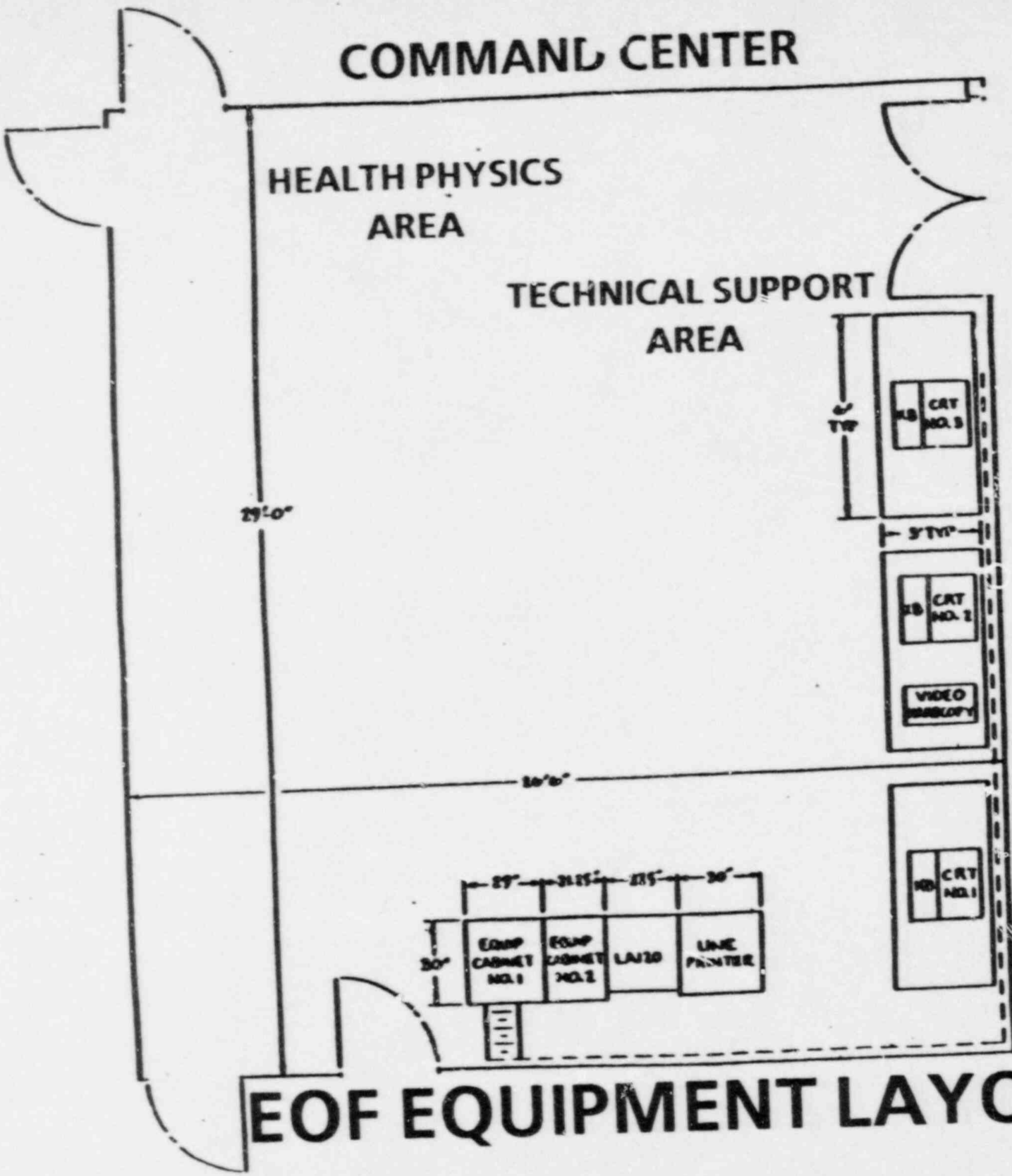
DATA ACQUISITION
COMPUTER
DISPLAY GENERATORS
440
DISCRETE
250
ANALOG
RAD/MET
DATA LINK
SWITCH 1
EOF COMMUNICATIONS
OTSC LINE PRINTERS 1 & 2
DISK
CONSOLE
COMPUTER 1
VCRC SWITCH
VIDEO COPIERS 1 - 3
SWITCH 2
PROGRAMMER DEVICES
2 MAG TAPES
1 VT 100
1 PRINTER
COMPUTER 2
DISK
CONSOLE
CPU 1
CPU 2
DISPLAY GENERATORS
1 - 4
CRT 1 - 10



CONTROL ROOM EQUIPMENT LAYOUT



TSC EQUIPMENT LAYOUT



EOF EQUIPMENT LAYOUT

SYSTEM DISPLAY TYPES

- PSSD
- OTSC
- BISI

PSSD FUNCTIONS

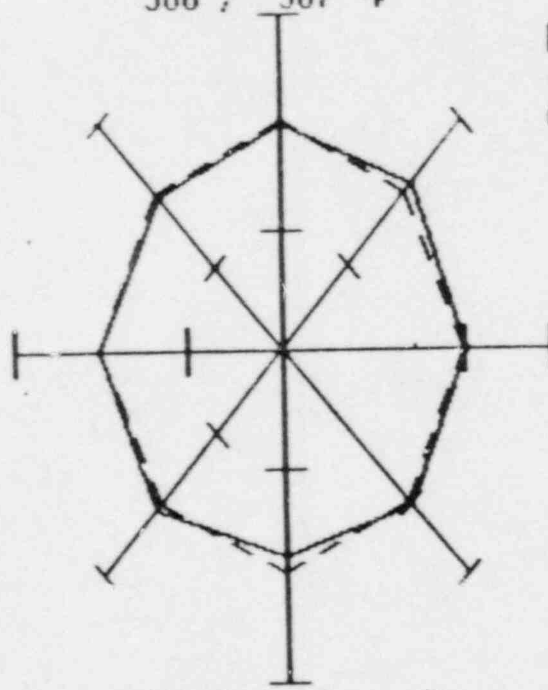
- OVERVIEW OF PLANT SAFETY STATUS
- DETECT & EVALUATE ABNORMAL CONDITIONS
- PROVIDE ABILITY TO MONITOR & HELP MITIGATE ABNORMAL EVENTS

1TL1 NAR RNG PSSD V. C. SUMMER 17-NOV-87 09:47:31

Tavg LP 2
586 / 587 °F

PRZR PRESS
2233 / 2235 PSIG

PWR MISMATCH
100 / 99 %
NUC TURB



PRZR LEV
59 / 59 %

CNTMT
TEMP NORM
RHR SUMP
LEV NORM

RAD
CNTMT NORM
SEC NORM P
OTHER NORM

NET CHG
10 GPM

NAR SG LEV LP 3
61 / 62%

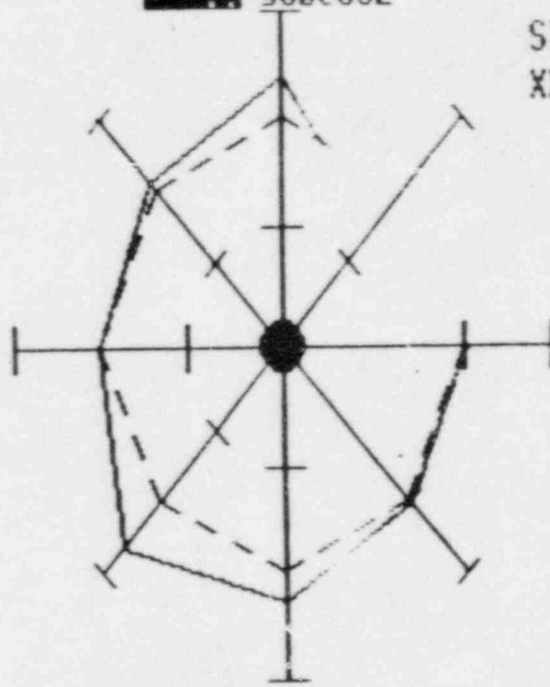
AMBIENT TEMP LOWER LEVEL DEGF	65.30	DEGF
PWR REL TO PRT TEMP	[redacted]	DEGF
SW FROM CC HEAT EXCHANGER B	8752.	GPM

ITL2 WID RNG — PSSD — V. C. SUMMER — 17-NOV-87 09:50:16

CORE EXIT
634 / 622 °F
[illegible] SUBCOOL

WID RCS PRESS
2254 / 2235 PSIG
126 MOP

STARTUP
XXXX[B] DPM



PRZR LEV
59 / 59 %

CNTMT PRESS
0 PSIG

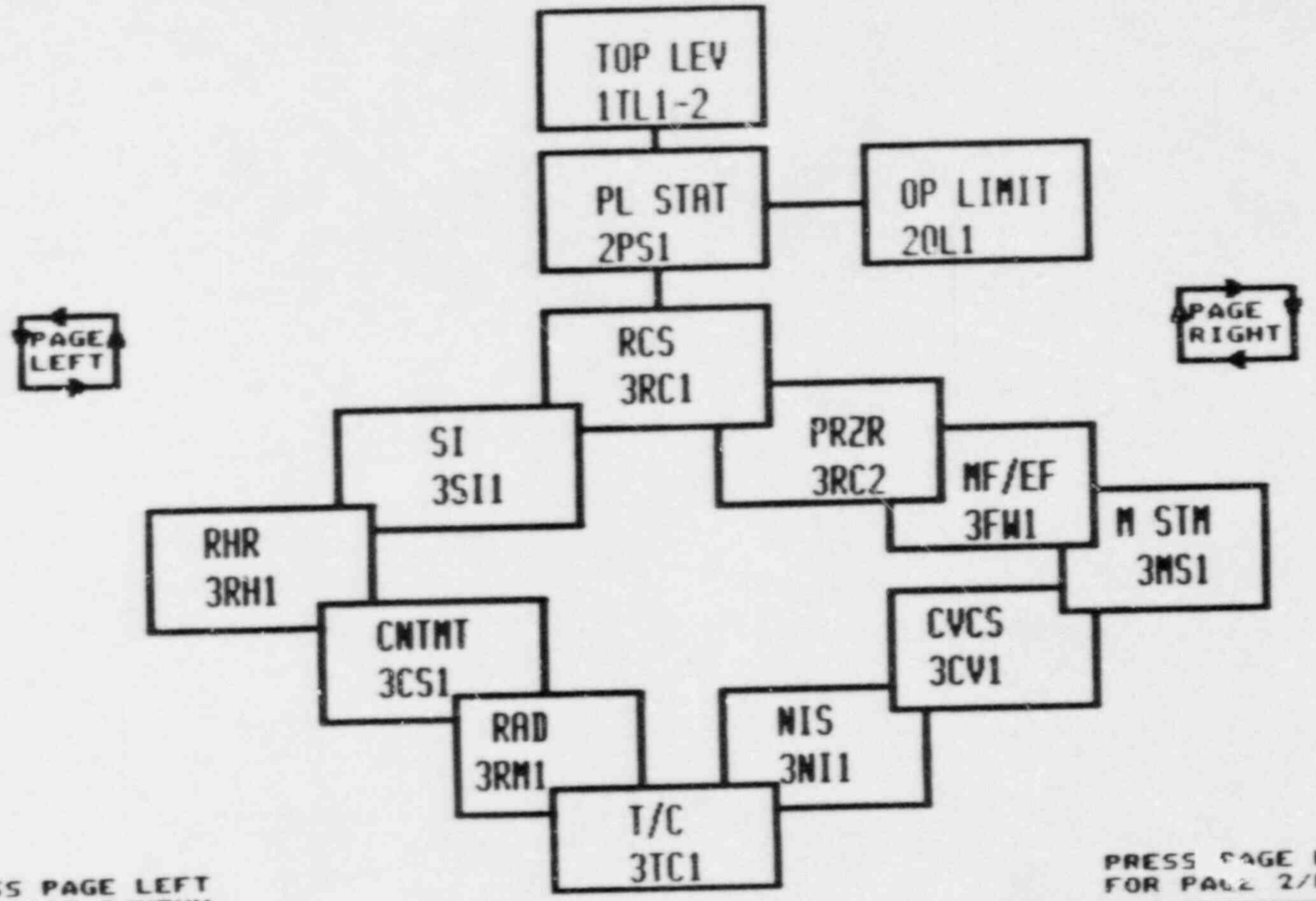
RAD
CNTMT NORM
SEC NORM[P]
OTHER NORM

RV LEV 113 %
EXP 100 %

WID SG LEV LP 3
66 / 54 %

AMBIENT TEMP LOWER LEVEL DEGF	65.30	DEGF
PWR REL TO PRT TEMP	[illegible]	DEGF
SW FROM CC HEAT EXCHANGER B	8746	GPM

1MM1 PSSD MAP PSSD V. C. SUMMER 17-NOV-87 09:49:16

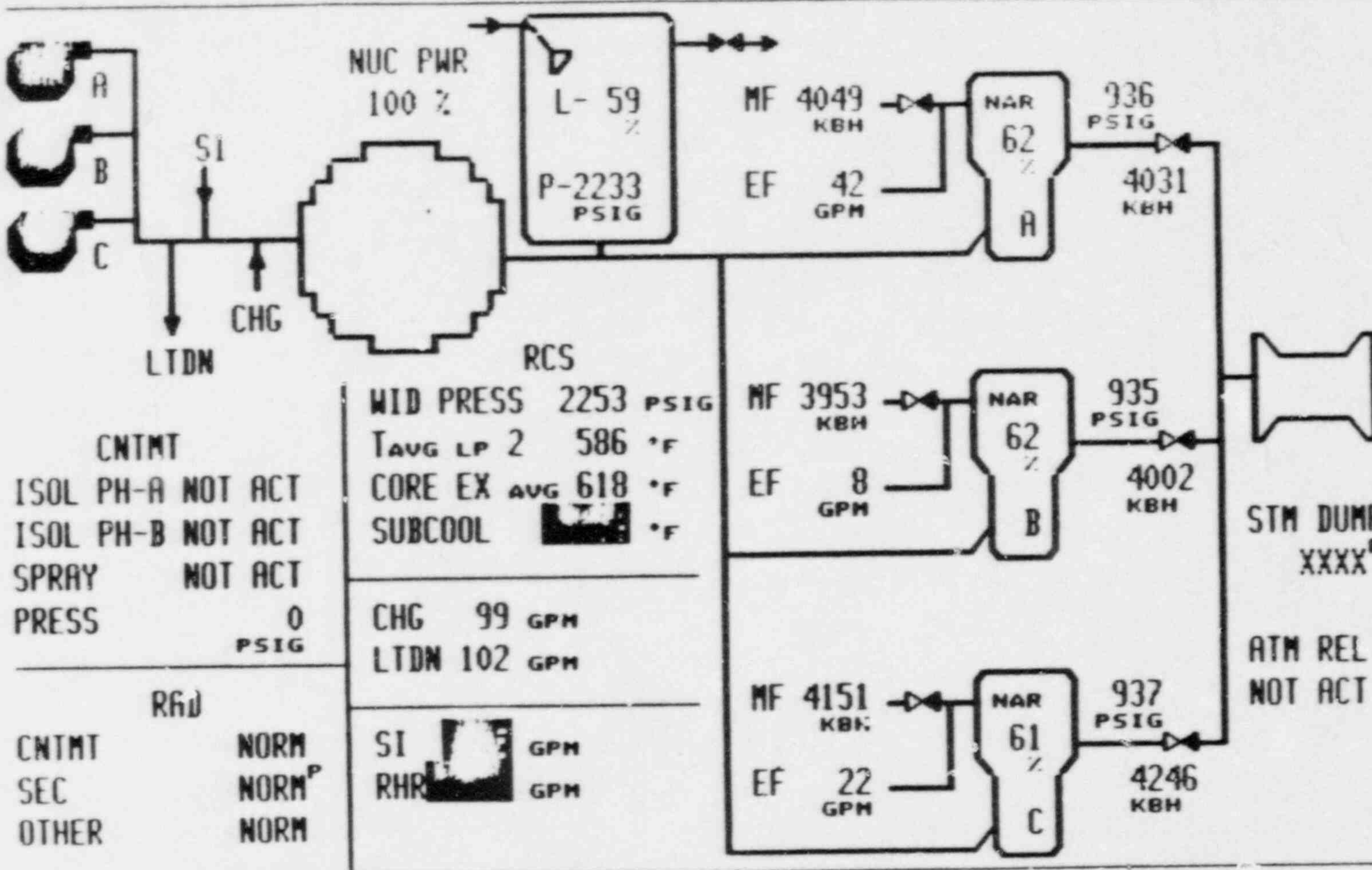


PRESS PAGE LEFT
FOR PAGE 3/MENU

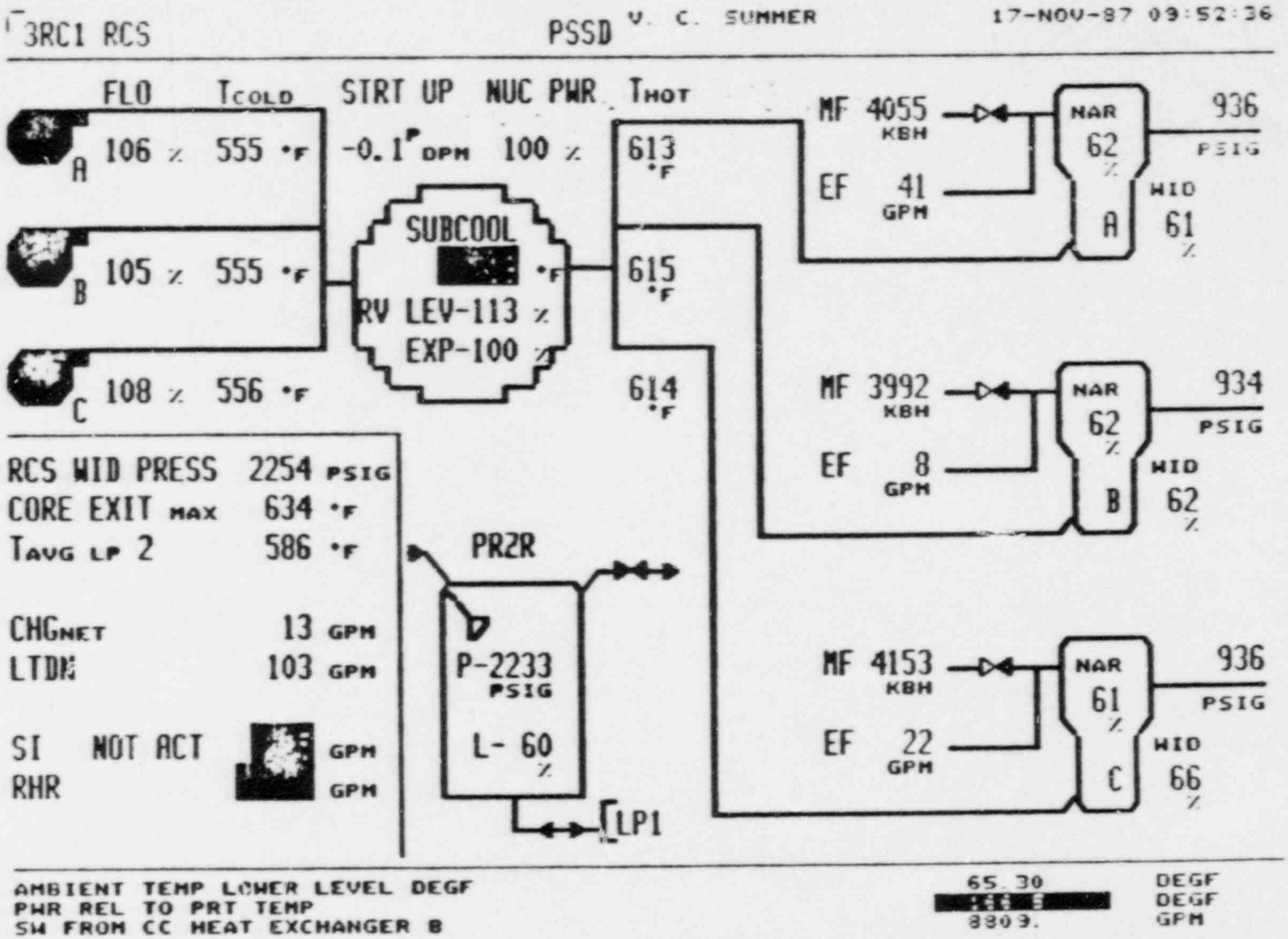
PRESS PAGE RIGHT
FOR PAGE 2/MENU

AMBIENT TEMP LOWER LEVEL DEGF	65.30	DEGF
PWR REL TO PRT TEMP	[illegible]	DEGF
SW FROM CC HEAT EXCHANGER B	8821.	GPM

2PS1 PL STAT PSSD V. C. SUMMER 17-NOV-87 09:51:49



AMBIENT TEMP LOWER LEVEL DEGF	65.30	DEGF
PWR REL TO PRT TEMP		DEGF
SW FROM CC HEAT EXCHANGER B	8753.	GPM


3RC1 RCS
PSSD
V. C. SUMMER
17-NOV-87 09:52:36
FLO
TCOLD
STRT UP
NUC PWR
THOT
A 106 % 555 °F
-0.1 DPM
100 %
B 105 % 555 °F
C 108 % 556 °F
613 °F
615 °F
614 °F
SUBCOOL
°F
RV LEV-113 %
EXP-100 %
MF 4055 KBH
EF 41 GPM
NAR 62 %
A
WID 61 %
936 PSIG
MF 3992 KBH
EF 8 GPM
NAR 62 %
B
WID 62 %
934 PSIG
MF 4153 KBH
EF 22 GPM
NAR 61 %
C
WID 66 %
936 PSIG
RCS WID PRESS 2254 PSIG
CORE EXIT MAX 634 °F
TAVG LP 2 586 °F
CHGNET 13 GPM
LTDN 103 GPM
SI NOT ACT GPM
RHR GPM
PRZR
P-2233 PSIG
L- 60 %
LP1
AMBIENT TEMP LOWER LEVEL DEGF
PWR REL TO PRT TEMP
SW FROM CC HEAT EXCHANGER B
65.30
8809.
DEGF
DEGF
GPM

RCS

FLO

LP 1	105 %	FT0414
	105	FT0415
	105	FT0416
LP 2	105 %	FT0424
	105	FT0425
	105	FT0426
LP 3	108 %	FT0434
	109	FT0435
	108	FT0436

PRESS

WID	2231 PSIG	PT0402
	2279	PT0403
PRZR	2225 PSIG	PT0455
	2233	PT0456
	2241	PT0457

T_{HOT}

LP 1	613 °F	TE0413
LP 2	615 °F	TE0423
LP 3	614 °F	TE0433

T_{COLD}

LP 1	553 °F	TE0410
LP 2	556 °F	TE0420
LP 3	551 °F	TE0430

T_{AVG}

LP 1	586 °F	TY0411C
LP 2	586 °F	TY0421C
LP 3	586 °F	TY0431C
AUCT	587 °F	TY0408

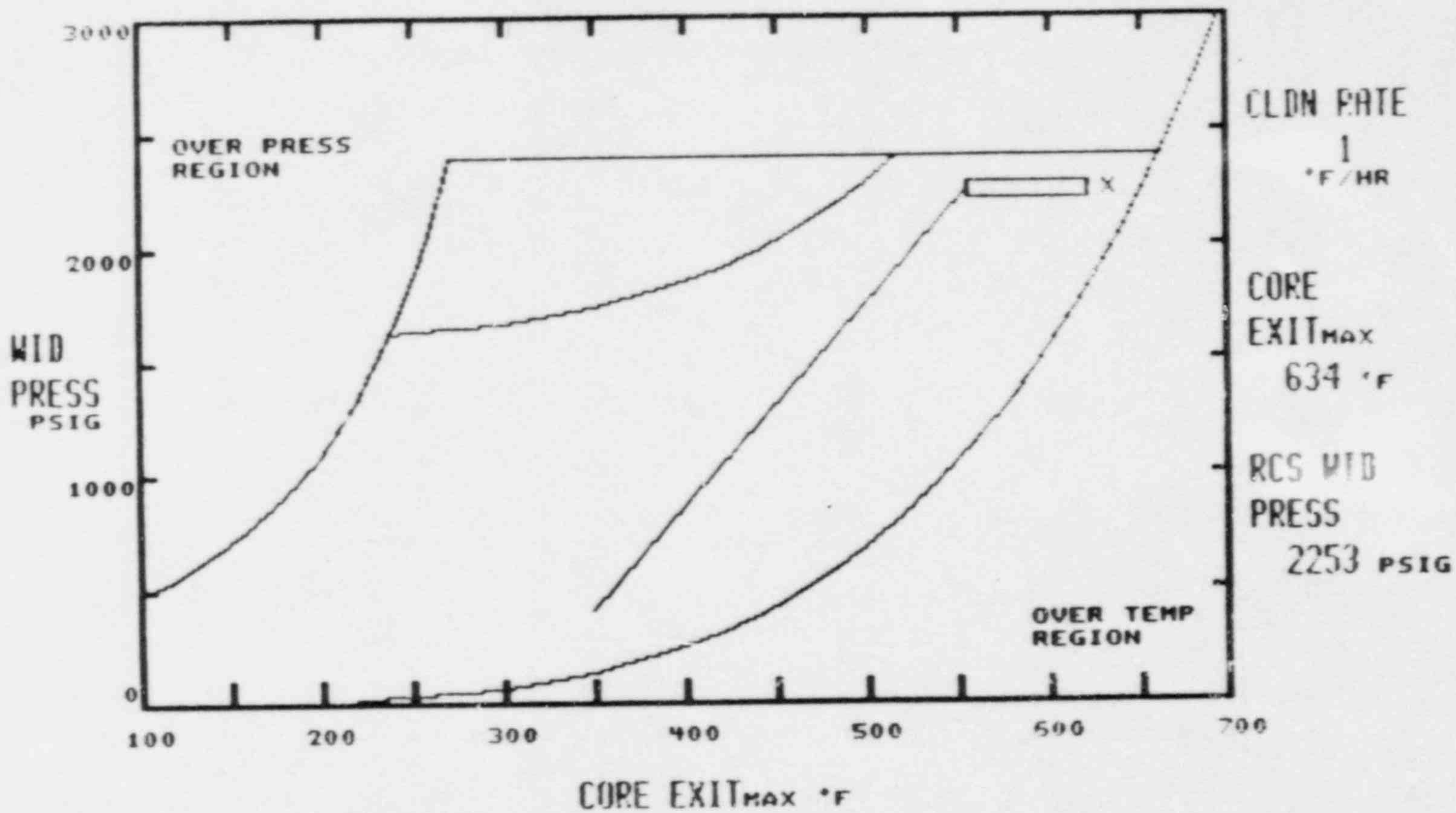
SUBCOOL [illegible] °F

CORE EXIT
AVG 618 °F

FOR INDIVIDUAL T/C VALUES
POSITION CURSOR ON THIS MESSAGE &
PRESS DISPLAY PAGE

AMBIENT TEMP LOWER LEVEL DEGF	65.30	DEGF
PWR REL TO PRT TEMP	[illegible]	DEGF
SW FROM CC HEAT EXCHANGER B	8543.	GPM

20L1 OP LIMIT PSSD V. C. SUMMER 17-NOV-87 09:51:03



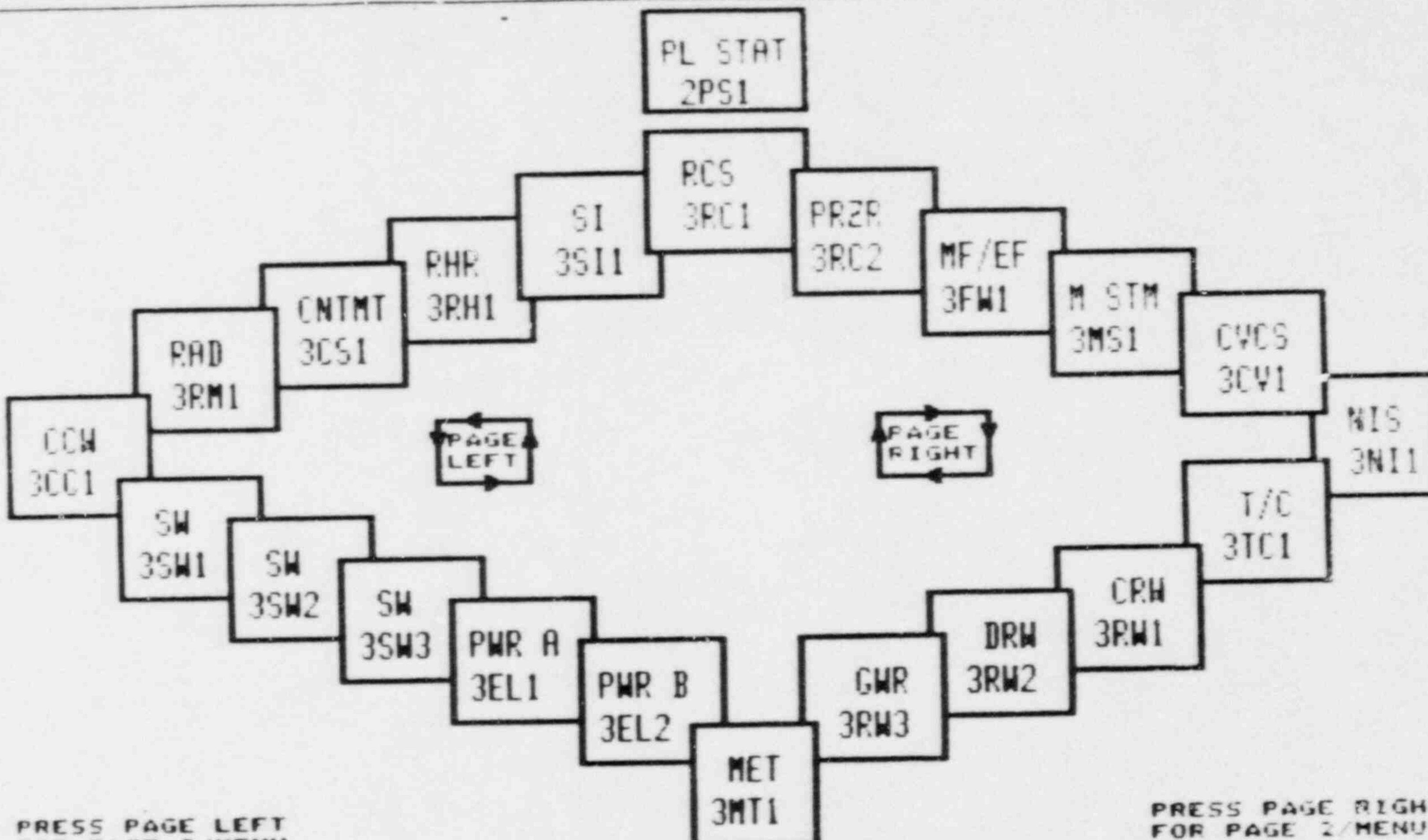
PLOT AS OF 09:51:03

AMBIENT TEMP LOWER LEVEL DEGF	65.30	DEGF
PWR REL TO PRT TEMP	[redacted]	DEGF
SW FROM CC HEAT EXCHANGER B	8300	GPM

OTSC FUNCTIONS

- PROVIDE STATUS OF MAJOR SYSTEMS
- PROVIDE STATUS OF SUPPORT SYSTEMS
- PROVIDE HISTORY & TREND FUNCTIONS

1MM1 DTSC MAP DTSC [illegible] SUMMER [illegible]



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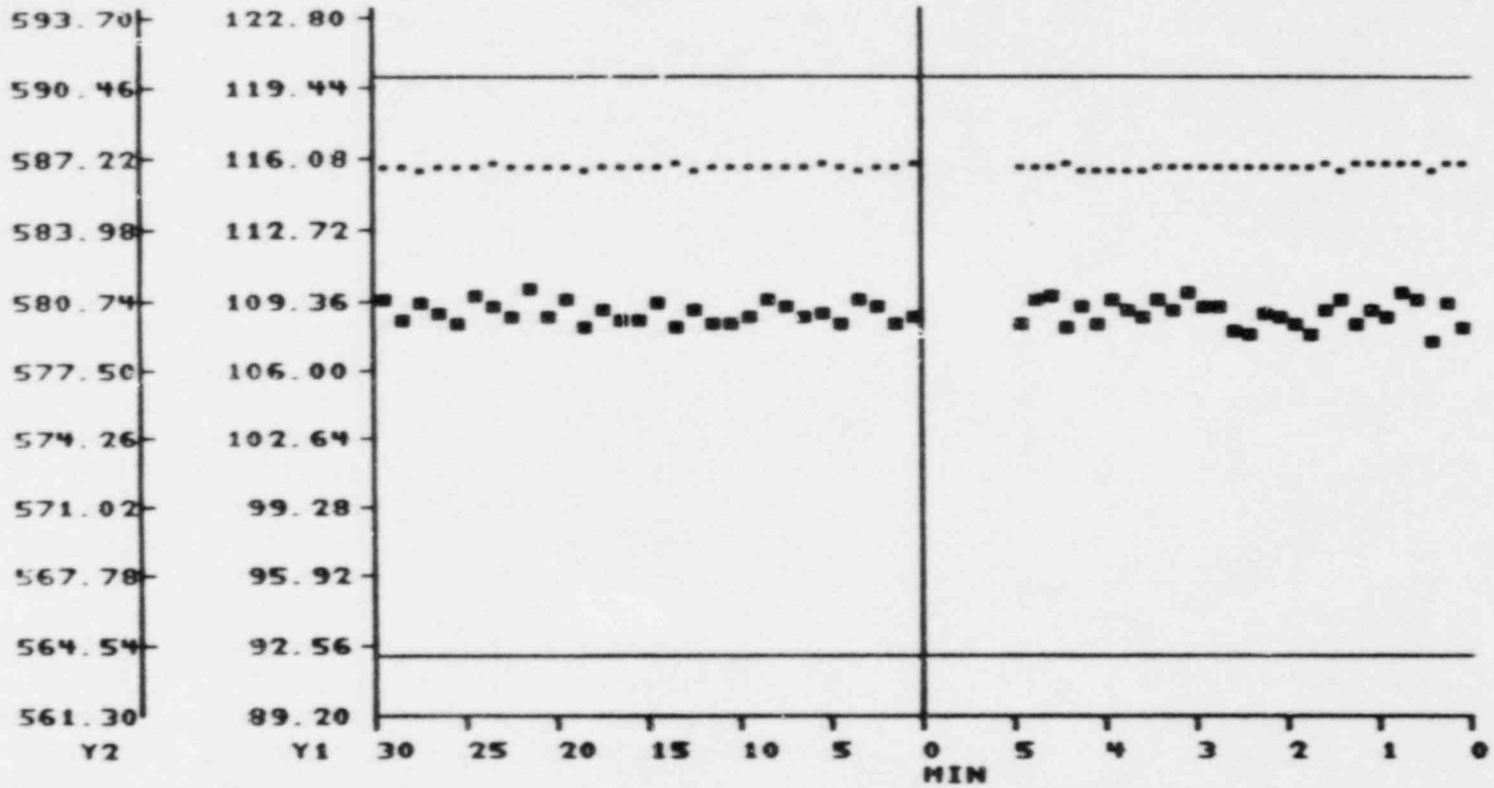
FOR PAGE 3/MENU

PRESS PAGE RIGHT
FOR PAGE 2/MENU

- HARDCOPY INITIATED -

TREND PLOT OTSC V. C. SUMMER 08-MAR-88 08:49:00

			HI	LO	CURRENT	
▪	Y1 FT0435	LOOP 3 RC FLOW	120.00	92.00	107.97	PC
·	Y2 TY0431C	RC LOOP 3 TAVG	591.00	564.00	586.85	DEGF



FOR AXIS SWAP HIT [illegible]

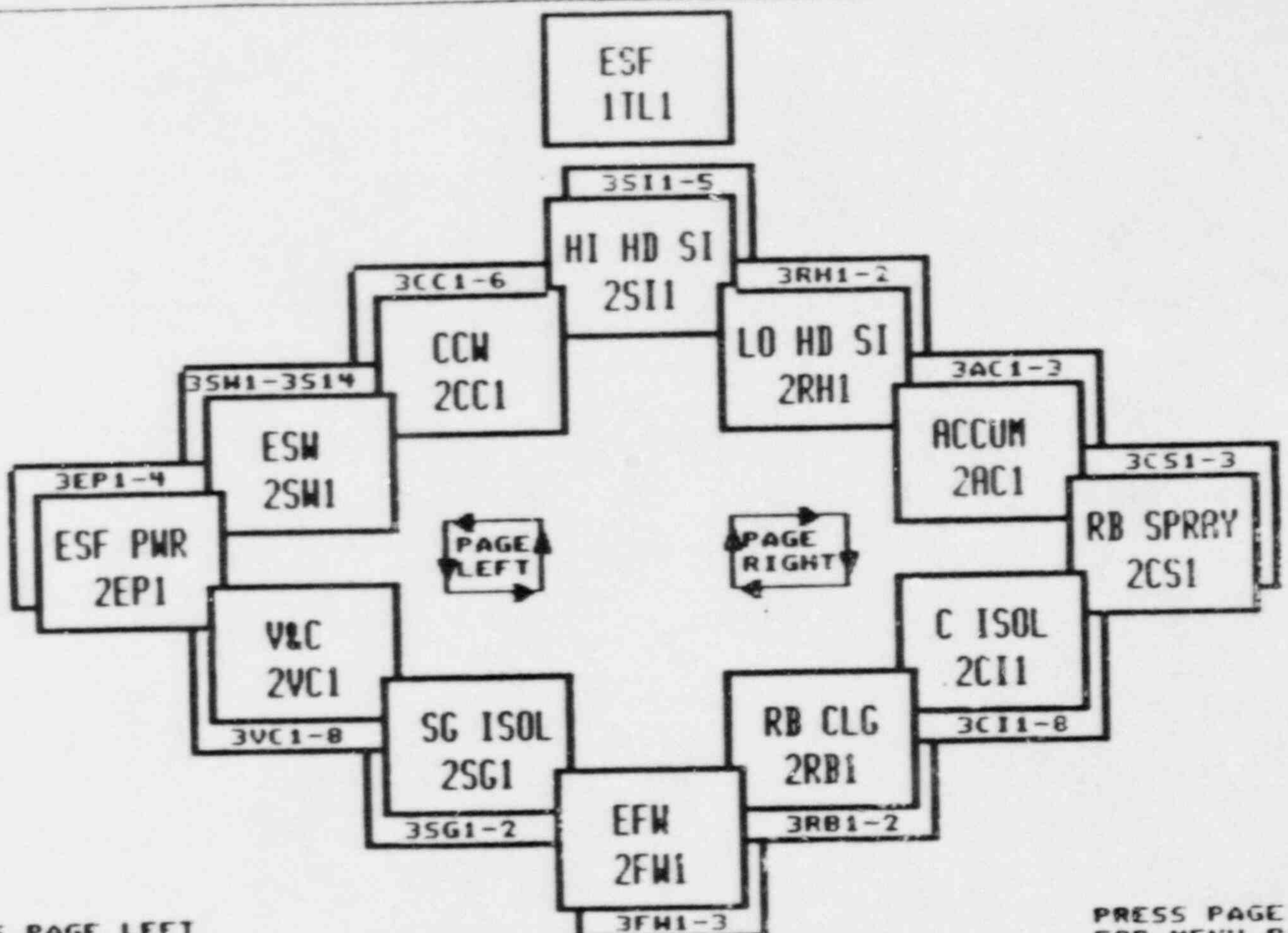
[illegible] FOR 240 MIN DATA

- HARDCOPY INITIATED -

BISI FUNCTIONS

- STATUS OF ESF SYSTEMS
- DETECT & EVALUATE ABNORMAL CONDITIONS
- TRACK ACTION TIME LIMITS

1MM1   BISI MAP - BISI   V C SUMMER



PRESS PAGE LEFT
FOR MENU PAGE 2

PRESS PAGE RIGHT
FOR MENU PAGE 1

AMBIENT TEMP LOWER LEVEL DEGF	62.24	DEGF
FWR REL TO PRT TEMP	[redacted]	DEGF
SW FROM CC HEAT EXCHANGER B	8776.	GPM

ITLI ESF SYSTEMS BISI V C SUMMER 30-NOV-85 09 42 24

	TRAIN A	TRAIN B
HIGH HEAD SI	OPER	OPER
LOW HEAD SI	OPER	OPER
ACCUM	OPER	OPER
RB SPRAY	OPER	OPER
CNTMT ISOL	OPER	OPER
RB CLG	OPER	OPER
EMRG FW	OPER	OPER
SG ISOL	OPER	OPER
VENT & CLG	OPER	OPER
ESF PWR	OPER	OPER
ESS SERV WTR	OPER	OPER
CMPNT CLG WTR	OPER	OPER

	TRAIN A	TRAIN B
CNTMT ISOL	OPER	OPER
PHASE A CMPNTS	OPER	OPER
PHASE B CMPNTS	OPER	OPER
CNTMT VENT ISOL CMPNTS	OPER	OPER
ESF PWR	OPER	OPER

AMBIENT TEMP LOWER LEVEL DEGF	53.72	DEGF
PWR REL TO RXT TEMP	[illegible]	DEGF
SW FROM CC HEAT EXCHANGER B	3657	GPM

3CII CNTMT ISOL BISI V. C. SUMMER 17-NOV-87 10 46 33

	STATUS	POSITION	TAG NUMBER
PHASE A CMPNTS TR A PG 1 OF 2	OPER		
RCP SEAL WTR	OPERM	NOT CLSD	XVT8112
RB SUMP	OPERM	NOT CLSD	XVD6242A
PRT N2 SUP	OPERM	NOT CLSD	XVD8047
ACCUM TEST LINE	OPERM	CLOSED	XVT8871
RB AIR SMPL	OPERM	NOT CLSD	XVA9311A
SMPL	OPERM	NOT CLSD	XVA9312A
SG A BLDN	OPERM	NOT CLSD	XVG0503A
B BLDN	OPERM	NOT CLSD	XVG0503B
C BLDN	OPERM	NOT CLSD	XVG0503C
RCDT VENT	OPERM	NOT CLSD	XVD7126
LEV CNTL	OPERM	CLOSED	LCV1003
H2 ANLZ A	OPERM	NOT CLSD	XVX6050A

PAGE RIGHT FOR PG 2

AMBIENT TEMP LOWER LEVEL DEGF	59.72	DEGF
PWR REL TO PRT TEMP	[illegible]	DEGF
SW FROM CC HEAT EXCHANGER B	3671.	GPM

TSC/P2500 REPLACEMENT UPGRADE

- PHASE 1 1988
- PHASE 2 1989
- PHASE 3 1990

DOSE ASSESSMENT

GLENN HIGGINBOTHAM

DOSE ASSESSMENT

THE SITE SPECIFIC COMBINATION OF SOURCE TERMS, EFFLUENT RELEASE PATHS, METEOROLOGICAL CONDITIONS, FIELD TEAM RESULTS, AND PLANT PARAMETERS USED TO PROJECT OFFSITE EXPOSURES AND TO RECOMMEND PROTECTIVE ACTION.

DOSE ASSESSMENT

- MANY FUNCTIONS COMPUTERIZED ON A SITE SPECIFIC CODE, CALLED EARS.
- CODE HAS BEEN VERIFIED BY HAND CALCULATIONS.
- COMPARISONS HAVE BEEN RUN BETWEEN EARS AND THE STATE DOSE ASSESSMENT METHOD AND IRDAM.

DOSE ASSESSMENT

SOME MAJOR CAPABILITIES:

- SEGMENTED GAUSSIAN PLUME MODEL.
- MODELS CODE ACCOUNTS FOR WIND SHIFTS GROUND LEVEL RELEASES.
- PRIMARY MET TOWER DELTA "T" INPUT.
- RADIATION MONITORING SYSTEM (RMS)/EFFLUENT MONITORS.
- PROJECTION/UPDATE MODE.
- CORRECT AND RERUN.
- OFFSITE CORRELATION

DOSE ASSESSMENT

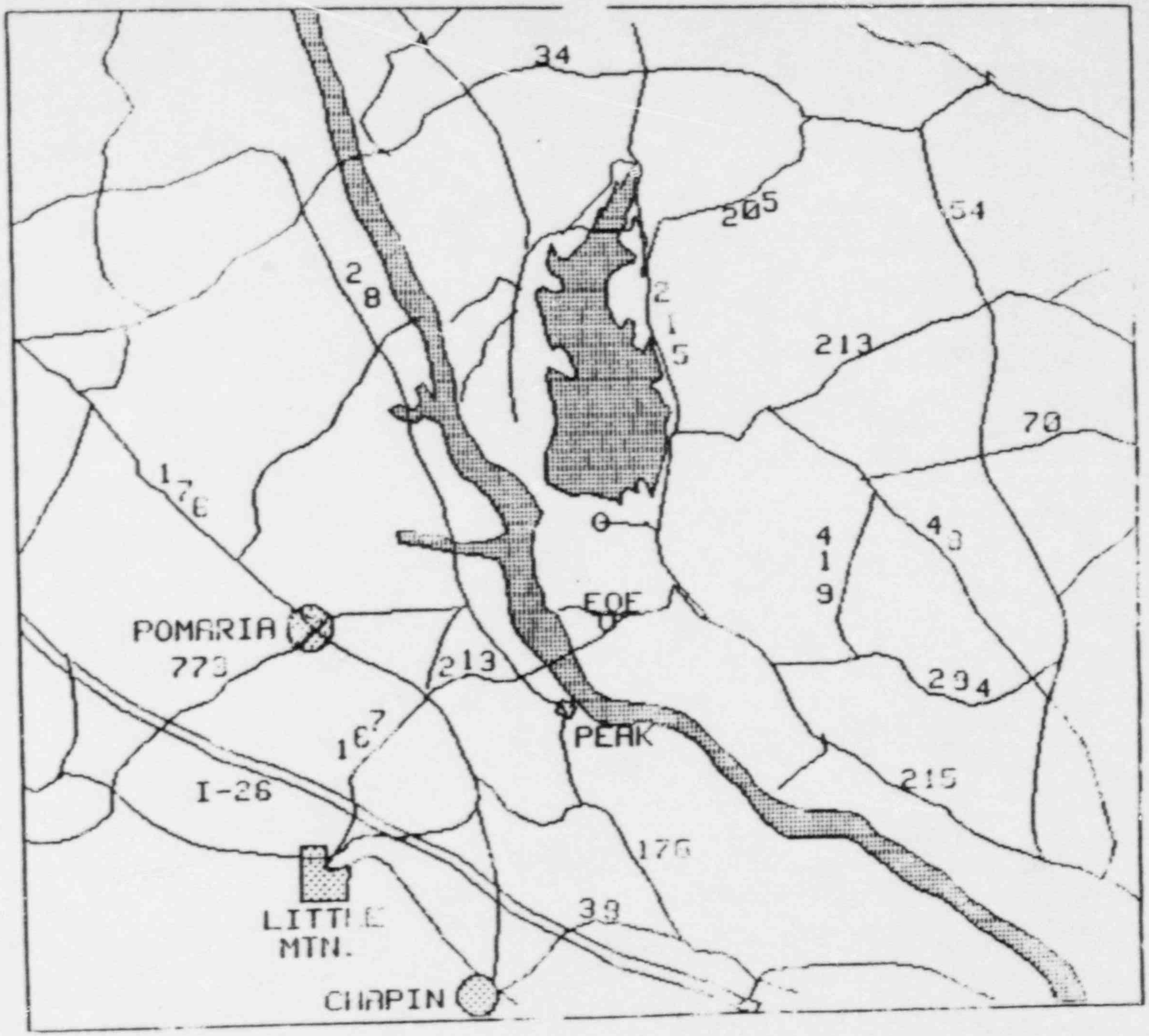
ASSUMPTION REFERENCES:

- REG GUIDE 1.23 FOR STABILITY CLASS.
- REG GUIDE 1.145 FOR ATMOSPHERIC DISPERSION FROM GROUND LEVEL RELEASES.
- REG GUIDE 1.109 WHOLE BODY AND CHILD THYROID INHALATION DOSE CONVERSION.

DOSE ASSESSMENT

AVAILABLE CHOICES

- CURRENT UPDATE
- FORECAST
- RETURN TO PRIOR UPDATE TIME
- END PROGRAM EXECUTION


34
205
54
28
2
1
5
213
70
176
419
43
EOE
POMARIA
773
213
294
167
PEAK
I-26
215
176
LITTLE
MTN.
39
CHAPIN

10 MILE EPZ

METEOROLOGY

- MET SYSTEM POWERED FROM DIESEL BUS
- ANALOG METEOROLOGICAL READ OUT IN CONTROL ROOM
- DIGITAL METEOROLOGICAL DATA THROUGH A COMPUTER SYSTEM WITH TRENDING AND HISTORY READILY AVAILABLE.
- JOINT DATA RECOVERY GOAL OF 90% (R/G 1.23) MET OR EXCEEDED SINCE 1983

DOSE ASSESSMENT

CURRENT UPDATE

- EFFLUENT MONITORS
- DIRECT ENTRY OF CI/SEC OR ISOTOPIC uCI/ML AND FLOW
- RETURN TO FORECAST IN PROGRESS
- FSAR CHAPTER 15 ACCIDENT SCENERIOS
- END PROGRAM EXECUTION

TSC/EOF Communicator Data Sheet

1. Time of Pr[illegible] 88/03/07 1530

2. Class of Emergency based on Dose Assessment is GENERAL EMERGENCY

3. Estimated duration of release in hours is 2

** See attached sheet for Protective Action Guides (PAG's) **

4. Dose Projection Base Data:

Current Total release rate (N.G.):	4.74E+03	Curies/sec
Event Total release (N.G.):	1.75E+07	Curies
Current Total release rate (IOD.):	9.43E-05	Curies/sec
Event Total release (IOD.):	3.51E-01	Curies
Windspeed (mph):	5	
Wind Direction from:	300	
Stability class (vert)	F	
Release height:	Ground level	
Temperature at site:		

Dose Rates:

	Whole Body	Child Thyroid
Site Boundary/1 Mile:	2.6E+02 R/Hr	1.5E+02 R/Hr
2 miles:	1.1E+02 R/Hr	6.5E+01 R/Hr
5 miles:	3.5E+01 R/Hr	2.1E+01 R/Hr
10 miles:	1.5E+01 R/Hr	8.9E+00 R/Hr

Projected Integrated Dose to 88/03/07 1730

Site Boundary/1 Mile:	5.2E+02 Rem	3.1E+02 Rem
2 miles:	2.2E+02 Rem	1.3E+02 Rem
5 miles:	7.1E+01 Rem	4.2E+01 Rem
10 miles:	3.0E+01 Rem	1.8E+01 Rem

Equivalent Whole [illegible]se Factor: 1.4E-01 (Rem/sec)/(Ci/m^3)
Equivalent Child [illegible]d Dose Factor: 8.4E-02 (Rem/sec)/(Ci/m^3)

6. Environmental measurements:

Location	Time	Dose Rates	Sample Type	Results

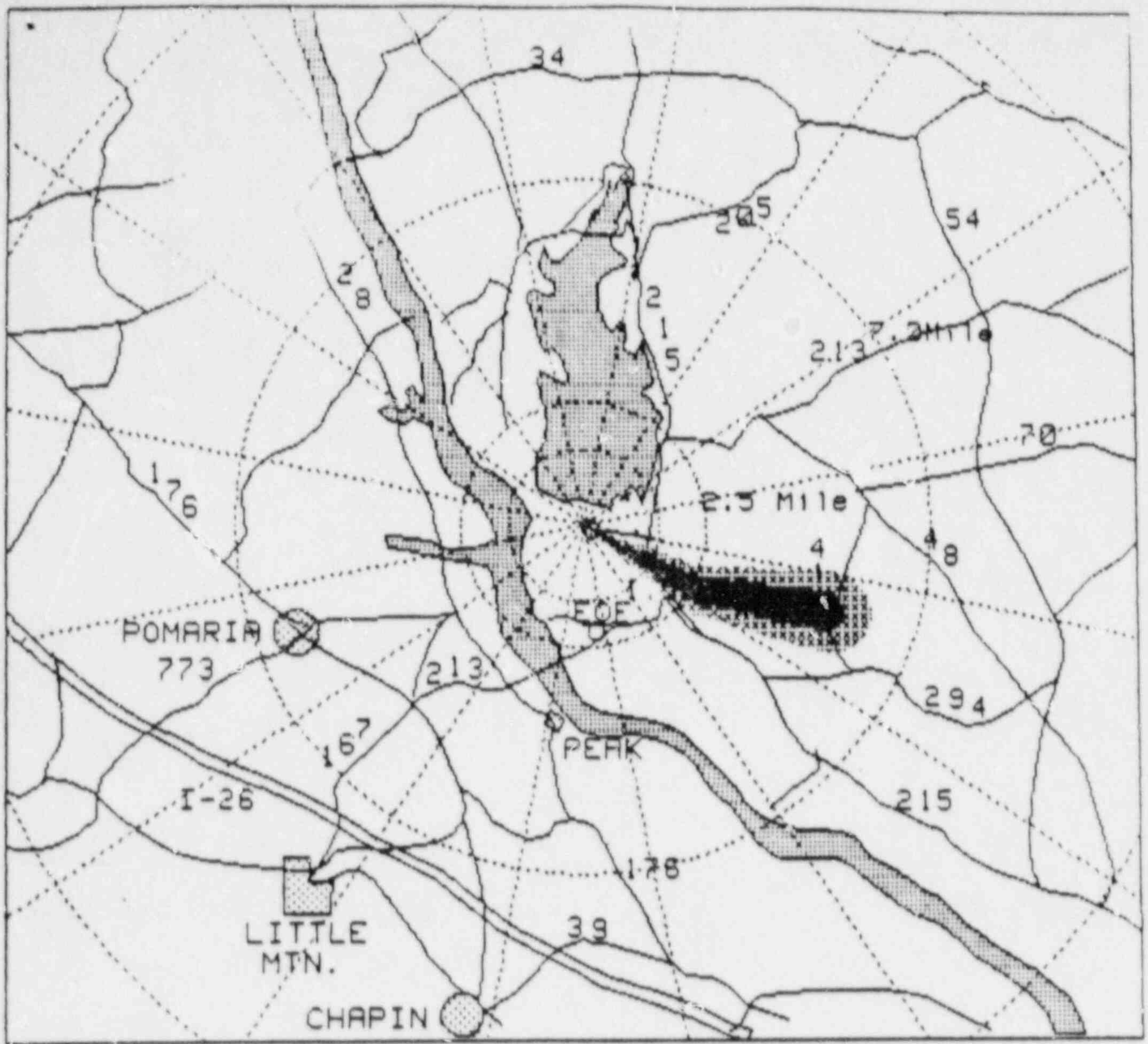
7. Comments:

CURRENT CUMULATIVE THYROID DOSE (mrem) @ 88/03/07 1600

SECTOR #	@ SITE Boundary	0-1.5 Mile(1)	1.5-2.5 Mile(2)	2.5-7.0 Mile(5)	7.0-12.5 Mile(10)	12.5-20 Mile(16
1	-*-	-*-	-*-	-*-	-*-	-*-
2	-*-	-*-	-*-	-*-	-*-	-*-
3	-*-	-*-	-*-	-*-	-*-	-*-
4	-*-	-*-	-*-	-*-	-*-	-*-
5 E	[illegible].15E+04	6.22E+04	2.63E+04	1.99E+04	-*-	-*-
6 ESE	7.05E+04	7.13E+04	3.02E+04	4.75E+04	-*-	-*-
7 SE	-*-	-*-	-*-	-*-	-*-	-*-
8 SSE	-*-	-*-	-*-	-*-	-*-	-*-
9 S	-*-	-*-	-*-	-*-	-*-	-*-
10 SSW	-*-	-*-	-*-	-*-	-*-	-*-
11 SW	-*-	-*-	-*-	-*-	-*-	-*-
12 WSW	-*-	-*-	-*-	-*-	-*-	-*-
13 W	-*-	-*-	-*-	-*-	-*-	-*-
14 WNW	-*-	-*-	-*-	-*-	-*-	-*-
15 NW	-*-	-*-	-*-	-*-	-*-	-*-
16 NNW	-*-	-*-	-*-	-*-	-*-	-*-

CURRENT THYROID DOSE RATE (mrem/hr) @ 88/03/07 1600

SECTOR #	@ SITE Boundary	0-1.5 Mile(1)	1.5-2.5 Mile(2)	2.5-7.0 Mile(5)	7.0-12.5 Mile(10)	12.5-20 Mile(16)
1 N	-*-	-*-	-*-	-*-	-*-	-*-
2 NNE	-*-	-*-	-*-	-*-	-*-	-*-
3 NE	-*-	-*-	-*-	-*-	-*-	-*-
4 ENE	-*-	-*-	-*-	-*-	-*-	-*-
5 E	-*-	-*-	-*-	-*-	-*-	-*-
6 ESE	1.41E+05	1.43E+05	6.04E+04	9.51E+04	-*-	-*-
7 SE	-*-	-*-	-*-	-*-	-*-	-*-
8 SSE	-*-	-*-	-*-	-*-	-*-	-*-
9 S	-*-	-*-	-*-	-*-	-*-	-*-
10 SSW	-*-	-*-	-*-	-*-	-*-	-*-
11 SW	-*-	-*-	-*-	-*-	-*-	-*-
12 WSW	-*-	-*-	-*-	-*-	-*-	-*-
13 W	-*-	-*-	-*-	-*-	-*-	-*-
14 WNW	-*-	-*-	-*-	-*-	-*-	-*-
15 NW	-*-	-*-	-*-	-*-	-*-	-*-
16 NNW	-*-	-*-	-*-	-*-	-*-	-*-



10 Mile Map
Release Start: 88/03/07 1500 Wind Speed: 2.2 M/sec
Plume Update: 88/03/07 1600 Wind Dir.: 300.0 Deg

Edge Dose Rate & Type: 6.1E-02 mrem/hr (THYROID)

*** Note: Intensified area interior of the PLUME represents >1 REM/Hr dose

EMERGENCY RESPONSE ORGANIZATION

KEN BEALE

EMERGENCY RESPONSE ORGANIZATION

TECHNICAL SUPPORT CENTER

- SUPPORT PERSONNEL
  - OPERATIONS
  - MAINTENANCE
  - ENGINEERING
  - HEALTH PHYSICS/CHEMISTRY
  - SECURITY
  - ADMINISTRATION
  - COMMUNICATIONS
  - REACTOR ENGINEERING
  - LICENSING

- MANAGEMENT PERSONNEL
  - EMERGENCY DIRECTOR
  - OPERATIONS SUPERVISOR
  - TECHNICAL SUPPORT SUPERVISOR
  - RADIOLOGICAL ASSESSMENT SUPERVISOR
  - MAINTENANCE SUPERVISOR
  - SECURITY SUPERVISOR
  - PERSONNEL ACCOUNTABILITY
  - COMMUNICATOR
  - SHIFT ENGINEER

ERGENCY RESPONSE ORGANIZATION

OPERATIONS SUPPORT CENTER

- SUPPORT PERSONNEL
  - MAINTENANCE
  - OPERATIONS
  - FIRE BRIGADE
  - FIRST AID
  - ADMINISTRATION
  - HEALTH PHYSICS
  - CHEMISTRY
  - QUALITY CONTROL
  - MATERIALS

- MANAGEMENT PERSONNEL
  - OSC SUPERVISOR
  - ECTRICAL SUPERVISOR
  - & C SUPERVISOR
  - MECHANICAL SUPERVISOR

:RGENCY RESPONSE ORGANIZATION

EMERGENCY OPERATIONS FACILITY

- SUPPORT PERSONNEL
  - DOSE ASSESSMENT
  - ENVIRONMENTAL TEAM
  - COMMUNICATIONS
  - ENGINEERING
  - SECURITY
  - CONSTRUCTION/REPAIR
  - GENERAL SERVICES
  - MEDIA

- MANAGEMENT PERSONNEL
  - EMERGENCY CONTROL OFFICER
  - OFF-SITE EMERGENCY COORDINATOR
  - OFF-SITE RADIOLOGICAL MONITORING COORDINATOR
  - TECHNICAL SUPPORT COORDINATOR
  - ERAL SERVICES COORDINATOR
  - STRUCTION/REPAIR COORDINATOR
  - RITY COORDINATOR
  - IA COORDINATOR
  - EMERGENCY PLANNING COORDINATOR
  - COMMUNICATOR
  - DATA LOGGERS

DOCUMENTATION AND LOGISTICAL OVERVIEW

HAL DONNELLY

ERF DOCUMENTATION OVERVIEW

- GENERAL EMERGENCY PLANNING DOCUMENTATION
- DOSE ASSESSMENT DOCUMENTATION
- COMPUTER SYSTEM DOCUMENTATION
- REACTOR OPERATIONS DOCUMENTATION
- METEOROLOGICAL DOCUMENTATION
  Not requested but available
- SOURCE TERM DOCUMENTATION

V. C. SUMMER ERF AUDIT QUESTION/ANSWER FORM

Quest... ____________ Topic Key Word: ____________

Perso... ____________ Date: ____________

Person ... on was presented: ____________

Question:

Answer:

Person formulating answer: ____________ Date: ____________

Person Reviewing answer: ____________ Date: ____________

Follow Up Action Required? YES / NO (circle one)

Fol... ...ons: ____________

Completed By: ____________

MANAGEMENT PRIMARY CONTACTS

If ... questions, concerns (or general information), or any difficulty co... of the people below, please contact Hal Donnelly, at ext. 4722.

Nuclear Protection Services	Ken Beale*	ext. 4268
Emergency Plan Coordination/Training	Mark Counts	ext. 4099
Operations	Jerry Shepp	ext. 4221
Health Physics	Bill Baehr	ext. 4125
Corporate Health Physics and Environmental	L. A. Blue	ext. 75-5002
Core Engineering and Nuclear Computer Services	Doug Warner	ext. 4734
Design Engineering	Steve Cunningham	ext. 4702
Systems and Performance Engineering	Chris Osier	ext. 4201
QA	Jim Proper	ext. 4088
QC	Steve Hunt	ext. 4128
Nuclear Licensing	Hal Donnelly	ext. 4722

For long-distance access, please dial 77-233-097-9-1-(Area Code)-Number.

* C... Coordinator

INSPECTION ITEMS	LICENSEE CONTACT PERSONNEL
03.02 Assessment of Radiological Releases (a) Source Term (b) Dose Assessment	Corporate Health Physics & Environmental Programs Glen Higginbotham 75-5009
03.03 Meteorological Information (a) Control Room Information (b) Representative Data (c) Data Reliability (d) Other Data Availability (e) NWS Data Availability (f) Data Adequacy (g) Data Storage, Display, Analysis (h) EOF Data Handling Reliability	Corporate Health Physics & Environmental Programs Steve Summer 75-5004
03.04 TSC Variable Availability (a) Documentation for Reg Guide 1.97 Variables (b) Reg Guide 1.97 Variable Availability and Sufficiency (c) Computer Data (d) Manual Data (e) Data Adequacy	Core Engineering and Nuclear Computer Services Al Barton/Rick Rusaw 4263
03.05 TSC Functional Capabilities (a) TSC Power Supplies (b) TSC Data Analysis	Core Engineering and Nuclear Computer Services Al Barton/Gene Baker 4263
03.06 TSC Habitability	Systems and Performance Engineering Gene Baker 4504
03.07 TSC Data Collection Storage, Analyses and Display (a) Review TSC Systems (b) Data Acquisition Systems	Core Engineering and Nuclear Computer Services Al Barton 4263

INSPECTION ITEMS	LICENSEE CONTACT PERSONNEL
03.08 EOF Variable Availability (a) Documentation for Reg Guide 1.97 Variables (b) Reg Guide 1.97 Variable Availability and Sufficiency (c) Computer Data (d) Manual Data (e) Data Adequacy	Core Engineering and Nuclear Computer Services Al Barton/Rick Rusaw 4263
03.09 EOF Location and Habitability (a) Location (b) Meets Criteria of Supp. 1 (c) Habitability	Nuclear Protection Services Ken Beale 4268
03.10 EOF Functional Capabilities (a) Data Analysis Adequacy (b) Backup EOF (c) EOF Reliability	Nuclear Protection Services Ken Beale 4268
03.11 EOF Data Collection, Storage, Analysis and Display	Core Engineering and Nuclear Computer Services Al Barton 4263

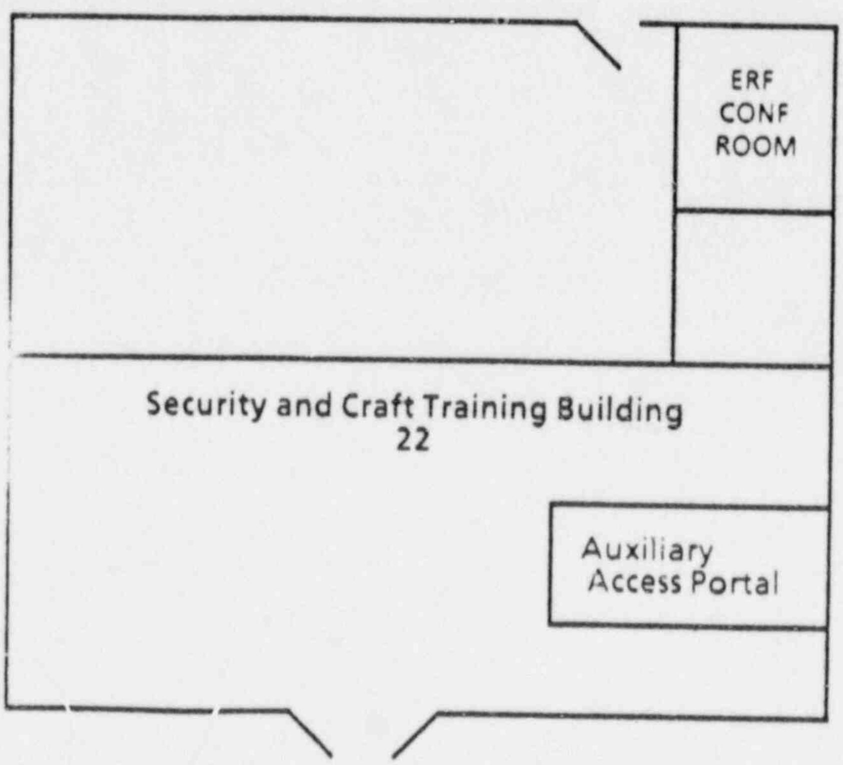
The ... maps of the Virgil C. Summer Station are being provided to reflect fac... ...le for your use:

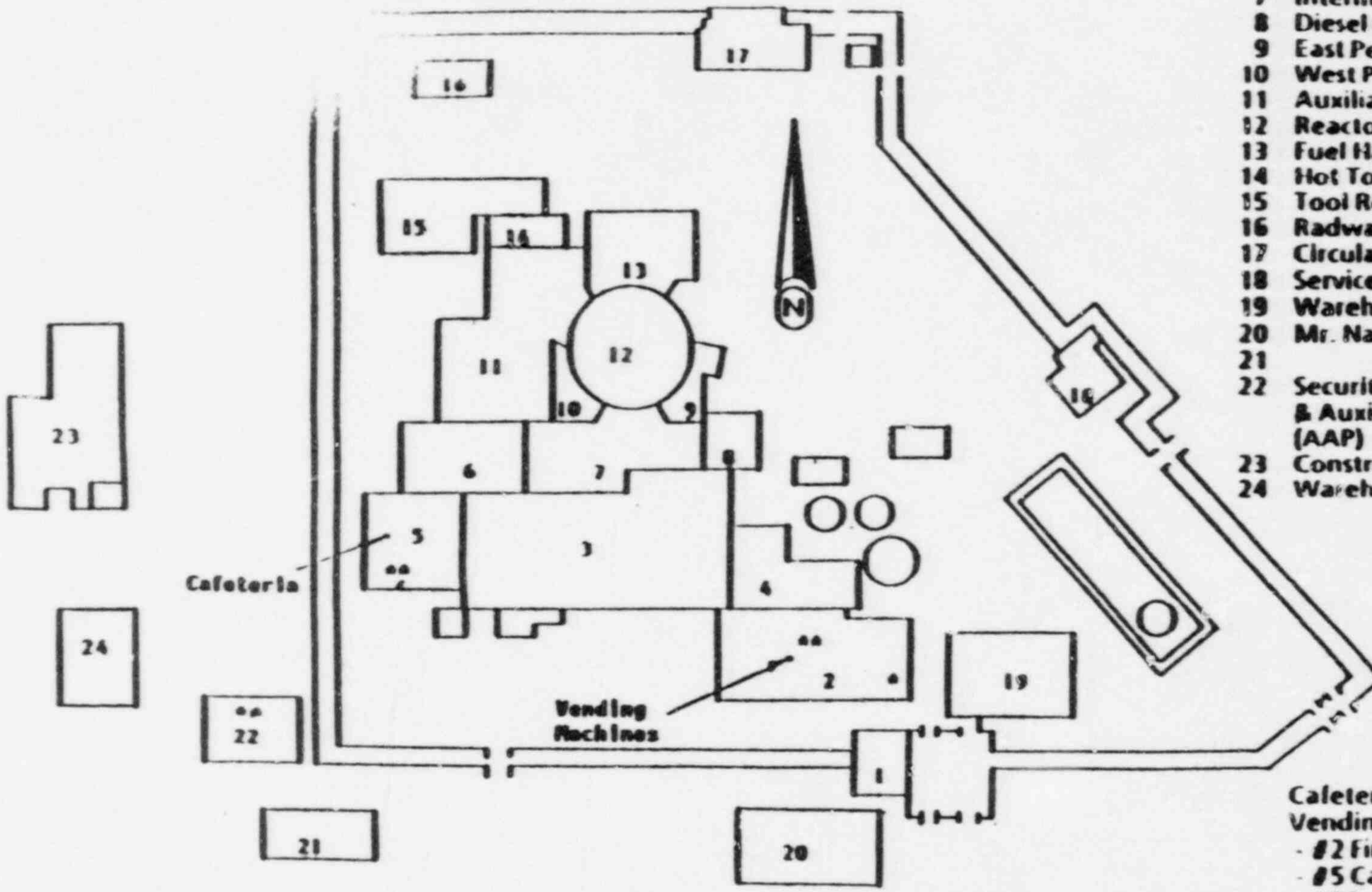
...eadquarters	First Floor Conference Room in Security Craft Training Building (see below)
Copiers - Use Code 1075	Located upstairs in the Security Craft Training Building
Cafeteria	1st Floor, Building #5 (Aux. Service Bldg.). Serves hot lunch from 11:00 A.M. TO 12:45 P.M. - no other meals

A telecopier is available on the first floor of the Security Craft Training Building, located in the Security area. The telephone number is 345-4569.

The Conference Room telephone extension is 4451.

If you have any further questions, please contact Hal Donnelly, at ext. 4722.





1 Primary Access Portal (PAP)
2 Service Building
3 Turbine Building
4 Water Treatment Building
5 Auxiliary Service Building
6 Control Building
7 Intermediate Bu...
8 Diesel Generat...
9 East Penetratio...
10 West Penetrat...
11 Auxiliary Buildi...
12 Reactor Buildin...
13 Fuel Handling Bu...
14 Hot Tool Room
15 Tool Room
16 Radwaste Storage
17 Circulating Water
18 Service Water
19 Warehouse "C"
20 Mr. Nauman's Staff Building
21
22 Security/Craft Training Bldg & Auxiliary Access Portal (AAP)
23 Construction Building
24 Warehouses "A" & "B"

Cafeteria - #5 First Floor
Vending Machines:
- #2 First Floor
- #5 Cafeteria
- #23

* Copier - First Floor
** Copier - Second Floor

SITE MAP