UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 30, 1999

LICENSEE: Wisconsin Public Service Corporation

FACILITY: Kewaunee Nuclear Power Plant

SUBJECT: MEETING BETWEEN THE WISCONSIN PUBLIC SERVICE CORPORATION AND THE NUCLEAR REGULATORY COMMISSION STAFF CONCERNING THE REACTOR PROTECTION SYSTEM UPGRADE PROJECT AT THE KEWAUNEE NUCLEAR POWER PLANT (TAC NO. MA5396)

The Nuclear Regulatory Commission (NRC) staff met with representatives from the Wisconsin Public Service Corporation (WPSC) and its contractor, Westinghouse Electric Company (Westinghouse) at NRC Headquarters on June 30, 1999, concerning the reactor protection system (RPS) upgrade project at the Kewaunee Nuclear Power Plant (Kewaunee). Enclosure 1 lists the meeting participants. A public meeting notice for the subject meeting was issued on June 11, 1999, and a copy of the meeting notice was posted on the NRC's public Internet Web page.

The WPSC's RPS upgrade project involves proposed replacement of the existing analog RPS and engineered safety features (ESF) instrumentation in the relay room at Kewaunee with new digital Westinghouse Ovation E-series equipment; according to the WPSC's project description, eight racks of original Foxboro process protection electronics and 14 racks of relay logic would be replaced in the fall of 2001.

A major factor in the licensee's decision revolves around the licensability of the new system and a timely review by the staff. Kewaunee would be the first domestic plant to utilize Westinghouse Ovation equipment in safety-related applications.

The WPSC and Westinghouse representatives presented an overview of the project and discussed the proposed schedule as described in the handout (Enclosure 2). The staff indicated that one of the most critical portions of its review would focus on the system architecture and defense-in-depth. WPSC requested that NRC review be conducted in two sequential parts. The first part involves staff review of the system architecture and project descriptions (submitted on June 7, 1999) including design, testing, verification, diversity, and defense-in-depth analysis. Supplemental submittals are expected in the next few months. WPSC requested the staff to issue a preliminary assessment letter by December 1999. The second part involves the license amendment request, which is planned to be submitted in December 2000, with the associated changes in technical specifications. WPSC requested that the staff complete its review in time to support the fall of 2001 installation schedule.

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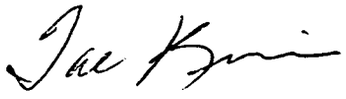
The staff stated that the WPSC's schedule appears very aggressive, and that the staff's ability to support the proposed schedule of issuing a preliminary assessment by December 1999 would depend on the quality and timely submittals and also would depend, in part, to the potential for involvement in Y2K inspection activities. The staff agreed to periodic meetings with WPSC and Westinghouse to discuss details of the submitted reports.



Tae Kim, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-305

Enclosures: As stated

cc w/encls: See next page

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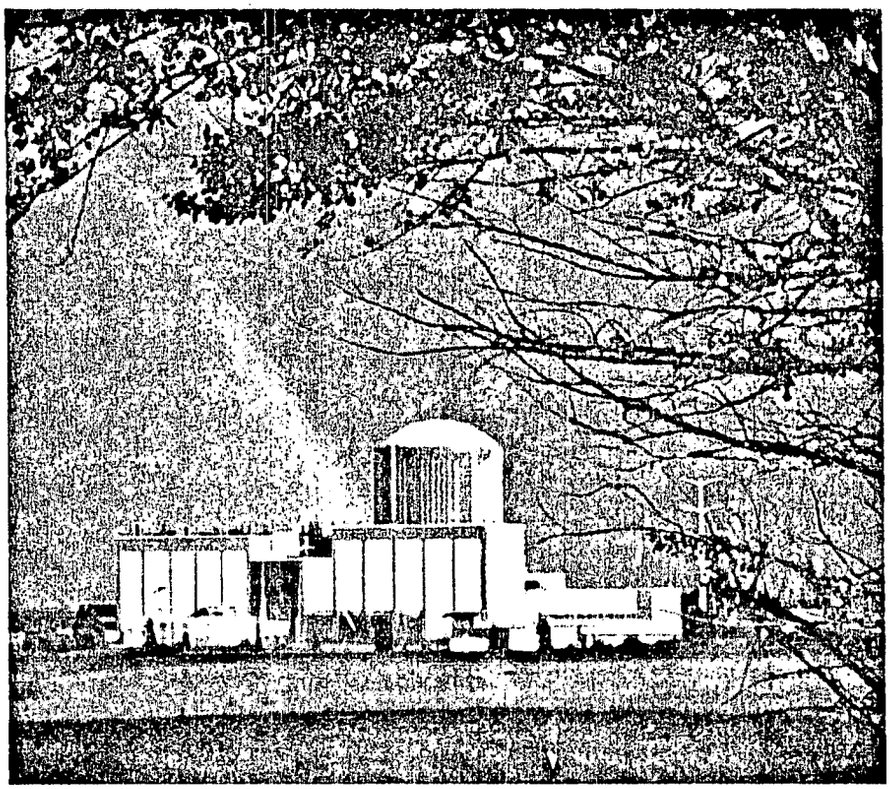
MEETING ATTENDEES

NAME	AFFILIATION
T.J. Kim	NRC
Jose Calvo	NRC
Paul Loeser	NRC
Angelo Marinos	NRC
Keith Mortensen	NRC
Sang Rhow	NRC
Subinoy Mazumdar	NRC
Hulbert Li	NRC
Iqbal Ahmed	NRC
Eric Lee	NRC
Hukam Garg	NRC
Mario Gareri	NRC
Jim Stewart	NRC
S.V. Athavale	NRC
P. Brantmeier	WPSC
Jerry Riste	WPSC
Tom Schneider	WPSC
David Ozarowicz	WPSC
Ken Weinhauer	WPSC
Glenn Lang	Westinghouse
Bob Sterdis	Westinghouse
Albert Crew	Westinghouse
Wayne Barber	McGraw-Hill
Althera Wyche	Bechtel

ENCLOSURE 1

Kewaunee Nuclear Power Plant
Reactor Protection System
Upgrade Project



WPS-NRC Meeting

June 30, 1999

Kewaunee Project

Enclosure 2

Agenda

- WPS Intent to Upgrade Reactor Protection System
- Overview of Upgrade System Architecture
- Proposed Schedule for Submittal of Licensing Documents
- NRC Support of Proposed Schedule

WPS Intent to Upgrade Reactor Protection System

- WPS/WEC Team Introduction
- Scope of RPS Upgrade
- Schedule for RPS Upgrade
- Current Status of RPS Upgrade

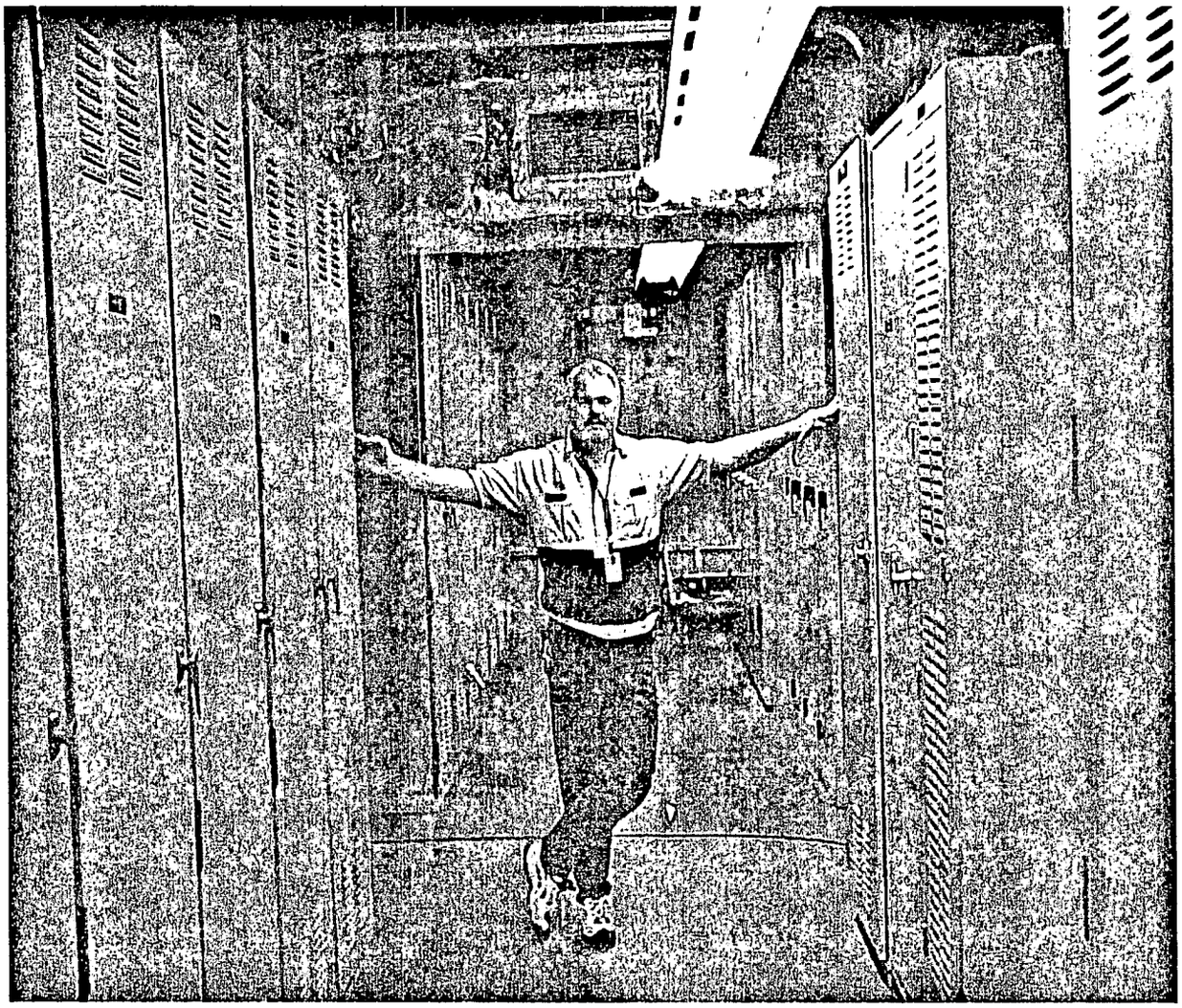
WPS-W RPS Upgrade Team

- WPS
  - Plant Manager - Ken Weinhauer
  - Engineering Manager - Dan Cole
  - Project Engineer - Dave Ozarowicz
  - I&C Engineering - Eric Streich, Pat Brantmeier
  - Licensing - Tom Webb, Jerry Riste
- Westinghouse
  - Project Manager - Bob Sterdis
  - Functional and Licensing Engineer - Glenn Lang
  - System Engineers - Carl Vitalbo, Al Crew
- NRC
  - Project Manager - T. J. Kim
  - I&C Branch Chief - Jose Calvo
  - Section manager - Jerry Mauck
  - Lead reviewer - Paul Loeser
  - Review team - Jim Stewart, Cliff Doutt

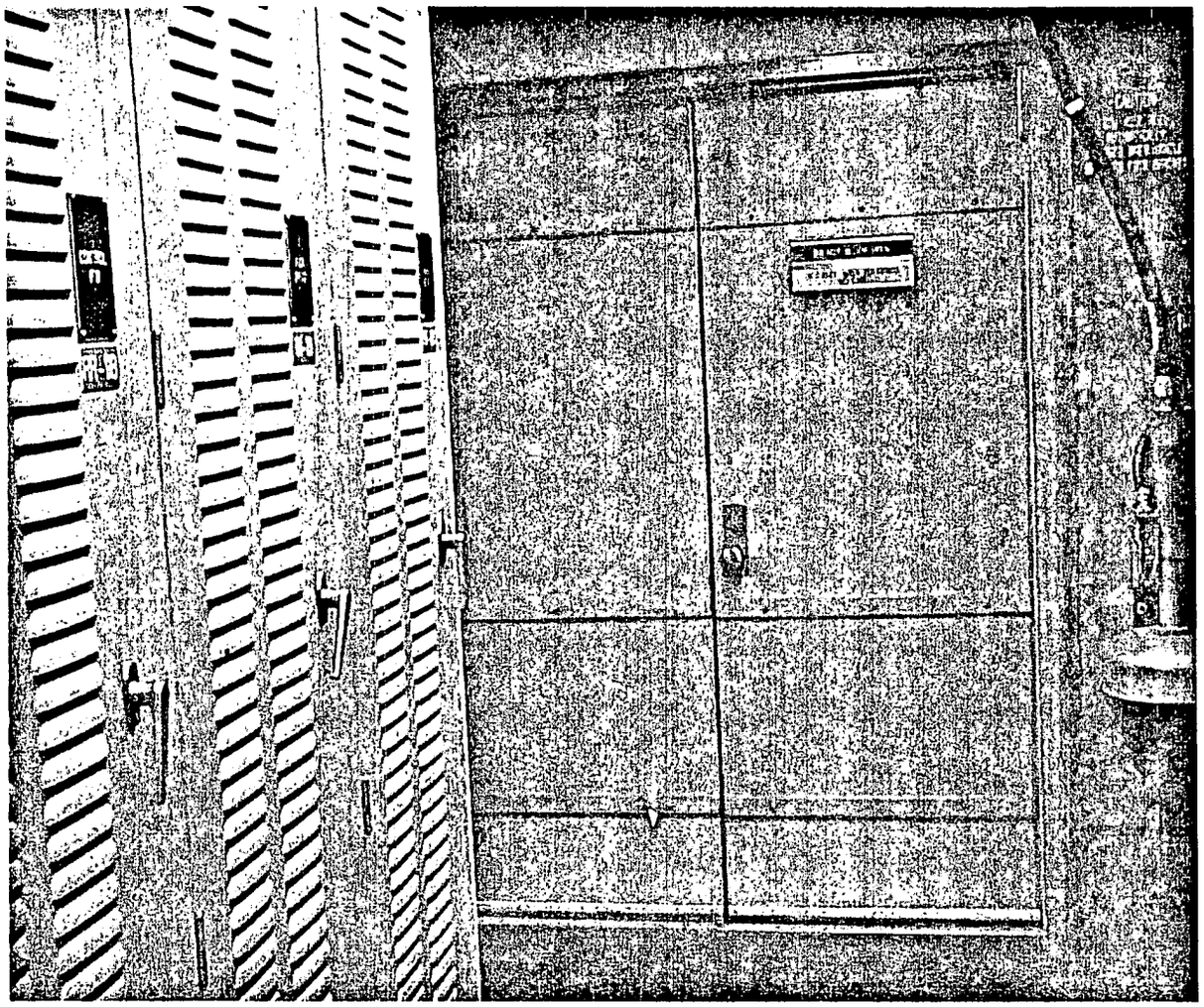
Scope of RPS Upgrade

- Replace 8 racks of Foxboro process protection electronics and 14 racks of relay logic
  - 4 process protection sets
  - 2 trains of RT, ESF, Aux Safeguards, and Test
- NIS electronics not replaced. NIS RT logic performed by upgraded system.
- Interfaces to plant computer, control systems, annunciator system, plant control board maintained
- Field devices not replaced as part of this upgrade
- Final actuation devices not replaced
- Field wiring to the cabinets maintained

Spacing Between Existing Racks

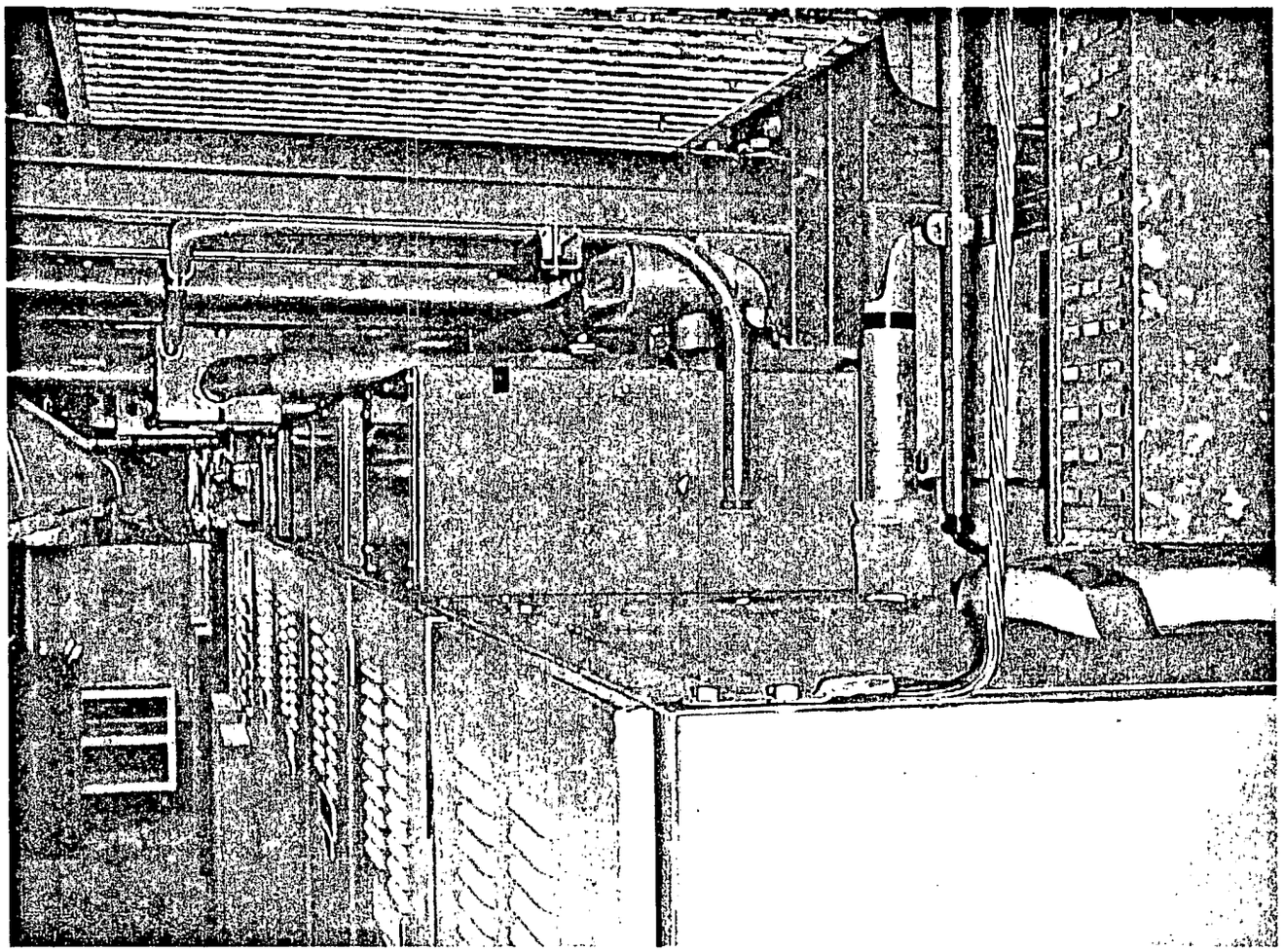


Entry Path for Upgrade Cabinets

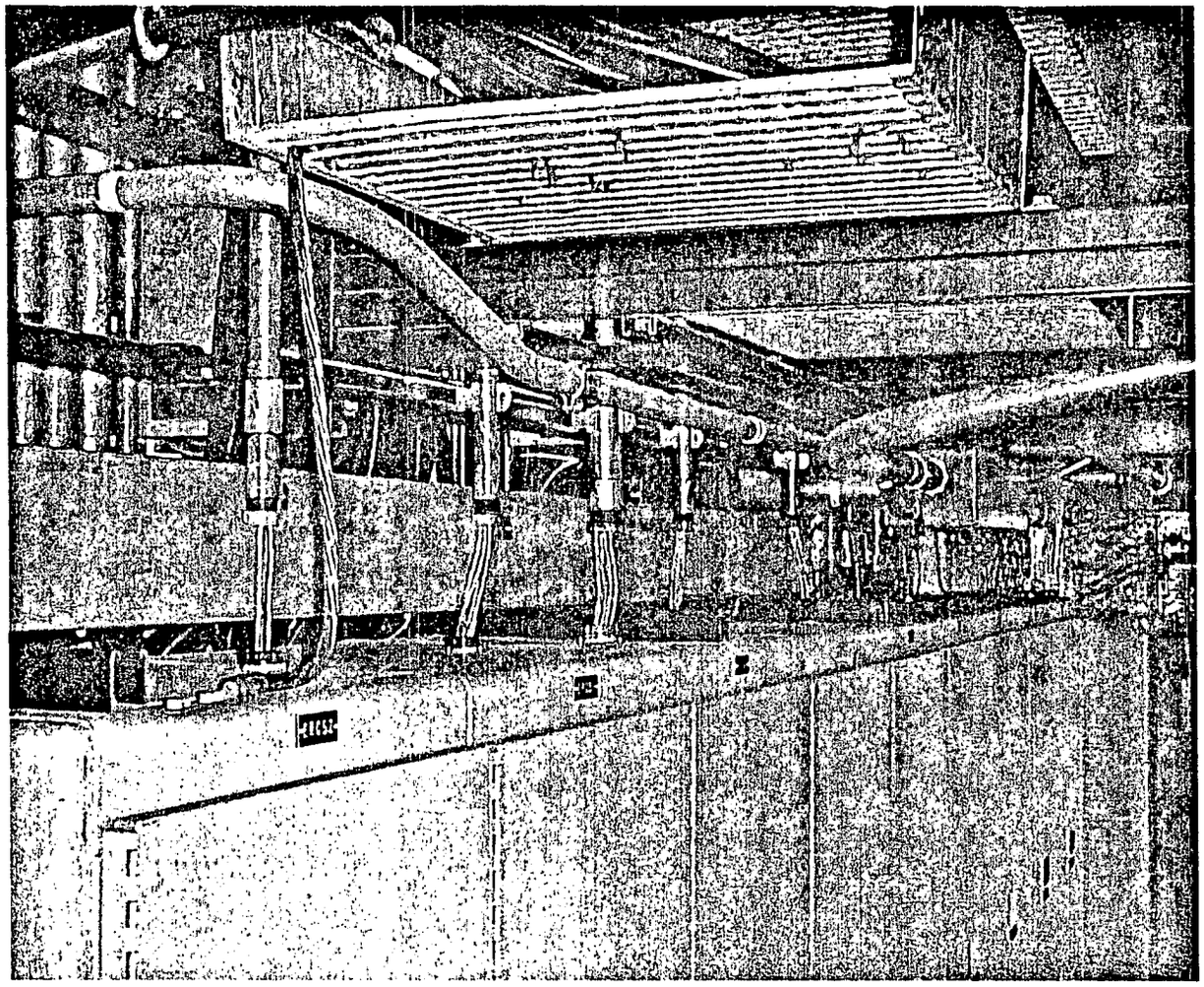


Existing RPS Relay Racks

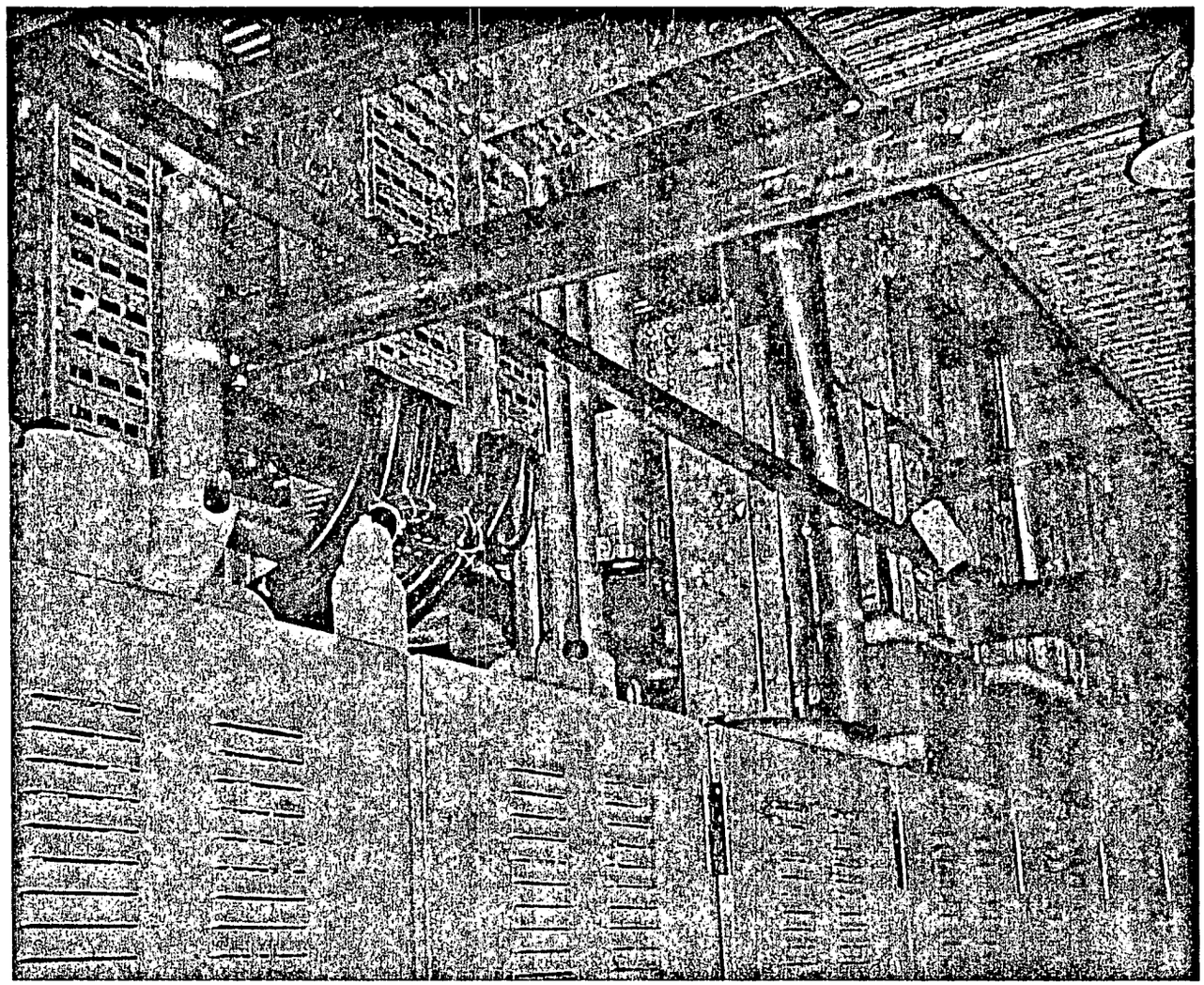
Termination Boxes on Top of Racks



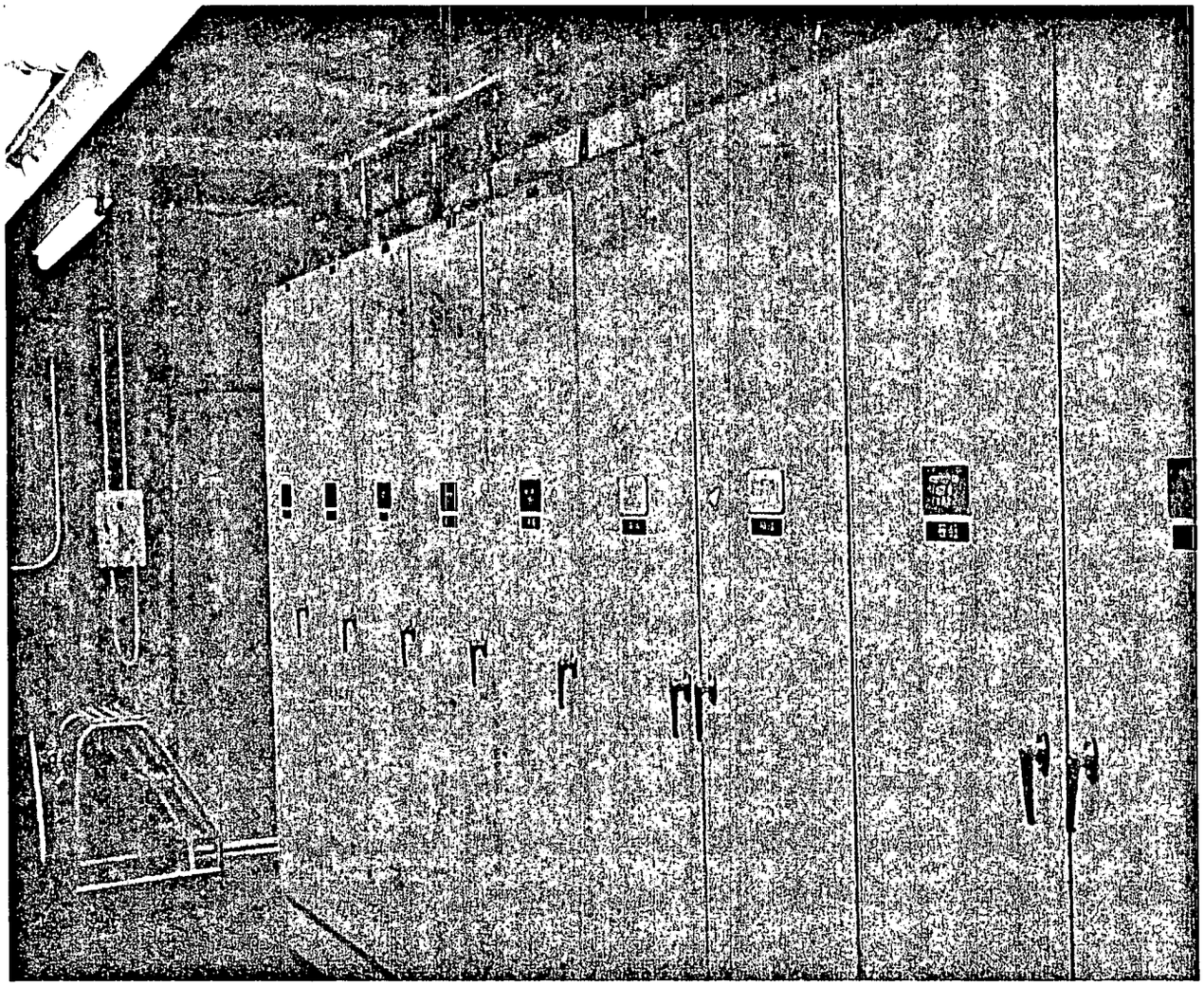
Existing Rack Cable Entry from Top



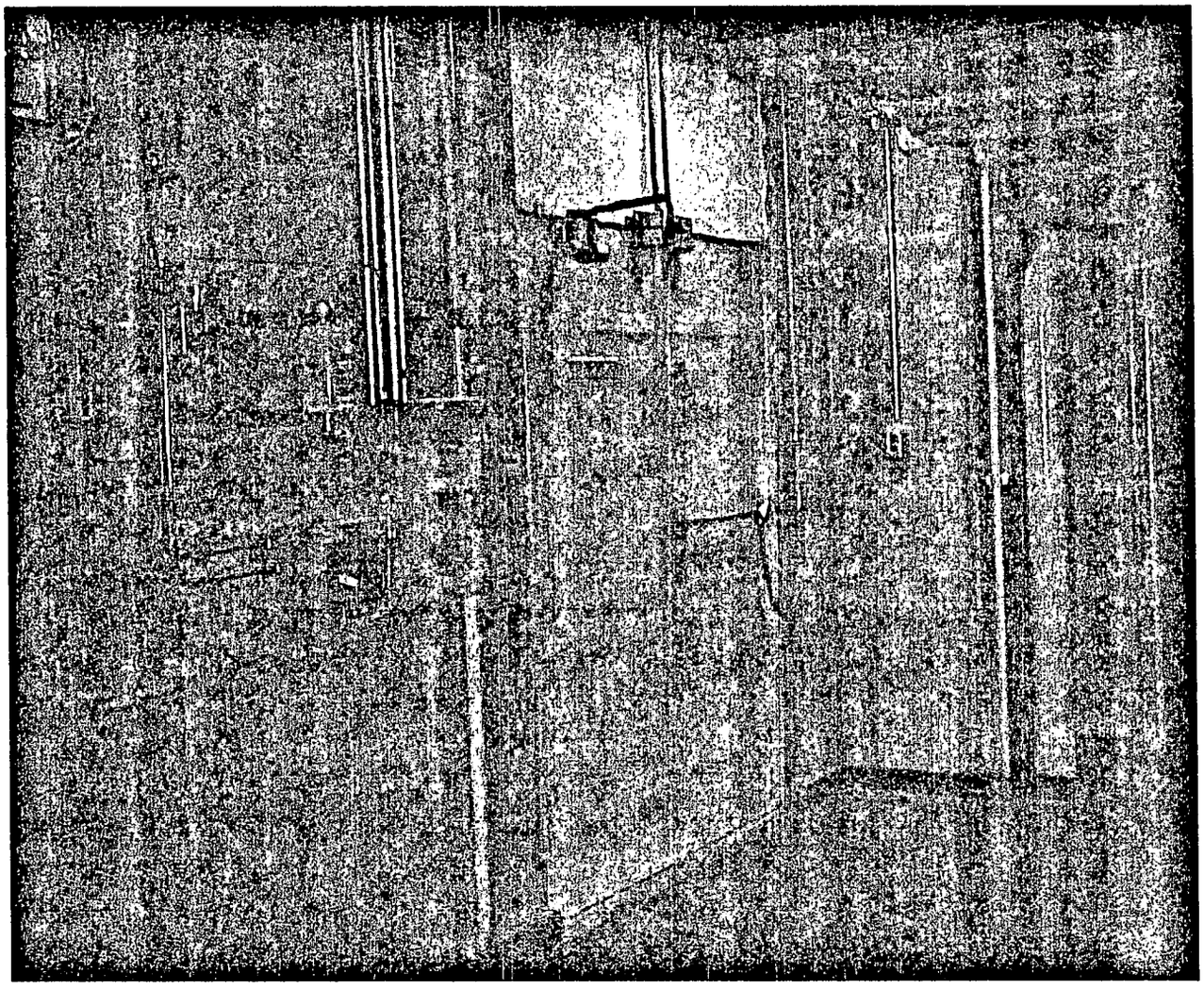
Existing Rack Cable Entry from Top



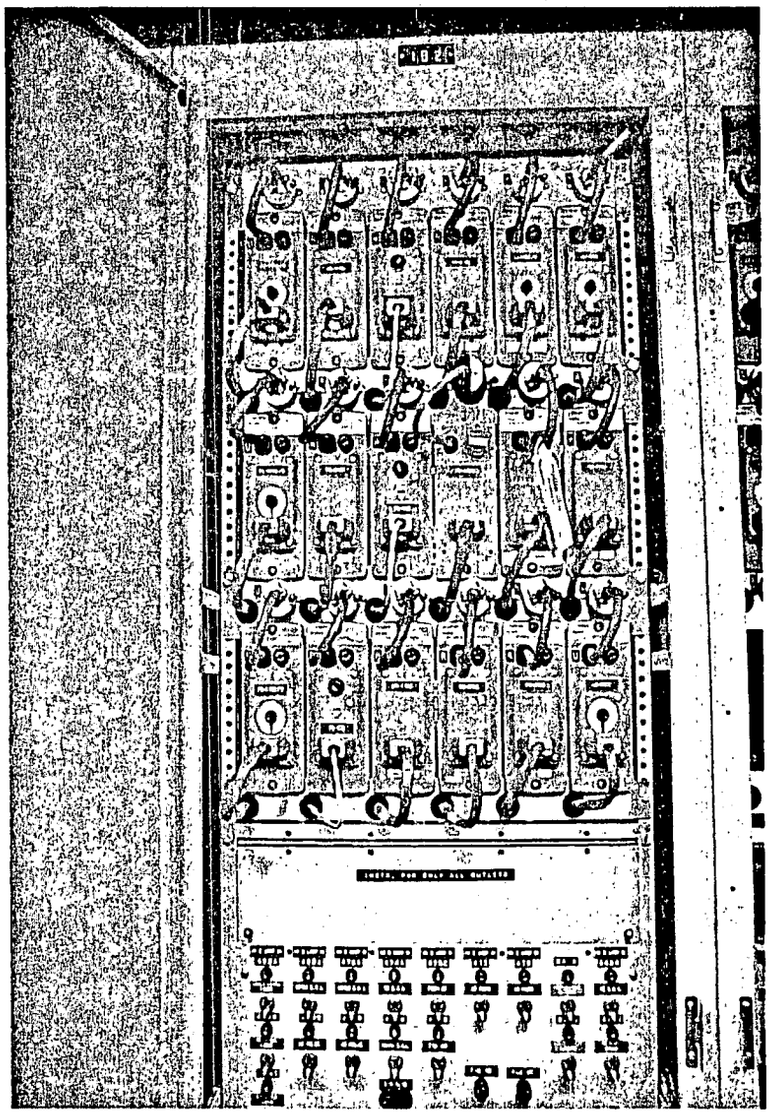
Racks in Front Double Entry Doors



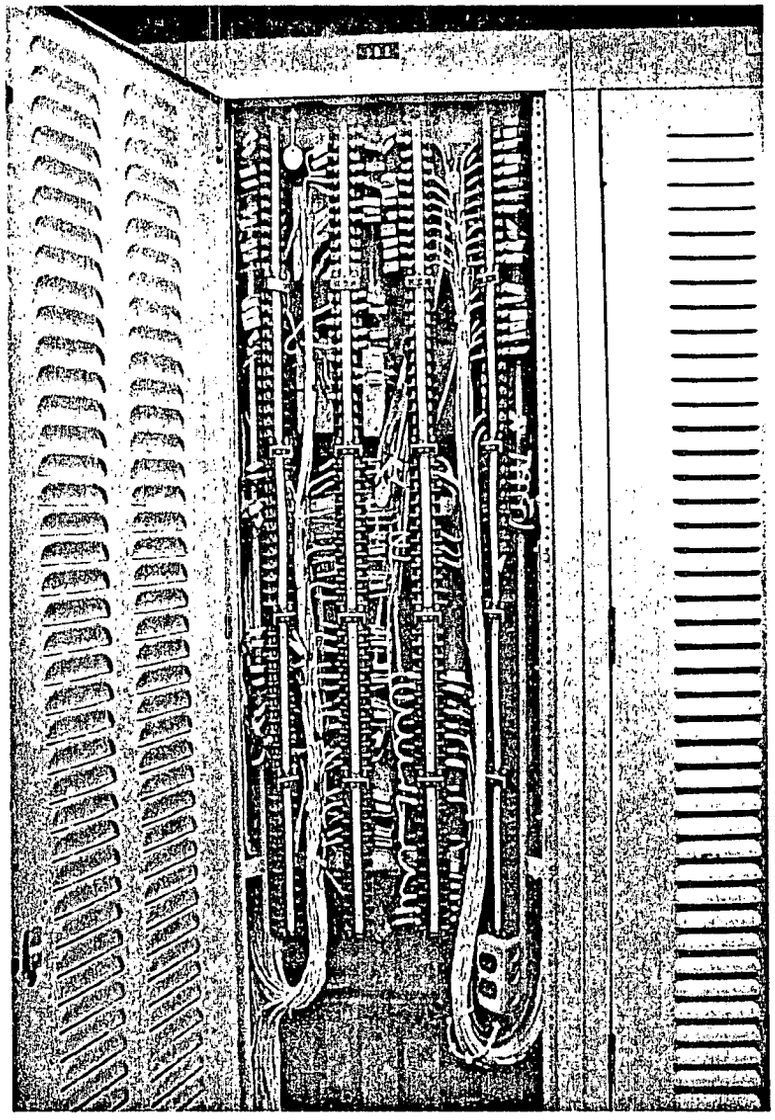
View of Double Doors from Turbine Building Side



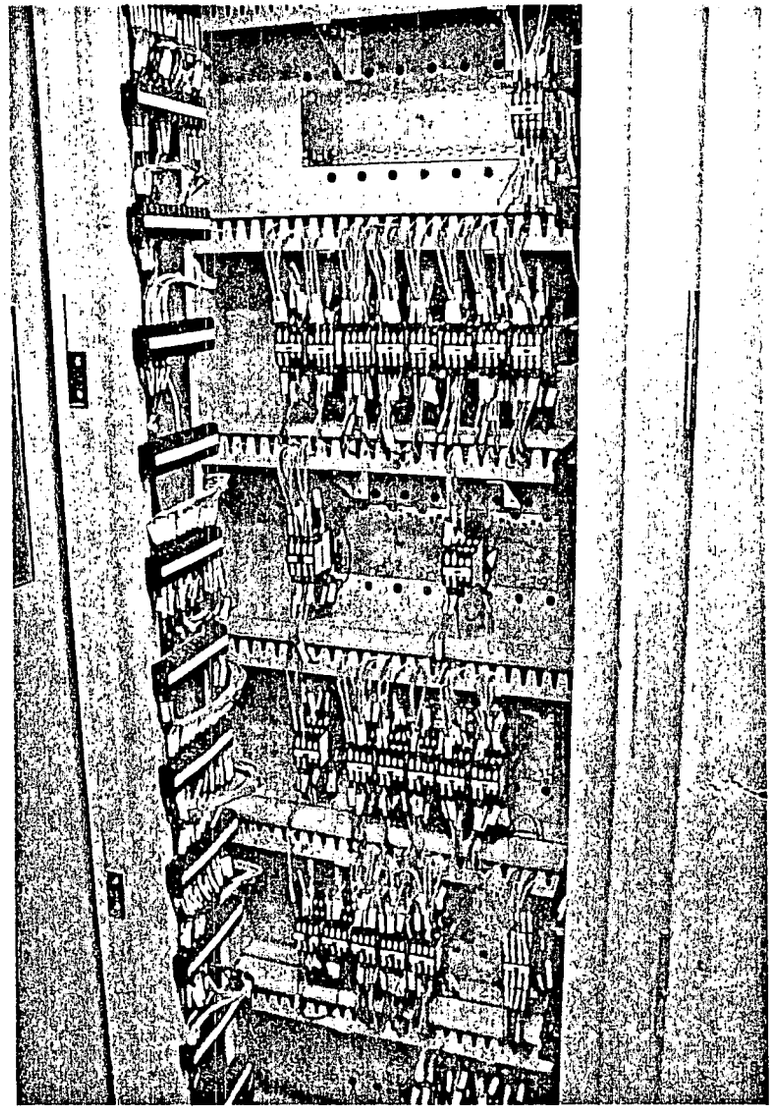
Front View of Existing Foxboro Process Protection Rack (Rack 113)



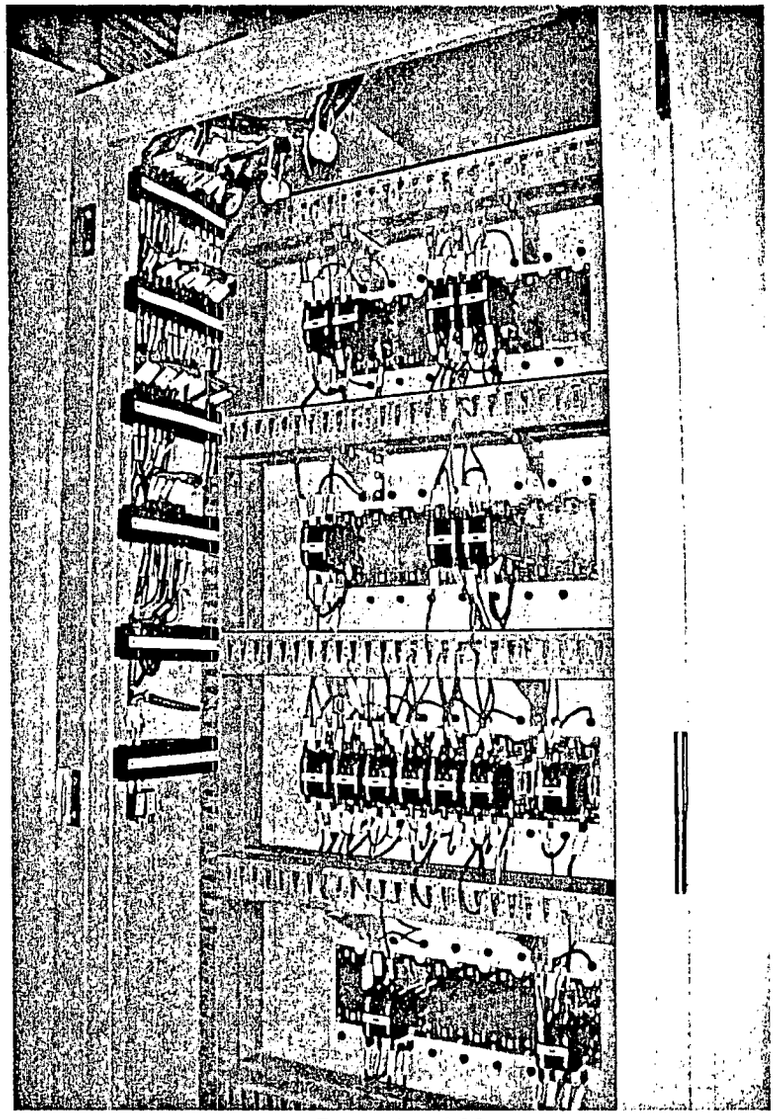
Rear View of Existing Foxboro Process Protection Rack (Rack 113)



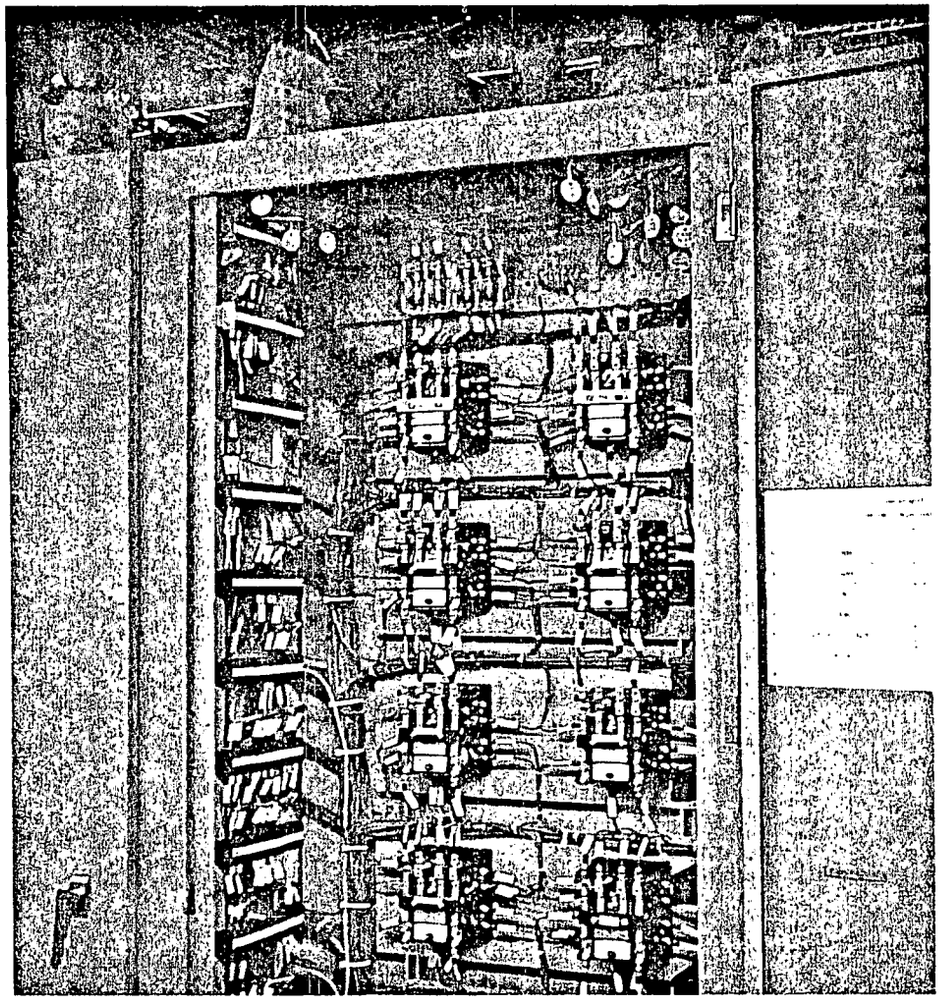
Front View of Existing Relay Rack 131



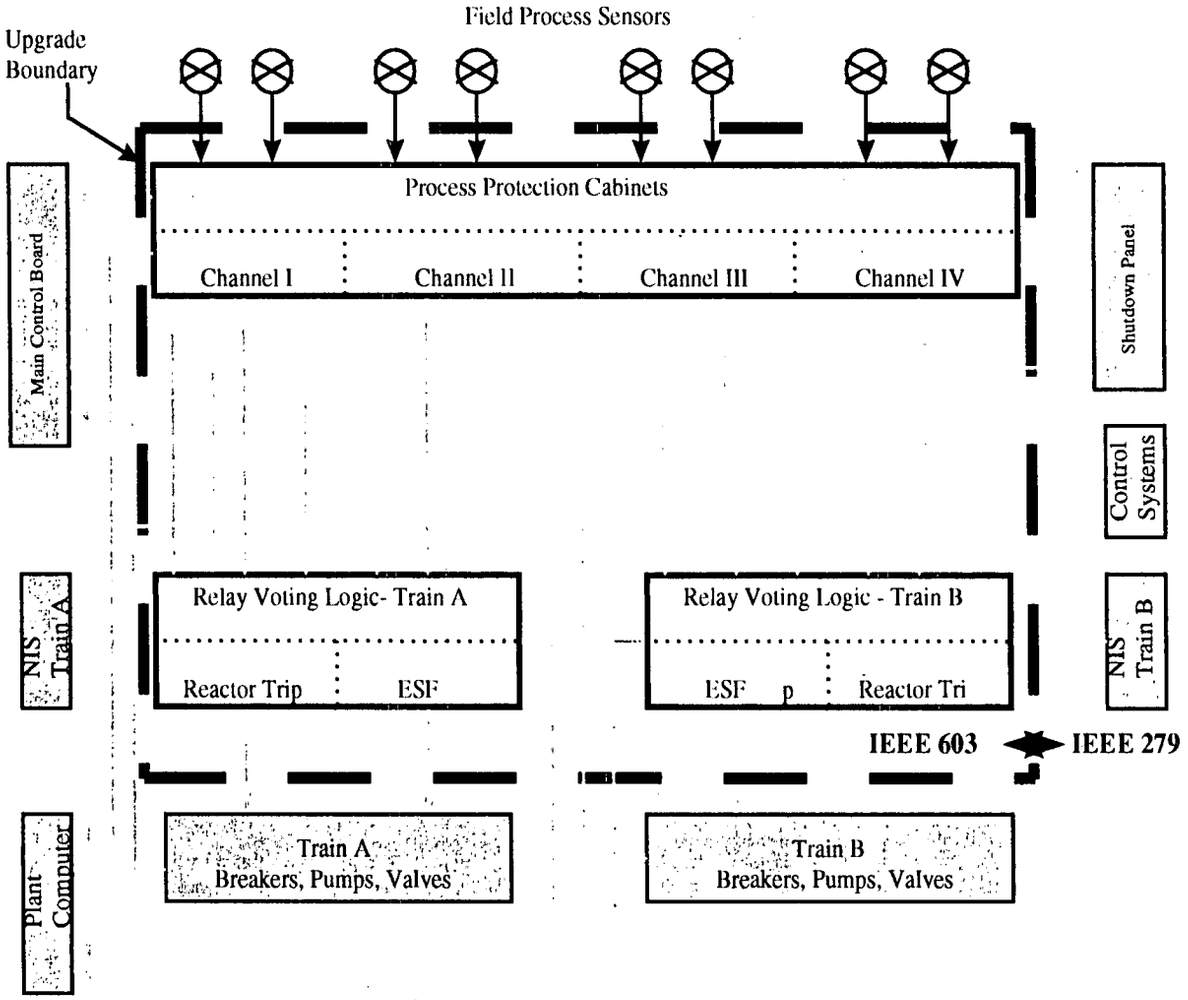
Rear View of Existing Relay Rack 131



MG-6 Relay Rack



Existing RPS Architecture



Schedule for RPS Upgrade

■ Project Kickoff	March 1999
■ Docket RPS Upgrade	June 1999
■ First Licensing Submittal	June 1999
■ Final Licensing Report	December 2000
■ License Amendment Request	December 2000
■ NRC SER	June 2001
■ Installation of Upgrade	September 2001

Current Status of RPS Upgrade Project

- Kickoff meeting held at NRC offices on March 4, 1999
- WPS docketted RPS Upgrade via letter NRC-99-041 dated June 7, 1999
- First licensing submittal in June 1999
  - Protection System Architecture
  - Protection System Testing Approach
  - Diversity & Defense-in-Depth Analysis
- Preliminary Design Review completed in May 1999

Overview of Upgrade System

Topics of Discussion

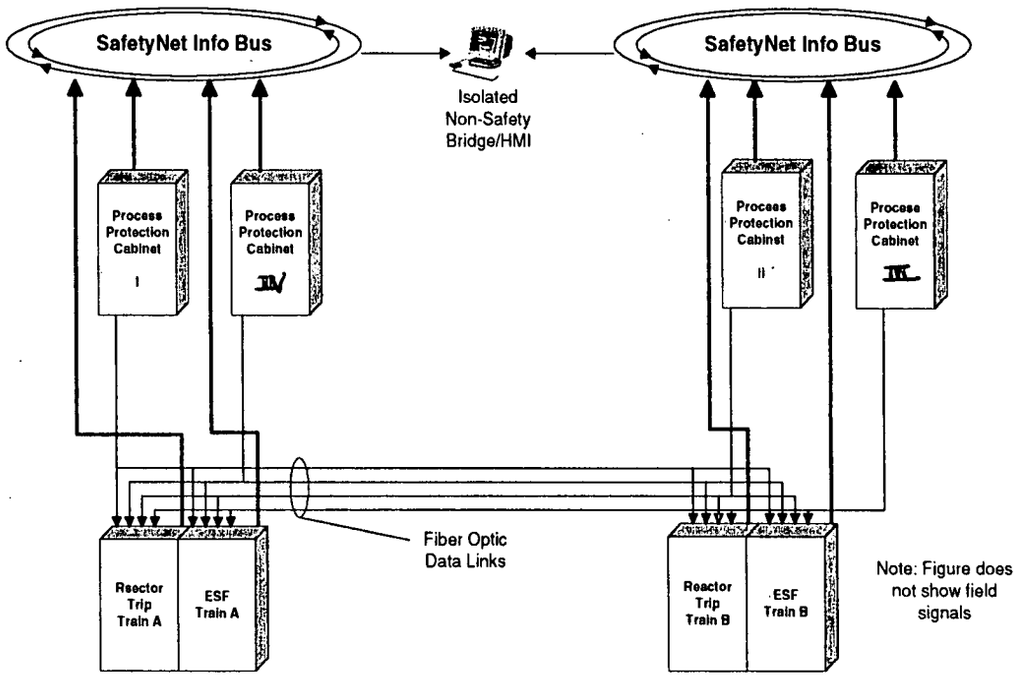
- Architectural Design Considerations
- Simplified Block Diagram (w/o DAS)
- E3 Design Approach
- E3 Controller Internal Architecture
- Detailed Architecture (w/o DAS)
- DAS Functions

Architectural Design Considerations

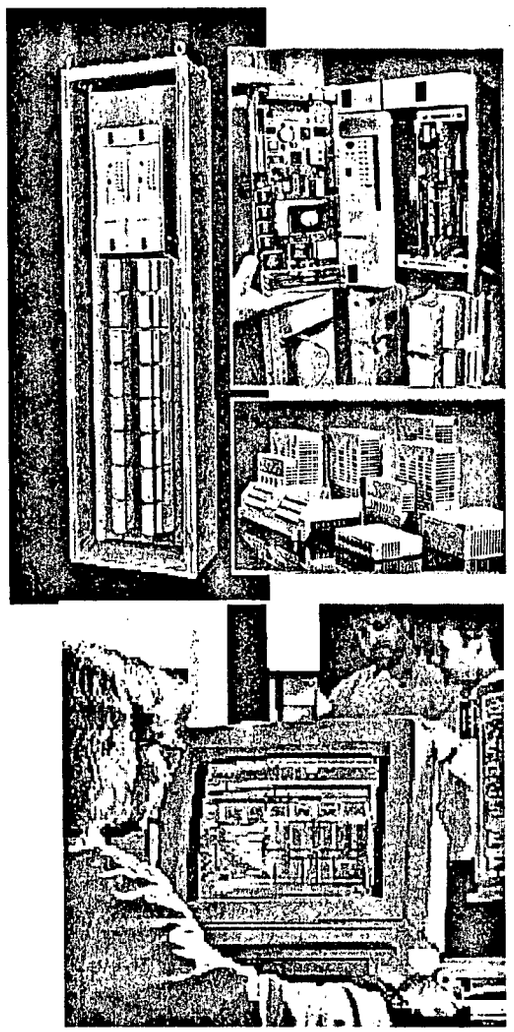
- Present architecture
- Present layout and space availability
- Location of field wiring
- Interfaces to existing systems and components
- Impact on plant operations and procedure
- Diversity and Defense-in-Depth
- Testability
- Licensability
- Communication interface to future I&C upgrades

Retrofit Protection System Architecture
Simplified Block Diagram

- Common solution for classic Westinghouse PWR plants.
- Maintains the "four process protection sets and two logic trains" model.
- Maintains existing plant interface signals and trip breaker configuration.
- Communication Network collects data for display at a maintenance workstation. (Possible future connection to the plant computer.)
- Each block is implemented with two "E3" controllers (D &D-in-D and protection against spurious trip)
- Replacement cabinets have same foot print and meet current qualification requirements



"E3"...
our unified approach to control & protection



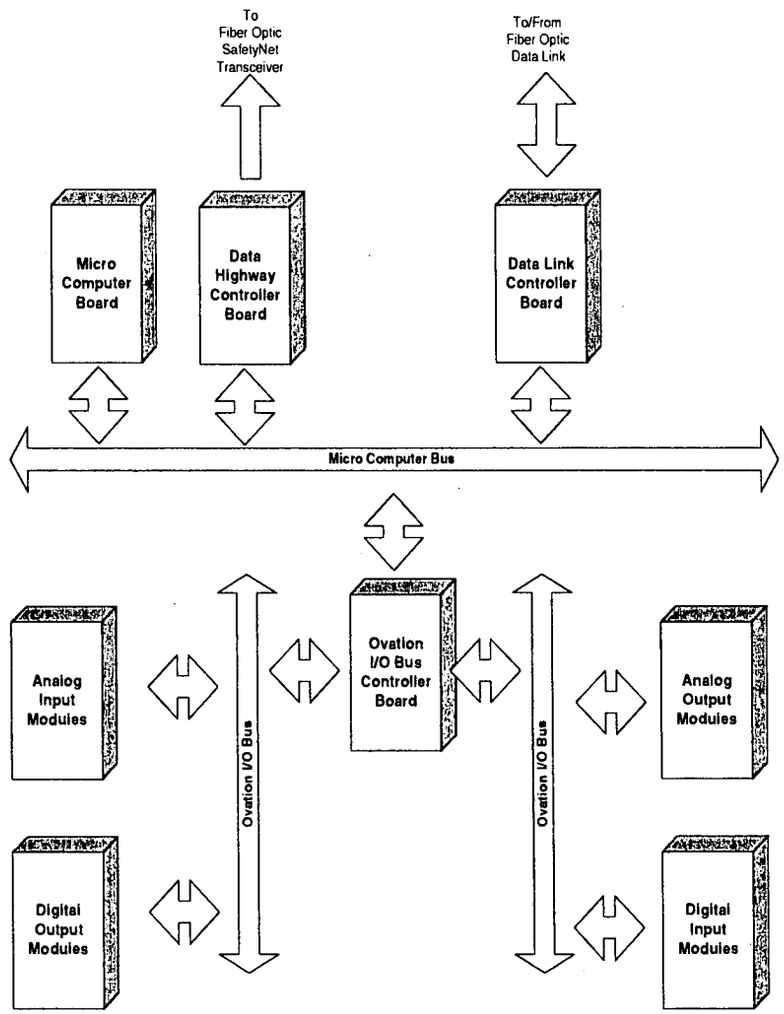
- Ovation™ hardware platform
- Additional "*nuclear*" features
  - Seismic Cabinet
  - CompactPCI Form Factor
  - Intelligent Communication Processors
  - Test Interface
- Qualify to Class 1E requirements

"E3"

- Eagle series multiprocessor controller architecture
- Eagle series licensed (NII) safety software
- Upgraded for new hardware
- Greater than 80% object module reuse in functional processor

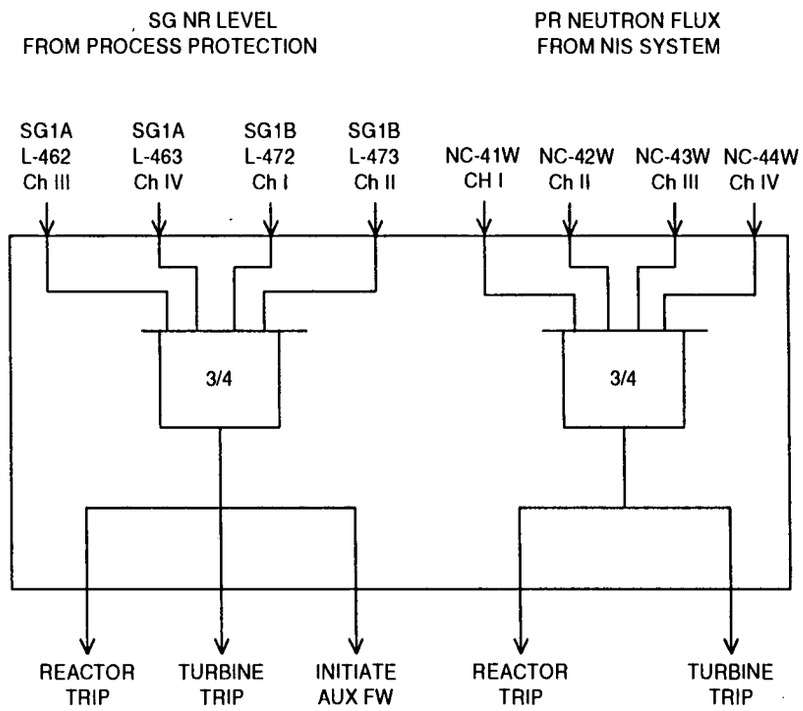
"E3" Controller Internal Architecture

- Eagle-Style Multiprocessor Controller Architecture
  - Main Computer Board
  - Intelligent Slave Controller
    - Datalinks
    - SafetyNet
- Ovation-Style I/O Architecture
  - I/O Modules
  - I/O Bus
  - Intelligent Slave Controller



Diverse Actuation System Design

- Sensor functional separation on module level
- Functional separation on a controller level
- Use of diverse sensors
- Diverse NIS process electronics
- Software design process per IEEE 7-4.3.2
- D&D-in-D analysis per NUREG/CR-6303
- Diverse actuation functions to meet 10CFR50.62
- Only one diverse actuation function added



I&C Upgrade Project Licensing Schedule

Kewaunee Project

Upgrade Project Licensing Schedule

ID	Task Name	Milestone
1	**Licensing Documents**	
2	Architecture Report	6/7/99 8:00 AM
3	D&D in D Report	6/7/99 8:00 AM
4	Design, S/W Life Cycle and V&V Plan	7/30/99 8:00 AM
5	Qualification Test Plan	9/30/99 8:00 AM
6	Reliability/FMEA Report	11/1/99 8:00 AM
7	Platform S/W Verification Report	9/4/00 8:00 AM
8	Application S/W Verification Report	9/4/00 8:00 AM
9	System Validation Test Report	12/4/00 8:00 AM
10	Qualification Test Results	12/4/00 8:00 AM
11	Final Integrated Report (All Comments)	12/11/00 6:00 AM
12	License Amendment	12/11/00 8:00 AM
13	**NRC Meetings**	
14	NRC kickoff Mtg.	
15	Arch. & D&D in D MTG	
16	H/W & S/W Design Process	
17	Qualification Plan	
18	NRC Preliminary Assessment	
19	**NRC Reports**	
20	License Amendment	
21	NRC SER	

NRC Support of Proposed Schedule

- Request periodic technical meetings with the NRC to discuss details of submitted reports
- Request NRC plan for technical review
- Request NRC estimate of time and schedule to review and issue RAI's and to review responses to RAI's
- Request NRC to issue a preliminary assessment letter for RPS upgrade by December 1999
- Request SER within 6 months after submittal of Final RPS Upgrade Integration Report to support installation in September 2001

Summary

- Scope of RPS Upgrade includes Foxboro Process cabinets and Relay Logic cabinets
- WPS has proposed a licensing approach of submitting a series of licensing topical reports prior to submitting LAR
- NRC involvement throughout project is requested in order to address key licensing areas as design process proceeds
- NRC SER is requested to support a September 2001 installation

The staff stated that the WPSC's schedule appears very aggressive, and that the staff's ability to support the proposed schedule of issuing a preliminary assessment by December 1999 would depend on the quality and timely submittals and also would depend, in part, to the potential for involvement in Y2K inspection activities. The staff agreed to periodic meetings with WPSC and Westinghouse to discuss details of the submitted reports.

Original signed by:

Tae Kim, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
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