Nebraska Public Power District

GENERAL OFFICE
P. O. BOX 499, COLUMBUS, NEBRASKA 68601
TELEPHONE (402) 564-8561

LQA8100198

June 9, 1981

Mr. Darrell G. Eisenhut, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Emergency Response Facilities
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Reference: 1) Letter from D. G. Eisenhut to All Licensees
Dated February 18, 1981, "Post TMI Requirements
for Emergency Operations Facility"

2) Letter from J. M. Pilant to H. R. Denton
Dated May 29, 1981, "Emergency Preparedness
Plans"

Dear Mr. Eisenhut:

Reference 1 required the submittal of Upgraded Emergency Support Facility conceptual design descriptions including six specific areas of discussion. Three of these areas are addressed specifically in Attachment 1 (Questions 1, 4, and 6). The remaining design areas (Questions 2, 3, and 5) are discussed below as requested.

TSC Instrumentation, Power Supply, Data Display and Transmission

Since late 1979 the District has been involved in the efforts of the BWR Owner's Group and its Control Room Committee. This group has developed an Emergency Response Facilities (ERF) conceptual design which is included as Attachment 2. The District presently intends to implement these concepts, if practical, while replacing the present plant process computer. This entire program will result in a Plant Management Information System (PMIS) at Cooper Nuclear Station which integrates all present NRC requirements while culminating in a system which provides additional features important for safe operation of the facility. The objectives of the PMIS are outlined in Attachment 3. The District is presently involved in the process of selecting a vendor(s) to implement this system. This process is expected to be completed by September, after which time the details requested in Reference 1 will be available. The District presently intends to meet the NRC's operational date of October 1, 1982 for the SPDS, TSC, and EOF, including the meteorology system.

A045
S
1/1
Aperture Dist.
DRAWING: to!
BC

F 8106160447

Technical Support Center (TSC)

As defined in Section 5.1 of the CNS Emergency Plan, the Technical Support Center (TSC) is located in the Computer Room adjacent to the Control Room. A floor plan is provided in the attachments. A study has shown that modifications will be required in the room's ventilation system to make it as habitable as the Control Room. As the emergency situation dictates, the corridor between the Control Room and additional space in the rear of the large Control Room can be utilized to provide the necessary support. The areas of these spaces are approximately as follows:

Computer Room	1290 ft^2	
Control Room Corridor	400 ft^2	
Rear of Control Room	690 ft^2	
	2380 ft^2	Total

This number is in excess of the recommended 1875 ft^2 in NUREG-0696. It is intended for the additional computer hardware to have a minimum effect on the usability of the Computer Room as a TSC.

In the event of minor activity releases from the containment or reactor building (such as a TMI type accident), the third floor of the Administration Building (floor plan enclosed) is conveniently located to the TSC and can be used for additional technical support work space.

Emergency Operations Facility (EOF)

As defined in Section 5.3 of the CNS Emergency Plan, the near-site EOF is located in the Security Building (floor plan enclosed), outside the station security area. As defined in Section 5.4 of the Plan, an alternate EOF (floor plan enclosed) was recently constructed in the town of Brownville as part of the Brownville Fire Station. Since this new building is located within 5 miles of the plant and has less than a protection factor of 5, a back-up second alternate EOF (floor plan enclosed) is available in the National Guard Armory in Auburn. This is located approximately 11 miles from the plant and in an excellent location relative to the Nemaha County EOF.

The areas of these EOF's are approximately as follows:

Near Site EOF	=	3,600 ft^2
Alternate EOF	=	1,845 ft^2
Second Alternate EOF	=	12,000 ft^2

Communications

Planned communications between the EOF's, TSC, and Operational Support Centers (OSC) are detailed in Attachment 4.

The District believes this information to be fully responsive to your request of Reference 1, as best can be provided at this early date. If you have any questions relating to the ambitious program which is to be implemented, please contact me.

Sincerely,

Jay M. Pilant
Director of Licensing
and Quality Assurance

JMP:JDW:cmk

Enclosure

District Response to NRC February 18, 1981 Letter

Question 1

Provide task functions of the individuals required to report to the TSC and EOF upon activiation and for each emergency class.

Response

This information is provided in section 5.0 "Support Centers" of the CNS Emergency Plan. The current revision to this plan was submitted in reference 2.

Question 4

Describe the plant records and data available in the TSC and the records management systems.

Response

As stated in sections 5.1 and 5.3 of the CNS Emergency Plan; to aid the personnel manning the TSC in determining the cause of the emergency and to formulate an action plan to mitigate the emergency, a set of as-built drawings of the station, schematics and diagrams, technical specifications, station operating procedures, emergency operating procedures, and a copy of the FSAR is available to the TSC personnel in the TSC itself or in the adjacent control room.

The CNS records management system utilizes computers at CNS and the General Office (G.O.) with the majority of the documents on microfilm. Duplicate copies of the microfilms are available at CNS and the G.O. Access to either system is available via a microwave link. General Office Records Administration and Licensing personnel are activated per the CNS Emergency Plan to assist the TSC personrel in recovery of any records required. A system save tape (a tape of the complete data base) is sent to the G.O. periodically for backup capability.

Question 6

Describe data to be provided to the EOF.

Response

This information is provided in section VI.4 "EOFIS Functional Design" of Attachment 2.

BWR OWNERS' GROUP

CONTROL ROOM COMMITTEE

ERF CONCEPTUAL DESIGN

APRIL 1981

I. HISTORY OF ACTIVITIES

The Three Mile Island (TMI-2) accident and subsequent studies by government bodies, utilities, and power plant equipment vendors have accelerated improvements in the control room designs and the procedures that operating personnel use. In early 1980, the BWR Owners stepped up various efforts to expedite related studies and program developments and, in particular, authorized two committees to recommend and carry out specific programs. These two Committees have been directing work in the areas of (1) emergency procedures and (2) in control room improvements. This conceptual design description results from the work of the Control Room Committee whose function was authorized on January 9,1980 by the full BWR Owners Group.

The Control Room Committee had its initial meeting on February 20, 1980 and has held monthly working sessions since then to evolve the BWR Owners approach to the data acquisition and information presentation needs appropriate for the emergency response facilities. The Emergency Response Information System (ERIS) described herein reflects those needs.

The Emergency Procedures Guidelines developed jointly by the Guidelines Committee and GE, have provided the bases for what information is needed to aid the operating personnel in an emergency.

The Committee has maintained communications with many other organizations during the ERIS concept development. In addition to GE, a number of industrial concerns met with the BWR Owners and provided suggestions and guidance. NSAC was invited to be a Committee member early on and has been able to bring results of other pertinent studies to the deliberations in addition to being an active participant in all meetings. The members have been represented by the chairman or designated individuals in many AIF, ACRS, and NRC meetings on emergency response facilities discussions. Meetings with INPO and DOE were also held to assure consideration of their studies.

II. APPROACH

This report describes the BWR Owners group approach to the information needed to better assess conditions during and following an emergency at a BWR power station. It is the intent of this report to build upon the guidelines provided in NUREG-0696 as well as to incorporate important considerations from diverse sources elsewhere in the nuclear industry. The basic approach to be taken with the ERIS is to provide additional information to the system user based upon the user's function. ERIS will supplement existing systems in assisting the user in performing required actions during and following an emergency at a BWR.

This report represents a consensus among the BWR Owners, but in no way binds any member to the approach described herein.

III. ERIS BASIS

The Emergency Response Information System (ERIS) is a concept which includes three distinct subsystems. The three subsystems are; the Safety Parameter Display System (SPDS), the Technical Support Center Information System (TSCIS), and the Emergency Operations Facility Information System (EOFIS). This document will not generically address the ERIS displays. These will be addressed by each utility independent of the BWR Owners Group.

III.1 Safety Parameter Display System (SPDS)

The basis for the SPDS is the Emergency Procedure Guidelines developed by the BWR Owners Group. Using the Emergency Procedures Guidelines, information needs will be determined and displays will be developed and evaluated. Only those displays that will aid the operating personnel will be implemented.

III.2 Technical Support Center Information System (TSCIS)

Plant data needed to analyze plant operating conditions prior to, during and after an accident will be supplied by the TSCIS to personnel in the TSC.

III.3 Emergency Operations Facility Information System (EOFIS)

The basis for the data to be displayed by the EOFIS will be the plant unique emergency plans. Thus, the details of what will be displayed will be addressed by each utility separately. It is anticipated, however, that the largest portion of information exchanged in this center will concern dose assessment and notification of civil authorities. Displays will be limited to those necessary to aid in the performance of these tasks.

IV. DEFINITIONS

The meaning of the words and terms, in context of their use in this specification, shall be in accordance with the following definitions.

Abnormal Plant Condition
Any plant condition or event which is the result of special tests, operator error, equipment malfunction, or equipment response to external upsets (eg. load rejection, earthquake).

Accident
A single event, not reasonably expected during the course of plant operation, that has been hypothesized for analysis purposes or postulated from unlikely but possible situations, and has the potential to cause a release of radioactive material. A reactor coolant pressure boundary rupture may qualify as an accident, a fuel cladding defect does not.

Alert
A minor event which could lead to more serious consequences given operator error or equipment failure, or which could be indicative of more severe conditions which are not yet fully realized.

Anticipated Operational Occurrences
Those conditions of normal operation which are expected to occur one or more times during the life of a nuclear power plant and include, but are not limited to, loss of power to all recirculation pumps, tripping of the turbine-generator at isolation of the main condenser, and loss of all off-site power.

Data Acquisition
The process of obtaining data and processing it for display and/or storage.

Event
A change in the status or state of an existing condition.

General Emergency
The General Emergency involves actual or imminent substantial core degradation or melting with the potential for loss of containment integrity. The immediate action for this case is sheltering (staying inside) rather than evacuation until an assessment can be made that (1) an evacuation is indicated and (2) an evacuation, if indicated, can be completed prior to significant release and transport of radioactive material to the affected areas.

Operational
Capable of performing an intended action in the required manner.

Parameter
A parameter is defined to be a physical property whose value determines the characteristic or behavior of a physical phenomenon.

Primary Variable
Primary variables are defined to be those parameters that provide the most direct indication of the status of the safety functions described the SPDS functional design.

Process Variable
An actual value of a plant parameter that is associated with a given system or process within a system.

Real Time
The acquisition and processing of data during the actual time that the related physical process transpires.

Reconstruction
The ordered time-sequence representation of measured process variables.

Record (Verb)
To put data in a form for recall at the convenience of the user for event reconstruction.

Safety Parameter Display System (SPDS)
The SPDS is a tool which will aid operating personnel to assess the status of basic safety functions and improve interaction with emergency procedures.

Safe State of the Plant
A BWR nuclear plant is defined to be in a safe state when the core is adequately cooled; when reactivity is controlled; when heat sink(s) and the heat transfer

path from core and containment to heat sink(s) are functioning properly; when integrity of fuel, reactor coolant system and containment is maintained; and when in-plant and effluent (to environment) radiation levels are within specified limits.

Secondary Variable

The secondary variables are those variables which provide additional information about the safety function status. Secondary variables provide information to perform one or more of the following functions:

A. Determine the cause of degradation of a safety function.
B. Alarm, regarding possible degradation of a safety function.
C. Provide means of validation of values of primary variables

Site Area Emergency

The site emergency alert reflects conditions where some significant releases are occurring but where a core meltdown situation is not indicated based on current information. In this situation full mobilization of emergency personnel in the near-site environs as well as dispatch of monitoring teams and associated communications is indicated.

Validation

Validation is the process of obtaining increased assurance that the indicated value represents the true value of the process variable.

V. REFERENCE DOCUMENTS

NUREG-0578, TMI-2 Lessons Learned Task Force; Status Report and Short Term Recommendations.

NUREG-0585, TMI-2 Lessons Learned Task Force Final Report, 10/79.

NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants

NUREG-0696, Functional Criteria for Emergency Response Facilities.

NUREG-0737, Clarification of TMI Action Plan Requirements

REGULATORY GUIDE 1.23, Meteorological Programs in Support of Nuclear Power Plants.

REGULATORY GUIDE 1.97, Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident.

VI. CONCEPTUAL DESIGN

VI.1 General Design Criteria

1. Operations performed at any data output locations shall not interfere with nor degrade the activities being performed in the control room or operation of plant instrumentation.

2. Data may be input into the ERIS in any combination of the following methods;

   Input signals may be collected on ERIS dedicated data acquisition equipment specifically designed for each plant.

   The input signals may be transmitted through a plant process computer.

   The data to the ERIS can be manually input.

   Closed circuit T.V. may be used to satisfy portions of the data acquisition requirements.

   Data input methods will match the required output.

3. Range and accuracy of equipment shall be consistent with intended use.

4. The ERIS shall be designed to function in the environment present during and after normal and abnormal plant conditions.

5. ERIS need not be designed to function during or after an operating basis earthquake (OBE) event.

6. The ERIS and related power supplies shall be of proven high quality and reliability. Equipment within the ERIS shall be self-checking and malfunctions be presented to operating personnel. The source equipment (sensors, transmitters, summers, etc.) is not considered to be part of this system and is not impacted by ERIS system or component design criteria.

7. The ERIS need not satisfy the single failure criterion.

8. Any interface between the ERIS equipment and safety systems shall include adequate isolation.

9. ERIS power supplies shall not degrade the capability and reliability of the safety-related power sources.

10. Class 1E Qualification of the ERIS is not required.

11. The ERIS shall be designed to ensure that there is no loss of stored data vital to ERIS functions due to power fluctuations.

12. Human factors considerations shall be incorporated in the design of the ERIS.

13. The ERIS shall be designed to include the capability of periodic testing to diagnose and recognize component or software degradation and malfunction.

VI.2 SPDS FUNCTIONAL DESIGN

1. Objective
   Provide one or more displays in the control room and in the TSC which will aid operating personnel in assessing the safety status of the plant and improve interaction with emergency procedures.

2. Scope
   The SPDS shall present the status of the following safety functions:
   - Reactivity
   - Core Cooling
   - Reactor Coolant System Integrity
   - Containment Integrity
   - Fuel Integrity
   - Radioactivity Effluent to the Environment

   Status will be illustrated by display of a set of primary variables or a combination of those variables.

   Secondary variables may be used for more detailed information or primary variable validation.

3. SPDS Specific Criteria
   The Safety Parameter Display (SPD) shall be located in the control room and shall attract the attention of the operating personnel when there exists a trend or condition indicating degradation in the safety function of the plant.

The Safety Parameter Display shall be located such that it is accessible and visible to operating personnel and be distinguishable from other displays.

The SPD shall not inhibit physical or visual access to operator interfaces with normal and operating systems located in the control room.

The SPD shall be designed for continuous operation.

Means shall be available to validate the parameters associated with the SPDS. Provision shall be made to alert operating personnel to any unsuccessful validation.

The SPDS shall be designed and arranged to ensure operability and maintainability by no less than 90 percent of the user population, based on anthropometric data. In addition, the SPDS design shall consider the following human engineering criteria:

(A) Grouping by alarm, displays and controls.
(B) Grouping by function and systems.
(C) Location of frequently used and short response functions in the areas of easiest access.
(D) Presentation of information in directly usable form
(E) Minimization of reflection and glare.
(F) Consistent use,of color, shape, size and location coding.
(G) Orientation of information displays to the operators line of sight.

The SPDS will consist of summary and supporting displays based on the emergency procedures guidelines.

The capability of user interaction with the SPDS will be provided.

The SPDS displays shall include the display of the primary variables, discretely or in combination with each other

Displayed variables shall be sufficient to indicate the status of the plant and shall be responsive to transient and accident sequences.

Capability shall exist to present trended information.

4. Implementation of SPDS
SPDS requirements may be met by the presentation of the following variables or the combination thereof.

Function	Primary Variable
Reactivity	SRM log count rate
Core Cooling	Reactor Water Level
Reactor Coolant System Integrity	Reactor Pressure Drywell Pressure RPV isolation, as shown by Safety relief valve position *** Drywell sump collection rate
Containment * Integrity	Containment pressure * Containment isolation valve positions *** Containment hydrogen concentration ** Suppression pool/wetwell/ torus temperature Suppression pool/wetwell/ torus level Drywell temperature
Fuel Integrity	Reactor coolant sample analysis Off-gas pretreatment radiation
Radioactivity Effluent to the Environment	Radiation level at planned plant release points

* For Mark III, II, and I containment designs these variables are containment/drywell pressure, drywell/wetwell pressure and drywell/torus pressure respectively.

** For inerted containments, containment oxygen concentration.

*** Includes the valves which require or initiate the reactor scram.

5. ERIS Display Verification Program

Recognizing the importance of verifying the effectiveness of the dispalys to be used in performing the SPDS functions, the BWR Owners Group plans to participate in an SPDS evaluation program.

VI.3 TSCIS FUNCTIONAL DEGISN

1. Objective
   A. To provide information in the technical support center for analysis of the plant conditions and to alleviate the problem of control room overcrowding during an accident
   B. To provide the basis for guidance to the control room operating personnel in the management of abnormal conditions and in accident mitigation.
   C. To provide the basis for supporting the data needs of management personnel who will be located in the near-site emergency operations facility (EOF) during recovery operations.

2. Scope
   The TSCIS consists solely of data acquisition, information display, data communications and supporting equipment.

3. TSCIS Specific Criteria
   A. The TSCIS shall provide to the plant management and technical personnel the technical data and displays which will enable them to:
      Evaluate and diagnose plant conditions
      Provide guidance to control room personnel in management of accident conditions, accident mitigation, recovery from accident conditions, restoration of the plant into a safe condition, and resumption of normal plant operation,
      Provide technical information to personnel in the Emergency Operation Facility (EOF).
   B. During the recovery operation the TSCIS shall aid the TSC staff to review the accident sequence, evaluate the extent of any damage, and determine the status of operations.
   C. The TSCIS shall enable the TSC staff to determine the plant steady state operating conditions prior to an accident,* the transient conditions producing the initiating event, and the plant systems dynamic behavior throughout the course of the accident.

* Accidents - alert, site emergency and general emergency classifications as defined in NUREG-0654 and Section IV.

D. The TSCIS shall also be capable of presenting the SPDS displays.
E. Data provided in the EOF shall also be available in the TSC.
F. Capability shall be provided for presenting current value and time history for selected data available in the TSC via the TSCIS.
G. A medium shall be available to store at least 5 minutes of pre-event and 10 minutes of post-event data. In addition the capability shall exist to store 2 weeks of additional compressed selected post-event data.

4. Implementation of TSCIS
As depicted in Figure VI.4.A, the TSCIS along with other data available to the TSC, shall enable the TSC staff to determine the following;
Plant status and dynamics prior to, during and following an accident.
Performance of accident mitigation functions
Nature and trend of the accident
Damage to the plant and equipment
Status of the operation
The TSCIS shall also maintain adequate communications with EOFIS to assure sufficient data availability to determine the following during the period prior to EOF staffing completion.
Prevailing meteorological conditions
Radiological release quantities
Radiological impact on environs and public
A list of primary variables associated with the TSCIS functions are;
1. SRM log count rate
2. IRM neutron flux
3. APRM neutron flux
4. Reactor water level
5. Suppression pool water level
6. Isolation condunsor system shell side water level (BWR/2 only)
7. Reactor pressure
8. Drywell pressure
9. Containment pressure (BWR/6 only)
10. Primary containment/shield differential pressure (BWR/6 only)
11. Shield/annulus atmospheric differential pressure (BWR/6 only)
12. Standby liquid control system pump discharge pressure or flow
13. Core flow
14. HPCS/HPCI flow
15. RCIC flow
16. LPCS flow
17. RHR flow

18. Feedwater flow
19. Control rod drive flow
20. Drywell temperature
21. Suppression pool temperature
22. Off-gas pretreatment radiation
23. RHR and RWCU heat exchanger secondary side water (service water) radiation level
24. Radiation exposure rate inside buildings or areas where access is required to service equipment important to safety
25. Drywell airborne gaseous and particulate radioactivity
26. Radiation level at planned release points
27. Control rods all in
28. PV isolation valve positions
29. Safety/relief valve positions
30. Containment isolation valve positions.

The specific system may be configured such that TSCIS and SPDS share the same data acquisition equipment.

As with all ERIS data, the means by which the data enters the system, will be commensurate with the use of that data and its projected behavior with respect to a given time frame.

This list of primary variables is subject to change as plants review results of Emergency Drills, operating and simulator experience, etc.

VI.4 EOFIS FUNCTIONAL DESIGN

1. Objectives
   A. Provide information for management of the overall emergency response to an accident which result in Site, Area or General Emergency Alerts.
   B. Evaluate radiological and meteorological data to assess off-site doses.
   C. To provide information to the NRC and state and local emergency response agencies about conditions potentially affecting the public in accordance with the utility emergency plan.

2. Scope
   The EOFIS includes data acquisition, information display, data communications and supporting equipment.

3. EOFIS Specific Criteria
   Capability shall be provided for presenting current value, time history and trends (where applicable) for meteorological and radiological data and dose assessment.

The data transmitted to any off-site calculational support facility for EOF shall be available via the EOFIS.

4. Implementation of EOFIS
Availability of the following parameters as specified in sections VI.4.1 and VI.4.3 is sufficient to meet the objectives of the EOFIS.
   - Containment Radiation
   - Refueling floor area radiation
   - Airborn Radioactivity Released from Plant Planned Release Points
   - Liquid Radioactivity Released to the Environment
   - Off-site Radiation and Radioactivity as Indicated by Survey Teams
   - Wind direction
   - Wind speed
   - Atmospheric temperature

The specific variables are plant unique. The above list does not include variables required to assess the general plant condition (safety status) because this will be supplied to the EOF from the TSC.

Radiological and meteorological instrumentation is plant unique to a greater extent than NSSS related instrumentation. As such,instrumentation requirements will be included in ERIS according to each utility's unique design.

Nebraska Public Power District

CNS Plant Management Information System Objectives

I. Introduction

Nebraska Public Power District (NPPD) intends to develop at Cooper Nuclear Station (CNS) a Plant Management Information System using the latest computer technology. This system will improve plant operations while meeting the various NRC requirements.

This attachment identifies the system's objectives. By integrating all functions required of a new computer system, many safety aspects of plant operation will be improved to a point exceeding those of present NRC requirements alone.

II. NPPD Objectives of Computer Update

A. Improve Communications (Safety Benefit)
B. Improve Plant Management (Safety Benefit)
C. Reduce Costs

Functions	Plant Mgmt.	Plant Tech	NRC Req'd	NRC Maybe
A. Improve Communications:				
1. SPDS Function (NUREG-0696)	X	X	X	-
2. TSC Function (NUREG-0696)	X	X	X	-
3. EOF Function (NUREG-0696)	-	-	X	-
4. Meteorological & Radiological Monitoring (NUREG-0654 & Reg. Guide 1.23)	-	-	X	-
5. Appendix I Meteorological and Off-site Dose Monitoring	X	X	X	-
6. Accident & Transient Analysis (NUREG-0696 & Reg. Guide 1.97)	X	X	X	-
7. NDL Function (NUREG-0696) (Future requirement)	-	-	-	X
8. Communications to General Office	X	X	-	X
B. Improve Plant Management:				
1. Core Management	X	X	X	-
2. Replace Zytron Computer	X	X	X*	-
3. Accident & Transient Analysis	X	X	X	-
4. Replace & Improve Process Computer	X	X	-	-
5. Environmental Calculations	X	X	X	-
6. Plant Performance Monitoring	X	X	-	-
7. Improve Personnel Utilization	X	X	-	-
C. Reduce Costs:				
1. Performance Monitoring	X	X	-	-
2. Eliminate Mark III Leasing	X	X	X	-
3. Common Data Base	X	X	X	X
4. Better Core Management	X	X	-	
5. Meteorological Monitoring	X	X	X	

* Subject to interpretation

A. Improve Communications (Safety Benefit)

1. SPDS Function (NUREG-0696)

The safety parameter display system (SPDS) will provide a display of plant parameters from which the safety status of operation may be assessed in the control room and TSC. The primary function of the SPDS is to help operating personnel in the control room make quick assessments of plant safety status.

2. TSC Function (NUREG-0696)

The technical support center (TSC) is an onsite facility located close to the control room that will provide plant management and technical support to the reactor operating personnel located in the control room during emergency conditions. It will have technical data displays and plant records available to assist in the detailed analysis and diagnosis of abnormal plant conditions and any significant release of radioactivity to the environment.

3. EOF Function (NUREG-0696)

The emergency operations facility (EOF) is a nearsite support facility for the management of overall licensee emergeney response (including coordination with federal, state, and local officials), coordination of radiological and environmental (including meteorological) assessments, and determination of recommended public protective actions. The EOF will have appropriate technical data displays and plant records to assist in the diagnosis of plant conditions to evaluate the potential or actual release of radioactive materials to the environment.

4. Meteorological and Radiological Monitoring (NUREG-0654 & Reg. Guide 1.23)

During an accident, the capability will exist onsite to perform dose rate projections based upon prevailing meteorological conditions. This will include the capability to track the plume and map its projected dispersal rate. Both of these require the evaluation of a rather complex series of calculations utilizing a sizable data base.

5. Appendix I Meteorological and Off-Site Dose Monitoring

Continuous monitoring of site meteorological parameters and off-site dose calculations are performed as required by 10CFR Part 50, Appendix I and CNS Environmental Technical Specification 5.4.1.b and in accordance with the appropriate Reg. Guides. Tabulation of meteorological data and calculated off-site doses resulting from station effluents, evaluation and reporting of results and comparison with results of the environmental radiation monitoring program are required. In addition, requirements for increased surveillance, various notifications

and corrective actions, as specified by CNS Tech Specs and various NRC regulations, are based on results of these several monitoring programs. In-house performance of data acquisition, compilation and calculations will facilitate timely identification and evaluation of suspected off normal trends and enable appropriate action to be taken promptly and effectively.

6. Accident and Transient Analysis (NUREG-0696 & Reg. Guide 1.97)

Reg. Guide 1.97 specifies instrumentation for use in light water-cooled nuclear power plants to assess plant and environmental conditions during and following an accident. Additionally, this instrumentation would supposedly permit analysis of plant transients (e.g. scrams) to determine the cause of the transient. (See II.B.3 below). Although Reg. Guide 1.97 is not a requirement for operating plants, the District will strive to incorporate as many safety enhancements as practical.

7. NDL Function (NUREG-0696)

The nuclear data link (NDL), a data transmission system, will be provided for sending a set of variables from the plant to the NRC Operations Center when and if the NRC requires. These data will be used for analysis by the NRC headquarters technical support groups and NRC Executive Team.

8. Communications to General Office

Connecting the computer installation to computers in the General Office at Columbus will permit access to the real-time plant data base for the Nuclear Fuel Group, the Environmental Group, the Nuclear Support Group, management, and any other General Office groups. This will permit accomplishing some tasks at the General Office that are currently done at CNS thereby relieving the CNS operating staff to perform more urgent functions.

B. Improve Plant Management:

1. Core Management

(See II.C.4 below).

2. Replace Zytron Computer

Since implementing the Document Control and Plant Equipment Management systems on the Zytron computer system at CNS, Zytron has gone out of business. As a result, it will become increasingly difficult to keep it operational. Additionally, the Zytron system is proving inadequate in size to implement additional functions or to fully utilize some existing options.

3. Accident and Transient Analysis

The NRC has held up the startup of some plants following scrams until it was explained satisfactorily exactly what caused the scrams and why certain equipment did not perform as expected. Better plant transient monitoring (including some or all of Reg. Guide 1.97 variables) could facilitate this evaluation more effectively. In addition, it could help CNS diagnose possible equipment problems to preclude future failures.

4. Replace and Improve Process Computer

The current plant process computer (GE/PAC 4020) is essentially a 1965 model computer. Honeywell has already announced an "official" withdrawal date for support of the 4020 of May 1, 1981. Unofficially, they will continue to support the 4020 as long as spare parts and experienced personnel are available.

Also, the existing process computer is not capable of having software added by site personnel. Currently, any software updates or additions have to be accomplished through General Electric. More control over the process computer by plant personnel has definite benefits from a plant management standpoint.

5 Environmental Calculations

The Environmental Technical Specifications will require off-site dose rate projections that will require a computer to perform the calculations. The complexity of the calculations and amount of data involved will not permit timely manual evaluations. The Plant Management Information System will enable these calculations as defined in the District's Appendix I Technical Specifications and Offsite Dose Assessment Manual (ODAM) submittal of January 30, 1980, to be performed rapidly and as required by the NRC.

6. Plant Performance Monitoring

Better plant monitoring will aid operational and engineering personnel in evaluating plant performance. An example would be displays showing such variables as turbine bearing vibration and temperature during startup. (See II.C.1 below). Although not a direct safety issue, plant performance and availability is of importance to the ratepayers of Nebraska and the NRC.

7. Improve Personnel Utilization

Improved computer capability and access to a common data base will permit better personnel utilization. This would be accomplished by permitting engineers, chemists, health physicists, and other non-data processing personnel to develop computer applications via user friendly software to perform calculations that currently are either not done or are performed by hand.

C. Reduce Costs:

The District is constrained to implement these non-safety benefits to benefit the ratepayers of Nebraska. The District is a publically owned utility.

1. Performance Monitoring - Balance of Plant (BOP)

With better modeling of the BOP Systems, it will be possible to achieve greater efficiency of such equipment as feedwater heaters, turbine steam condensers, pumps, etc. This will permit operation of CNS closer to rated electrical output and better scheduling of maintenance activities.

2. Eliminate Mark III Leasing

CNS currently utilizes the GE Mark III timeshare system as a backup to the process computer for core monitoring. The CNS Reactor Engineers have also written software to perform Special Nuclear Material management and other engineering calculations on the Mark III system. These functions will be performed on a future system installed at CNS.

3. Common Data Base

Currently, NPPD is in the process of implementing such management information tools as preventative maintenance scheduling, work item tracking, equipment data file, etc. on a separate computer system. (See II.B.2 above). With these management tools implemented on a fully integrated computer system that had access to a real time common data base, it will be possible to implement surveillance tracking and schedule preventative maintenance and equipment replacement based upon actual equipment run times. Data will also be retained for historical purposes that could be more easily searched to discover trends that could help pinpoint problems. Additionally, it would also more readily depict operational improvements.

4. Better Core Management

With greater computer capability, it will be possible to implement on-line core predictive software. By utilizing this software, control rod patterns will be fine tuned to permit optimum fuel utilization. This will also permit greater operational flexibility in terms of Technical Specification thermal limits.

5. Appendix I Meteorological and Off-Site Dose Monitoring

The District presently performs the Routine Meteorological Monitoring and Off-Site Dose Calculations (required by

10CFR50, Appendix I and the CNS Environmental Tech Specs Section 5.4.1.b by use of outside consultants. Incorporation of the capabilities to perform in-house the required data compilation and calculations will reduce the need for outside consultant services to those required for maintenance of quality control and quality assurance.

Communication Capabilities of CNS Emergency Response Facilities

A. Technical Support Center (Computer Room)
   1. Telephones
      a. Outside line 825-6711
      b. Extension 205 (Outside line 825-4511)
      c. Extension 207 (Outside line 825-3781)
      d. Extension 208 (Switchboard 825-3811)
      e. Extension 209 (Switchboard 825-3811)
      f. Extension 233 (Switchboard 825-3811)
      g. Extension 249 (Switchboard 825-3811)
   2. Microwave communication via extensions 205, 207, 208, 209, 233 & 249
   3. Plant wide intercom (Gaitronics)
   4. Alternate intercom system (Bone Phone)
   5. NRC hot line (Red Phone)
   6. NRC Health Physics direct telephone (Locked Phone)
   7. Portable radios (optional)

B. Operational Support Centers (Radiochemistry Laboratory, Health Physics Office Area, Instrument and Control Shop, Electrical Shop, Maintenance Shop)

Radiochemistry Laboratory
   1. Telephones
      a. Extension 289 (Switchboard 825-3811)
   2. Microwave communication via extension 289
   3. Plant wide intercom (Gaitronics)
   4. Alternate intercom system (Bone Phone)
   5. Portable radios (optional)

Health Physics Office Area
   1. Telephones
      a. Extension 258 (Switchboard 825-3811)
      b. Extension 272 (Switchboard 825-3811)
   2. Microwave communication via extensions 258 & 272
   3. Plant wide intercom (Gaitronics)
   4. Alternate intercom system (Bone Phone)
   5. Portable radios (optional)

Instrument and Control Shop
   1. Telephones
      a. Extension 213 (Switchboard 825-3811)
      b. Extension 283 (Switchboard 825-3811)
   2. Microwave communication via extensions 213 & 283
   3. Plant wide intercom (Gaitronics)
   4. Alternate intercom system (Bone Phone)
   5. Portable radios (optional)

Electrical Shop

1. Telephones
   a. Extension 247 (Switchboard 825-3811)
   b. Extension 257 (Switchboard 825-3811)
2. Microwave communications via extensions 247 & 257
3. Plant wide intercom (Gaitronics)
4. Alternate intercom system (Bone Phone)
5. Portable radios (optional)

Maintenance Shop

1. Telephones
   a. Extension 212 (Switchboard 825-3811)
   b. Extension 220 (Switchboard 825-3811)
   c. Extension 248 (Switchboard 825-3811)
   d. Extension 260 (Switchboard 825-3811)
2. Microwave communications via extensions 212, 220, 248 & 260
3. Plant wide intercom (Gaitronics)
4. Alternate intercom system (Bone Phone)
5. Portable radios (optional)

C. Near-Site Emergency Operations Facility (Security Building)

1. Telephones

   Emergency Command Phones

   a. Outside line 825-4521
   b. Extension 233 (Switchboard 825-3811)
   c. Extension 224 (Switchboard 825-3811)
   d. Extension 205 (Outside line 825-4511)
   e. Extension 207 (Outside line 825-3781)
   f. Extension 208 (Switchboard 825-3811)
   g. Extension 209 (Switchboard 825-3811)

   Press, Highway Patrol and Civil Defense Phones

   a. Extension 223 (Outside line 825-6311)
   b. Extension 231 (Outside line 825-3711)
   c. Extension 291 (Outside line 825-3701)
   d. Extension 292 (Outside line 825-6421)
   e. Extension 293 (Switchboard 825-3811)
2. Microwave communication via extensions 233, 224, 205, 207, 208, 209, 223, 231, 291, 292 & 293
3. Plant wide intercom (Gaitronics)
4. Alternate intercom system (Bone Phone)
5. NRC Health Physics direct telephone (Locked Phone)
6. Alternate communication system (450 MHZ radio - KUW 955)
7. Portable radios (optional)

D. Alternate Emergency Operations Facility (Brownville Firehouse)

1. Telephones

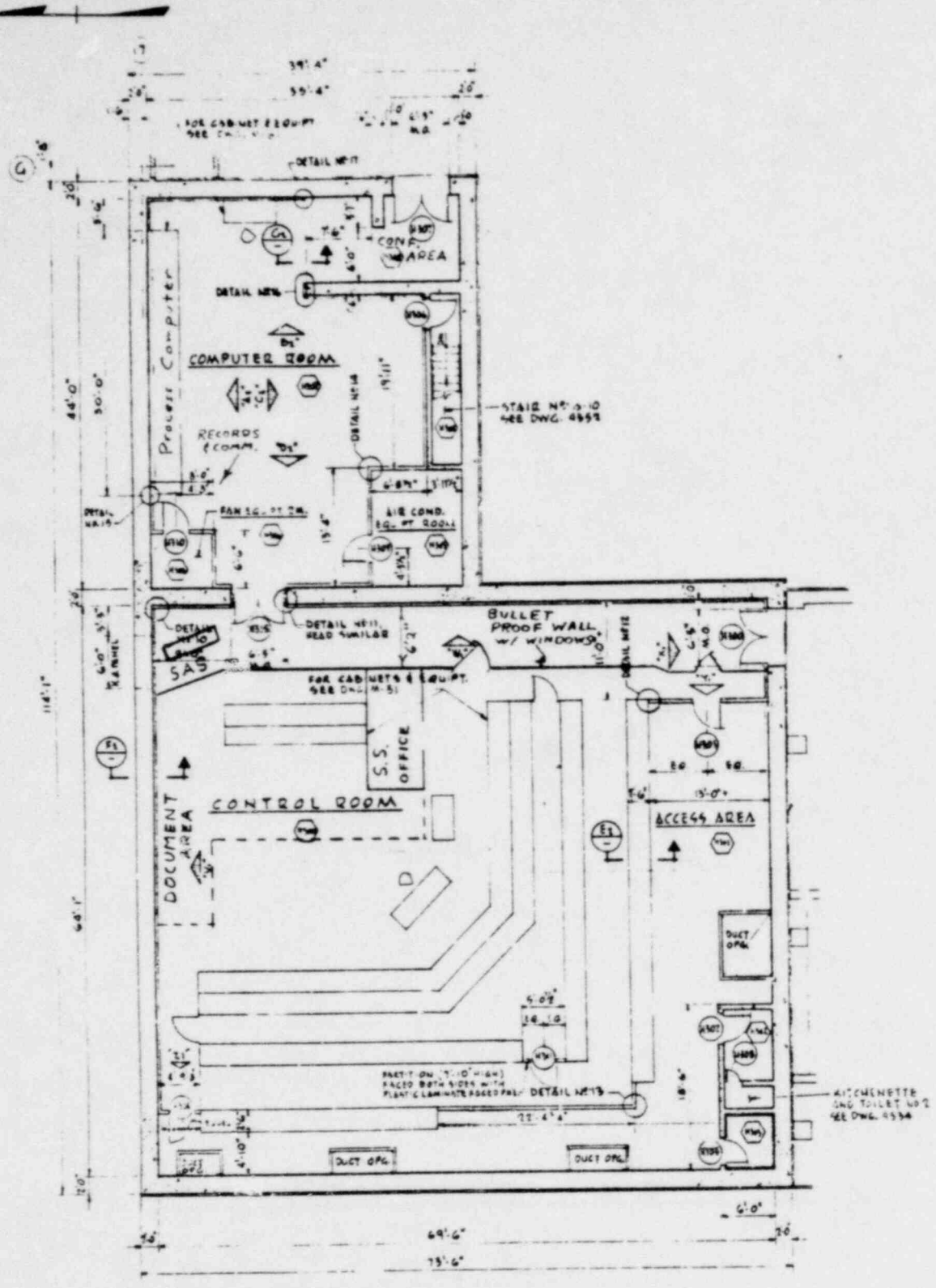
Emergency Command Phones

a. Extension 233 (Switchboard 825-3811)
b. Extension 205 (Outside line 825-4511)
c. Extension 207 (Outside line 825-3781)
d. Extension 208 (Switchboard 825-3811)
e. Extension 209 (Switchboard 825-3811)

Press, Highway Patrol and Civil Defense Phones

a. Extension 223 (Outside line 825-6311)
b. Extension 231 (Outside line 825-3711)
c. Extension 291 (Outside line 825-3701)
d. Extension 292 (Outside line 825-6421)
e. Extension 293 (Switchboard 825-3811)

2. Microwave communication via extensions 233, 205, 207, 208, 209, 223, 231, 291, 292 & 293
3. Alternate communication system (450 MHZ radio - KUW 955)
4. Portable radios (optional)



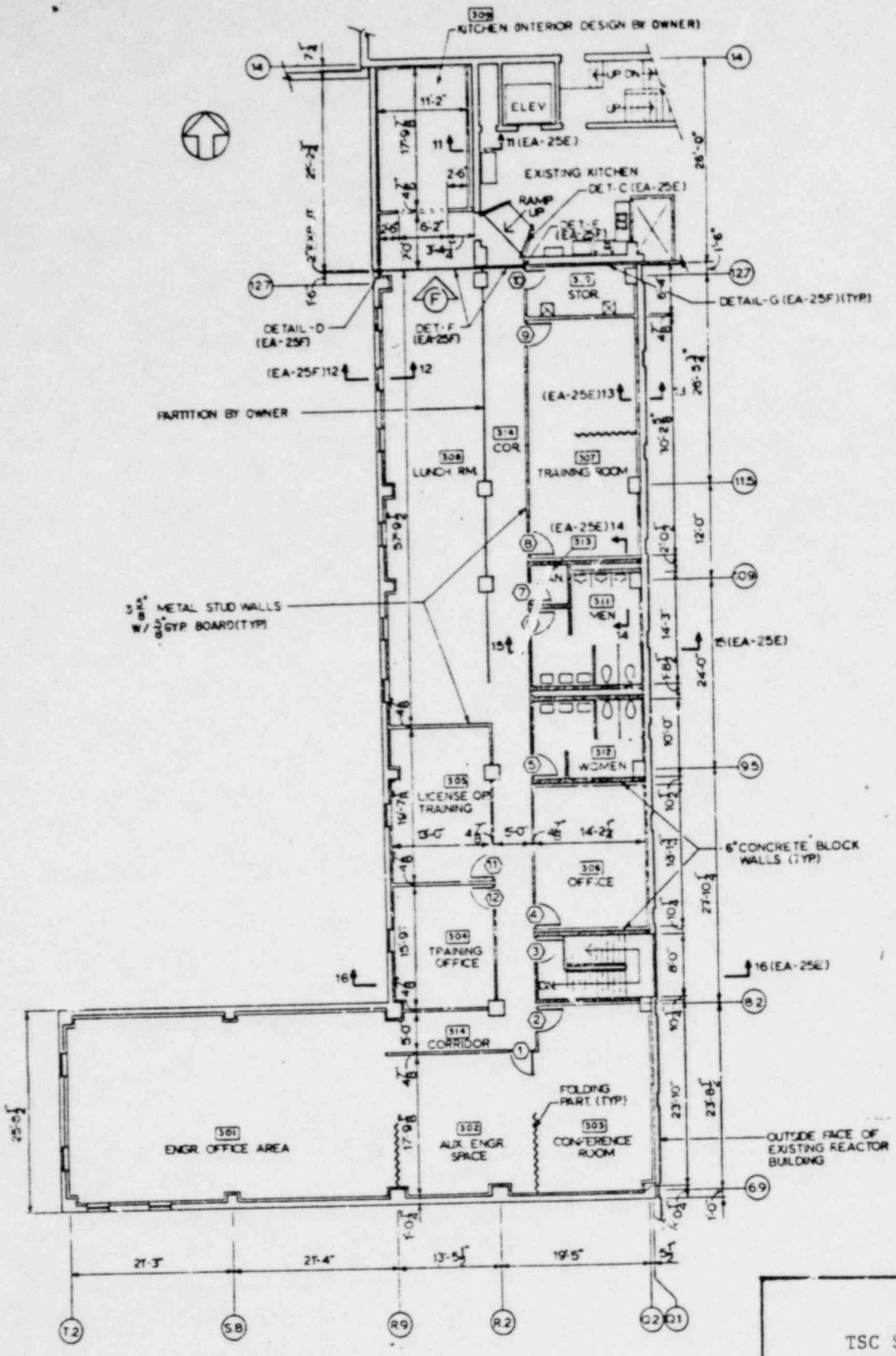
FLOOR PLAN · CONTROL B'LDG · EL 932'-6"

SCALE: 1/8"=1'-0"

TECHNICAL SUPPORT CENTER

&

CONTROL ROOM



THIRD FLOOR – PLAN
OFFICE SPACE EXPANSION
ELEVATION 93'-10"

TSC SUPPORT AREA
(THIRD FLOOR - PLAN
OFFICE SPACE EXPANSION)