Northern States Power Company

414 Nicollet Mall
Minneapolis, Minnesota 55401
Telephone (612) 330-5500

April 15, 1983

Director
Office of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket No. 50-282 License No. DPR-42
50-306 DPR-60

Supplement 1 to NUREG-0737 - Response to Generic Letter 82-33

The material furnished with this letter is submitted pursuant to 50.54(f) to provide a current status, an integration plan and proposed schedule for completing the basic requirements identified in the enclosure to your Generic Letter No. 82-33 dated December 17, 1982. Information in this submittal supersedes related information and commitments contained in prior submittals that may be in conflict. The information is organized as:

I Introduction
II Integration Plan
III Status Report
IV Schedule

The proposed schedule represents our best judgement of what can be accomplished within the limits of available resources applied to currently planned projects. Large commitments of finances, technical expertise, supervision, and manpower are currently being applied to other major regulatory required projects. Unforseen contingencies on these projects, as well as possible new projects arising from future plant inspections and performance monitoring or from future regulatory requirements, could impact the schedule by pre-empting our resources. Also, some elements in the schedule are dependent upon activities of vendors or other organizations which can not be predicted with certainty.

A003
S
1/40

ADD:
W. Paulson

The proposed schedule information being furnished will be a major input to forthcoming periodic discussions with the NRC Project Manager. This will allow us to refine the schedule and update the technical information consistant with developments that will occur.

David Musolf
Manager-Nuclear Support Services

DMM/js

cc: Regional Administrator-III, NRC
NRR Project Manager, NRC
NRC Resident Inspector
G Charnoff

Attachments

UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket No. 50-282
50-306

LETTER DATED APRIL 15, 1983
SUPPLEMENT 1 to NUREG-0737

Northern States Power Company, a Minnesota corporation, by this letter dated April 15, 1983 hereby submits information related to Supplement 1 to NUREG-0737 in response to a letter dated December 17, 1982 from Mr Darrel G Eisenhut, Director, Division of Licensing, USNRC (Generic Letter 82-33).

This letter contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By David Musolf
David Musolf
Manager - Nuclear Support Services

On this 15th day of April, 1983 before me a notary public in and for said County, personally appeared David Musolf, Manager - Nuclear Support Services, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Northern States Power Company, that he knows the contents thereof and that to the best of his knowledge, information and belief, the statements made in it are true and that it is not interposed for delay.

Betty J. Dean

BETTY J. DEAN
NOTARY PUBLIC - MINNESOTA
RAMSEY COUNTY
My Commission Expires Dec 16 1987

I. Introduction

Based on the progress in addressing emergency response enhancements described in Generic Letter 82-33 NUREG 0737 Supplement 1, Northern States Power is presently in an excellent position to respond to any emergency condition that might occur. The present emergency response design at the Prairie Island Nuclear Generating Plant provides confidence that a sufficient response capability will exist during the time required to complete the entire emergency response program described herein. This is confirmed in the success of an exercise conducted October 14, 1982 and the positive findings of related Inspection Reports.

Northern States Power concurs with the NRC's position that schedules for accomplishing these emergency response enhancements are to be integrated with other high priority work and plant improvements. In the interim, there is a requirement for developing well-planned, integrated, engineered solutions to these complex design challenges. In order to develop accurate implementation schedules, it is required that the preparation of adequate design specifications and development of detailed procurement and construction estimates, integrated with plant constraints, be complete.

Northern States Power has made good faith efforts to take action to satisfy the requirements. The Emergency Response Facilities (ERF), including the Technical Support Center (TSC), Operational Support Center (OSC), and Emergency Offsite Facilities (EOF), are essentially complete and operational.

Northern States Power has actively participated in the following areas related to Emergency Response Capabilities:

1. Westinghouse Owners Group Emergency Operating Procedures Subcommittee

2. Westinghouse Owners Group Emergency Operating Procedures Systems Review and Task Analysis Subcommittee

3. Utilities Ad Hoc Committee for developing Safety Assessment System Software

4. Electrical Power Research Institute Program RP501-4, Human Factors Review of Enhancement Approachs for Nuclear Control Rooms

5. INPO Nuclear Utility Task Action Committee on Control Room Design Review

6. INPO Nuclear Utility Task Action Committee on Emergency Response Capabilities

II. Integration Plan

Northern States Power integration plan will enable the integration process to be performed as efficiently as possible and with the least amount of iteration. The plan allows the ideal integration of Emergency Operating Procedures (EOP's), Control Room Design Review (CRDR), Regulatory Guide 1.97 (RG 1.97), Safety Parameter Display System (SPDS), and Emergency Response Facilities (ERF's). Figure 1 which addresses the basic elements of NUREG 0737 Supplement 1 is divided into the elements and interfaces considered in the development of the integration plan. The plan allows the basic elements to be developed using preliminary design guidance obtained from plant specific criteria, owners group work, NRC criteria, and other industry related guidelines. Each of the Emergency Response capability elements are being evaluated, written, or designed in a parallel effort with each basic element design being interfaced with its appropriate counterpart. Each element and its relation to previous and succeeding steps in the integrated plan is discussed in the following element briefs. Detailed plans are described in Appendix A.

SPDS

The functions of the Safety Parameter Display System (SPDS) are satisfied by the design of a Safety Assessment System (SAS).

SAS is a state-of-the-art system targeted for implementation on pressurized water reactor nuclear units within the emergency response facilities. It has been designed to provide control room operators with centralized and easily understandable information from a computer-based data and display system. SAS was developed for the Ad-Hoc Committee on Instrumentation, a group of 12 utilities representing 27 PWR nuclear power stations. The SAS project began in late 1980 and was completed in May, 1982.

The purpose of the SPDS portion of SAS is to assist control room personnel in evaluating the safety status of the plant. Functionally, the requirements are:

Provide a continuous indication of plant parameters or derived variables, representative of the safety status of the plant;
Aid the operator in the rapid detection of abnormal operating conditions;
Concentrate in one location, a minimum set of parameters to allow timely status assessment without surveying the entire control room;
Incorporate human-factors considerations for simplicity and pattern recognition;
Identify and delete faulty data; and
Display information during steady-state and transient conditions.

The SAS project included extensive human factors engineering and a thorough V&V plan supported by multiple phases of software testing and system operational evaluation. The SAS project addressed the SPDS guidance in NUREG 0696 and the Critical Safety Functions (CSF) defined during emergency response guideline development by the Westinghouse Owners Group. All necessary parameters were included.

Plant specific application of the SAS system is presently being addressed as part of an overall plant computer upgrade project. This project will implement SAS on one of the major computer subsystems, the ERF system. The other three subsystems encompassed by this integrated project are: A Radiation Dose Assessment System; A Plant Process Computer System to replace the present vintage plant computer; and a data acquisition system to provide a common data base to all of the other subsystems.

Once the design is finalized, an interative process will be used that considered changes associated with EOPs, Human Engineering Discrepancies (HED's) and RG-1.97 parameters in an integration of all control room elements program.

CRDR

The CRDR Program Plan is the first step towards performing a CRDR and provides a methodology for performing the entire review.

The Operating Experience Review is performed to identify any operational problems resulting from design discrepancies, or identifying any improvements to the control room which would improve the ability of an operator to respond to any emergency condition.

The Control Room Survey will utilize results from the initial CRDR, the NSSS Owners Group Emergency Response Guidelines (ERG's) and subsequent plant specific EOP System Review and Task Analysis, and the operating experience data to uncover any control room design problems. This survey will include, among other things, an assessment of control room layout, the control room environment, the usefulness of audible and visual alarms, the readability of displays, the adequacy of instru-mentation, and the information recording and recall capabilities.

The Control Room Survey will identify HED's which will be evaluated with items identified from other programs such as EOP, RG-1.97, and the SPDS in an integration of all control room elements program. The CRDR is the focal point for inte-gration and an interactive process will be used continuously in the design of each of the elements.

To insure that the control room design review will be of lasting benefit and that its findings are available in a form which can influence control room modifications, a set of human factor design specifications will be developed in parallel with these review activities. These specifications will document the human factors design principles used for control room enhancement, and the coding, labeling, and control/display conventions practiced.

RG-1.97

A review is being made to compare the existing post-accident monitoring instruments with those of RG-1.97. Utilizing design criteria, as well as the results of the above comparison, a plant-specific list of accident monitoring instrumentation qualification criteria and locations will be developed. Once the list is finalized in design, an interactive process will be used that considers changes associated with EOPs, HEDs, and SPDS in an integration of all control room elements program.

Emergency Operating Procedures

Initial plant-specific EOPs are being developed for the purpose of mitigating the consequences of a broad range of initiating events, and subsequent multiple failures or operator errors, without the need to diagnose a specific event. These procedures will be function-oriented and written with human factors considerations to improve human reliability. These initial EOPS are being developed based upon a Writer's Guide, NSSS Owners Group Emergency Response guidelines and the NSSS Owners Group System Review and Task Analysis.

Determination of procedure adequacy is dependent upon the trained operator's needs. In order for operators to have confidence in the EOP's the EOPs will be checked for completeness, understandability, technical correctness, usability, and compatibility with the control room. A walk-through of the initial EOPs on a simulator will provide a method of evaluating these criteria. Although Figure A4-1 indicates only one EOP walk-through, this process may be repeated following any major modifications to the EOPs.

Plant-specific EOPs will be incorporated in an interactive process with Control Room HEDs, application of RG-1.97 recommendations, SPDS design bases, and Emergency Response Facility criteria. This interactive process will be used to determine what changes can easily be made to the EOPs to accommodate deficiencies in other areas without impacting the effectiveness of the EOPs.

EMERGENCY RESPONSE CAPABILITY INTEGRATION PLAN

(DETAILED PLANS FOR ERC ELEMENT LOCATED IN IDENTIFIED APPENDIX)

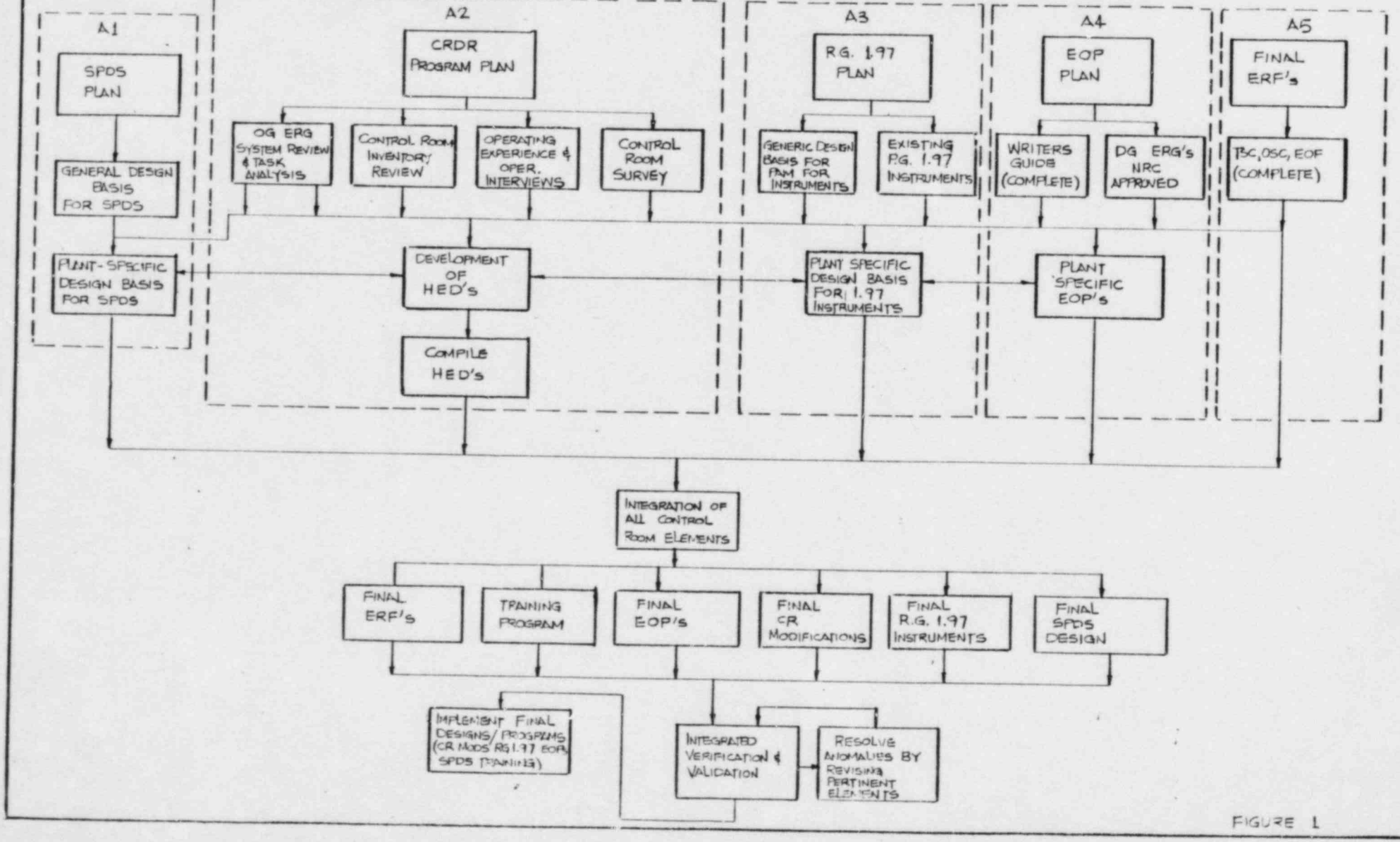


FIGURE 1

III. STATUS REPORTS

A1 Safety Parameter Display System (SPDS)

A2 Control Room Design Review (CRDR)

A3 Regulatory Guide 1.97 (RG 1.97)

A4 Upgrade Emergency Operating Procedures (EOP)

A5 Emergency Response Facilities (ERF)

STATUS REPORT

A1 SAFETY PARAMETER DISPLAY SYSTEM

The computer systems at Prairie Island are the subject of a large upgrade project. Work has been underway for approximately three years including defining user interfaces, I/O requirements, functional requirements, HED concerns, V&V and specific software packages. These are documented in several studies undertaken to define and scope the project and in a comprehensive V&V plan for the ERF systems. The results are several specifications which have been released for bid for (1) a Radiation Release Dose Assessment Computational System (RRDACS), (2) an upgraded Plant Process Computer System (PPCS), (3) an Emergency Response Facility Computer System (ERFCS), (4) a computer based Data collection Multiplexing system (Mux), (5) a plant site digital communication system, and (6) a building to house much of the computer equipment. Several interfaces with existing plant systems and equipment have been identified including but not limited to installation of additional sensors, upgrades to the yet to be installed full scope simulator, and an Uninterruptable Power Supply (UPS).

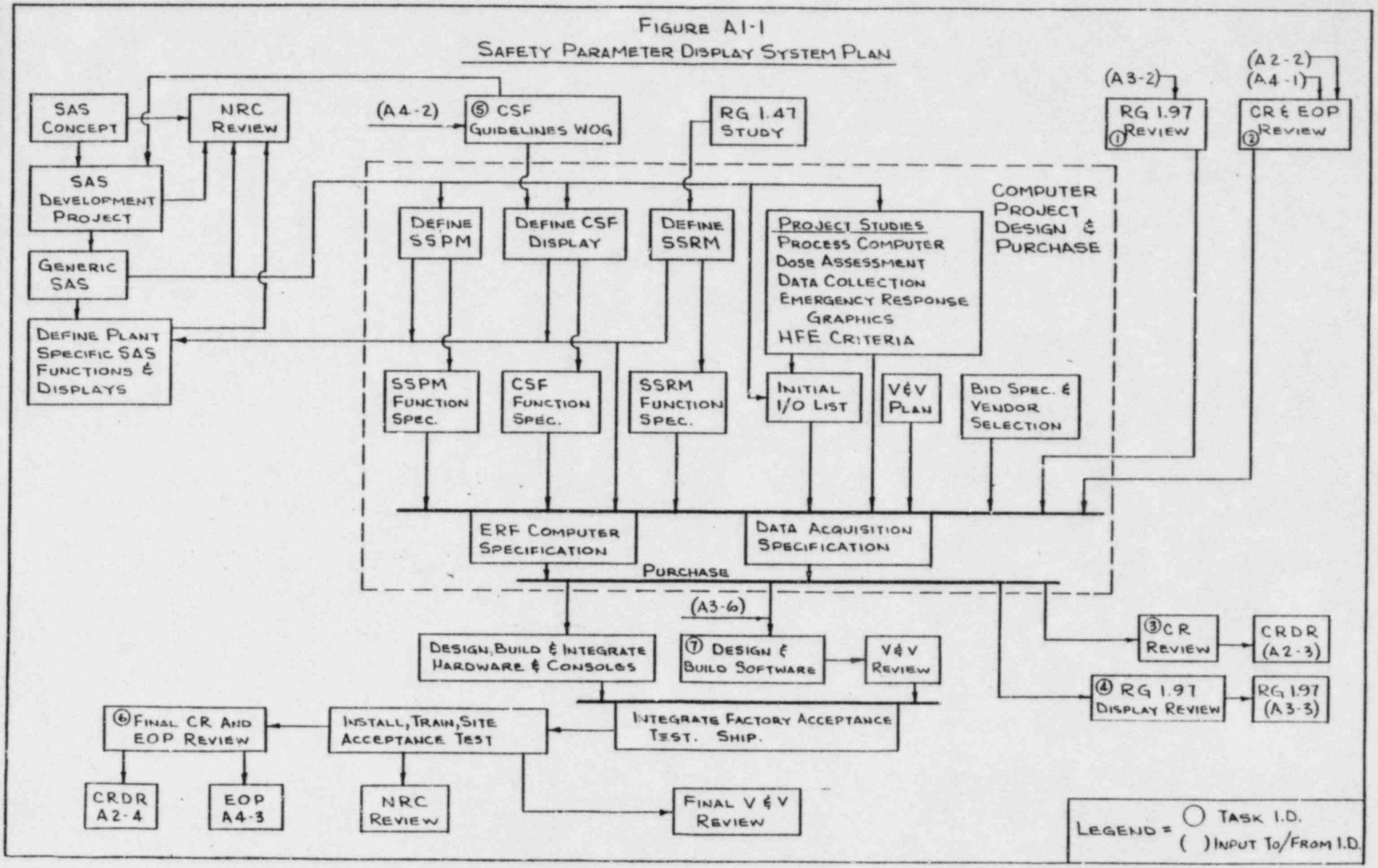
Presently the RRDACS and communications systems are partially installed. The meteorological towers and related instrumentation are operational on an interim basis. We expect to choose a vendor and contract for the PPCS, ERFCS, and Mux systems by that date. Human engineering is continuing on full scale plywood mock-ups of the planned control room equipment. The scopes of the UPS and computer building have been completed and are detailed engineering has started.

The ERF computer system will provide the functions of the SPDS in the control room. ERF displays are also available in the shift supervisors' office, TSC, EOF, and the HQEC. The ERFCS will utilize a subset of the data base provided by a unit wide Mux system. This Mux system will be comprised of redundant computers using redundant communication paths to remote input cabinets and redundant communication paths to the ERFCS and other computer systems.

A realistic implementation date cannot be committed at this time due to the large number of contingencies involved. Similarly a date for submission of a Safety Analysis cannot be made at this time. For instance there are plans for minor modifications to the Westinghouse Owners Group Critical Safety Function's (CSF) which are to be made available to the computer project by early May. In a similar manner plant specific modifications to the SAS displays are continuing. The design and construction of the computer upgrade project has been and will continue to be carefully monitored by the project team, its consultant and by corporate management. Figure A1-1 shows the major tasks being considered in the development of SPDS and how the other elements of the ERC are considered in the development and final design.

FIGURE A1-1

SAFETY PARAMETER DISPLAY SYSTEM PLAN



STATUS REPORT

A2 CONTROL ROOM DESIGN REVIEW

INTRODUCTION

The Control Room Design Review (CRDR) Plan referenced in Generic Letter 82-33 will be issued on June 1, 1983. A draft plan is being used at this time to perform the Prairie Island CRDR. The review plan will describe the human factors control room design review undertaken at the Prairie Island Nuclear Generating Plant (PINGP).

PINGP's approach to performing a control room review is characterized by five major features:

First, during the period of August 1980 to December 1981, PINGP participated in the Electrical Power Research Institute (EPRI) research program RP501-4, Human Factors Review of Enhancement Approaches for Nuclear Control Rooms. During this study, the Unit 1/Unit 2 Control Room and the Auxiliary Shut-Down Panel at PINGP were subjected to close human factors review and evaluation, which included identification and evaluation of HED's, and generation and assessment of enhancement options. Methodologies, data, and documents which were developed during this study are available to the control room design review team and the methodology of the review takes advantage of this existing work wherever possible.

Second, PINGP has joined with other utilities to form a Westinghouse Pressurized Water Reactor (PWR) owner's group procedures subcommittee to address the accident and transient procedures requirement of NUREG 0737. As a complement to this work, the subcommittee has performed generic system review and task analyses (SRTA) designed to support human factors control room reviews. The task analyses, modified to accomodate plant specific Emergency Operating Procedures at Prairie Island will be integrated into other control room review activities including validation and verification activities.

Third, PINGP wishes to insure that the control room design review will be of lasting benefit, and that its findings are available in a form which can influence future control room modifications. To accomplish this goal, a set of human factor design specifications will be developed in parallel with other review activities. These specifications will document the human factors design principles used for control room enhancement, and the coding, labeling, and control/display conventions practiced.

Fourth, to minimize the potentially disruptive effect of personnel orientation, operator training, and the control room design review on operations, PINGP has constructed a full-scale, color, photorelief mock-up of the unit 1 main control board. This mock-up is available to the review team and will serve as a test-bed for the evaluation of enhancement options. It also serves as the platform for walk-through/talk-through analyses of selected procedures.

Fifth, to ensure that all the elements of the Emergency Response Capabilities are coordinated, the CRDR will be the focal point for verifying final designs and implementation of changes to the control room.

PRESENT STATUS

Figure A2-1 shows the major tasks being considered in the CRDR and how the other elements of the ERC are considered in the review. The status of each major task is:

1) Develop Emergency Operating Procedures System Review and Task Analysis (SRTA)

   The Generic System Review and Task Analysis has been completed by the Westinghouse Owners Group. PINGP is in the process of developing the Plant Specific SRTA based on the first draft of the Plant Specific Emergency Operating Procedures described in Appendix A4. The SRTA has been developed for E-0. Plans are to have the SRTA completed by the end of third quarter 1983.

2) Control Room Inventory Review

   The control room inventory review has been completed for each unit.

3) Operating Experience Review

   a) The Operator Interviews have been completed and all associated Human Engineering Deficiencies (HEDs) documented and compiled into a master set organized into the same categories identified in NUREG 0700, Section 6.

   b) To assist in the examination of operational history archieved documents, a methodology and human error categorization flow chart is being developed at this time. This methodology flow chart will also become a tool for examination of future operational events.

4) Control Room Survey Ergonometrics

   The survey of noise, lighting, and workspace is completed. The surveys of annunciators, communications, and panel layout has begun. The control and displays component conventions checklist has been completed and all associated HED's documented. All HED's will be documented and compiled into a master set organized into the same categories identified in NUREG 0700, Section 6.

5) Interface With Other Control Room Projects

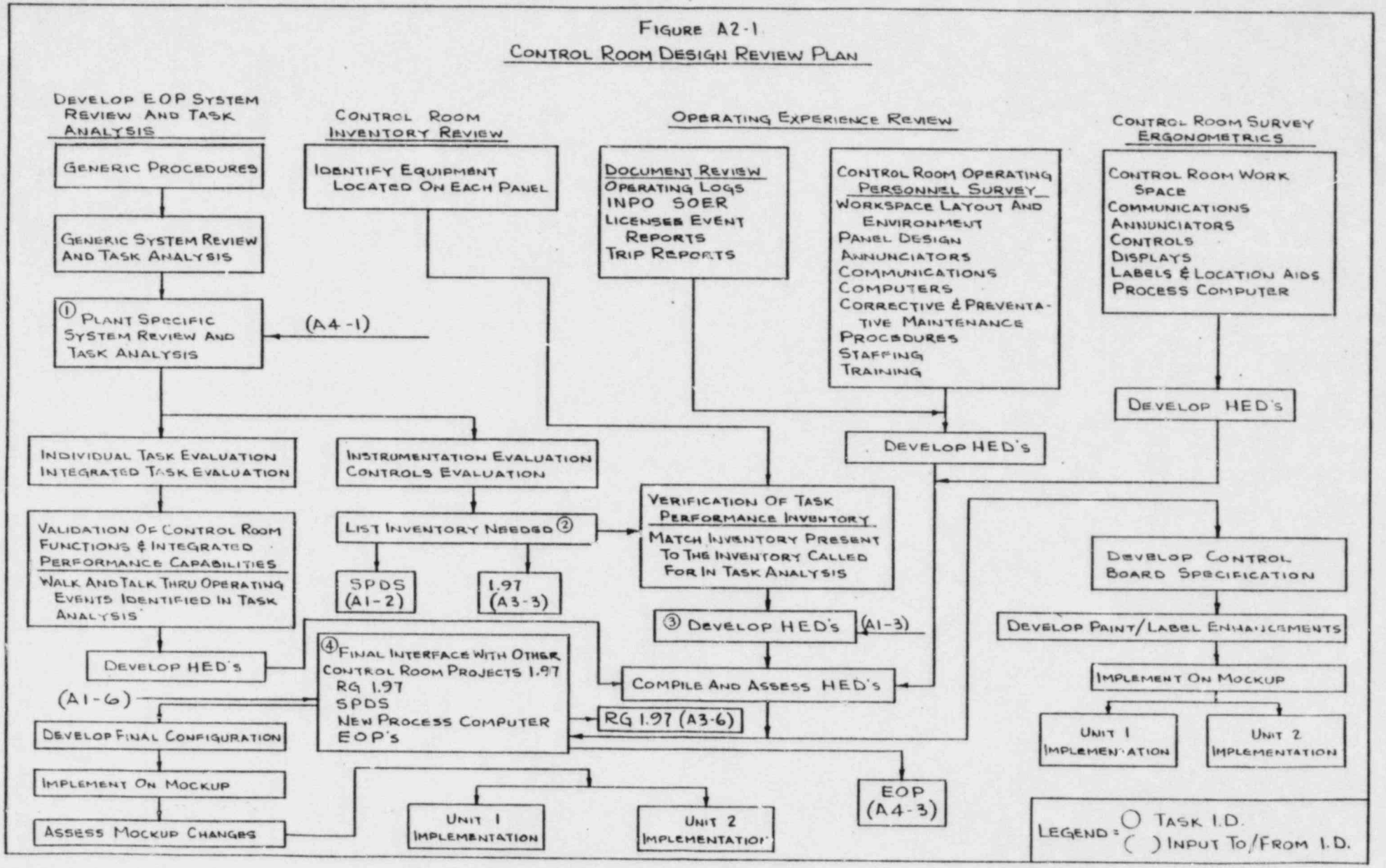
A mock-up of a control room computer sit-stand work station has been designed and built for operator evaluation and human engineering evaluations. This console will house the CRT's and keyboards for a new process computer and SPDS displays. After detailed evaluation the proposed console will be fabricated as a part of the computer upgrade program.

SCHEDULE CONSIDERATIONS

A major CRDR task results in development of HED's which will then be assessed to determine which are significant and should be corrected. HED's that are selected to be corrected will be coordinated with the SPDS, RG 1.97 and EOP programs to determine the best way to make the changes without creating any other unacceptable human engineering discrepancies. After the final configuration is developed, a summary report will be issued detailing the results of the CRDR and final implementation schedule. Improvements that can be accomplished with an enhancement program will be done upon completion of a control board specification.

FIGURE A2-1

CONTROL ROOM DESIGN REVIEW PLAN



STATUS REPORT

A3 REGULATORY GUIDE 1.97 (RG 1.97)

The review of RG 1.97, Revision 2, has been in process since its receipt. All variables listed in RG 1.97, Revision 2, Table 2 have been reviewed for applicability to the Prairie Island Nuclear Generating Plant (PINGP). Figure A3-1 shows the techniques used in reviewing the variables and interfacing the implementation or modification of variables with other tasks shown in Figure 1.

As shown on Figure A3-1, a review of the Emergency Operating Procedures (EOP's) has been conducted to identify type A variables in accordance with the guidance of RG 1.97, Revision 2. For the purposes of the submittal the type A variables have been identified by reviewing the upgraded EOP's. This was done because the implementation of the EOP's is scheduled within this calendar year. If a variable listed in RG 1.97, Revision 2 has been judged not applicable to PINGP, a justification will be forwarded with the initial submittal.

For those variables that are applicable to PINGP, reviews to determine the desire of implementation of the variable, modification to existing equipment required, possible implementation by SPDS or plant process computer project, and whether existing or proposed instrumentation meet Human Engineering requirements are performed. At the conclusion of these reviews, which may require several iterations of design, funding for required changes will be established based upon the final design and the variable implemented in its final form.

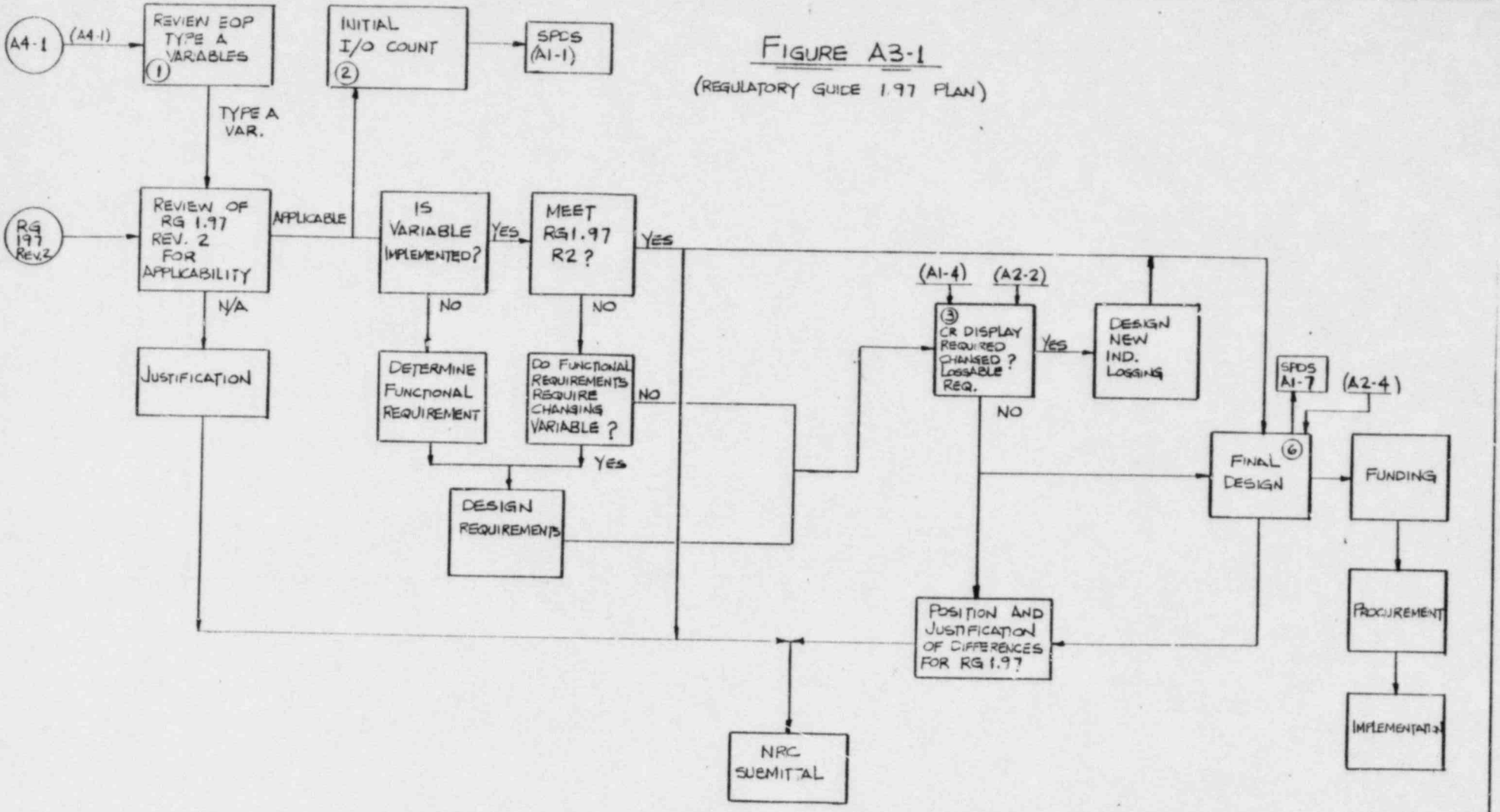
Tables showing the implementation of RG 1.97, Revision 2 variables will be the result of the above process. The tables will show the conformance of existing equipment to RG 1.97, Revision 2 and a schedule for implementation of upgrades. A sample table is enclosed to show the format being used.

SCHEDULE CONSIDERATIONS

Where previous commitments exist (such as reactor vessel level) the RG 1.97 table will reference that commitment. For items not previously identified for change or implementation in RG 1.97 the table will identify a schedule for completion. In cases where intermediate milestones can affect the final implementation date, those milestones will be indicated.

FIGURE A3-1

(REGULATORY GUIDE 1.97 PLAN)



R.G. 1.97, Rev. 2

VARIABLE	TYPE	RANGE	POWER SUPPLY	CONTROL ROOM DISPLAY	TSC READOUT	REDUNDANCY	ENVIRONMENTAL QUALIFICATION	SEISMIC QUALIFICATION	QA CATEGORY
NEUTRON FLUX	B	10^{-11}-120%	1E	ANALOG METERS/ RECORDERS COMPUTER LOG	RECALL COMPUTER	4 POWER RANGE 2 INTERUM RANGE 2 SOURCE RANGE	REACTOR TRIP ONLY		
	B	10^{-8}-125%	1E	SEE COMMENTS	SEE COMMENTS	2 CHANNELS	PER 50.49	PER R.G.1.100	1

COMMENTS: 1) Existing System not qualified for monitoring after all Design Basis Events.

2) New system consisting of fission chamber detectors and associated electronics is qualified per IEEE 323-1974 and IEEE 344-1975. New system for monitoring only. Old system will retain trip functions.

3) New System to Display initially on NIS racks in control room and replace existing signals for NIS readout on recall computer in TSC. Final control room readout and recording will be determined as apart of the control board review.

4) Logging of new system will be by computer when new process computer installed.

5) Installation of new system to be complete on or before completion of 1985 outages.

Example
Table A3-2

STATUS REPORT

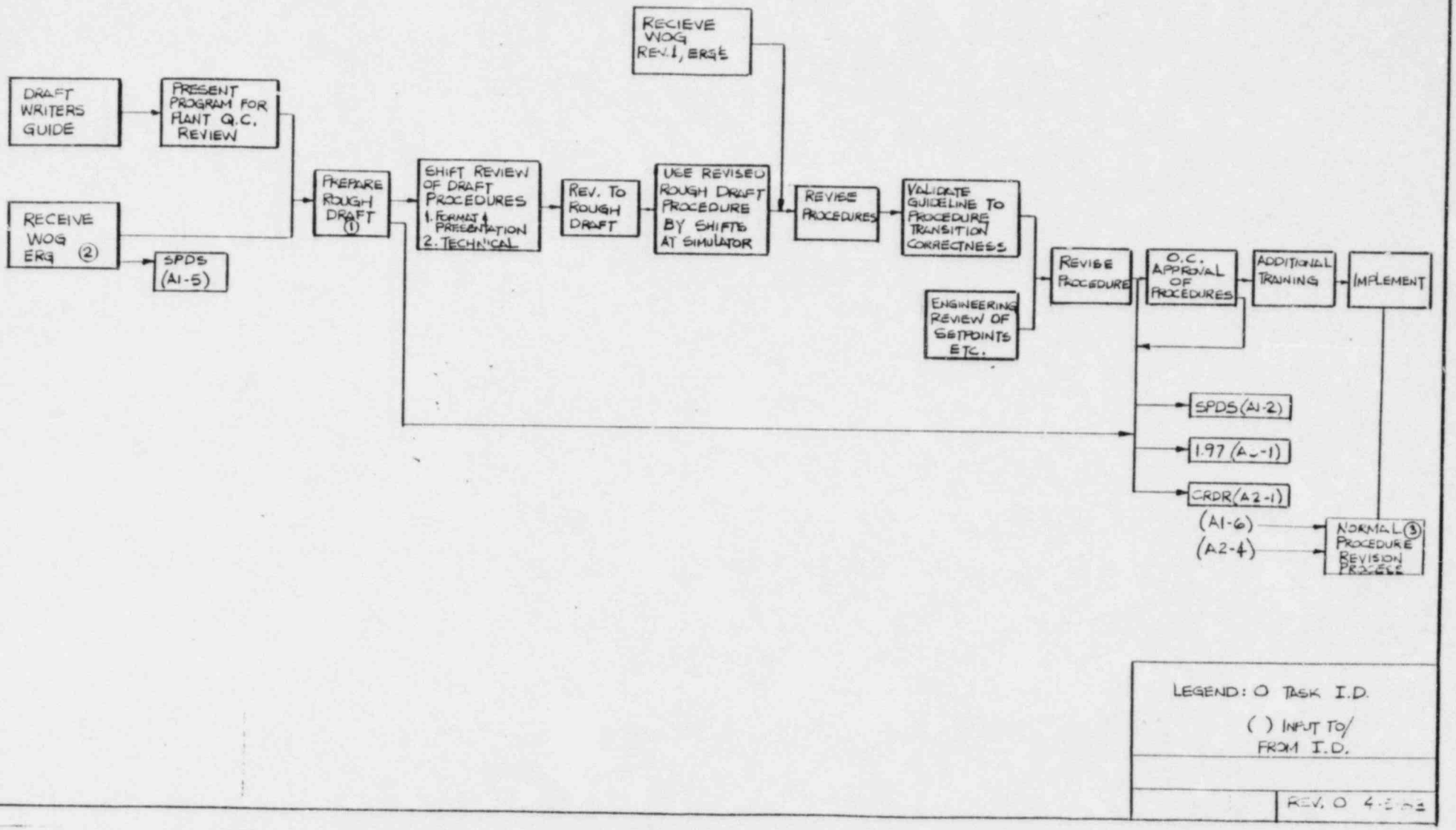
A4 UPGRADE EMERGENCY OPERATING PROCEDURES

Current Status of EOP Upgrade Development

Draft plant specific Emergency Procedures and background documents have been written from the Generic Technical Guidelines, Basic Revision. Additional plant specific procedures will be written as new Guidelines are received from Westinghouse Owner's Group. Technical, as well as format, presentation and style, review by the operating shifts has been ongoing since approximately February 1, 1983. The comments generated from this review will be factored and used to revise the draft procedures. The revised draft procedures will then be used by the operating shifts at a simulator. Comments received from the simulator usage of the procedures will be combined with the Generic Guidelines, Revision 1 due out in July 1983 to formulate the final revision.

FIGURE A4-1

EMERGENCY RESPONSE GUIDELINE / EMERGENCY OPERATING PROCEDURE PLAN



STATUS REPORT

A5 EMERGENCY RESPONSE FACILITIES

Descriptions of the Emergency Response Facilities were documented to the NRC in letters dated December 31, 1979 and January 26, 1982. Information and conditions in containment, radiological releases and meteorology necessary to determine protection measures is available to the TSC and EOF. The TSC and EOF have available all documents required for their functions. They provide sufficient working area for utility, federal, state and local officials. As indicated previously the Emergency Response Facilities are complete with the following exceptions:

1) EOF HEP Filtration System

   As indicated in our letter to the NRC dated December 3, 1982 the system will be completed by July 1, 1983.

2) The Class A Model and meteorological data acquisition system of the Dose Computation System as described in Appendix D of our January 26, 1982 response will be available in the TSC and EOF by July 15, 1983. Training and implementation procedures will be completed in 1983.

3) Data that is essential for performance of TSC functions is presently available to the TSC via a B&W Recall Unit and the Prodac 250 Engineers Console. Data essential for performance of EOF functions is available via telephone communications with the TSC and displayed manually on a status board. Final data displays will be via a new process computer and SPDS display systems in the TSC and EOF.

4) A regulatory compliance review against 0737 Supplement 1 is being performed at this time. Any deviations from the guideline will be noted and corrected if necessary.

According to regulatory guidance, a backup EOF is suggested if the primary EOF is located within 10 miles of the plant. As part of the Corporate Emergency Response Plan, a Headquarters Emergency Center (HQEC) is provided for. This HQEC will be manned for those emergency classes that require manning of the EOF. Therefore, the HQEC is available and functional during those times that the EOF is activated. For those unlikely circumstances that could result in abandonment of the primary EOF, the HQEC would function as the backup EOF and would be able to assume the responsibility and functioning of the primary EOF. Because the purpose of the HQEC is to provide a corporate focal point for

monitoring of emergencies, the correct decision making authority would be available in the backup EOF at any time the primary EOF would need to be abandoned. The location of the HQEC is on the 4th floor of the Midland Square Building located in downtown Minneapolis, Minnesota, approximately 55 road miles from Prairie Island and one-half the distance between our Monticello and Prairie Island plants. Provisions have been made for security at the HQEC both during normal working hours and off-hours.

While this location exceeds the 10 to 20 miles suggested, it is felt that this additional distance is not a significant deviation. The backup EOF will be equipped with a remote terminal from the plant Dose Assessment System. This will allow the backup EOF to perform dose projections if it is necessary to assume the role of the primary EOF. Dedicated communications systems are available in the HQEC.

All required documents are available in the HQEC and significant plant flow and logic diagrams are maintained in adjacent offices. For those cases where rapid transportation between the site area and the HQEC may be necessary, arrangements have been made for the use of a helicopter pad on a building adjacent to the HQEC building.

IV. Schedule

Status reporting described in Appendix A covers schedule considerations for each of the elements.

We are not in a position to give a detailed schedule for the overall integration of all the control room elements and the schedule for completion of the final designs. These dates will be provided later when more information is available.

However a target toal is to have all elements complete during the refueling outage schedule for 1985.

Major milestones identified are:

	Element	Target Date
1.	SPDS Safety Analysis Submitted	First Quarter 1984
	SPDS Fall Implementation Date	Date to be provided First Quarter 1984
2.	CRDR Program Plan Submitted	June 1983
	CRDR Summary Report Submitted	Fourth Quarter 1984
3.	R.G. 1.97 Report Submitted	June 1983
4.	EOP's Generic Technical Guidelines Submitted	Have been submitted by Westinghouse Owners Group
	EOP's Procedures Generation Package Submitted	June 1983
	EOP's Implemented	November 1983
5.	Fully Functional TSC, OSC, EOF	Complete except as noted in Appendix A5