

NRC Region III
February 21, 2001

Kewaunee Nuclear Power Plant Steam Generator Replacement

NMC Commitment to SGR

by Mark Reddemann

Introductory Remarks

Presentation Agenda

| | |
|------------------------------|-----------------------------------|
| NMC Commitment to SGR | Mark Reddemann, Site VP |
| Plant Ownership of SGR | Kyle Hoops, Plant Manager |
| Project Overview | Jeff Jensen, Project Manager |
| SG Design Change | George Bieberbach, SG Design |
| RSG Safety Analysis | John Holly, Engineering |
| RSG Supply and Safe End Weld | Guy Holmes, Fabrication |
| RSG Installation | Kim Hull, Installation Manager |
| RP and OSG Disposal | Brad Gauger, Radiation Protection |
| Quality Assurance | Brian Koehler, QA Manager |
| Closing Remarks | Mark Reddemann, Site VP |
| Questions and Discussion | |

Plant Ownership of SGR

by Kyle Hoops

Integration of Plant and SGR

- Key Lesson Learned
- Success Built on Uniform Site Purpose

Integration of Plant and SGR

- SGR Team Reports to Plant Manager
- Integrated SGR Outage Schedule
- Dedicated KNPP Shift Manager to SGR Planning
- Integrated KNPP and Bechtel Processes

SGR Project Overview

by Jeff Jensen

SGRP Team Leaders

KNPP

Project Management
Contract Management
Safety Analysis
OSG Disposal
Radiation Protection
Design Change Process
Quality Programs

Industry SGR Experts

RSG Design
RSG Fabrication
RSG Installation
Quality Programs
Welding Oversight
Licensing

SGR Project Work Breakdown

Westinghouse

RSG Design, Licensing & Safety
Analysis

Ansaldo

RSG Fabrication

Bechtel

RSG Installation

Duratek

OSG Disposal

KNPP

Project Management
Design Change Process
Non-LOCA Analysis
Contract Mgmt
Radiation Protection
Licensing
QA & QC
Resolution of Non-Conformances

SGR Project Goals

- Maximize Personnel Safety
- First Time Quality
- Minimize Radiation Exposure
- Minimize SGR Outage Duration

SGR Project Strategy

- Use Industry Lessons Learned
- Ensure KNPP Retains Knowledge of SGRP

SGR Project Readiness

- Readiness is the assurance that the strategy can be followed to achieve SGRP goals & objectives
 - Team Development
 - Employ Industry Expertise
 - Independent Assessment
 - Site Access Plan

AFW Pump Lessons Learned

Suction Strainer Non-Conformance

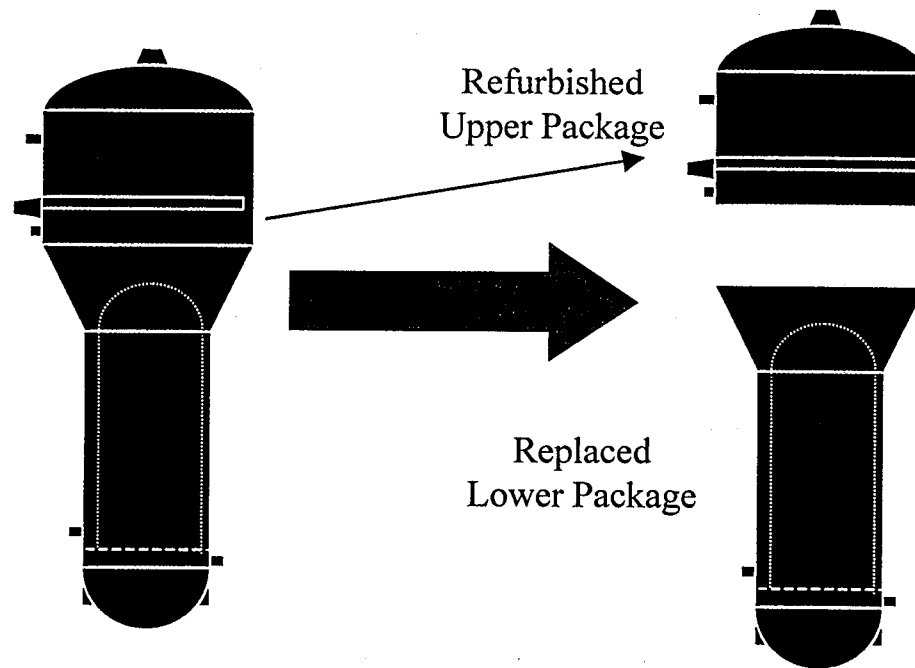
- Configuration Control
- Receipt Inspection
- Questioning Attitude



Replacement SG Design Change

by George Bieberbach

Replacement Steam Generator Design Change Summary



**Original SG
Model 51**

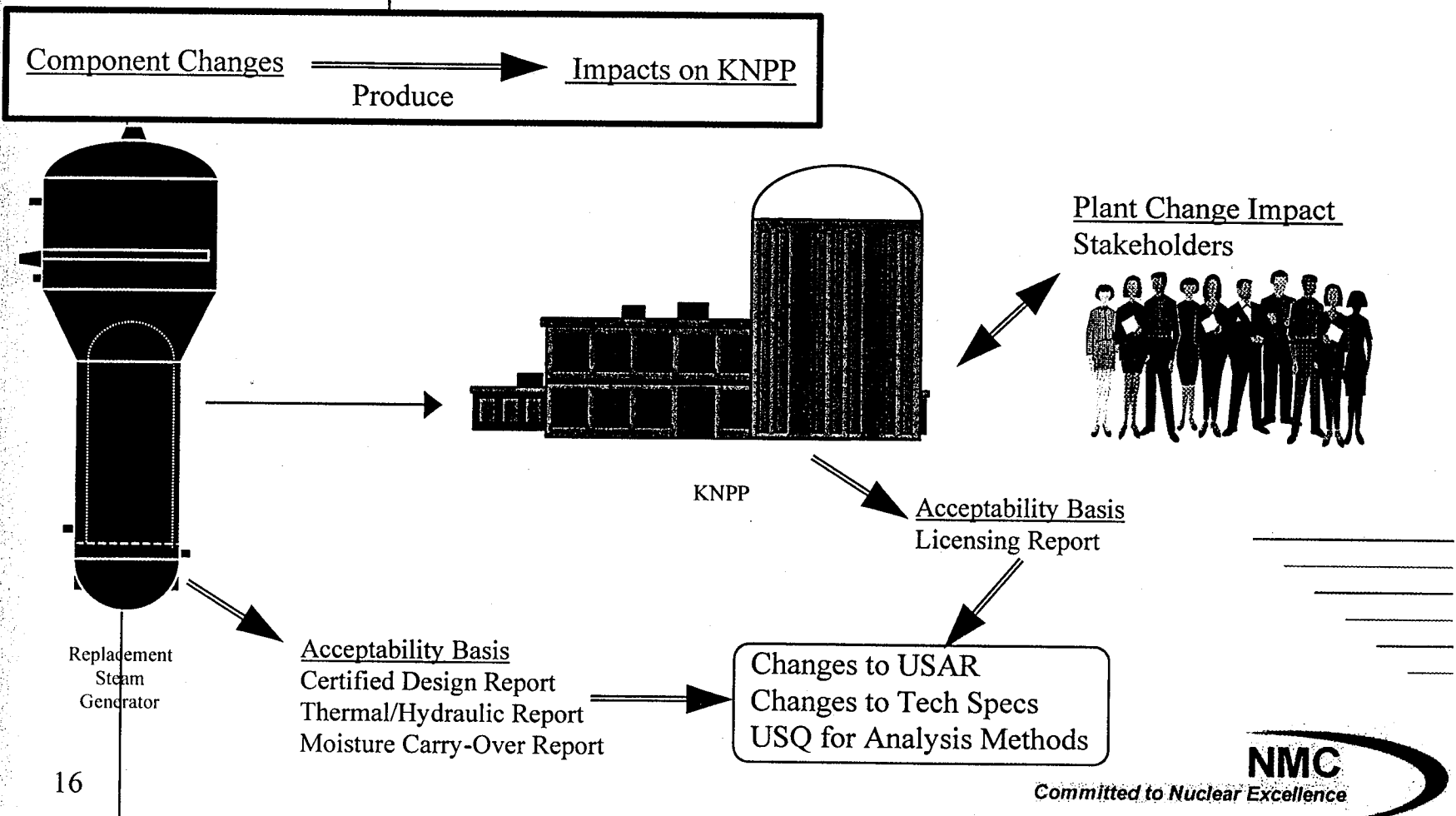
**Replacement SG
Model 54F**

Key Improvements

Steam Flow Limiter
Separator Mods
Feedwater Ring

Alloy 690 Tubes
Stainless Support Plates
Hydraulic Tube Expansion
3 Sets of U-bend Supports

Replacement Steam Generator Design Change Overview



Replacement Steam Generator Design Key Changes/Resulting Plant Impacts

Plant Operation Impacts are Minimal

Change

Primary Loop Flow Rate Increase (+6%)

Primary Volume/Mass Change(+3%)

Secondary Volume/Mass Change (-2%)

Circulation Ratio(2.71 to 4.28)

Constant Water Level Program

Impact

None, remains below MDF

} Only minor changes
during load changes

Minor simplification

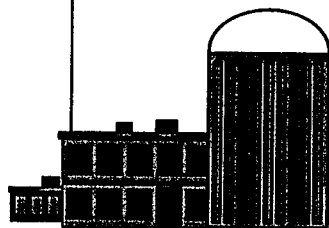
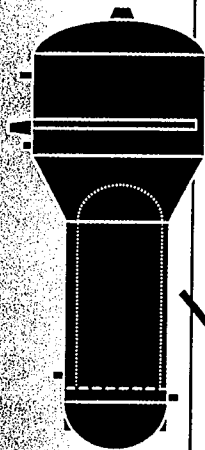
These changes have been fully evaluated and all results are within acceptance criteria

10CFR 50.59

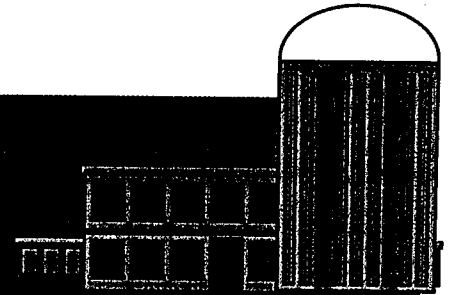
10 Safety Evaluations were Completed for Mod 1
to Assure Sufficient Evaluation Detail

-Overall

- Materials
- Design Feature
- Thermal Hydraulic
- Component/Structural
- Analysis Methods
- Non LOCA
- LOCA
- Radiological
- Systems/Components



NRC Submittals



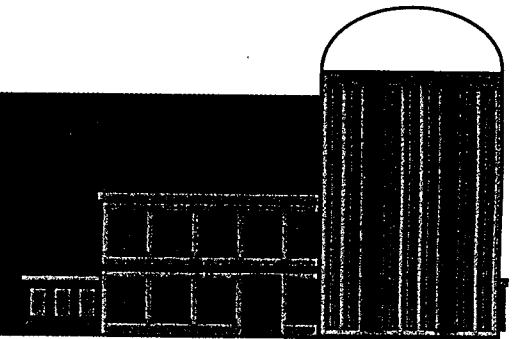
■ Tech Spec Changes

- TS 3.1.d.2 - RCS Min Flow Rate → Returned to Zero Plugging Value
 - TS 3.10.m - Primary to Secondary Leak Rate → Reduced from 500gpd to 150gpd
 - TS 5.1 - Site → Previous Owner, deleted
 - Steam Generator Tube Repair
 - Support Plate and Tubesheet Crevice Plugging Criteria
 - Voltage Based TSP Repair Criteria
- Eliminated, not applicable to RSG Design

■ USQ

- RETRAN3D
- GOTHIC

RSG Design Change



Summary/Conclusions

- ◆ In terms of plant operations, there are only minor impacts
- ◆ All changes and their impact on the plant have been reviewed and assessed
- ◆ Mod 1 was divided into 10 Safety Evaluations to assure thoroughness and completeness.
- ◆ There are only a few required Tech Spec changes caused by the RSG

RSG Safety Analysis

by John Holly

Analysis Scope

- Design Basis Accidents, NSSS
- Split between Westinghouse and KNPP
- KNPP Scope
 - USAR Chapter 14 Non-LOCA Accidents
 - MSLB Accident inside and outside containment
 - LTOP Analysis

Analysis Scope

- Westinghouse Scope
 - USAR Chapter 14 LOCA
 - ✦ Large Break LOCA
 - ✦ Small Break LOCA
 - ✦ LOCA containment response
 - ✦ LOCA hydraulic forces
 - NSSS components/systems/controls
 - RCS Loop piping & support systems
 - Radiological
 - RSG Component T/H and Structural

Analysis Methods

- Consistent Methods for Analyses
- Upgrade to Methodology
 - RETRAN 3D and GOTHIC
- KNPP Experts Used
 - Ensured accurate analysis inputs
 - Reviewed results/licensing report

Unchanged Analysis Inputs

- Reactor Core Physics Parameters
- Reactor Power Level
- Reactor Temperature
- Fuel Design
- Engineered Safeguards Systems
- Plant Setpoints

Changed Analysis Inputs

- RSG Component Design and Performance
- NSSS Thermal Hydraulics
 - ✦ e.g., RCS flow, 10% SGTP
- SG Programmed Level vs. Power
 - Constant at 44%
- SG Outlet Nozzle Flow Restrictor

Summary and Conclusions

- SGR Change was Analyzed
 - Design Basis Accidents/Transients and NSSS
 - All Acceptance Criteria are Satisfied
 - Verified plant operation within design and licensing basis
- KNPP is Positioned for the Future
- Plant Change was Minimized

Replacement SG Supply

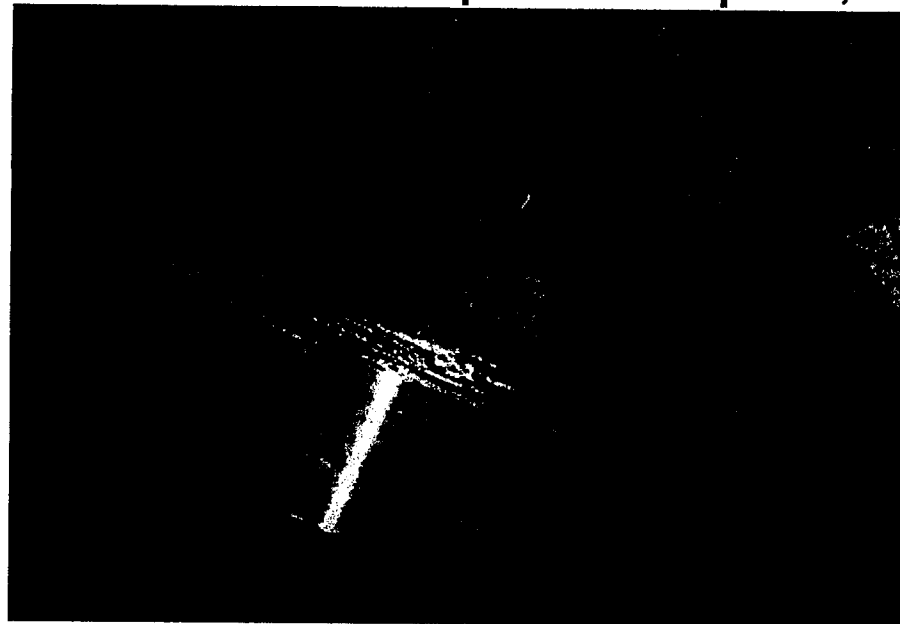
by Guy Holmes

RSG Manufacturing / Design Scope Split

- Westinghouse- Design and Engineering - Model 54F
- Ansaldo - Manufacturing and Procurement
- KNPP - Configuration Control, Surveillance of Manufacturing

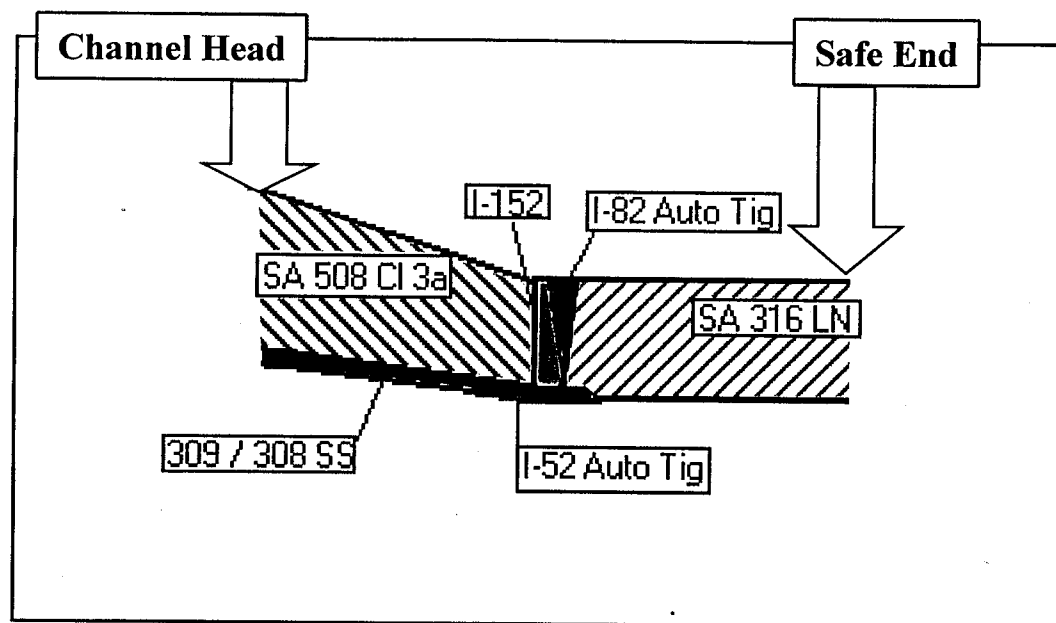
RSG Safe End Welds

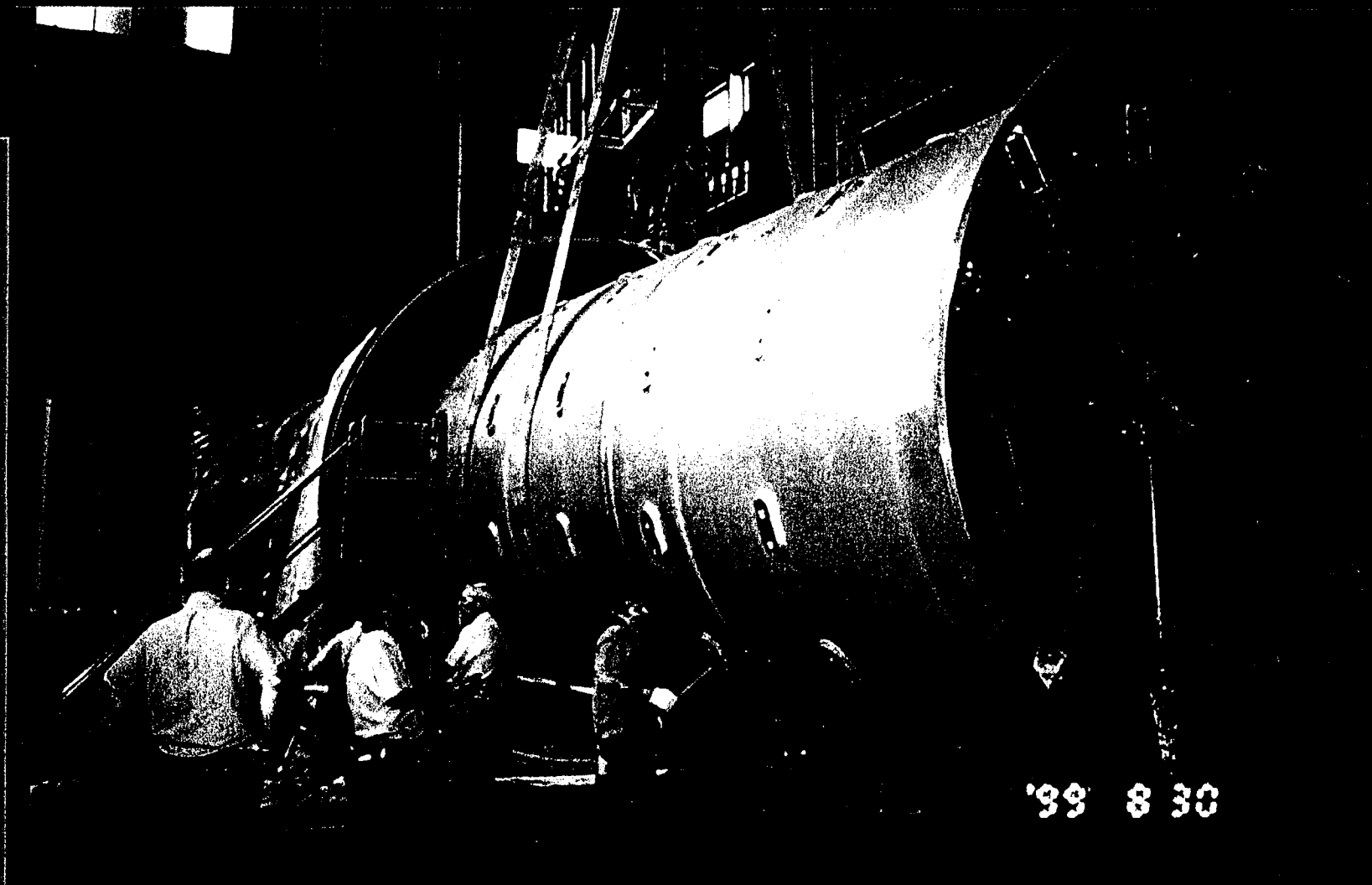
- Welds on RSG
 - Passed ASME III RT
 - One Weld required repair, ASME XI UT

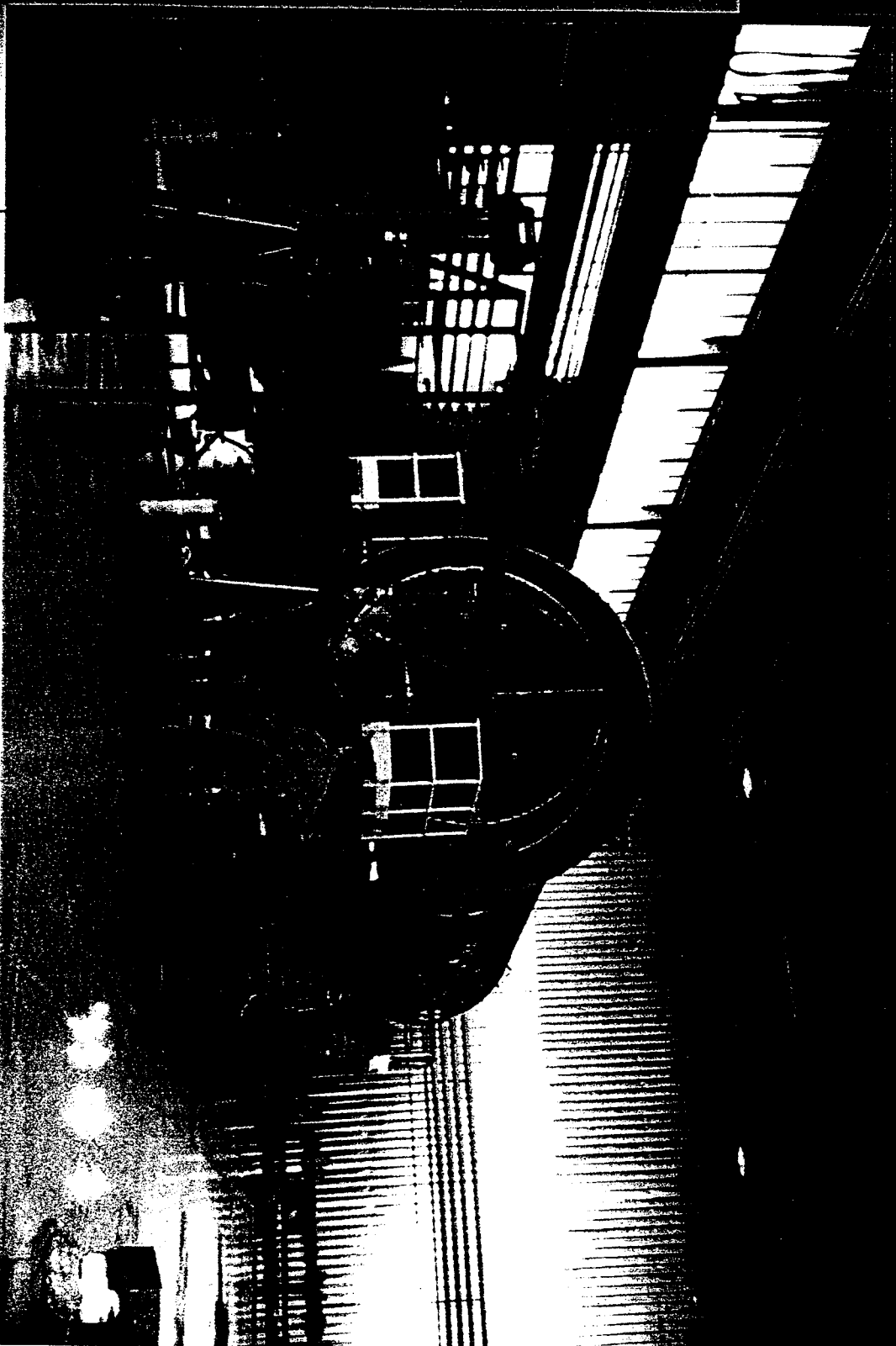


RSG Safe End Weld Resolution

- Weld will be performed on site by PCI







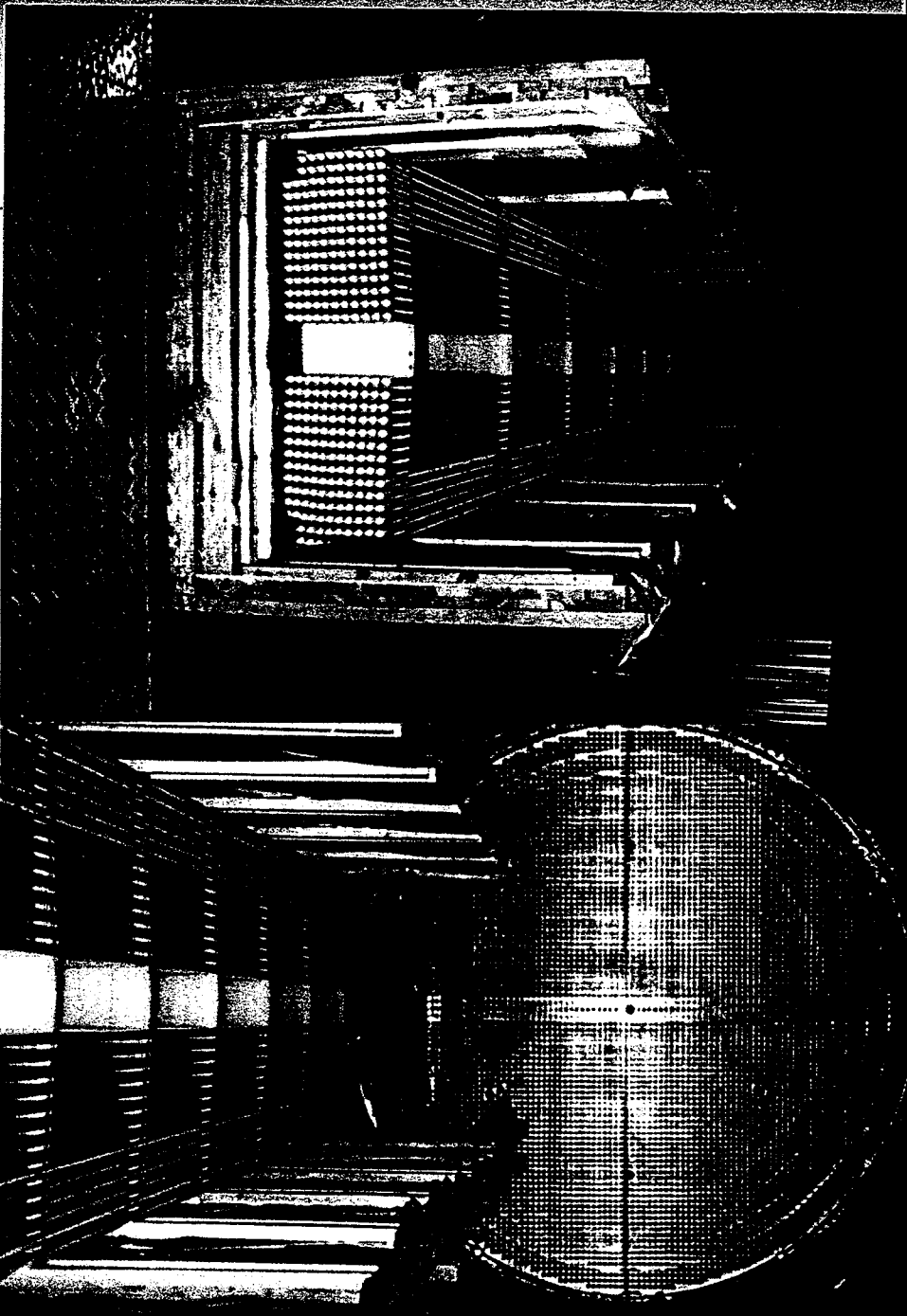
Tube Support Plate Insertion

Committed to Nuclear Excellence

NMIC

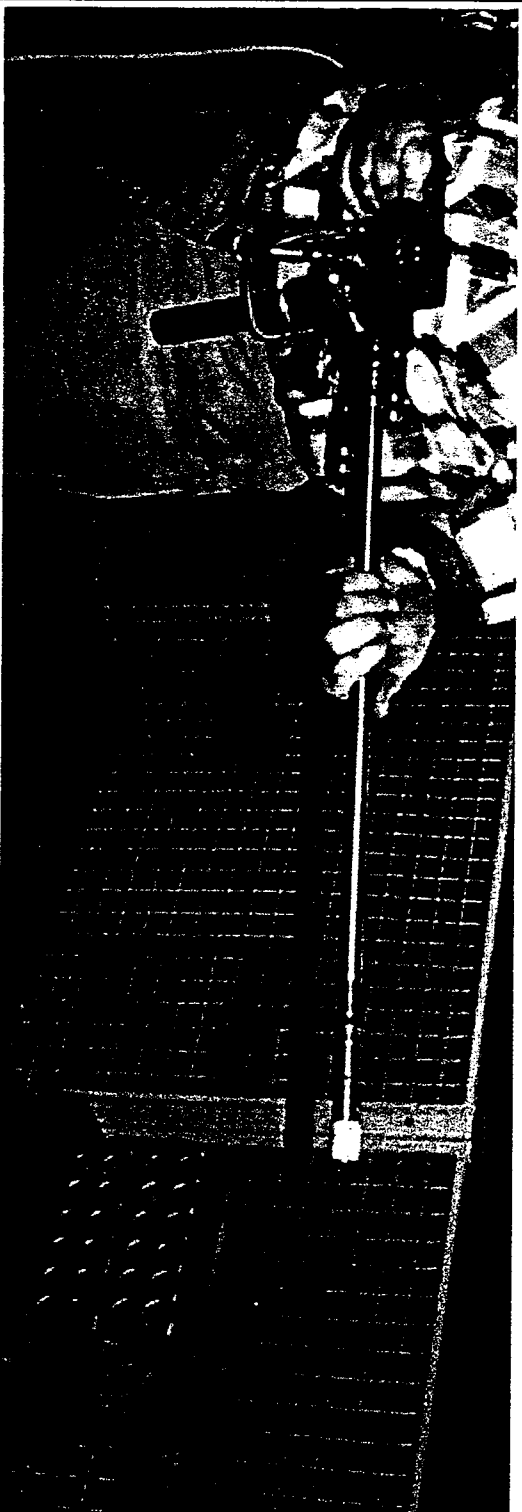
RSG Tubing

Tube Insertion





Tack Expander



Hydraulic Expander

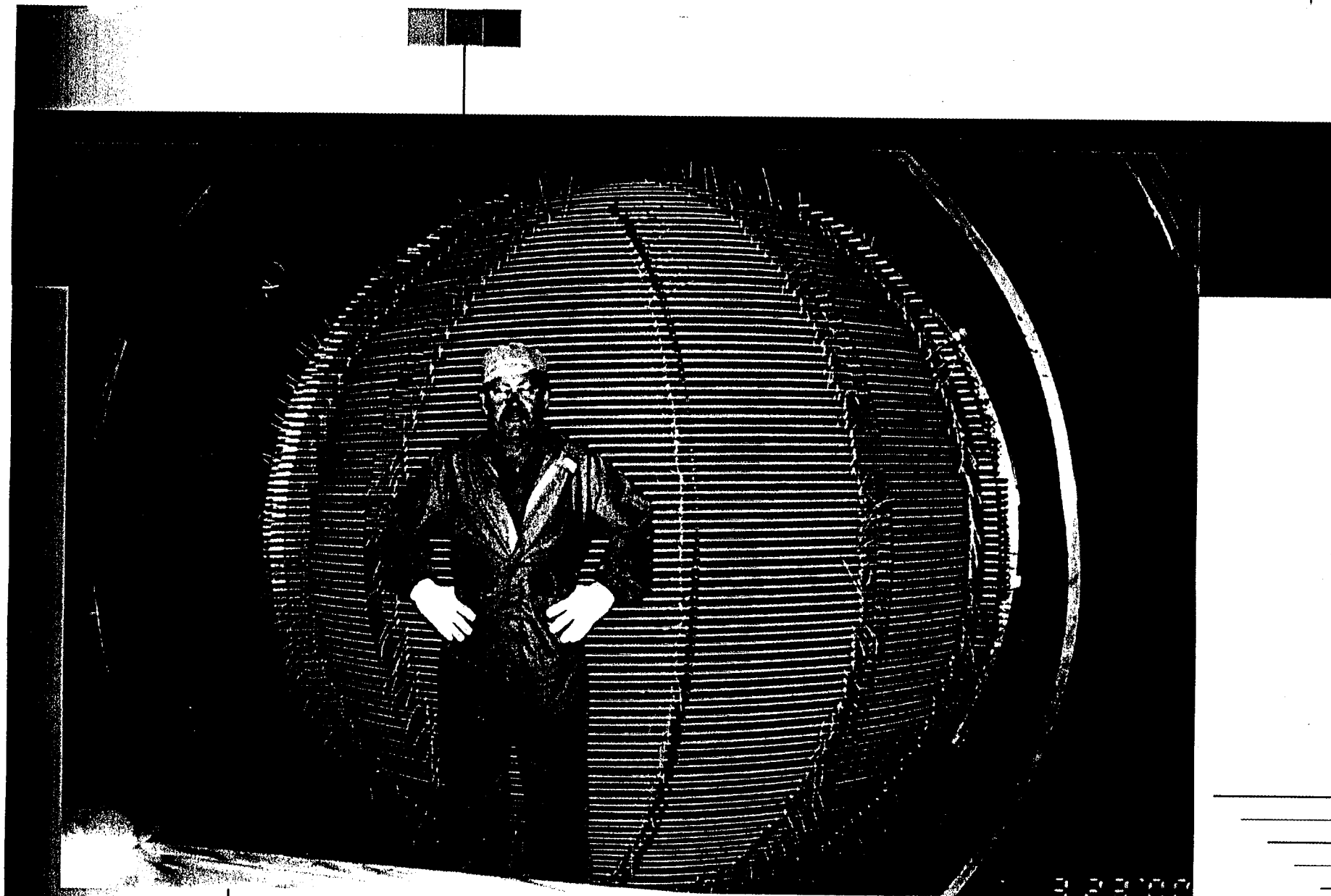


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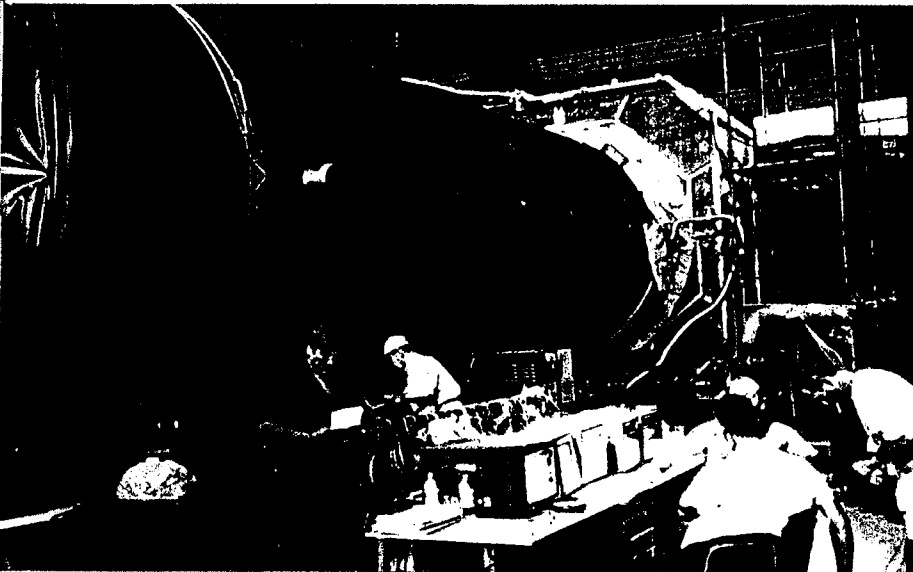
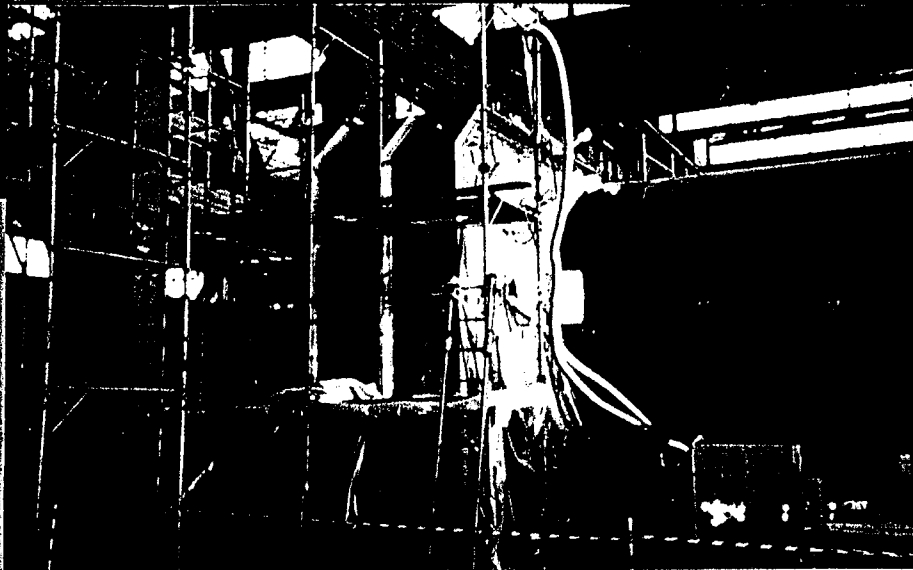
Tube End Welds

Tube End Welding

NMC
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AVBs Installed. End Caps ready to Weld to Retaining Rings.



Channel Head to

Tube Sheet Weld

Post Weld Heat Treatment



Unloading From Ship in Port of Kewaunee

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NMCC



RSG Installation

by Kim Hull

Outside Railway System - 1971



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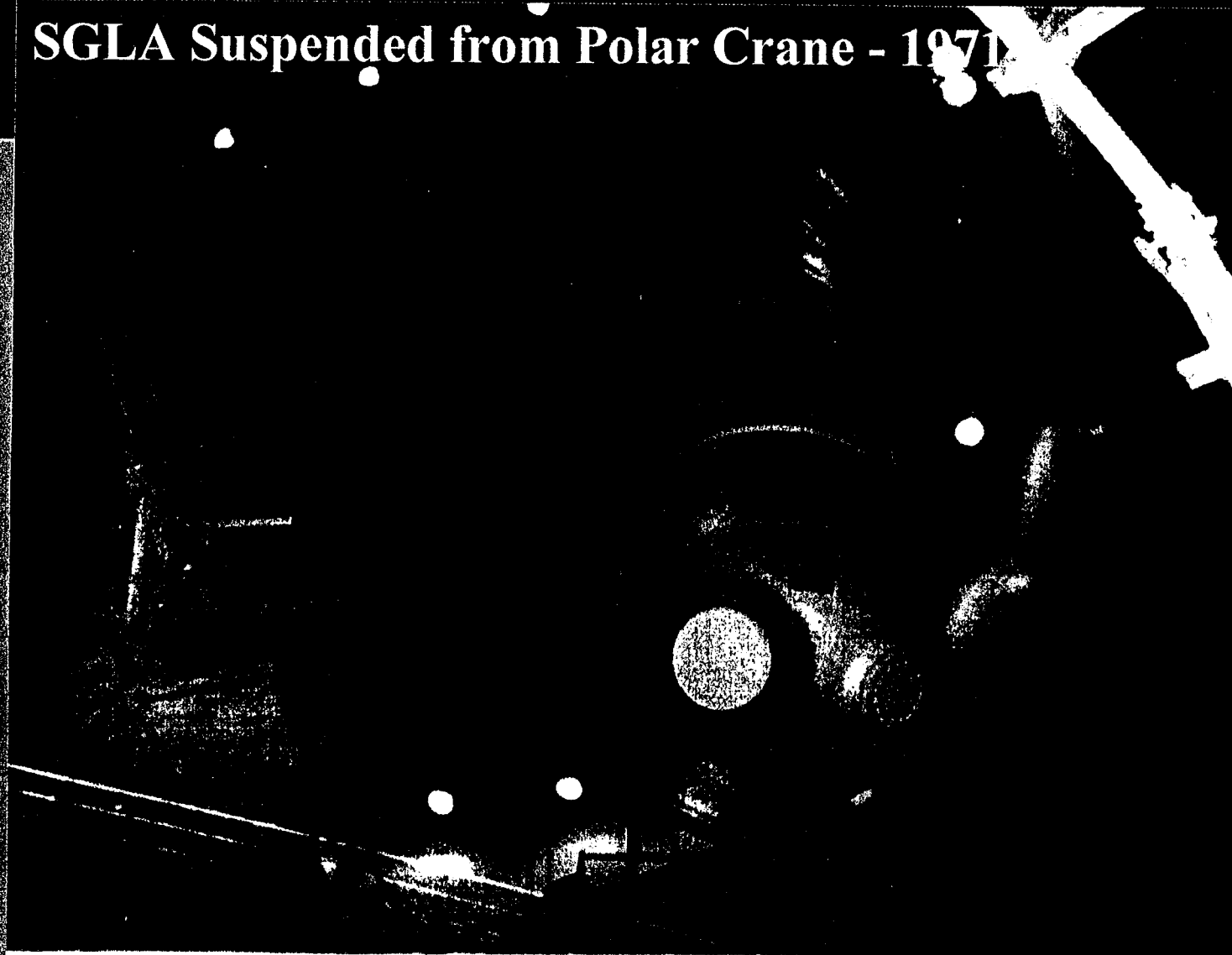
Committed to Nuclear Excellence

NIMC

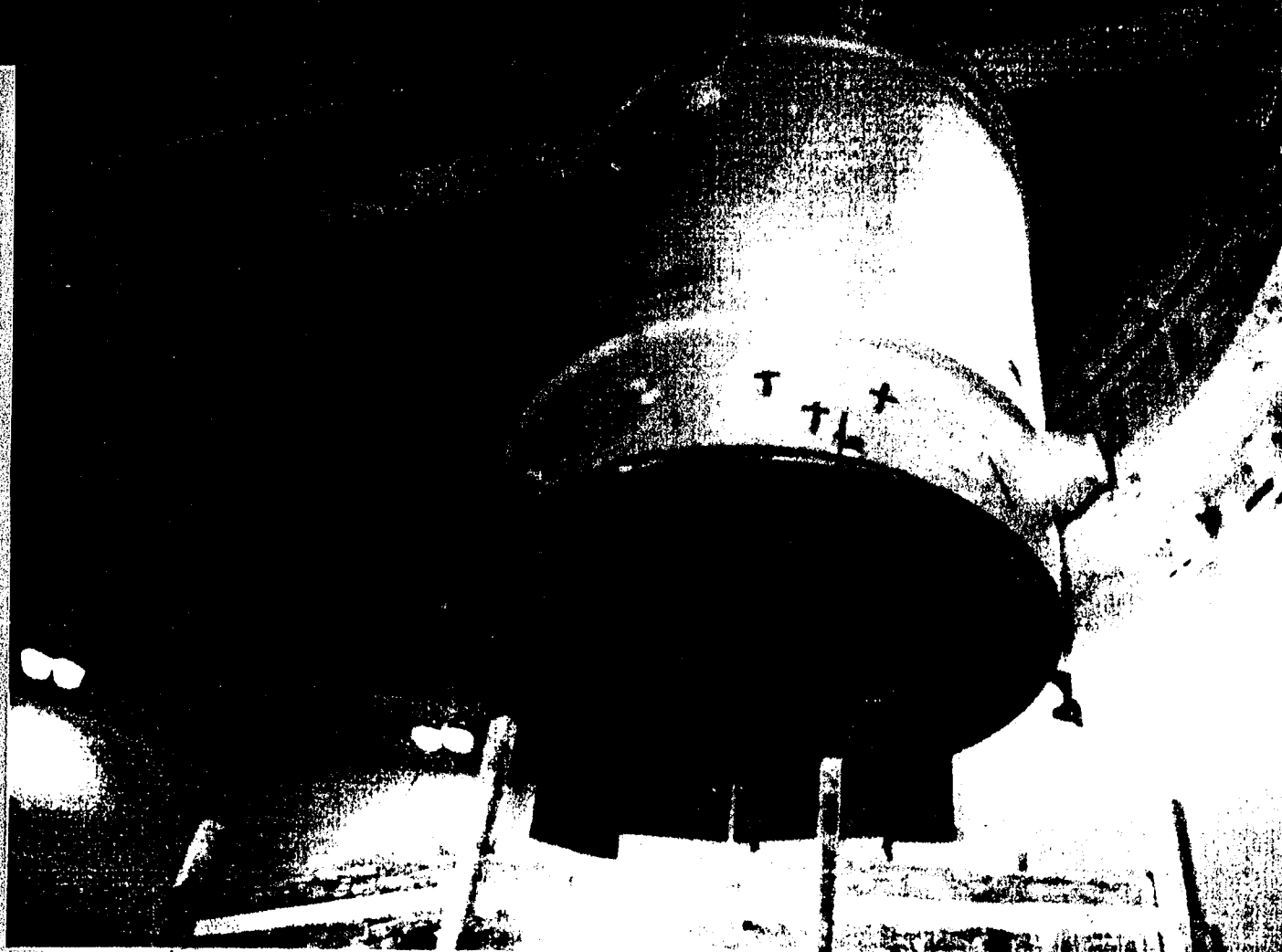
Advanced Equipment Hatch - 1971



SGLA Suspended from Polar Crane - 1971



Steam Dome Suspended from Polar Crane - 1971



SGR Welding

- Welding in RSGs
 - Lessons Learned
 - Welder training & certification
 - Weld material and process control
- KNPP Control of Welding
 - Ownership
 - Review
 - Oversight

Installation Conclusions

■ Summary

- Replacement Similar to Original
- Rigorous Control of Welding



Radiation Protection

by Brad Gauger

Radiation Protection Process Control

- KNPP Control of Radiation Protection
 - Expanded Organization under KNPP
 - Rad Pro Plan & Interface Plan
 - Using KNPP Procedures
 - Detailed ALARA Plans for critical work

New Facilities Planned

- Augmented Access Control Facility
 - CAF (containment access facility)
- New Decontamination Facility

ALARA - Plan Early

- Approximately 57,000 lbs of Lead Shielding
- Closed Circuit TV
- Pipe End Decon and Shielding
- SG Secondary Water Level
- RP Training with Mockups

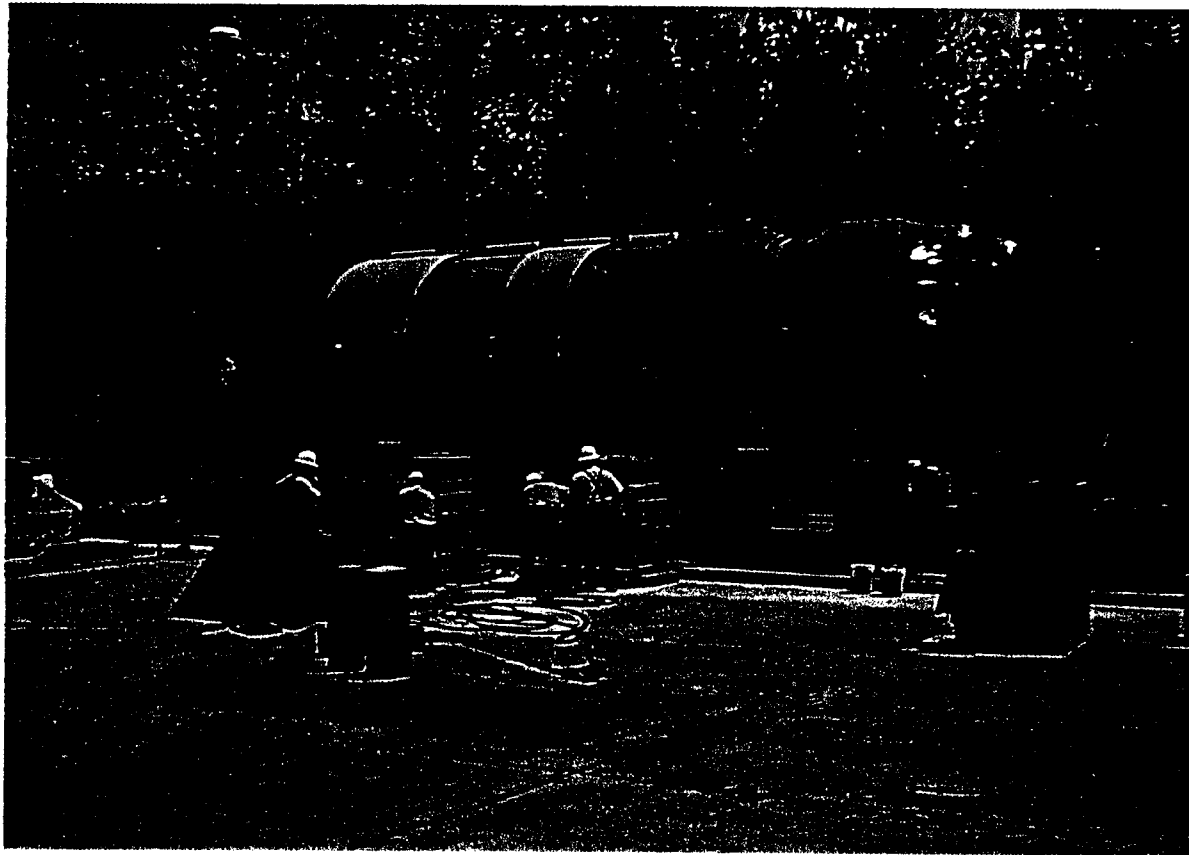
Significant RP Challenges

- Radiography
- RCS Pipe Cut and Decon
- Moving Original Steam Generators
- Increase in Personnel - Doubling of Site Staff

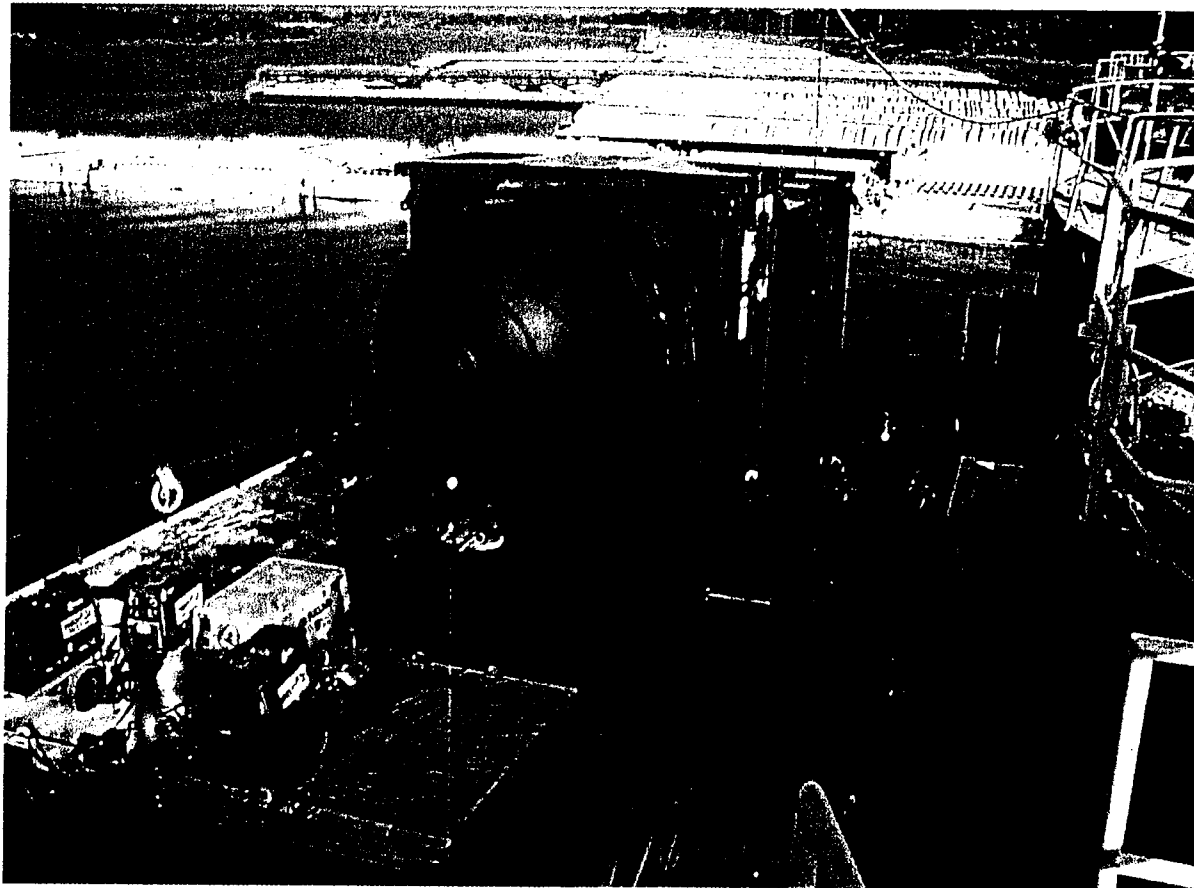
Original Steam Generator (OSG) Disposal

- Duratek
 - Performs work under contract
- Move OSGs
 - KNPP to Port by Transporter
 - Kewaunee to Memphis by Barge
 - Port to Duratek by Transporter

DC Cook To Barnwell, SC



Maine Yankee to Duratek in Memphis, TN



Original Steam Generator (OSG) Disposal (cont.)

- KNPP Similar to Maine Yankee
 - NRC Generic Letter 96-07
 - 49 CFR 173.403 Exemption
 - ✦ surface contamination demonstration
 - 49 CFR 173.427(b)(1) Exemption
 - ✦ packaging requirements

Original Steam Generator (OSG) Disposal (cont.)

- Duratek will:
 - Decontaminate
 - ✦ SIVAblast Grit
 - Divide OSG into Sections
 - Metal Melt
 - ✦ Shielding Blocks
 - Free Release of Clean Metal



Quality Assurance

by Brian Koehler

General

- Quality Oversight
 - Early in project
 - Dedicated QA staff
- Specific QA Plan for SGRP

Westinghouse Design & Licensing

- Vendor Evaluation
- Audits & Surveillances
 - Pensacola - RSG Design
 - Monroeville - Licensing and Safety Analysis
 - Waltz Mills - Steam Dome Design
- Technical Specialists Used

Ansaldo - Fabrication in Milan

- Vendor Selection
- Supplier Qualification - 1996
 - Joint Utility Audit (APS and BG&E)
- Re-Evaluation Audit - 1999
 - APS lead
- Fabrication at Ansaldo
 - Including major sub-suppliers

Bechtel - Frederick, MD

- Supplier Audit Evaluation (initial)
- NUPIC Audit - 1999
 - KNPP Lead on Joint Utility Effort
- Surveillances
 - Bechtel and Sub-suppliers
 - ✦ Westinghouse, Colonial Machine

KNPP Site

- Internal Audit of SGRP
- Document Control Audit
- ECT Surveillance
- Safe-End Surveillance at PCI
- Readiness Review (Planned)
- SGRP Surveillances (on-going)

Closing Remarks

by Mark Reddemann

- NMC Committed to SGRP
- Operating Plant Integrated with SGR
- SGR Project Focused on Excellence
- Questions and Discussion