EXAMPLE

080009-EI

REDACTED

Progress Energy

August 23, 2007

Mr. Jim Gannon
Enercon Services, Inc.
500 Townspark Lane
Kennesaw, GA 30144

Subject: Progress Energy Florida, Inc.
Crystal River Discharge Canal Cooling Study
Request No. xxx07-01

Dear Mr. Gannon:

You are invited to submit a proposal for the evaluation and conceptual design of cooling options for Progress Energy's Crystal River South and Crystal River Unit 3 sites. Two (2) signed copies of the proposal (one priced and one unpriced) shall be sealed and marked "CONFIDENTIAL" and submitted to Deborah Hanna, Progress Energy Florida, Inc., 15760 W. Powerline Street (SA2C), Crystal River, FL 34428-6708. No copies of the proposal shall be distributed to any other Progress Energy personnel. Your proposal must be received no later than close of business September 29, 2007. If your proposal is received after that day or time, it will not be considered for the described work. Telephoned or faxed proposals or proposal information are unacceptable and will not be considered. No modifications to the proposal will be accepted after the bid due date and time specified above unless specifically requested in writing and approved by Progress Energy.

It is intended that a Contract in the form of the attached sample Contract will be awarded for this scope of work and quotations shall be made accordingly, unless the successful Vendor has an existing Master Contract with Progress Energy, in which case a Work Authorization will be released against that Master Contract incorporating the details of this Request for Proposal.

Progress Energy does not obligate itself to accept the lowest or any other bid and specifically reserves the right to reject any and all bids. Vendors are advised that all bids will be opened and evaluated solely by Progress Energy. All information contained in the bids submitted to Progress Energy and Progress Energy's evaluation, including any Vendor's relative position to the successful Vendor, is considered exclusive information of Progress Energy and will not be made available to any of the Vendors. All unsuccessful Vendors will be notified by Progress Energy in writing of the award of the work to another firm.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to any of the

CMP ____
COM ____
CTR ____
ECR 1
GCL ____
OPC ____
RCA ____
SCR ____
SGA ____
SEC ____
OTH ____

DOCUMENT NUMBER-DATE
03238 APR 22 08
FPSC-COMMISSION CLERK

PEF-NCR-00581

proposal documents or related project data furnished as part of the proposal documents shall be made directly to Deborah.Hanna@pgnmail.com, (352) 563-2943, x4547.

It is the Vendor's responsibility to advise his potential subcontractors, suppliers, and other sub-vendors that information will be available only through the Vendor and that no direct contacts with Progress Energy by other firms shall be initiated. Information exchange shall be between Progress Energy and Vendor, and Vendor and his potential subcontractors. No work shall be subcontracted without the approval of Progress Energy. Subcontract work and proposed subcontractors must be identified in Vendor's proposal.

Please acknowledge receipt of this proposal and your bidding intentions by completing the attached Acknowledgement and General Information forms. The forms are to be completed in their entirety so that Progress Energy has all the information necessary make the contract award. Bids will not be considered when submitted on forms other than those provided. Please fax the completed Acknowledgement & General Information forms to Deborah Hanna at (352) 563-4464 before the close of business on September 4, 2007. Progress Energy will host a walk through of the applicable Crystal River areas on September 6, 2007 from 1 to 3 PM. The walk through will be followed by a question and answer session to ensure all the potential vendors understand the scope of this work.

PROGRESS ENERGY FLORIDA, INC.

By:

Deborah Hanna

Lead Contract Management Specialist

Attachments:

Acknowledgement
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Scope and Other Requirements

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Request for Information Form

ACKNOWLEDGEMENT

To: Deborah Hanna
Progress Energy Florida, Inc.
15760 W. Powerline St. (SA2C)
Crystal River, FL 34428-6708
Fax: 352-563-4464

In regards to: Progress Energy Florida, Inc.
Crystal River Discharge Canal Cooling Study
Request No. xxx07-01

I acknowledge receipt of the subject proposal package and have indicated my bidding intentions as follows:

☐ I have reviewed the proposal documents and will not be submitting a bid for this work.

☐ I have reviewed the proposal documents and intend to submit a bid for this work.

☐ I plan to attend the facility walkthrough and solicitation discussion on September 6, 2007.

_____
(Signature)

_____
(Name)

_____
(Title)

_____
(Company)

_____
(Date)

GENERAL INFORMATION

In the event that your Proposal is accepted and a Contract is awarded to the firm whose full legal company name appears herein below, Mr./Ms. _____, whose title is _____, will be executing the Contract on behalf of the firm. Should this person's title not indicate that he/she is a corporate officer (president, vice president, or corporate secretary), an affidavit signed by a corporate officer shall be provided along with the bid, stating that the person whose name appears above is duly authorized to execute contracts on behalf of the firm.

The Contractor is: (select appropriate line and complete information)

An Individual: _____

A Corporation of the State of: _____

A Partnership consisting of: _____

A Joint Venture comprised of: _____

Full Legal Company Name _____

Business Address _____

_____

_____

Mailing Address _____
(if different)

_____

_____

Contact Name _____

Contact Phone _____

Contact E-Mail _____

Company Website _____

Federal Tax ID Number _____

Contractor's License Number (if applicable) _____ State of Issuance _____

In accordance with the Federal Acquisition Regulation section 52.219, please check all that apply to your company. Please provide supporting documentation or certification to confirm the status for any categories checked under Small/Diverse Vendors.

[ ] Certified small business* [ ] HUBZone, 8(a) or disadvantaged business*
[ ] Veteran-owned business* [ ] Minority-owned business * *
[ ] Service-disabled veteran-owned business* [ ] Women-owned small business * *
[ ] Not a Small Business

* As defined by the Small Business Administration (SBA): www.sba.gov
* * Certified by Progress Energy and as defined by SBA.

Register online at www.progress-energy.com/supplierdiversity

BY: _____

NAME (printed): _____

TITLE: _____

DATE: _____

SCOPE AND OTHER REQUIREMENTS

I. Background

Progress Energy Florida, Inc. (PEF) plans to increase the electrical power output of its nuclear reactor – Crystal River Unit 3 (CR3) – located in Crystal River, FL via an Extended Power Uprate (EPU) scheduled for completion in 2011. The planned changes will increase the licensed core power from 2568 MWt (903 MWe) to 3014 MWt (1080 MWe), an electrical improvement of roughly 20%. A direct result of the augmented electrical generation will be an increase in heat rejected from the circulating water system through the once-through condensers and into the discharge canal. Without mitigation, the corresponding increase in dissipated heat is expected to affect the permitted discharge temperature limit of 96.5 °F.

CR3 shares a common discharge canal with two adjacent coal-fired units, CR1 (400 MW) and CR2 (500 MW). The common discharge canal currently has 36 cells of helper (mechanical draft) cooling towers plus 67 additional modular cooling towers that operate during the summer months to cool a portion of discharge canal water to comply with permit limits. However, even with the helper and modular cooling towers, high discharge canal water temperatures periodically cause CR1 and CR2 to de-rate so as not to exceed the permitted National Pollutant Discharge Elimination System (NPDES) limit. After the 2011 EPU implementation, operation of CR1 and CR2 will be further impacted by the increase in discharge canal water temperature without any mitigation.

PEF developed and submitted a Site Certification Application (SCA) to the Florida Department of Environmental Protection (FDEP) as part of the EPU permitting process. One of the possible mitigating actions submitted in the SCA was the use of additional cooling towers. Applicable sections of the SCA are included in Attachment C. Although cooling towers were mentioned in the SCA, the use of cooling towers may not be the best alternative. As a result, this Request for Proposal (RFP) has been developed to determine the best thermal mitigation alternative.

II. Vendor Scope of Work

The Scope of Work is divided into two phases. Phase I is to evaluate alternatives for reducing the discharge canal water temperature in order to (1) accommodate the planned thermal increase associated with CR3's EPU, (2) minimize the effect on full-load operation of CR1 and CR2 and potentially eliminate necessary de-rates of either unit, and (3) comply with all existing and proposed environmental permits, including re-circulating water from the discharge canal to the intake canal to offset increased condenser flow from CR3's EPU and address 316(b) requirements. The goal of this study is to evaluate the potentially viable alternatives, compare the alternatives, and recommend the most cost effective and technically feasible alternative. The Study Report will be structured using the outline provided in Attachment B. Phase II of this work scope is to develop a conceptual design, general cost estimate (±25%) and high-level

schedule for the Project's implementation.

Phase I
The alternatives analysis shall contain sufficient design consideration (e.g., equipment sizing, quantity, and materials) to determine whether it is technically and economically feasible to implement each alternative. The following list provides the expected alternatives, in whole or in combination, for this evaluation.

- Evaluation of cooling alternatives, including, but not limited to, the following:
  - ⇒ New Cooling Towers
  - ⇒ Modifying Existing Cooling Towers
    - o Upgrade Helper Cooling Towers (fans, stacks, or fill)[1]
    - o Eliminate Modular Cooling Towers
  - ⇒ Evaporative Cooling
  - ⇒ Inlet/Discharge Chillers
  - ⇒ Air Spargers/Bubblers[2]
- Analysis of each alternative including, but not limited to, the following:
  - ⇒ Economic Cost Estimate (including the basis for the estimate)
  - ⇒ Schedule Analysis
  - ⇒ Quantity and Size of Equipment
  - ⇒ Infrastructure Requirements (e.g., electrical needs)
  - ⇒ Proposed location(s) considered for the alternative
  - ⇒ Site Impacts (e.g., environmental, operational and maintenance)
  - ⇒ Advantages and Disadvantages Relative to Other Options
- Identify environmental impacts for each alternative[3]
  - ⇒ Wetlands Mitigation
  - ⇒ Biota Impingement and Entrainment Issues
- Preparation of an Alternatives Summary Report comparing the alternatives and an on-site presentation (to plant personnel) of the selection results.

Phase II
The recommended alternative shall be developed into a conceptual design, which shall contain sufficient detail to prepare a request for proposal (RFP) package for the final equipment procurement and design. Section X of this document identifies the level of detail expected in the conceptual design report. PEF expects that the conceptual design can be used as the stand alone engineering design input document for the final design.

This work is NOT nuclear safety related and does not need to be completed under the Vendor's

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[1] Helper Cooling Tower upgrades were evaluated previously (additional References – Bechtel Cooling Water Study).
[2] Bubble cooling was previously reviewed (additional References – John Cooper & Associates Engineering Evaluation).
[3] PEF will perform detailed review of 316(b) impacts; Vendor is not expected to coordinate any interaction with permit agencies. PEF expects the Vendor to identify possible environmental impacts, as well as solutions, for each alternative.

Appendix B program.

The technical details and requirements for each of the items associated with this scope of work are discussed in the following sections.

III. Owner Scope of Work

PEF personnel will work with the selected Vendor in obtaining additional information (e.g., wetland surveys, civil engineering drawings, and plant electrical drawings) to support the evaluation. The selected Vendor should expect a one day turn around time for on site delivery of drawings and an additional one to two days time for off site delivery. PEF personnel will coordinate the Vendor's CR site indoctrinations, badging, and specific training, as required.

After the Phase I alternative selection, an economic analysis will be performed using PEF's in-house EESY+ software. PEF will input the Vendor's supplied data into EESY+ and provide the output results for incorporation into the final study report. The Vendor will review the EESY+ input for accuracy and review/incorporate the output results into the study.

IV. Technical Details

Vendor shall conduct a thorough review of design alternatives to reduce the discharge canal water temperature and satisfy the stated Project objectives following CR3's EPU. This evaluation shall include a technical analysis of design variables such as discharge canal temperature variation, ambient temperatures, and environmental restrictions. Specific data related to the unit operations following the EPU are included below. Additional information will be supplied by PEF after contract award and requested by the selected vendor.

- CR1 full-load operation
  - ⇒ 245,000 gpm Circulating Water Flow (actual)
  - ⇒ ~17 °F Circulating Water Temperature Rise Through Condenser
- CR2 full-load operation
  - ⇒ 308,000 gpm Circulating Water Flow (actual)
  - ⇒ ~14 °F Circulating Water Temperature Rise Through Condenser
- CR3 full-load operation
  - ⇒ 832,000 gpm Circulating Water Flow
  - ⇒ ~17 °F Circulating Water Temperature Rise Through Condenser
  - ⇒ .768 MBtu/hr of Additional Heat Dissipated due to EPU
- (Hamon) Helper Cooling Towers operation
  - ⇒ 4 blocks of 9 cells
  - ⇒ 686,000 gpm Total Water Flow
  - ⇒ 89.5 °F Design Outlet Temperature (based on 103 °F inlet and 81 °F wet bulb)
- (Aggreko) Modular Cooling Tower operation
  - ⇒ 67 individual cells
  - ⇒ 180,000 gpm Total Water Flow

⇒ 90 °F Design Outlet Temperature (based on 103 °F inlet and 81 °F wet bulb)

- Project Objectives
  - ⇒ Allow Full-Load Operation of CR1, CR2 and CR3 during Summer
  - ⇒ Plan for Maximum Design Intake Water Temperature of 91 °F
  - ⇒ Comply with 96.5 °F Point of Discharge (POD) 3-hr Rolling Average
  - ⇒ Maintain a maximum Permitted Discharge Flow Rate of 1,320,000 gpm (or 1,897.9 Mgpd) by returning cooled discharge canal water (approximately 152,000 gpm) to the intake canal.
- Additional Data
  - ⇒ Intake canal cannot be blocked due to barge traffic.
  - ⇒ Though additional cooling capacity is only required during summer months, re-circulating water flow back to the intake canal is necessary year round.
  - ⇒ The return water from discharge to intake canals will be designed for most efficient and cost effective mitigation of biota entrainment and impingement.

V. REFERENCES

The following reference documents are provided as part of this RFP. These documents are located in Appendix C.

1. PEF Safety Plan
2. Site Land Use Classification Map
3. Applicable Sections of the Site Certification Application
4. Historical Data of Circulating Water Temperatures
5. Helper Cooling Tower Performance Curves
6. Modular Cooling Tower Performance Curves
7. Local Annual Windrose
8. Request for Information Form

Additional documents will be provided following contract award. Other data that may be provided to facilitate technical evaluations, as requested.

- Site civil engineering drawings
- Site electrical drawings
- Wetland surveys
- Site Certification Application
- Bechtel Cooling Water Study
- John Cooper & Associates Engineering Evaluation

VI. PEF Contacts

Contractual: Deborah Hanna
Telephone: (352)563-4547
E-mail: Deborah.Hanna@pgnmail.com

Technical: Mark Gillespie or Mark Hickman

Telephone: (352) 795-0504 x6926 or (352) 563-2943 x4233
Email: mark.gillespie@pgnmail.com or mark.hickman@pgnmail.com

VII. Work Control

The majority of the work is expected to be completed at Vendor's facility. However, one cubicle with 2 desks and 2 chairs will be provided (if requested) at Crystal River for the selected Vendor's use. Vendor shall be responsible for all office supplies, equipment and personnel protective equipment (e.g., hard hat, safety glasses and safety shoes). Vendor shall be responsible for identifying personnel that need access on Site and shall coordinate temporary badges and training so as not to impact the schedule of work.

The selected Vendor shall establish a Request for Information (RFI) Log to track information transmitted between PEF and Vendor. The RFI form (see Attachment C) will be completed for all questions on the Project that need formal clarification. RFI's shall be used to resolve any questions related to Project scope, schedule or cost. Additionally, RFI's may be used to request drawings or other documents not accessible to Vendor or to document equipment or system specifications.

Vendor shall conduct weekly status meetings/teleconferences with PEF Project personnel. Vendor shall distribute an agenda (with input from PEF) prior to the meeting, take minutes and distribute the minutes after the meeting. PEF personnel will have an opportunity (1 working day minimum) to comment on the meeting minutes before they are submitted as final. Minimum topics to be covered at each meeting are:

- Safety topic
- Earned value status (cost vs. schedule)
- Projected Estimate at Completion (EAC)
- Accomplishments/Milestones
- Issues/Request for Information
- Scheduled accomplishments for next week
- Number of personnel working on the project (last week and next week)

The Vendor shall conduct a Phase I completion and 90% project completion review meetings with PEF personnel at CR. Vendor shall distribute an agenda (with input from PEF personnel) prior to the review, take minutes and distribute the minutes after the review. PEF personnel will have an opportunity (4 working days minimum) to comment on the review meeting minutes before they are submitted as final. Minimum topics to be covered at each review are:

- Safety topic
- Earned value status (cost vs. schedule)
- Projected EAC
- Accomplishments
- Presentation of completed documents for approval
- Issues
- General discussion (question & answers)

Vendor shall perform technical evaluation of cooling alternatives and complete a conceptual design of the recommended solution. Interaction between PEF and Vendor is expected to clarify any comments on alternatives as well as to identify site restrictions that may not have been considered.

Vendor shall attend a mandatory Kick-Off Meeting prior to the start of work, to be set up when the contract is issued.

VIII. Schedule

The following sequence of activities identifies the formal reviews and deliverables for the work. Vendors are required to submit a schedule with the required time line completed. The stated scope of work is required to be complete by January 31, 2008.

- RFP sent to Vendors
- September 4, 2007 – Submit Acknowledgement & General Information Forms
- September 6, 2007 – Walkdown and RFP Discussion at Crystal River
- October 5, 2007 – Proposals Due [Approx. 4 WEEKS TO PREPARE]
- October 11, 2007 – Contract Award Notice to Proceed (NTP)
- $\leq$1 Week After NTP – Kick-Off Meeting (at Crystal River Site)
- ~ 5 Weeks After NTP – Phase I Completion Review (Alternative Selection on or before this review) and Presentation of Report (at Crystal River Site).
- ~ 14 Weeks After NTP – Conceptual Design Draft (90% Completion) Report
- ~ 15 Weeks After NTP – PEF comments on Draft Report
- ~ 16 Weeks After NTP – Final Report
- ~ 16 Weeks After NTP – Presentation of Report (at Crystal River Site)

The selected Vendor is required to change this time line into a schedule that contains meaningful milestone and deliverable dates within one week of NTP. Project completion must not exceed January 31, 2007.

Vendors are encouraged to identify any dates that can be improved in the above schedule.

IX. Quality Assurance

Quality Assurance (QA) and Quality Control (QC) shall be accomplished under Vendor's internal QA/QC Program. Vendor's QA/QC Program shall be submitted to PEF for review with their proposal.

X. Technical Documentation and Submittal Requirements

Phase I

Finalize the list of alternatives to be evaluated and obtain Alternative Evaluation List approval from PEF Project Manager. Complete the alternatives analysis and draft the Alternatives

Summary Report. The selected Vendor shall work with PEF personnel to determine a recommended alternative for implementation after the alternative analysis is complete. A preliminary draft of the Phase I alternatives summary report shall be submitted to PEF for review and comment 5 days prior to final document submittal and presentation at Crystal River. The final Alternatives Summary Report shall be approved by PEF before starting the conceptual design. The final alternatives analysis will identify additional testing and information that is required in order to complete the conceptual design (i.e. underground utilities location, soils sampling, etc.).

Five copies of the final Alternatives Summary Report shall be supplied to PEF.

Phase II

The Vendor shall then develop a Conceptual Design of the selected alternative. The design shall have sufficient detail that the information can be used as the primary input for the detailed design. PEF personnel will supply site specific criteria for Vendor inclusion in the conceptual design document as identified below. At a minimum, the Conceptual Design will include the following:

- Provide a detailed scope description. The description should include the boundaries and interfaces with existing systems (i.e., site electrical, helper and modular cooling towers).
- Identify the location(s) for installation and reason for selection, including any testing data that was used to aid in the site selection.
- Identify any exclusions or caveats that were considered during alternative selection.
- Identify applicable codes and standards.
    - State design conditions such as seismic loads, wind speeds, thermal and dynamic loads, system pressure and temperatures, and chemical considerations.
- Identify installation requirements that are unique to the proposed design, installation, and/or startup of the equipment. Include specific direction if field routing is not acceptable.
- Identify any assumptions made during the alternative selection.
    - State environmental conditions anticipated during storage, construction, and operation.
    - Identify environmentally sensitive areas near the construction areas. Identify the environmental permitting requirements for the construction.
    - Identify any interface requirements including definition of the functional and physical interfaces involving structures, systems and components.
- Identify any precautions or limitations that need to be considered in completing the design.
    - Identify environmental considerations (e.g., maximum particulate carry over during evaporative processes).
- Provide installation sketches and marked up drawings for electrical, I&C, and mechanical systems. Develop P&ID of recommended system(s).
- Provide installation sketches and marked up drawings with civil/structural details.
- Provide calculations developed during the alternative evaluation and selection process.
- Provide suggested component and equipment selection and specifications.
    - Identify the performance requirements of the selected alternative systems and

equipment, such as capacity, rating, and system output.
    - Identify material requirements such as electrical insulation properties, protective coating and corrosion resistance.
    - State mechanical requirements such as vibration, stress, shock, and reaction forces.
    - Identify Structural requirements covering items such as equipment foundations and pipe supports.
    - Identify hydraulic requirements such as pump net positive suction heads, allowable pressure drops, and allowable fluid velocities.
    - Identify electrical requirements such as source of power, voltage, conduit requirements, electrical insulation and motor requirements. Provide the electrical power supply for each component and calculation of the total electrical power required for the project.
    - State the on-site electrical power source that will be used to supply the project. List the major pieces of electrical equipment to be procured and installed in order to provide electrical power to the major electrical components.
    - Identify of the electrical power routing from the main distribution switchgear to transformer(s) and load center(s) to be used for the project.
    - Provide layout and general arrangement requirements.
    - Additional requirements such as inadvertent activation prevention devices, such as switch covers, key lock switches and other human factors considerations (i.e. handwheel locks) may be provided by PEF personnel.
- Identify operational requirements and sequencing under various conditions, such as plant start-up, normal plant operation, plant shutdown, plant emergency operation, special or infrequent operation, and system abnormal or emergency operation, including postulated accident conditions. PEF personnel will assist in determining these criteria.
- State instrumentation and control requirements, including indicating instruments, controls, and alarms for operation, testing, and maintenance. Other requirements such as the type of instrument, installed spares, range of measurement, and location of indication should also be included. PEF personnel will identify desired instrumentation and alarms. The instrumentation and controls should be similar to existing equipment monitoring and control schemes.
- Access and administrative control requirements for plant security (PEF personnel to identify).
- If applicable, state redundancy, diversity and separation requirements of structures, systems, and components.
- Identify the failure effects on the requirements of structures, systems, and components, including a definition of those events and accidents that they must be designed to withstand (i.e. hurricane winds).
- Identify system and component test requirements and the conditions under which they will be performed.
- Identify accessibility, maintenance, repair, and in-service inspection requirements for the equipment, including the conditions under which these will be performed (PEF personnel to assist).
- Identify the on-site transportability requirements such as size and shipping weight,

limitations.

- Identify the fire protection or resistance requirements.
- State that the design is to identify the handling, storage, and shipping requirements of procured material.
- Identify safety requirements for preventing personnel injury including such items as restricting the use of dangerous materials, escape provisions from enclosures, and grounding of electrical systems. Identify plant procedures that address these hazards (i.e. Chemical Control). PEF personnel will assist in identifying site requirements and procedures.
- Provide an Affected Documents List of site drawings and procedures.
- Provide an estimate of new drawings that will be generated during the detailed design phase.
- Prepare a Conceptual Design Report Package.

Drawings shall be performed and submitted in US standard units (i.e. feet, lbs, kips, inches). All engineering drawings and calculations will be reviewed and approved by a registered Professional Engineer.

Five copies of the final conceptual design documents shall be supplied to PEF.

XI. Deliverables

Phase I
Kickoff meeting agenda and minutes
List of alternatives to be analyzed
Weekly meeting agenda, status, & minutes
Draft Alternatives Summary Report (5 copies)
Final Alternatives Summary Report (5 copies) and Presentation

Phase II
Updated project schedule
Weekly meeting agenda, status, & minutes
Draft Conceptual Design Report (5 copies)
Final Conceptual Design Report (5 copies) and Presentation

XII. Additional Information

PEF will hold a pre-bid meeting with interested Vendors to clarify questions and expected scope. The meeting will be held on September 6, 2007 from 1 to 3 pm.

XIII. Attachments

A. Bid Requirements
B. General Study Outline
C. PEF Technical Documentation

Attachment A. Bid Requirements

Vendor shall provide the following information with their proposals.

1. Company's resume providing qualifications and references that demonstrate Vendor's capability to complete the work.
2. Vendor's organization chart identifying how this work will be managed as well as interface points with PEF.
3. Resumes of personnel intended to be used on this project. These resumes will be evaluated as part Vendor's qualification to accomplish the stated scope of work.
4. Commitment to start work within ten (10) days of the Notice to Proceed.
5. Company safety statistics.
6. Classification of each type person associated with the work scope.
7. Hourly billing rates for each classification (straight time/overtime or all-hours rate)
8. Billable travel and living expenses.
9. Estimated man-hours for each personnel classification.
10. This contract will be completed as a Time & Materials contract, divided into two phases. Provide a maximum not-to-exceed contract dollar amount for each phase of the work described in this RFP.
11. Provide a description of the suggested approach the Vendor will take to complete this work. The approach description should:
    - be consistent with the estimated cost and schedule,
    - include the expected manpower (by classification) needed for each phase of the work,
    - demonstrate that the Vendor understands the work scope & schedule requirements,
    - identify what work will be completed at Crystal River and the work to be completed at the Vendor's facility,
    - include potential problems that could affect the project cost or schedule,
    - include methods to control contract costs,
    - describe the Vendor's earned value system that will be used to monitor and report project cost (this description should demonstrate that the Vendor has the capability to properly identify, monitor, collect, analyze, and report project costs),
    - identify opportunities to improve the project's completion.
12. Provide a schedule for accomplishing this scope of work that contains the sequence of activities in Section VIII.
13. QA/QC Program Manual &/or Procedures to be followed in completing the work.
14. Health & Safety (H&S) Plan or agreement to comply with the PEF's H&S Plan.

SPECIAL REQUIREMENTS:

Confidentiality:
All RFP drawings, specifications, and contractual documents will remain the property of Progress Energy and are to be returned in good condition within ten (10) days after the date set

for receiving bids. RFP documents shall not be reproduced or used for any purpose other than for the preparation of a proposal in accordance with this request. The information contained in these documents is proprietary and confidential and shall be maintained in strict confidence.

RFP Interpretation:
An interpretation request shall be made to Progress Energy if a Vendor is in doubt as to the true meaning of any part of the drawings, specifications, or contractual documents. Modification of the documents will be made only by written addendum issued to each Vendor as described below.

RFP Exceptions:
If a Vendor's proposal contains any deviations or exceptions, those deviations or exceptions must be specifically identified on a single separate attachment to the proposal in order to be considered in the evaluation. If not so identified, the deviations or exceptions will not be considered part of the proposal. Conditional proposals based on Vendor-generated clarifications may not be accepted. If a Vendor takes any exceptions in addition to those submitted in accordance with this section, that Vendor's proposal may be rejected by Progress Energy.

RFP Approved Equal Evaluation:
Submittals by Vendor for evaluation of products as "approved equal" shall be made to the appropriate designated individual listed in the Request for Proposal at least ten (10) days prior to the proposal due date. Results of evaluations will be provided no later than seven (7) days prior to the proposal due date. Submittals made later than ten (10) days prior to the proposal due date will not be considered.

RFP Addenda:
Progress Energy reserves the right to amend or clarify requirements herein by Addenda. An addendum may be issued at any time prior to the date for receipt of proposals and may be mailed or otherwise delivered to all Vendors who have been invited to bid. Request by a Vendor for extension of the proposal due date shall be received by Progress Energy at least one week prior to the then scheduled date. If revisions or clarifications are of magnitude to warrant, in the opinion of Progress Energy, the extension of the date set for receipt of proposals, an addendum will be issued announcing the new date. Failure of a Vendor to acknowledge receipt of any addendum in the space provided on the proposal form may result in rejection of that proposal.

Safety:
Progress Energy is committed to using safety conscious contractors. To this end, Progress Energy collects safety-related data voluntarily provided by all persons performing or desiring to perform Progress Energy work. This data is compiled and made available to Progress Energy employees via Progress Energy's intranet. This intranet system is accessible by non-Progress Energy employees, and thus, so will be any safety-related information you provide. In providing the safety-related information requested herein, to Progress Energy or to any other person doing business, directly or indirectly, with Progress Energy, the undersigned contractor explicitly authorizes Progress Energy to disclose said information to non-Progress Energy persons and hereby releases Progress Energy and its agents and employees from any cause of action or claim

for damages related to said disclosures.

Nuclear Requirements:
This work is NOT classified as Nuclear Safety Related and does not need to be accomplished under the vendor's Appendix B Program.

Attachment B. Alternatives Analysis Report Outline

1. Title/Signature Page
   i. Contact Information
2. Executive Summary
3. Table of Contents
4. Introduction
   i. Project Description
   ii. Preliminary Scope Statement
   iii. References
   iv. Existing Unit Overview
5. Design Criteria
   i. Design Objectives
   ii. Design Parameters
6. Evaluation of Alternatives
   i. General Descriptions
      - Equipment
      - General layout
   ii. Technical Evaluation
      - Operating parameters
      - Ability to meet project requirements
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      - Site preparation
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Attachment C. PEF Technical Documentation

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2. Site Land Use Classification Map
3. Applicable Sections of the Site Certification Application
4. Historical Data of Circulating Water Temperatures
5. Helper Cooling Tower Performance Curves
6. Modular Cooling Tower Performance Curves
7. Local Annual Windrose
8. Request for Information Form

PEF Safety Plan

Progress Energy	I Information Use

NUCLEAR GENERATION GROUP

STANDARD PROCEDURE

VOLUME 99

BOOK/PART 99

SAF-NGGC-2172

INDUSTRIAL SAFETY

REVISION 8

NGG Nuclear Generation Group

PEF-NCR-00602

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1.0 PURPOSE

This procedure provides guidance and responsibilities for safe work practices for the Progress Energy nuclear generation group.

2.0 REFERENCES

2.1 FRM-CPL-470, Power Generation, Distribution and Transmission Standard Annual Inspection Checklist Energy Supply Form

2.2 29 CFR 1904, Recording and Reporting Occupational Injuries and Illness

2.3 29 CFR 1910, Occupational Safety and Health Standards for General Industry

2.4 29 CFR 1926, Occupational Safety and Health Standards for Construction Industry

2.5 ANSI Z41-1999 American National Standard for Personal Protection Protective Footwear

2.6 ANSI Z87.1 – 1991 American National Standard for Personal Protection – Personal Footwear

2.7 ANSI Z89.1 – 1997 Personnel Protection – Protective Headwear for Industrial Workers

2.8 ANSI Z358.1-2004 American National Standard for Emergency Eyewash & Shower Equipment

2.9 MNT-NGGC-0004, Scaffolding Control

2.10 OPS-NGGC-1301, Equipment Clearance

2.11 SAF-SUBS-00001, Health & Safety Guidance Document Introduction

2.12 SAF-SUBS-00002, OSHA Recordkeeping

2.13 SAF-SUBS-00003, Fire Prevention, Control and Evacuation

2.14 SAF-SUBS-00004, Hearing Conservation

2.15 SAF-SUBS-00005, Process Safety Management of Highly Hazardous Chemicals

2.16 SAF-SUBS-00006, Hazardous Waste Operations and Emergency Response (HAZWOPER)

2.17 SAF-SUBS-00007, Respiratory Protection

2.18 SAF-SUBS-00008, Confined Space

2.19 SAF-SUBS-00010, First Aid/Emergency Medical Response

2.20 SAF-SUBS-00011, Wheel Rim Service

2.21 SAF-SUBS-00012, Asbestos Exposure Control

2.0 REFERENCES

2.22 SAF-SUBS-00013, Lead Exposure

2.23 SAF-SUBS-00015, Bloodborne Pathogens

2.24 SAF-SUBS-00016, Hazard Communication

2.25 SAF-SUBS-00017, Laboratory Safety

2.26 SAF-SUBS-00018, Trenching and Excavation

2.27 SAF-SUBS-00019, Fall Protection

2.28 SAF-SUBS-00020, Power Generation, Distribution & Transmission

2.29 SAF-SUBS-00021, Slips, Trips, and Fall Safety

2.30 SAF-SUBS-00022, Stairway and Ladder Safety

2.31 SAF-SUBS-00023, Compressed Gases

2.32 SAF-SUBS-00024, Flammable and Combustible Liquids

2.33 SAF-SUBS-00025, Personal Protective Equipment

2.34 SAF-SUBS-00026, Marking Industrial Hazards

2.35 SAF-SUBS-00027, Industrial Trucks/Forklifts

2.36 SAF-SUBS-00029, General Machine Guarding

2.37 SAF-SUBS-00030, Hand and Power Tool Safety

2.38 SAF-SUBS-00031, Welding/Hot Work Safety

2.39 SAF-SUBS-00033, Employee Incident Investigation

2.40 SAF-SUBS-00034, Cranes and Rigging

2.41 SAF-SUBS-00035, Diving Operations

2.42 SAF-SUBS-00036, Scaffolding Safety

2.43 SAF-SUBS-00039, DOT Motor Carrier Safety (FMCSR) Driver Qualification Process

2.44 SAF-SUBS-00041, Contractor Safety

2.45 SAF-SUBS-00042, Chemical Control

2.0 REFERENCES

2.46 SAF-SUBS-00043, DOT Motor Carrier Safety (FMCSR) Drug & Alcohol Program

2.47 SAF-SUBS-00044, Exposure Assessment Guideline

2.48 SAF-SUBS-00047, DOT Motor Carrier Safety (FMCSR) Driver and Supv. Responsibilities

2.49 SAF-PGNC-00048, Protective Grounding Guidelines

2.50 SAF-SUBS-00055, Electric Arc Flame Resistant Clothing Guideline

2.51 SAF-SUBS-00060, Corporate Health & Safety Audit and Self-Assessment Programs

2.52 SAF-SUBS-00062, Safety Council Meetings

2.53 SAF-SUBS-00203, Ergonomics

2.54 CHE-NGGC-0045, NGG Chemical Control Program

2.55 LEG-SUBS-00001, Reporting Procedure for Personal Injuries, Vehicle Accidents, Claims, and Damages

2.56 ACGIH - Threshold Limit Values (TLVs) for Chemical Substances & Physical Agents, current edition

2.57 SAF-NGGC-2175, Electrical Safety and ARC Flash Protection

2.58 SAF-NGGC-2174, Confined Space Entry Procedure

2.59 CAP-NGGC-0200, Corrective Action Program

2.60 SAF-ESGX-00002, Energy Supply Fall Protection Procedure

2.61 SAF-SUBS-00065, Safety Manual

2.62 SAF-PGNF-00065, Accident Prevention Manual

3.0 DEFINITIONS

3.1 ACGIH

American Conference of Governmental Industrial Hygienists

3.2 ANSI

American National Standards Institute

3.0 DEFINITIONS

3.3 dBA

Noise level in decibels measured on the A weighted scale of a standard sound-level meter or noise dosimeter at slow response.

3.4 HE&EC

Harris Energy and Environmental Center

3.5 Hydrolazing

High-pressure water washing at greater than 5000 psig.

3.6 Immediate Hazard

Hazard that has the potential to severely injure an individual or do significant damage to safety-related equipment. Examples of these hazards include, but are not limited to a leaking fuel tank, a severed high voltage electrical line, or damaged structural member.

3.7 MDLS

Materials Dedication and Laboratory Services

3.8 MSDS

Material Safety Data Sheet

3.9 NCR

Nuclear Condition Report

3.10 OSHA

Occupational Health and Safety Administration

3.11 Unsafe Act

An action taken by a person or persons which is a departure from safe work practice, a task error, or an oversight, and which is correctable given proper knowledge, training, or leadership.

3.12 Unsafe Condition

A physical situation, circumstance, or situation which in itself creates the potential for accident or injury without the addition of an unsafe act being committed.

4.0 RESPONSIBILITIES

4.1 Site Vice-President

Responsible for the implementation of this procedure.

4.2 Managers and Supervisors

Responsible for ensuring all personnel under their supervision are fully aware of the hazards associated with the job, work procedures involved, special precautions, and personal protective equipment requirements and the requirements contained within this procedure.

4.3 Employees

Responsible for maintaining the highest regard for safety while planning and conducting work. Employees are also responsible for ensuring that a safe work environment exists for themselves and their coworkers and for following the requirements contained within this procedure.

4.4 Occupational Health and Safety Section

Responsible for providing information and guidance to employees regarding industrial hygiene and safety issues.

4.5 Designated Representatives

Responsible for ensuring SAF-SUBS-00041, or site procedure is implemented for their contractor.

5.0 PREREQUISITES

As designated in this procedure.

6.0 PRECAUTIONS AND LIMITATIONS

As designated in this procedure.

7.0 SPECIAL TOOLS AND EQUIPMENT

As designated in this procedure.

8.0 ACCEPTANCE CRITERIA

N/A

9.0 INSTRUCTIONS

9.1 Practice and Philosophy

9.1.1 All employees shall use approved procedures and established safe practices when performing their duties. Employees should report all industrial safety related deficiencies and make recommendations as to how a safer working environment can be attained. Before undertaking a task, the employee should be satisfied and confident that the task can be done without subjecting himself or others to any unsafe condition or hazard. An employee should also assist his coworkers in ensuring their safety. Employees are required to comply with this procedure as well as all plant procedures, programs, and safety rules, which assure OSHA compliance.

9.2 Safety Meetings

9.2.1 All employees are expected to attend monthly safety meetings in accordance with SAF-SUBS-00062. When schedule conflicts do not permit attendance at assigned safety councils, each employee will arrange to make up the council meeting and notify their council secretary. Makeup meetings may include:

- Attending another council meeting
- Viewing videotape of a meeting
- Reviewing the Presentation Package for the meeting.

9.3 General Rules

9.3.1 Each supervisor shall determine through inspections conducted on at least an annual basis that each employee is complying with the safety related work practices required by this and other safety related procedures. This determination must be documented using FRM-SUBS-00470 or other similar means.

9.3.2 It is the responsibility of each person to be observant of unsafe acts or conditions and to document these observations utilizing site observation procedures or the Corrective Action Program. When unsafe acts or conditions pertaining to personnel safety are observed, they should be promptly corrected if possible. If not possible, mark them in some way as to prevent others from inadvertently coming into contact with the hazard.

9.3.3 Personal injuries, property damage, and near misses shall be reported and investigated in accordance with the Site Accident Investigation and Corrective Action Program. All First Aid reports shall be sent to the Site Occupational Health and Safety Specialist.

9.3.4 The person in charge of the job or crew shall conduct a pre-job briefing before the start of each day or when significant work changes occur. Briefings should be conducted in accordance with site procedures

9.3 General Rules

9.3.5 Red and black (danger) barrier ribbon (or equivalent to meet intent) is used to identify imminent hazards which, if not avoided, will result in death or serious injury. A sign identifying the person in charge, the hazard, and contact phone number must be posted in areas where red and black barrier ribbon is used if the area is not immediately occupied and controlled by the work group using the barrier ribbon. Personnel shall not cross the boundary without permission of personnel working on the job. Red and black barrier ribbon shall not be used as a substitute for approved railing, floor hole covers, or a hole watch.

9.3.6 Yellow and black (caution) barrier ribbon (or equivalent to meet intent) shall be used for potential hazards which, if not avoided, could result in minor/moderate injury. A sign identifying the hazard should be posted when barricading a work area with caution ribbon if the area is not immediately occupied and controlled by the work group using the barrier ribbon.

9.3.7 When working overhead, keep tools and small materials not in use, in belts or in an appropriate container. Consider utilizing tool lanyards when the possibility exists for tools to be dropped onto employees working below. Use a bucket and/or hand line to raise and lower tools, and materials. Do not throw anything up to or down from any elevated work position.

9.3.8 When possible, do not stand where you could be struck by tools or materials accidentally dropped from above.

9.3.9 Smoking is not permitted in radiation control areas, or in areas which contain flammables such as gasoline, oil, acetylene, hydrogen, solvents, or paint that is stored or in use. Smoking is also prohibited in all buildings on site and in all company vehicles.

9.3.10 Use extreme caution and appropriate protective clothing when handling or transporting acids, caustics, hot water, or other chemicals; or when working around steam systems (see Attachment 6 NGG Hazard Assessment Matrix). Use MSDS for use of hazardous chemicals.

1. Assure cargo is properly distributed and adequately secured on or within transportation vehicle.

2. Prevent cargo from leaking, spilling, blowing or falling from transportation vehicle.

3. Cargo must be secured to prevent shifting within the transportation vehicle to an extent that stability or maneuverability is affected.

9.3.11 Handrails should be used when ascending or descending stairs.

9.3.12 Each site should implement an Emergency Evacuation Plan in accordance with SAF-SUBS-00003 or site procedures.

9.3.13 Each employee should know the location of the nearest exit from the area in which he is working, should rapid evacuation be necessary.

9.3 General Rules

9.3.14 When machining on contaminated lathes in the hot machine shop (i.e., grinding, cutting, boring, turning, and polishing), employees should dress in short-sleeved scrubs or paper PCs with elastic wristbands, and surgeon's gloves. Employees shall dress in accordance with their appropriate RWP while they prepare, set up, and perform work on the work piece.

9.3.15 All hand and power tools shall be inspected in accordance with site procedures and manufacturers' recommendations before and after each use . Damaged and/or defective tools shall be removed from service immediately and repaired or discarded.

9.3.16 Each person is responsible for maintaining a high standard of housekeeping within the areas under his/her control and for cleaning up the work area at the conclusion of each job or work day.

9.3.17 Air hoses supplying pneumatic tools and exceeding 1/2" ID must be equipped with a safety device to reduce pressure in the event of failure. Where a pneumatic tool will not operate with a safety device in place, the proper operating condition of the tool has been verified, the proper air hose size has been verified, the proper safety device size and operational condition has been verified, and no other usable tool is available on site, an exemption to this requirement may be granted by completing Attachment 6, Pneumatic Tool Safety Device Exemption. This should be considered a solution of last resort.

9.3.18 Drill motors and powered saws without installed guards shall be stored in tool rooms with bits and blades removed or sheathed to prevent puncture and/or laceration hazards.

9.4 Personal Safety Protection

9.4.1 Each Site has designated areas where personal protective equipment will be worn. Refer to specific site procedures or Attachments 1, 2, 3, 4 or 5 to identify areas. Proper protective clothing and equipment shall be worn while performing jobs that are potentially hazardous from a chemical, radiological, or physical aspect. Protective clothing for jobs involving hazardous chemicals shall be utilized in accordance with the appropriate MSDS.

9.4.2 Shirt sleeves, lanyards, ties, jewelry, hair, etc., will be properly secured when working in the plant while working around operating or moving equipment.

9.4.3 Finger rings, loose chains, metal wrist bands, other metal jewelry or key rings shall not be worn while working around moving machinery, on energized lines and equipment, or when performing any other hands-on activity where these articles may present a hazard.

9.4 Personal Safety Protection

9.4.4 Hard hats should be worn while headsets are in use whenever an overhead or bumping hazard exists. If a supervisor deems this impossible, the employee must be a safe distance from the hazard and must don the hat immediately following task completion. Attachment 8 Personal Protective Equipment Waiver form or the FRM-SUBS-01086 PPE waiver form (link to the form can be found in SAF-SUBS-00025) shall be used to document the waiving of the requirement for a hard hat by the supervisor

9.4.5 Travel directly from dress-out area to contaminated work area and directly from contaminated work area back to dress-out area without hard hat is allowed **IF NO HEAD INJURY HAZARDS EXIST IN THE TRAVEL PATH.**

9.4.6 Caps and other headwear that interferes with the capability of the suspension of hard hats shall not be worn under the hard hat (this does not include non-flammable welding caps or liners designed to be worn under hard hats for cold weather protection.).

9.4.7 Prior to welding, cutting, or brazing employees shall have eye protection with the required shade number for that job. Safety glasses shall be worn under welding hoods.

9.4.8 Do not look at a welding arc unless a welding shield with suitable lens is used. Where feasible and necessary, welding screens shall be used to protect employees in adjacent work areas from the potential effects of the welding arc, in accordance with SAF-SUBS-00031 or site procedures.

9.4.9 Flame retardant PCs shall be worn while stick welding, arc-gouging and cutting activities involving oxygen/acetylene. Flame retardant PCs should be evaluated for use when performing other types of hot work.

9.4.10 Shoes shall be appropriate for the activity being performed. Reinforced toe protection approved by ANSI Z41-1999 (steel toe, composite, etc.) is required when work conditions warrant. This includes areas where there is a danger of foot injuries due to crushing, falling or rolling objects or objects piercing the sole and where feet are exposed to electrical hazards.

1. The sole of the shoe must provide a substantial degree of puncture and slip resistance.

2. Upper construction of the shoe shall be substantial, non-porous material such as leather.

3. Employees actively involved with work where there are foot hazards shall wear toecap safety shoes in accordance with ANSI-Z41-1999 and the site hazard assessment.

4. Only boots or shoes with discrete heels shall be worn to help prevent slipping when climbing poles and towers.

9.4.11 All employees, contractors and visitors will wear gloves while engaged in maintenance, operational and other physical work activities that could pose a potential hand injury in industrial areas (see Attachment 6 NGG Hazard Assessment PPE Matrix).

9.4 Personal Safety Protection

9.4.12 Supervisors may exempt (during the pre-job brief) glove use in those cases where gloves interfere with the work being performed and adequate protection is provided.

9.4.13 The hazard of wearing gloves while operating rotating machinery must be assessed to determine if hand protection presents a greater risk to the worker.

9.4.14 Each site is responsible for conducting and documenting a personal protective equipment hazard assessment (see Attachments 1, 2, 3, 4, 5, and 6).

9.4.15 Safety Equipment shall be used in accordance with the Site Personal Protective Equipment Hazard Assessments (see Attachments 1, 2, 3, 4, 5, and 6).

9.4.16 Clothing worn must conform to good safety practices. Shorts, tank shirts, T-shirts without sleeves, cut-off shirts, or fishnet type shirts are generally not permitted.

9.4.17 Employees working with exposed energized electrical conductors or equipment that has potential for electric arcs shall wear clothing in accordance with SAF-NGGC-2175.

9.4.18 Personal protective equipment waivers may be granted on a case-by-case basis by the job supervisor or site Occupational Health and Safety Specialist. Use Attachment 8 Personal Protective Equipment Waiver form or FRM-SUBS-01086 PPE Waiver Form (link can be found in SAF-SUBS-00025 Personal Protective Equipment) to document the waiver.

9.5 Hearing Conservation

9.5.1 Each site will implement a continuing effective hearing conservation program as outlined in SAF-SUBS-00004.

9.5.2 Areas greater than 85 dBA shall be posted with the following sign or alternative language that identifies the hazard and meets the intent for level of protection:

CAUTION
Hearing Protection Required
When Working in This Area
While Machinery is Operating

9.5.3 Individuals will be responsible for adhering to hearing protection signs and using adequate hearing protection equipment where required by elevated sound levels.

9.5.4 Managers and supervisors shall ensure that personnel working in designated hearing protection areas wear adequate hearing protection.

9.5.5 Hearing protection is required in those areas not posted when, due to the nature of the work being performed, there exists noise levels greater than 85 dBA. Hearing protection should also be considered whenever unmeasured noise levels appear to be excessive. Supervisors may contact the site Occupational Health and Safety Specialist for assistance in making sound level determinations.

9.6 Respiratory Protection

9.6.1 The use of respiratory protection related to radiation safety is specified and controlled in accordance with the site respiratory protection procedure.

9.6.2 The use of respiratory protection related for non-radiological purposes must be in accordance with the SAF-SUBS-00007 or site procedures.

9.6.3 Respirators shall be used when engineering controls cannot reduce personal exposure to airborne non-radiological hazard(s) to concentrations below OSHA established Permissible Exposure Limits (PELs) and/or ACGIH Threshold Limit Values (TLVs).

9.7 Confined Spaces

9.7.1 Each site will implement a confined space entry program in accordance with SAF-NGGC-2174.

9.7.2 A confined space may contain a life-threatening atmosphere or condition. An area is referred to as a confined space if it meets all three of the following criteria:

- any space not intended for continuous human occupancy,
- any space having a limited means of access and egress (i.e., tanks, vessels, vaults, pits),
- is large enough and so configured that an employee can bodily enter and perform assigned work.

9.8 Asbestos

9.8.1 Asbestos removal shall be performed in accordance with SAF-SUBS-00012 or site procedures.

9.8.2 Asbestos may be present in the plant in many forms. Some of these forms include but are not limited to the following: insulation such as pipe, duct, boiler wall, electrical cable insulation, and arc chutes; building materials such as transit board, ceiling and floor tile, roofing materials, acoustic and fireproofing insulation, and friction and mechanical products including brake shoes, clutch lining valve packing, and gasket material. All of these materials shall be treated as suspect asbestos containing material until appropriately licensed personnel determine otherwise. If material is presumed to be asbestos work must proceed according to the site asbestos exposure control program.

9.8.3 All asbestos containing materials that needs to be removed shall be removed only by appropriately trained personnel.

9.9 Lead

9.9.1 Lead removal shall be performed in accordance with SAF-SUBS-00013 or site procedures.

9.9.2 Lead may be present in the facilities in the form of: paint and coatings, as well as in bricks and blankets used for radiological shielding. All lead or suspect lead containing material shall be treated as containing lead unless determined otherwise.

9.10 Heat Stress

9.10.1 Each site shall implement a heat stress procedure in accordance with SAF-SUBS-00032 or site procedures.

9.10.2 Use extreme care when working in hot environments. Length of time in a work area, special clothing, and adequate fluid intake should be considerations when determining stay times for work in hot environments.

9.11 Hazardous Chemicals

9.11.1 All employees shall be trained on the hazards associated with the chemicals with which they work, the personal protective equipment to be used, the location of the MSDS, the labeling procedures, and the location of the Hazard Communication Program. Training shall be in accordance with SAF-SUBS-00016 and CHE-NGGC-0045 as applicable.

9.11.2 Employees should consult with their supervisor, the MSDS, and follow CHE-NGGC-0045 prior to using any new or potentially hazardous chemicals.

9.11.3 Handling of flammable/combustible substances shall be in accordance with SAF-SUBS-00024 or site procedures.

9.12 Electrical Safety

9.12.1 Work performed on electrical equipment will be performed in accordance with SAF-NGGC-2175.

9.12.2 All electrical hand tools will be provided with adequate shock protection; that is, three prong plugs or a double insulated frame.

9.12.3 No electrical hand tool that is considered unsafe will be reissued until repaired. Any tool which is not working properly will be repaired and tested prior to issue or discarded.

9.12 Electrical Safety

9.12.4 Electrical equipment will be inspected and has the current quarterly inspection color code (if applicable) visible on the cord, is equipped with a ground fault circuit interrupter (GFCI) or ground continuity monitor (GCM) or is double insulated in accordance with site procedures.

9.12.5 Extension cords and cables may not be used in place of permanent wiring of a structure. Avoid "daisy-chaining" multi-strip power devices or using these devices in conjunction with an extension cord.

9.12.6 All electrical hand tools will be inspected for defects prior to use.

9.12.7 When erecting scaffolding, ladders, or similar equipment in the vicinity of electrical equipment with the potential for an electrical arc or if an electrical arc is observed, STOP WORK and notify the Superintendent - Shift Operations. Certain areas in the plant have been marked/identified where this potential for arcing exists (e.g., around isophase bus ducts).

9.13 Rubber Insulating Gloves

9.13.1 Rubber insulating gloves shall be inspected and air tested prior to each use.

9.13.2 Rubber insulating gloves shall be periodically tested by the a test laboratory and stamped with an expiration date. Gloves will not be used beyond the stamped expiration date.

9.13.3 Rubber insulating gloves shall always be used with the appropriate glove protectors.

9.13.4 Low voltage gloves are rated for 1,000 volts maximum. High voltage gloves are rated for 17 kV maximum. Class 00 gloves are rated at 500V maximum.

9.13.5 Low voltage gloves shall be red or yellow in color. High voltage gloves shall be black in color. At sites where Class 00 gloves are used they will be white or blue in color.

9.14 Handling, Use, and Storage of Portable Compressed Gas Cylinders

9.14.1 Cylinders shall be used in accordance with SAF-SUBS-00023 and SAF-SUBS-00031.

9.14.2 Cylinders not used in a 24-hour period shall be placed in storage.

9.14.3 Cylinders shall be stored at least 20 feet from flammable and combustible liquids and easily ignitable forms of materials such as wood, paper, oil, and grease.

9.14.4 Cylinders shall be stored where they will not be exposed to excessive rise in temperature or physical damage.

9.14.5 All cylinders shall have their valves closed while in storage and during transit. Empty cylinders should be tagged or labeled as being empty.

9.14.6 Cylinder caps shall be in place except when cylinders are in service or connected ready for service.

9.14.7 Cylinders shall be securely restrained to prevent tipping at all times.

9.14.8 Welding or cutting work shall not be physically supported by compressed gas cylinders.

9.14.9 Gas shall not be transferred from one cylinder to another or mixed with another gas in a cylinder, except for approved cascading systems.

9.14.10 Leaks from valves or fittings on compressed gas cylinders, with the exception of Freon cylinders, should be stopped by closing of the valve or taken outdoors away from sources of ignition and slowly emptied. Leakage through a valve outlet may be temporarily stopped by attaching a regulator. The cylinder should have a note attached in such a way as to indicate the nature of trouble. The cylinder shall be stored separately from the other used cylinders. When the vendor picks up the used cylinder they shall be advised of the leaking cylinders.

9.14.11 Cylinders should be located at a safe distance from the welding or be appropriately protected so that they will not be exposed to sparks, slag, or misdirection of the torch flame or overheating from hot materials of processing.

9.14 Handling, Use, and Storage of Portable Compressed Gas Cylinders

9.14.12 Cylinders not having fixed hand wheels should have keys or handles on valve stems while these cylinders are in service. In multiple cylinder installations, only one key or handle is required for each manifold.

9.14.13 Compressed gas cylinder valves should be opened slowly.

9.14.14 Before a regulator is removed from a cylinder valve, the cylinder valve should be closed and the gas released from the regulator.

9.14.15 As oxygen under high pressure may react violently with oil or grease, every possible precaution should be taken to prevent oxygen from coming in contact with oil or grease. Oxygen cylinders, valves, regulators, hose, and other apparatus shall be kept free from oil or grease and should not be handled with oily hands, oily gloves, or with greasy equipment.

9.14.16 Acetylene cylinders must be kept in an upright position at all times.

9.14.17 Acetylene, propane, methane, ethylene and hydrogen should not be used in torches or other devices without reducing the pressure through a suitable regulator.

9.15 Rigging

9.15.1 Rigging shall be inspected, and performed in accordance with SAF-SUBS-00034 or site rigging procedures.

9.16 Safe Sling Operations

9.16.1 Slings shall be inspected, and used in accordance with SAF-SUBS-00028 or site rigging procedures.

9.16.2 Damaged or defective slings shall not be used.

9.16.3 Slings shall not be shortened with knots, bolts or other makeshift devices.

9.16.4 Slings shall not be kinked.

9.16.5 Loads lifted in a basket hitch shall be balanced to prevent spillage.

9.16.6 Slings shall be securely attached to the load.

9.16.7 Suspended loads shall be kept clear of all obstructions.

9.16.8 Personnel shall be kept clear of suspended loads and loads about to be lifted.

9.16.9 Hands and fingers shall not be placed between sling and load while sling is being tightened around load.

9.16.10 Tag lines shall be employed to guide loads and prevent excessive sway during load movement.

9.17 Fall Protection

9.17.1 Fall protection should be used in accordance with SAF-ESGX-00002, SAF-SUBS-00019, SAF-SUBS-00021 and site procedures.

9.17.2 All fall protection users must be properly trained and qualified as directed in SAF-ESGX-00002.

9.17.2 Safety harnesses and lanyards shall be inspected by each user prior to use.

9.17.3 Full body harnesses with shock absorbing lanyards shall be used when working at unprotected elevations above six feet.

9.17.4 Lanyards shall not be tied to themselves in a choked manner. If the anchorage point is too large for the lanyard to hook directly on, the employee shall use an anchorage strap or other approved attachment device to attach to the anchorage point. Note: Lanyards with an installed D-Ring can be connected back to the D-Ring.

9.17.5 Escorts of contractors and vendors shall ensure fall protection requirements are followed.

9.17.6 Occupied elevated fixed ladder access points and floor openings shall be guarded by a floor cover, guardrail or other substantial physical barrier, or shall be constantly attended to prevent personnel from falling into openings.

9.17.7 Employees shall wear properly tied-off safety harnesses whenever working in manlifts or aerial lifted baskets. It is not required for employees to tie-off in manlifts that move only in the vertical direction and have OSHA approved handrails, midrails and toeboards.

9.17.8 A safety harness is not to be used to support any employee. It is a back-up safety device only in case the employee slips or falls.

9.17.9 When utilizing personal fall protection, employees shall select appropriate anchorage points as indicated in Attachment 2 or Attachment 3 in SAF-ESGX-00002.

9.17.10 Climbing on insulated pipes, pipe hanger components, and instrument lines is prohibited, except where the nature of the work is such that no damage is expected and other options are determined as not being feasible.

9.17.11 Climbing on cable trays is to be minimized. In cases where access to equipment can ONLY be attained by climbing on or through cable trays, the access will be permitted while exercising maximum caution. The possible damage to insulation, instrument lines, and power cables make strict compliance with this rule mandatory.

9.18 Ladders

9.18.1 Ladders should be erected, used and stored in accordance with SAF-SUBS-00019, SAF-SUBS-00022 and SAF-SUBS-00036 or site procedures.

9.18.2 Ladders shall be inspected in accordance with the site's maintenance inspection programs **AND** prior to each use by the ladder user. At a minimum, the following items should be included in the inspection:

- Missing or damaged components (e.g., cracked side rails, bent or damaged rungs, missing non-slip material on feet of ladder, loose or missing rivets, screws, or bolts, etc.)
- All fasteners are secure
- All moving parts are in good working order
- Side rails and rungs are free from dirt, oil or other foreign material.

Defective ladders shall be removed from service for repair or destruction and tagged or marked, "Dangerous, Do Not Use" or other suitable verbiage.

9.18.3 Step ladders shall be used appropriately with legs fully extended and locked, and shall not be used as extension ladders.

9.18.4 Portable rung and cleat ladders shall, where possible, be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is one-quarter of the working length of the ladder (the length along the ladder between the foot and the top support). The ladder shall be so placed as to prevent slipping, and it shall be tied off, or held in position. Ladders shall not be used horizontally as platforms, runways, or scaffolds.

9.18.5 When working on a ladder resting against a pole or round structure, always secure the ladder at the top. Until this is done, have someone hold the ladder.

9.18.6 The top of a ladder used to gain access to a roof or working platform shall extend at least three feet above the roof or platform, where possible.

9.18.7 Ladders shall not be placed in front of doors opening toward the ladder unless the door is blocked, locked, or guarded.

9.18.8 Ladders shall not be placed on boxes, barrels, or other unstable bases to gain additional height.

9.18.9 Fall protection shall be utilized when working off a ladder <6 feet from the working surface when the ladder is set in close proximity to a fall hazard >6 feet from the surface on which the ladder is resting, i.e, ladder set up on floor level with a fall potential nearby below the floor level.

9.18.10 Employees shall not climb ladders with tools, materials or anything else in their hands.

9.19 Scaffolding

9.19.1 All scaffolds shall be erected and used in accordance with SAF-SUBS-00036 or MNT-NGGC-0004.

9.19.2 All scaffolding and their supports shall be capable of supporting at least four times the intended load.

9.19.3 When work on a specific scaffold requires the use of personal fall protection because of the scaffold's construction (incomplete rails), the fall protection requirements shall be specified on the scaffold tag.

9.19.4 Working on scaffolding during high winds, storms or when snow/ice is present on scaffolding is prohibited.

9.19.5 Scaffold information tags shall be attached to all scaffolds. These information tags shall include pertinent hazard information relevant to work to be performed on the scaffold (e.g., exposed hot pipes, overhead hazards, special fall protection systems and requirements, etc.) and shall be reviewed by all scaffold users prior to climbing the scaffold.

9.20 First Aid Including Bloodborne Pathogens

9.20.1 Every accident, no matter how minor, must be reported promptly to your supervisor or the person in direct charge of the work and the site Occupational Health and Safety Specialist. Individuals working at an NGG site who do not report to the site must report all injuries occurring at the site to their CBO supervisor or site contact (so that For-Cause FFD testing requirement can be evaluated) and to the site Occupational Health and Safety Specialist as soon as possible.

9.20.2 Accident reports shall be completed in accordance with LEG-SUBS-00001, SAF-SUBS-00002, SAF-SUBS-00033, or site procedures.

9.20.3 Injured employees requiring emergency medical treatment shall call the control room at X5555 to obtain assistance. HE&EC shall call 911.

9.20.4 Exposure incidents for employees, who have had contact with blood or other body fluids, shall be handled in accordance with SAF-SUBS-00015 or site procedures.

9.20.5 In the event of area contamination with blood or other body fluids that pose the potential for presence of bloodborne pathogens, contact the site group that is trained for clean-up and decontamination of bloodborne pathogen containing materials.

9.21 Safety Showers and Eyewash Stations

9.21.1 Safety showers and eyewash stations are provided at appropriate locations throughout the plants and the HE&EC. These eyewash stations shall be maintained in accordance with SAF-SUBS-00010 or site procedures.

9.21.2 Portable eyewash stations are available from Materials Control, and shall be used in areas where caustic or acid compounds, or other chemicals which are hazardous to the eyes, are used and fixed eyewash stations are not available.

9.21.3 Drench hoses meeting the requirements of ANSI Z358.1-2004 Emergency Eyewash and Shower Equipment may be used in lieu of a portable eyewash station and/or emergency shower/eyewash station.

9.21.3 Weekly inspections (activation) of safety showers and eyewash stations shall be performed in accordance with site procedures.

9.21.4 It is each employee's responsibility to be familiar with the location and operation of safety showers and eyewash stations prior to beginning any job where their use may be necessary.

9.22 Office Safety

9.22.1 Repairs to any office machinery shall be made by qualified personnel only.

9.22.2 Only one drawer of a file cabinet should be opened at time and should not be opened and left unattended. When possible, stand to the side of the cabinet when opening drawers and do not rely on file drawer stops to prevent drawer from falling out. Ensure filing cabinet top drawers are not overloaded as to allow tipping of the cabinet when drawers are opened.

9.22.3 Tilting in chairs which raises the chair's feet from the floor is prohibited.

9.22.4 Standing on swivel chairs is prohibited.

9.22.5 Use caution when lifting loads. Ensure a clear path is available prior to moving loads. Use the legs, bend at the knee, keep the back straight and lift by straightening the legs. Carry loads close to the body. Twisting the torso should be avoided when carrying a load. Change the position of your feet to change direction.

9.22.6 Electrical extension cords should not be used as a substitute for permanent wiring. When extension cords are a temporary necessity, they should be taped down, clipped to the back of desks or covered with a rubber passageway if they cross walkways. Avoid "daisy-chaining" multi-strip power devices or using these devices in conjunction with an extension cord.

9.23 Compressed Air Use

9.23.1 Compressed air greater than 30 psi shall not be used for cleaning.

9.23.2 Air hoses exceeding ½" ID must be equipped with a safety device to reduce pressure in the event of failure when used with pneumatic tools (Reference Attachment 6, Pneumatic Tool Safety Device Exemption).

9.23 Compressed Air Use

9.23.3 Job-made air hose connects shall be constructed in accordance with manufacturers' recommendations. At least two securing bands should be used when making hose connects.

9.24 Work Over Water

9.24.1 All employees who work over or near water, or where danger of drowning exists without the protection of guardrails, fall protection, etc., shall wear U.S. Coast Guard approved life jackets or buoyant work vests. All equipment shall be inspected prior to and after each use for defects. Defective equipment shall not be used.

9.24.2 Ring buoys with an appropriate amount of attached line shall be provided and readily available for emergency rescue operations during times when employees are working in areas above water.

9.24.3 At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water and are not tied off to prevent them from falling into the water. Reactor cavities (when flooded) and spent fuel pools are exempt from this requirement. Bodies of water which may be too small or otherwise inappropriate for accommodation of a skiff should be evaluated for alternatives.

9.25 Pedestrian Safety

9.25.1 Pedestrians should observe crosswalk markings; stay within the lines and to the right.

9.25.2 Pedestrians should wait for all traffic to come to a complete stop.

9.25.3 Pedestrians should check both ways and allow enough time to cross safely.

9.25.4 Handrails should be used when ascending or descending stairs.

9.26 Motor Vehicle Safety

9.26.1 Compliance with DOT driving regulations shall be in accordance with SAF-SUBS-00039 and SAF-SUBS-00047.

9.26.2 Employees shall not attempt to get on or off a moving vehicle.

9.26.3 Any employee operating a company vehicle licensed for off-site use shall ensure that a first aid kit and a fully charged fire extinguisher are installed.

9.26.4 Seat belts and shoulder harness shall be used when operating company vehicles, if so-equipped.

9.26 Motor Vehicle Safety

9.26.5 Employees shall ride in or on only properly protected area of vehicles in motion - never on bumpers, tail gates, running boards, fork-lift forks, fenders or other hazardous locations.

9.26.6 Employees will obey all site, local and state regulations when operating vehicles.

9.26.7 Employees will obey posted speed limits and other traffic regulation signs on site.

9.27 Trenching

9.27.1 At any excavation site there shall be a competently trained person, who is capable of identifying existing and predictable hazards and who shall have the authority to take prompt corrective action to eliminate them on the site. Through training, this individual shall be able to determine soil classifications and select protective systems to be used.

9.27.2 ALL trenches and excavations greater than 5 feet in depth must be sloped, benched or shored. Trenches and excavations must be either sloped back to its proper angle to achieve a stabilized slope, properly benched or must be shored with a protective system. (However, some excavations and trenches **less** than 5 feet in depth may be sloped or shored dependent upon the examination of the competent person.)

9.27.3 Trenches and excavations DO NOT require sloping or shoring when:

- Excavations are made entirely in stable rock
- Excavations are less than 5 feet in depth and examination of the ground by the competent person provides no indication of a potential cave-in.

9.27.4 All work in excavations shall be performed in accordance with SAF-SUBS-00018 and/or site procedures.

9.28 Hydrolazing

9.28.1 Persons performing hydrolazing shall be trained in hydrolazing hazards prior to performing work.

9.28.2 Only dual trigger hydrolazing guns may be used with wands less than 36 inches in length. The release of either trigger must immediately shut off the hydrolazing gun.

9.28.3 Access to the area where hydrolazing is being conducted shall be restricted to minimize the number of persons exposed.

9.28.4 Persons performing hydrolazing shall wear Kevlar gloves, rubber gloves, face shields, and rubber boots with steel toes and metatarsal guards, as a minimum. Personal protective equipment requirements may be modified by the job supervisor or site Occupational Health and Safety Specialist based upon the hazard analysis of the specific job.

9.29 Job Safety Analysis

9.29.1 Job supervisors or their designee shall perform a written Job Safety Analysis (JSA) on projects or work activities that they deem warrant an additional safety barrier. The JSAs will include, at a minimum, job steps, hazards associated with the work activities, measures to be taken to minimize or eliminate the hazards and a person responsible for the measure. It is the responsibility of the job supervisor to complete the JSA and ensure employees know and understand the expected safe work practices for any job evaluated by the JSA.

9.29.2 Jobs that may require a JSA include, but are not limited to, the following:

- New or infrequently performed jobs
- Jobs that require extensive manual handling of material
- Jobs with a high risk of injury or damage to equipment (consider using internal and external OE to determine if job may need a JSA)
- Jobs with a history of injury or near misses (consider using internal and external OE to determine if job may need a JSA)
- Jobs that entail long-term repetitive actions
- Critical jobs with perceived time constraints.

9.30 Ergonomics

9.30.1 Ergonomics is the multi disciplinary study of the interaction between people and their working environment. The working environment includes the physical environment (e.g. temperature, light) and the tools and equipment that are used for performing the job (e.g., including workstations, computers, hand tools, etc.). Failure to address ergonomics in designing or performing work can reduce the comfort and efficiency of employees and lead to workplace injuries and illnesses.

9.30.2 Refer to SAF-SUBS-00203 for further guidance. The purpose of this guidance is to provide an effective process to identify, evaluate and control ergonomic risk factors that can lead to employee discomfort.

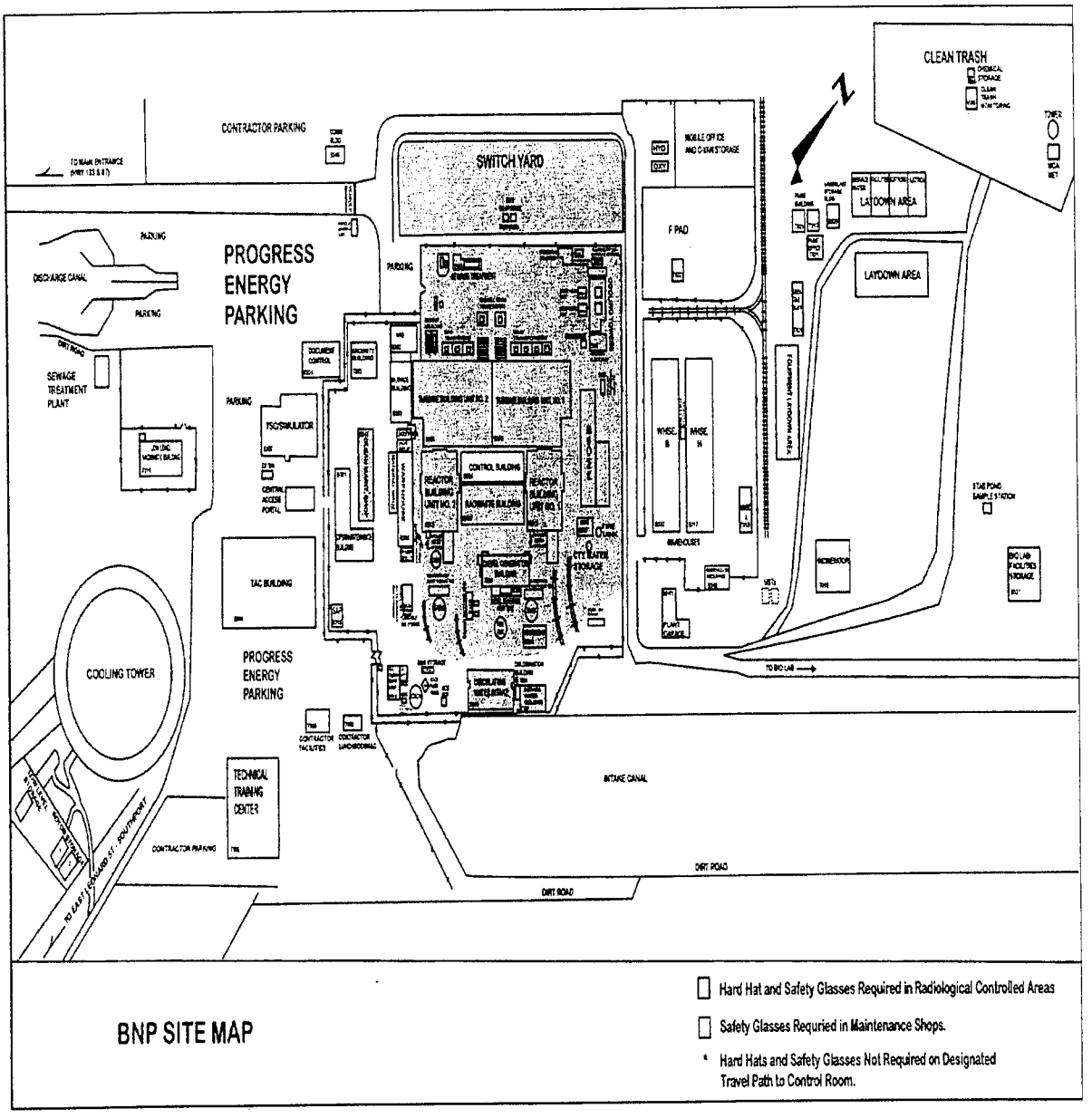
10.0 RECORDS

10.1 All OSHA-required records shall be kept in accordance with:

- 29 CFR 1904
- 29 CFR 1910
- 29 CFR 1926
- SAF-SUBS-00002

ATTACHMENT 1
Sheet 1 of 5

BNP Personal Protective Equipment Designated Area Diagram
29 CFR 1910 Subpart I
Certification of Hazard Assessment - 7 September 2006



29 CFR 1910 Subpart I
BNP Personal Protective Equipment Site Hazard Assessment

This hazard assessment covers typical work situations in various areas of the Brunswick Nuclear Plant. The Site PPE Designated Area Diagram on page 1 of this Attachment designates areas where hard hats and safety glasses shall normally be worn regardless of work taking place (shaded areas).

Tasks shall be evaluated by supervision and specific personal protective equipment (PPE) identified and used in accordance with that evaluation and this assessment. The Job Safety Analysis (JSA) Process (see section 9.30 of this procedure) can be used as a tool in determining PPE requirements. Some types of PPE are addressed in other program documents such as procedures and guidance documents. Non-routine tasks that are not addressed in this hazard assessment must be evaluated on a case-by-case basis and appropriate PPE identified and used. The site Occupational Health and Safety Specialist is available to provide assistance in performing these evaluations.

Supervision can, on a case-by-case basis, adjust the requirements for PPE for a defined task after personnel hazards have been clearly determined. Waivers to PPE requirements may be granted on a case-by-case basis by the job supervisor provided that there are no hazards in the work area requiring such PPE or it is deemed that a higher risk of injury or illness exists by using that PPE. The PPE waiver shall be documented on Attachment 8 of this procedure or on FRM-SUBS-01086, PPE Waiver (link to this form is found in SAF-SUBS-00025 Personal Protective Equipment).

MINIMUM PPE REQUIREMENTS

IF, industrial-type work is to take place in areas not addressed on the Site PPE Designated Area Diagram, THEN minimum PPE requirements include, but are not limited to, safety glasses, appropriate work shoes, and appropriate gloves for the task.

Some areas that are shown on the map in this attachment as areas typically not requiring PPE usage may be designated by supervision to require certain PPE as based upon tasks and subsequent hazards introduced due to those tasks. These areas shall be controlled in order to protect employees dedicated to the task as well as those in close proximity. Controls shall be established through methods such as guarding, barricading and posting, or other equivalent means.

SAFE WALK PATH

"Safe Walk Path" is defined as that designated travel path which, after hazard evaluation, has been deemed safe for traversing to and from certain areas without the use of PPE.

The accepted "designated safe walk path" is that pathway from the RCA SPA entrance to the control room.

Personnel will follow the "designated safe walk path" established by management. This path may be altered by supervision and posted for PPE use accordingly to ensure personnel safety during times of ensuing work at close proximity to pathway.

NOTE: Employee training on proper use of Personal Protective Equipment is provided in General Employee Training (GET), General Employee Retraining (GER) and in Continuing Training (CT). Training for contract personnel should be provided by the contractor.

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BNP Personal Protective Equipment Site Hazard Assessment

1910.133 EYE AND FACE PROTECTION

Those areas requiring the use of safety glasses with side shields are designated on the BNP Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Safety Glasses Required", as determined by supervision, based upon a Job Safety Analysis.

Where designated, protective eye and face devices shall meet the criteria specified in ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection". Eye protection lens material must be made of polycarbonate as a minimum. The manufacturer's emblem and a "+" must be on the lens to designate "High Impact" lens on all non-prescription safety glasses purchased after August, 2003 (prescription high impact lens will not have Z87 stamped on them). Prescription safety lenses must have the + next to the manufacturing lab's monogram. Prescription safety frames must meet the High Impact Standard and shall be marked "Z87-2" or "Z87+". REMOVABLE side-shields must be marked Z87.

Safety Glasses are not required in offices, control rooms, designated warehouse areas, auxiliary building tool room, locker rooms, HP work area and instrument issue room.

Dark glasses shall not be worn inside buildings unless medically prescribed.

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without safety glasses provided no eye injury hazards exist within the travel path.

The job supervisor and employee(s) must determine the need for eye protection based upon the risk of eye injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

1910.135 HEAD PROTECTION

Those areas requiring the use of hard hats are designated on the BNP Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Hard Hat Required", as determined by supervision, based upon specific job hazard evaluations.

Where designated, protective helmets shall meet the criteria specified in ANSI Z89.1-1986, "American National Standard for Personal Protection-Protective Headwear for Industrial Workers-Requirements".

The job supervisor and employee(s) must determine the need for head protection based upon the risk of head injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without hard hat provided no head injury hazards exist within the travel path.

Per manufacturers' recommendation, hard hat liners should be replaced annually and the entire hardhat hat replaced not greater than 5 years from the date it was placed into service. Individuals are responsible for maintaining the 1 (one) and 5 (five) year periods.

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BNP Personal Protective Equipment Site Hazard Assessment

Areas Exempt from General Hard Hat Requirements **(when overhead lifting or any other head injury hazards exist, head protection must be worn)**:

- Crane, forklift or other vehicles with overhead protection
- Laboratories
- Locker Rooms
- Bath and Shower Rooms
- Tool Rooms
- Radwaste Control Room
- Battery Rooms
- Designated Warehouse Areas (except when required by task)
- Shop areas
- HP Work Area
- Main Control Room Complexes
- Offices
- Switchgear Rooms

1910.95 HEARING PROTECTION

Wear approved hearing protection in areas ≥85 dBA. These areas will be designated or posted:

"Caution Hearing Protection Required"

Due to varying plant conditions, there may be times when hearing protection will be required in areas not posted as "Hearing Protection Required".

1910.136 FOOT PROTECTION

Foot Protection *("hard toe safety shoes" or "foot guards")* is required when carrying or handling materials such as heavy packages, objects, parts or tools, which could be dropped onto the feet.

When used, protective footwear shall meet the criteria specified in ANSI Z41-1999, "American National Standard for Personal Protection - Protective Footwear".

The job supervisor and employee(s) must determine the need for foot protection based upon the risk of foot injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

The Site Occupational Health and Safety Specialist will work with supervision to determine individuals whose jobs require that they wear hard toe safety shoes. In accordance with the supervisor's guide to standard company attire, PROGRESS ENERGY will pay for hard toe safety shoes that are required for PROGRESS ENERGY employees whose work activities require that they wear them.

Foot guards, available from the tool rooms, can provide metatarsal protection. This equipment shall be worn when operating air or electric paving breakers, tamps, jackhammers, hydrolazers, etc. *(See "Foot Protection" Matrix in Attachment 6)*

Employees requiring special shoes due to a medical condition shall provide their supervisor a note from their physician prior to wearing the footwear on site.

1910.138 HAND PROTECTION

Hand Protection (gloves) is required to prevent cuts, abrasions, burns, and skin contact with hazardous chemicals.

The job supervisor and employee(s) must determine the need for hand protection based upon the risk of hand injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

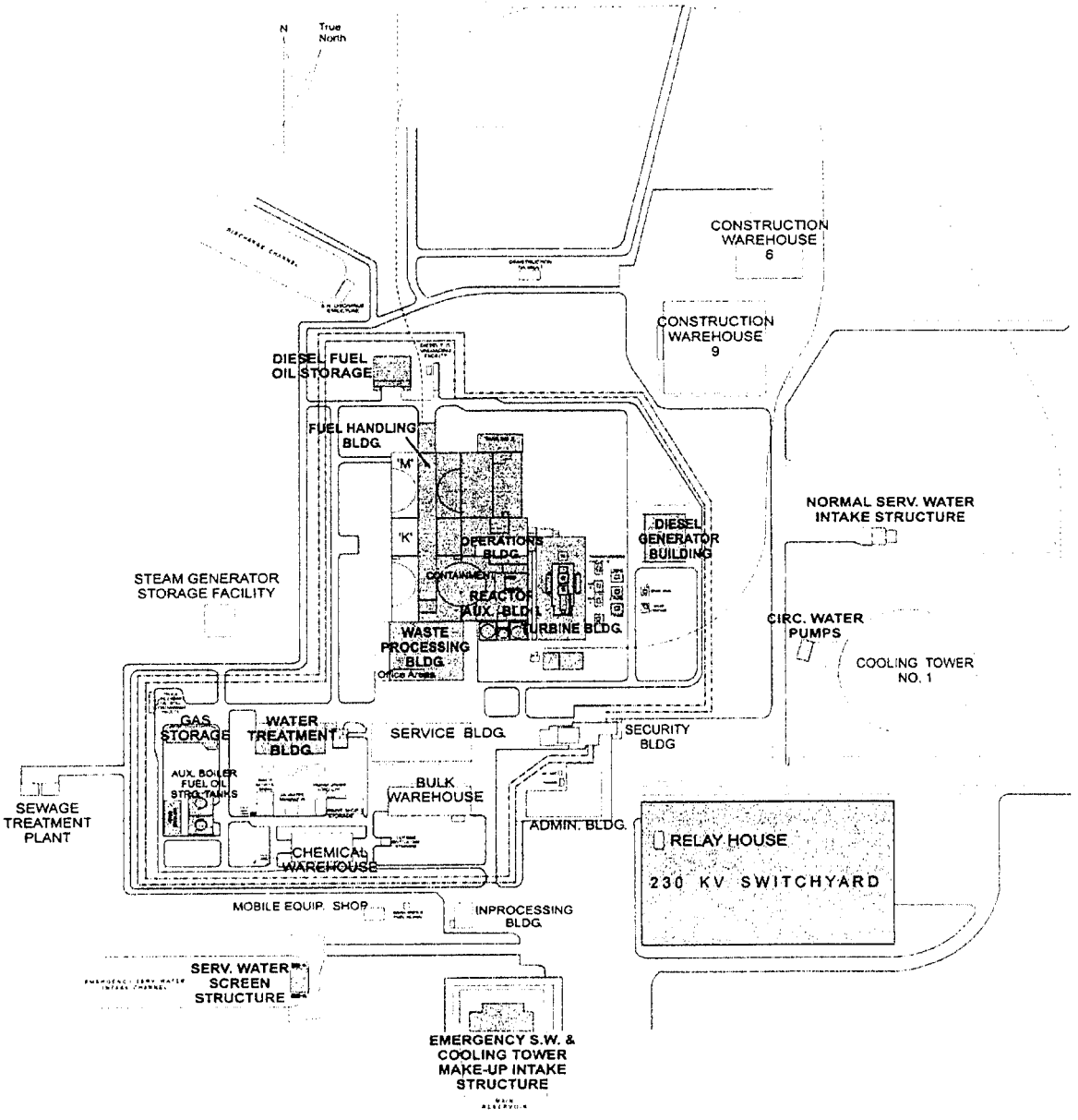
The type of gloves selected for a particular task shall be based on the degree of protection necessary for the specific hazard and for the level of risk to the worker's hands.

Appropriate hand protection must be worn when employees' hands are exposed to hazards that could cause burns, cuts, abrasions, splinters, electrical shock, chemicals, or blood borne pathogen exposures. For hands-on-work in industrial work areas, gloves shall always be used, unless there is a valid reason not to wear them.

Finger rings, loose chains, metal wrist bands, body jewelry or key rings shall not be worn while working around moving machinery or when performing any other hands-on activity where these articles may present a hazard. Additional requirements, as addressed in SAF-NGGC-2175 Electrical Safety, apply for working on, or near energized electrical components.

ATTACHMENT 2
Sheet 1 of 5

HNP Personal Protective Equipment Designated Area Diagram
29 CFR 1910 Subpart I
Certification of Hazard Assessment - 7 September 2006



HNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

This hazard assessment covers typical work situations in various areas of the Harris Nuclear Plant. The Site PPE Designated Area Diagram on page 1 of this Attachment designates areas where hard hats and safety glasses shall normally be worn regardless of work taking place (shaded areas).

Tasks shall be evaluated by supervision and specific personal protective equipment (PPE) identified and used in accordance with that evaluation and this assessment. The Job Safety Analysis (JSA) Process (see section 9.30 of this procedure) can be used as a tool in determining PPE requirements. Some types of PPE are addressed in other program documents such as procedures and guidance documents. Non-routine tasks that are not addressed in this hazard assessment must be evaluated on a case-by-case basis and appropriate PPE identified and used. The site Occupational Health and Safety Specialist is available to provide assistance in performing these evaluations.

Supervision can, on a case-by-case basis, adjust the requirements for PPE for a defined task after personnel hazards have been clearly determined. Waivers to PPE requirements may be granted on a case-by-case basis by the job supervisor provided that there are no hazards in the work area requiring such PPE or it is deemed that a higher risk of injury or illness exists by using that PPE. The PPE waiver shall be documented on Attachment 8 of this procedure or on FRM-SUBS-01086, PPE Waiver (link to this form is found in SAF-SUBS-00025 Personal Protective Equipment).

MINIMUM PPE REQUIREMENTS

IF, industrial-type work is to take place in areas not addressed on the Site PPE Designated Area Diagram, THEN minimum PPE requirements include, but are not limited to, safety glasses, appropriate work shoes, and appropriate gloves for the task.

Some areas that are shown on the map in this attachment as areas typically not requiring PPE usage may be designated by supervision to require certain PPE as based upon tasks and subsequent hazards introduced due to those tasks. These areas shall be controlled in order to protect employees dedicated to the task as well as those in close proximity. Controls shall be established through methods such as guarding, barricading and posting, or other equivalent means.

SAFE WALK PATH

"Safe Walk Path" is defined as that designated travel path which, after hazard evaluation, has been deemed safe for traversing to and from certain areas without the use of PPE.

The accepted "designated safe walk path" is the established pathway from the 261'elevation to the Turbine Building via the concrete slab between the tank farm and Turbine Building, the elevator itself and the stairway adjacent to the elevator. Another "safe walk path" exists on the 314' elevation of the Turbine Building, consisting of the painted walkway leading to the north stairway from the Main Control Room and Operations Building.

Personnel will follow the "designated safe walk path" as established by management. This path may be altered by supervision and posted for PPE use accordingly, to ensure personnel safety during times of ensuing work at close proximity to pathway.

NOTE: Employee training on proper use of Personal Protective Equipment is provided in General Employee Training (GET), General Employee Retraining (GER) and in Continuing Training (CT). Training for contract personnel should be provided by the contractor.

HNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

1910.133 EYE AND FACE PROTECTION

Those areas requiring the use of safety glasses with side shields are designated on the HNP Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Safety Glasses Required", as determined by supervision, based upon a Job Safety Analysis.

Where designated, protective eye and face devices shall meet the criteria specified in ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection". Eye protection lens material must be made of polycarbonate as a minimum. The manufacturer's emblem and a "+" must be on the lens to designate "High Impact" lens on all non-prescription safety glasses purchased after August, 2003 (prescription high impact lens will not have Z87 stamped on them). Prescription safety lenses must have the + next to the manufacturing lab's monogram. Prescription safety frames must meet the High Impact Standard and shall be marked "Z87-2" or "Z87+". REMOVABLE side-shields must be marked Z87.

Safety Glasses are not required in offices, control rooms, designated warehouse areas, auxiliary building tool room, locker rooms, HP work area and instrument issue room.

Dark glasses shall not be worn inside buildings unless medically prescribed.

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without safety glasses provided no eye injury hazards exist within the travel path.

The job supervisor and employee(s) must determine the need for eye protection based upon the risk of eye injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

1910.135 HEAD PROTECTION

Those areas requiring the use of hard hats are designated on the HNP Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Hard Hat Required", as determined by supervision, based upon specific job hazard evaluations.

Where designated, protective helmets shall meet the criteria specified in ANSI Z89.1-1986, "American National Standard for Personal Protection-Protective Headwear for Industrial Workers-Requirements".

The job supervisor and employee(s) must determine the need for head protection based upon the risk of head injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without hard hat provided no head injury hazards exist within the travel path. Individuals may also travel from the Waste Processing Building 261' dress-out area to the PAL door or directly to the Spent Fuel Pool FME Area with a hard hat.

Per manufacturers' recommendation, hard hat liners should be replaced annually and the entire hardhat hat replaced not greater than 5 years from the date it was placed into service. Individuals are responsible for maintaining the 1 (one) and 5 (five) year periods.

HNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

Areas Exempt from General Hard Hat Requirements **(when overhead lifting or any other head injury hazards exist, head protection must be worn)**:

- Shop areas and yards (except when required by task)
- Offices
- Locker Rooms
- Bath and Shower Rooms
- Crane, forklift or other vehicles with overhead protection
- Radwaste Control Room Complex
- A&B EDG Control Panel Rooms
- Battery Rooms
- Switchgear Rooms
- Designated Warehouse Areas (except when required by task)
- Tool Rooms
- HP Work Area
- Main Control Room Complex
- Stairwell from Main Control Room Complex to the Ops Building
- Auxiliary Control Panel Room
- Secondary Sample Station (TB 240' Elev.)
- Laboratories
- Spent Fuel Pool Area

1910.95 HEARING PROTECTION

Wear approved hearing protection in areas ≥85 dBA. These areas will be designated or posted:

"Caution Hearing Protection Required"

The entire Turbine Building is designated a "Hearing Protection Required" area during operation.

Due to varying plant conditions, there may be times when hearing protection will be required in areas not posted as "Hearing Protection Required".

Due to very high noise levels, some plant areas will require two (2) sets of hearing protection. This will consist of one set of earplugs AND earmuffs. These areas will be designated by signs stating:

"Caution – Double Hearing Protection Required"

HNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

1910.136 FOOT PROTECTION

Foot Protection *("hard toe safety shoes" or "foot guards")* is required when carrying or handling materials such as heavy packages, objects, parts or tools, which could be dropped onto the feet.

When used, protective footwear shall meet the criteria specified in ANSI Z41-1999, "American National Standard for Personal Protection - Protective Footwear".

The job supervisor and employee(s) must determine the need for foot protection based upon the risk of foot injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

The Site Occupational Health and Safety Specialist will work with supervision to determine individuals whose jobs require that they wear hard toe safety shoes. In accordance with the supervisor's guide to standard company attire, PROGRESS ENERGY will pay for hard toe safety shoes that are required for PROGRESS ENERGY employees whose work activities require that they wear them.

Foot guards, available from the tool rooms, can provide metatarsal protection. This equipment shall be worn when operating air or electric paving breakers, tamps, jackhammers, hydrolazers, etc. (See "Footwear Protection" Matrix in Attachment 6)

Employees requiring special shoes due to a medical condition shall provide their supervisor a note from their physician prior to wearing the footwear on site.

1910.138 HAND PROTECTION

Hand Protection (gloves) is required to prevent cuts, abrasions, burns, and skin contact with hazardous chemicals.

The job supervisor and employee(s) must determine the need for hand protection based upon the risk of hand injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

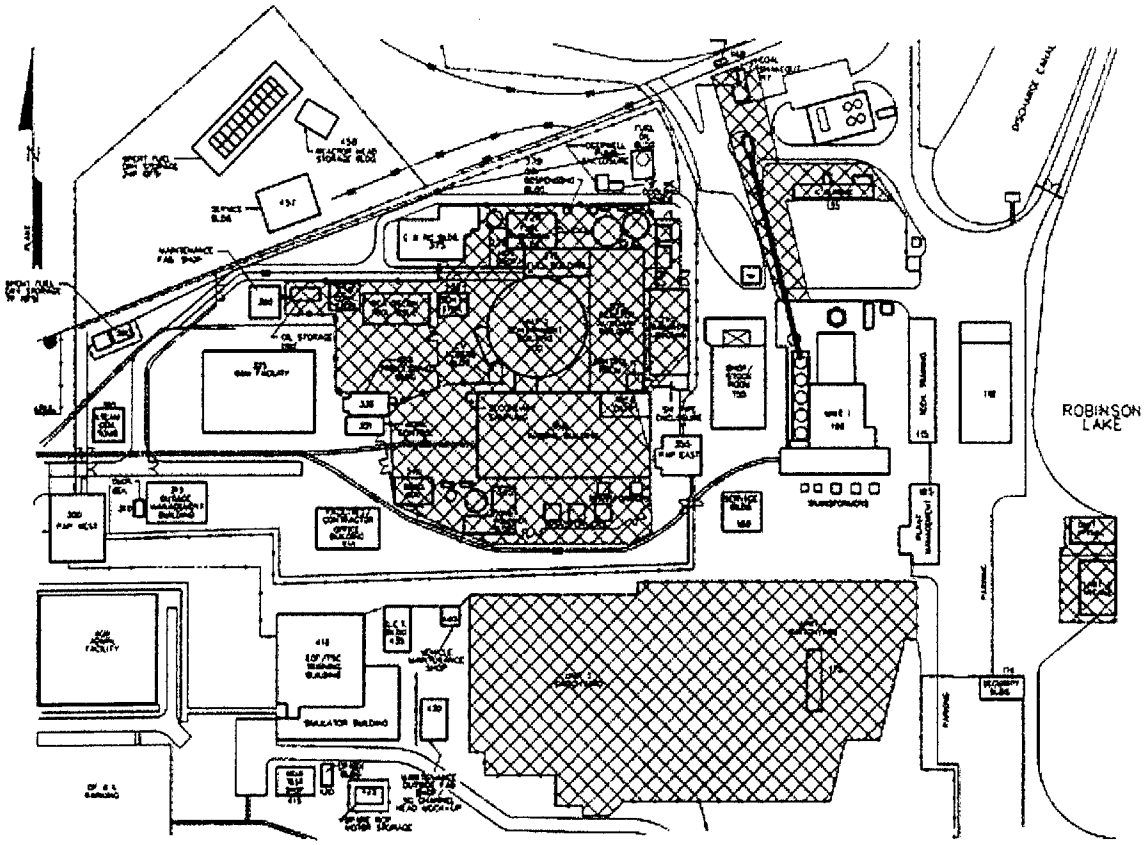
The type of gloves selected for a particular task shall be based on the degree of protection necessary for the specific hazard and for the level of risk to the worker's hands.

Appropriate hand protection must be worn when employees' hands are exposed to hazards that could cause burns, cuts, abrasions, splinters, electrical shock, chemicals, or blood borne pathogen exposures. For hands-on-work in industrial work areas, gloves shall always be used, unless there is a valid reason not to wear them.

Finger rings, loose chains, metal wrist bands, body jewelry or key rings shall not be worn while working around moving machinery or when performing any other hands-on activity where these articles may present a hazard. Additional requirements, as addressed in SAF-NGGC-2175 Electrical Safety, apply for working on, or near energized electrical components.

ATTACHMENT 3
Sheet 1 of 5

RNP Personal Protective Equipment Designated Area Diagram and Site Hazard Assessment
29 CFR 1910 Subpart I
Certification of Hazard Assessment - 7 September 2006



Crosshatched areas indicate PPE –Required Areas (hard hat and safety glasses at a minimum).

RNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

This hazard assessment covers typical work situations in various areas of the Robinson Nuclear Plant. The Site PPE Designated Area Diagram on page 1 of this Attachment designates areas where hard hats and safety glasses shall normally be worn regardless of work taking place (shaded areas).

NOTE: For ease of recognition, there is a "Green Line" painted around the power block which indicates the general "hard hat and safety glasses required area".

Tasks shall be evaluated by supervision and specific personal protective equipment (PPE) identified and used in accordance with that evaluation and this assessment. The Job Safety Analysis (JSA) Process (see section 9.29 of this procedure) can be used as a tool in determining PPE requirements. Some types of PPE are addressed in other program documents such as procedures and guidance documents. Non-routine tasks that are not addressed in this hazard assessment must be evaluated on a case-by-case basis and appropriate PPE identified and used. The site Occupational Health and Safety Specialist is available to provide assistance in performing these evaluations.

Supervision can, on a case-by-case basis, adjust the requirements for PPE for a defined task after personnel hazards have been clearly determined. Waivers to PPE requirements may be granted on a case-by-case basis by the job supervisor provided that there are no hazards in the work area requiring such PPE or it is deemed that a higher risk of injury or illness exists by using that PPE. The PPE waiver shall be documented on Attachment 8 of this procedure or on FRM-SUBS-01086, PPE Waiver (link to this form is found in SAF-SUBS-00025 Personal Protective Equipment).

MINIMUM PPE REQUIREMENTS

IF industrial-type work is to take place in areas not addressed on the Site PPE Designated Area Diagram, THEN minimum PPE requirements include, but are not limited to, safety glasses, appropriate work shoes, and appropriate gloves for the task.

Some areas that are shown on the map in this attachment as areas typically not requiring PPE usage may be designated by supervision to require certain PPE as based upon tasks and subsequent hazards introduced due to those tasks. These areas shall be controlled in order to protect employees dedicated to the task as well as those in close proximity. Controls shall be established through methods such as guarding, barricading and posting, or other equivalent means.

SAFE WALK PATH

"Safe Walk Path" is defined as that designated travel path which, after hazard evaluation, has been deemed safe for traversing to and from certain areas without the use of PPE.

The accepted "designated safe walk path" is that pathway **outside** the "Green Line" to the south of the TB between the TB and the Switchyard and then to the east of the TB between the TB and PAP East to the TB elevator or NE stairwell. This "designated safe walk path" allows workers to travel to and from the control room without wearing hard hat and safety glasses provided there is no industrial work taking place in or near the path.

Personnel will follow the "designated safe walk path" as established by management. This path may be altered by supervision and posted for PPE use accordingly, to ensure personnel safety during times of ensuing work at close proximity to pathway.

NOTE: Employee training on proper use of Personal Protective Equipment is provided in General Employee Training (GET), General Employee Retraining (GER) and in Continuing Training (CT). Training for contract personnel should be provided by the contractor.

RNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

1910.133 EYE AND FACE PROTECTION

Those areas requiring the use of safety glasses with side shields are designated on the RNP Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Safety Glasses Required", as determined by supervision, based upon a Job Safety Analysis.

Where designated, protective eye and face devices shall meet the criteria specified in ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection". Eye protection lens material must be made of polycarbonate as a minimum. The manufacturer's emblem and a "+" must be on the lens to designate "High Impact" lens on all non-prescription safety glasses purchased after August, 2003 (prescription high impact lens will not have Z87 stamped on them). Prescription safety lenses must have the + next to the manufacturing lab's monogram. Prescription safety frames must meet the High Impact Standard and shall be marked "Z87-2" or "Z87+". REMOVABLE side-shields must be marked Z87.

Safety Glasses are not required in offices, control rooms, designated warehouse areas, auxiliary building tool room, locker rooms, HP work area, instrument calibration/respirator decon room, and the calibrated instrument issue room.

Dark glasses shall not be worn inside buildings unless medically prescribed.

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without safety glasses provided no eye injury hazards exist within the travel path.

The job supervisor and employee(s) must determine the need for eye protection based upon the risk of eye injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

1910.135 HEAD PROTECTION

Those areas requiring the use of hard hats are designated on the RNP Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Hard Hat Required", as determined by supervision, based upon specific job hazard evaluations.

Where designated, protective helmets shall meet the criteria specified in ANSI Z89.1-1986, "American National Standard for Personal Protection-Protective Headwear for Industrial Workers-Requirements".

The job supervisor and employee(s) must determine the need for head protection based upon the risk of head injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

During refueling outages, individuals may normally travel between the RCA Entrance dress-out area and the entrance to the CV without wearing a hard hat. Hard hats will be provided at the SOP for donning prior to entering the CV. Hard hat requirement for this area may be changed based on adjacent work.

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without hard hat provided no head injury hazards exist within the travel path.

Per manufacturers' recommendation, hard hat liners should be replaced annually and the entire hardhat hat replaced not greater than 5 years from the date it was placed into service. Individuals are responsible for maintaining the 1 (one) and 5 (five) year periods.

RNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

Areas Exempt from General Hard Hat Requirements **(when overhead lifting or any other head injury hazards exist, head protection must be worn)**:

- Offices
- Shop Areas and Yards Areas (except when required by task)
- O&M and Auxiliary Building Tool Rooms
- From Dress-out area to CV entrance (during refueling outages)
- Instrument Calibration Facility
- Bath and Shower Rooms
- Crane, forklift or other vehicles with overhead protection
- Safeguards Room
- 4160 Switchgear Room
- A/B Battery Room
- Spent Fuel Pool Area
- Tool Decon Area in the Radwaste Building
- Hagan Room
- Control Rooms
- Designated Warehouse Areas (except when required by task)
- Laboratories
- HP Work Area (except when required by task)
- Respirator Decon Facility
- Cable Spread Room
- Spent Fuel Building Roof (when roof is open)
- E1/E2 Room
- Control Rod Drive Room
- C Battery Room
- Sorting Area in the Radwaste Building
- WWDS Room
- Locker Rooms

1910.95 HEARING PROTECTION

Wear approved hearing protection in areas ≥85 dBA. These areas will be designated or posted:

"Caution Hearing Protection Required"

The entire Turbine Building is designated a "Hearing Protection Required" area during operation.

Due to varying plant conditions, there may be times when hearing protection will be required in areas not posted as "Hearing Protection Required".

Due to very high noise levels, some plant areas will require two (2) sets of hearing protection. This will consist of one set of earplugs AND earmuffs. These areas will be designated by signs stating:

"Caution – Double Hearing Protection Required"

RNP Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

1910.136 FOOT PROTECTION

Foot Protection *("hard toe safety shoes" or "foot guards")* is required when carrying or handling materials such as heavy packages, objects, parts or tools, which could be dropped onto the feet.

When used, protective footwear shall meet the criteria specified in ANSI Z41-1999, "American National Standard for Personal Protection - Protective Footwear".

The job supervisor and employee(s) must determine the need for foot protection based upon the risk of foot injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

The Site Occupational Health and Safety Specialist will work with supervision to determine individuals whose jobs require that they wear hard toe safety shoes. In accordance with the supervisor's guide to standard company attire, PROGRESS ENERGY will pay for hard toe safety shoes that are required for PROGRESS ENERGY employees whose work activities require that they wear them.

Foot guards, available from the tool rooms, can provide metatarsal protection. This equipment shall be worn when operating air or electric paving breakers, tamps, jackhammers, hydrolazers, etc. (See "Foot Protection" Matrix in Attachment 6)

Employees requiring special shoes due to a medical condition shall provide their supervisor a note from their physician prior to wearing the footwear on site.

1910.138 HAND PROTECTION

Hand Protection (gloves) is required to prevent cuts, abrasions, burns, and skin contact with hazardous chemicals.

The job supervisor and employee(s) must determine the need for hand protection based upon the risk of hand injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

The type of gloves selected for a particular task shall be based on the degree of protection necessary for the specific hazard and for the level of risk to the worker's hands.

Appropriate hand protection must be worn when employees' hands are exposed to hazards that could cause burns, cuts, abrasions, splinters, electrical shock, chemicals, or blood borne pathogen exposures. For hands-on-work in industrial work areas, gloves shall always be used, unless there is a valid reason not to wear them.

Finger rings, loose chains, metal wrist bands, body jewelry or key rings shall not be worn while working around moving machinery or when performing any other hands-on activity where these articles may present a hazard. Additional requirements, as addressed in SAF-NGGC-2175 Electrical Safety, apply for working on, or near energized electrical components.

ATTACHMENT 4
Sheet 1 of 2

HE&EC Personal Protective Equipment and Hazard Assessment
29 CFR 1910 Subpart 1
Certification of Hazard Assessment for E&EC - 7 Sept 2006

This hazard assessment covers typical work situations in various areas of the Energy and Environmental Center (E&EC). Tasks shall be evaluated by supervision and specific personal protective equipment (PPE) identified and used in accordance with this assessment. Non-routine tasks addressed in this hazard assessment must be evaluated on a case-by-case basis and appropriate PPE identified and used.

29 CFR 1910.133 EYE AND FACE PROTECTION:

Where designated, protective eye and face devices shall meet the criteria specified in ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection". Eye protection lens material must be made of polycarbonate as a minimum. The manufacturer's emblem and a "+" must be on the lens to designate "High Impact" lens on all non-prescription safety glasses purchased after August, 2003 (prescription high impact lens will not have Z87 stamped on them). Prescription safety lenses must have the + next to the manufacturing lab's monogram. Prescription safety frames must meet the High Impact Standard and shall be marked "Z87-2" or "Z87+". REMOVABLE side-shields must be marked Z87.

Dark glasses shall not be worn inside buildings unless medically prescribed.

The job supervisor and employee(s) must determine the need for eye protection based upon the risk of eye injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

29CFR 1910.135 HEAD PROTECTION

Where designated, protective helmets shall meet the criteria specified in ANSI Z89.1-1986, "American National Standard for Personal Protection-Protective Headwear for Industrial Workers-Requirements".

The job supervisor and employee(s) must determine the need for head protection based upon the risk of head injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

Per manufacturers' recommendation, hard hat liners should be replaced annually and the entire hardhat hat replaced not greater than 5 years from the date it was placed into service. Individuals are responsible for maintaining the 1 (one) and 5 (five) year periods.

1910.95 HEARING PROTECTION

Wear approved hearing protection in areas $\geq$85 dBA. These areas will be designated or posted:

"Caution Hearing Protection Required"

Due to varying conditions, there may be times when hearing protection will be required in areas not posted as "Hearing Protection Required".

Due to very high noise levels, some areas will require two (2) sets of hearing protection. This will consist of one set of earplugs AND earmuffs. These areas will be designated by signs stating:

"Caution – Double Hearing Protection Required"

HE&EC Personal Protective Equipment and Hazard Assessment
29 CFR 1910 Subpart 1

1910.136 FOOT PROTECTION

Foot protection (hard toe safety shoes) shall be worn when carrying or handling materials such as heavy packages, parts or tools, which could be dropped onto the feet.

When used, protective footwear shall meet the criteria specified in ANSI Z41-1999, "American National Standard for Personal Protection - Protective Footwear."

A pre-job brief should be performed to determine the need for foot protection based upon the risk of foot injuries from the items listed in Attachment 6.

E&EC supervision, along with the Occupational Health and Safety Specialist will work with management to determine those individuals whose jobs may require that they wear hard toe safety shoes. In accordance with the supervisor's guide to standard company attire, supervision and management will determine, on a case by case basis, whether PROGRESS ENERGY will pay for safety shoes that are required based upon the job duties of each employee.

29 CFR 1910.138 HAND PROTECTION

Hand Protection (gloves) is required to prevent cuts, abrasions, burns, and skin contact with hazardous chemicals.

The job supervisor and employee(s) must determine the need for hand protection based upon the risk of hand injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

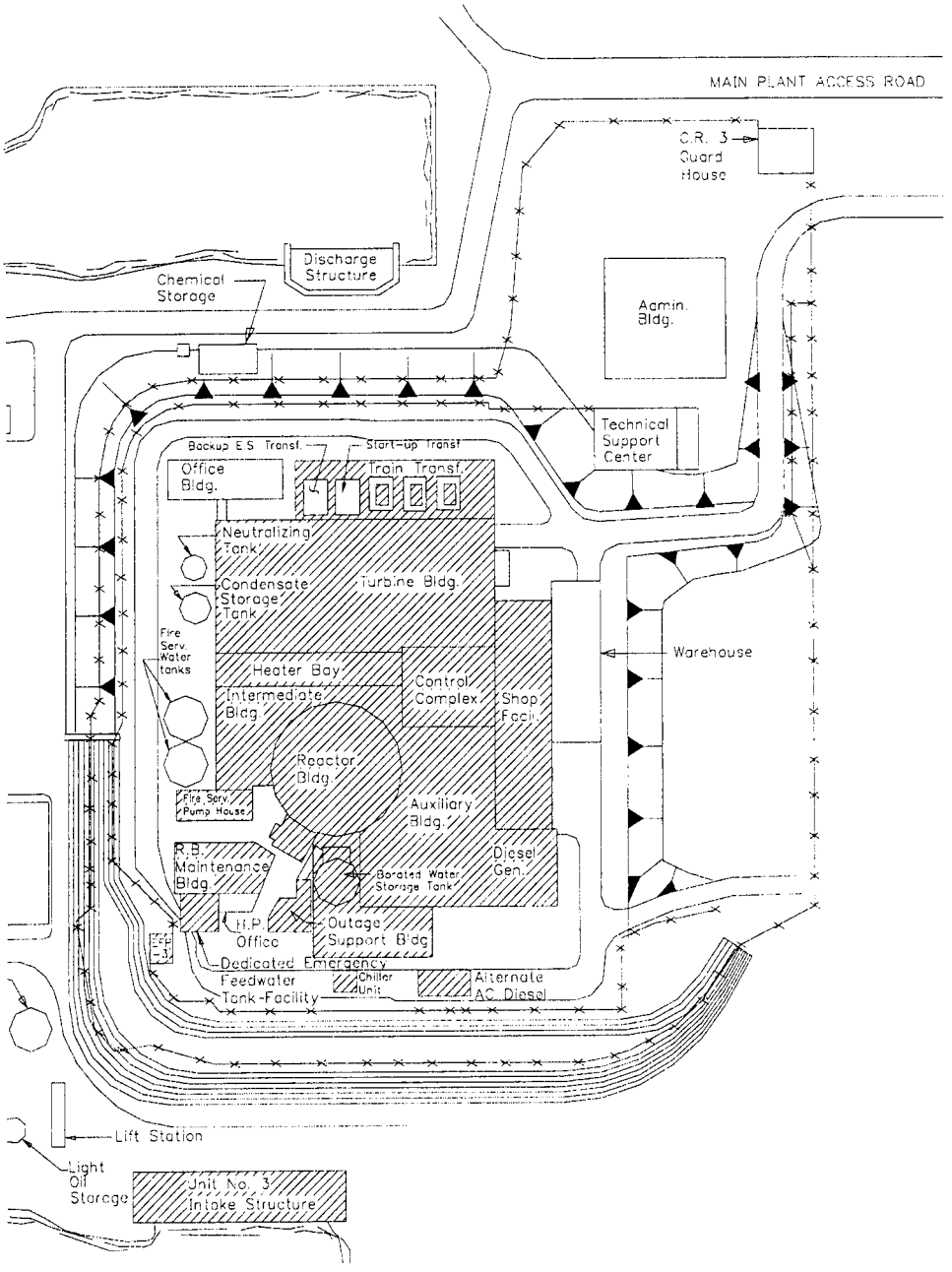
The type of gloves selected for a particular task shall be based on the degree of protection necessary for the specific hazard and for the level of risk to the worker's hands.

Appropriate hand protection must be worn when employees' hands are exposed to hazards that could cause burns, cuts, abrasions, splinters, electrical shock, chemicals, or blood borne pathogen exposures. For hands-on-work in industrial work areas, gloves shall always be used, unless there is a valid reason not to wear them.

Finger rings, loose chains, metal wrist bands, body jewelry or key rings shall not be worn while working around moving machinery or when performing any other hands-on activity where these articles may present a hazard. Additional requirements, as addressed in SAF-NGGC-2175 Electrical Safety, apply for working on, or near energized electrical components.

ATTACHMENT 5
Sheet 1 of 5

CR3 Personal Protective Equipment Designated Area Diagram
29 CFR 1910 Subpart I
Certification of Hazard Assessment - 7 September 2006



CR3 Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

This hazard assessment covers typical work situations in various areas of the CR3 Nuclear Plant. The Site PPE Designated Area Diagram on page 1 of this Attachment designates areas where hard hats and safety glasses shall normally be worn regardless of work taking place (shaded areas).

Tasks shall be evaluated by supervision and specific personal protective equipment (PPE) identified and used in accordance with that evaluation and this assessment. The Job Safety Analysis (JSA) Process (see section 9.29 of this procedure) can be used as a tool in determining PPE requirements. Some types of PPE are addressed in other program documents such as procedures and guidance documents. Non-routine tasks that are not addressed in this hazard assessment must be evaluated on a case-by-case basis and appropriate PPE identified and used. The site Occupational Health and Safety Specialist is available to provide assistance in performing these evaluations.

Supervision can, on a case-by-case basis, adjust the requirements for PPE for a defined task after personnel hazards have been clearly determined. Waivers to PPE requirements may be granted on a case-by-case basis by the job supervisor provided that there are no hazards in the work area requiring such PPE or it is deemed that a higher risk of injury or illness exists by using that PPE. The PPE waiver shall be documented on Attachment 8 of this procedure or on FRM-SUBS-01086, PPE Waiver (link to this form is found in SAF-SUBS-00025 Personal Protective Equipment).

MINIMUM PPE REQUIREMENTS

IF, industrial-type work is to take place in areas not addressed on the Site PPE Designated Area Diagram, THEN minimum PPE requirements include, but are not limited to, safety glasses, appropriate work shoes, and appropriate gloves for the task.

Some areas that are shown on the map in this attachment as areas typically not requiring PPE usage may be designated by supervision to require certain PPE as based upon tasks and subsequent hazards introduced due to those tasks. These areas shall be controlled in order to protect employees dedicated to the task as well as those in close proximity. Controls shall be established through methods such as guarding, barricading and posting, or other equivalent means.

SAFE WALK PATH

"Safe Walk Path" is defined as that designated travel path which, after hazard evaluation, has been deemed safe for traversing to and from certain areas without PPE.

The accepted designated "Safe Walk Path" is that pathway, demarcated by a Green Line from the 119' Turbine Building roll up door to/from the elevator access 124' landing and to/from the Cold Machine shop and/or East stairwell leading to the 95' TB and access to the 95' Control Complex. Personnel may use the Safe Walk Path for traversing without PPE.

To ensure personnel safety during times of ensuing work in or at close proximity to pathway, this path may be altered by supervision and posted for PPE use accordingly.

NOTE: Employee training on proper use of Personal Protective Equipment is provided in General Employee Training (GET), General Employee Retraining (GER) and in Continuing Training (CT). Training for contract personnel should be provided by the contractor.

CR3 Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

1910.133 EYE AND FACE PROTECTION

Those areas requiring the use of safety glasses with side protectors are designated on the CR3 Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Safety Glasses Required", as determined by first-line supervision, based upon specific job hazard evaluations.

Where designated, protective eye and face devices shall meet the criteria specified in ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection". Eye protection lens material must be made of polycarbonate as a minimum. The manufacturer's emblem and a "+" must be on the lens to designate "High Impact" lens on all non-prescription safety glasses purchased after August, 2003 (prescription high impact lens will not have Z87 stamped on them). Prescription safety lenses must have the + next to the manufacturing lab's monogram. Prescription safety frames must meet the High Impact Standard and shall be marked "Z87-2" or "Z87+". REMOVABLE side-shields must be marked Z87.

Dark glasses shall not be worn inside buildings unless medically prescribed.

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without safety glasses provided no eye injury hazards exist within the travel path.

The job supervisor and employee(s) must determine the need for eye protection based upon the risk of eye injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

1910.135 HEAD PROTECTION

Those areas requiring the use of hard hats are designated on the CR3 Personal Protective Equipment Designated Area Diagram located on sheet 1 of this attachment (shaded areas). Other areas may be designated "Hard Hat Required", as determined by supervision, based upon specific job hazard evaluations.

Where designated, protective helmets shall meet the criteria specified in ANSI Z89.1-1986, "American National Standard for Personal Protection-Protective Headwear for Industrial Workers-Requirements".

The job supervisor and employee(s) must determine the need for head protection based upon the risk of head injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

Persons working in full face respirators in contaminated areas may travel directly to and from dress-out areas and their work locations without hard hat provided no head injury hazards exist within the travel path.

Per manufacturers' recommendation, hard hat liners should be replaced annually and the entire hardhat hat replaced not greater than 5 years from the date it was placed into service. Individuals are responsible for maintaining the 1 (one) and 5 (five) year periods.

CR3 Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

Areas Exempt from General Hard Hat Requirements **(when overhead lifting or any other head injury hazards exist, head protection must be worn)**:

• Offices	• Laboratories
• Control Rooms	• Control Rod Drive Room
• Shop Areas and Berm (except when required by task)	• Crane, forklift or other vehicles with overhead protection
• Locker Rooms	• 95' Control Complex
• Bath and Shower Rooms	• Cable Spread Room (bump cap instead)
• Switchgear Rooms	• A/B/C Battery Rooms
• Around the Spent Fuel Pool when open	• RB 160' and 180' adjacent to, or over refuel pool/incore pit
• Instrument Calibration Facility	• Hot & Cold Tool Rooms
• Maintenance Support Building	• Outage Support Building
• Chemistry Count Rooms	• MTF (unless posted)
• Designated Warehouse areas (except when required by task)	

1910.95 HEARING PROTECTION

Wear approved hearing protection in areas ≥85 dBA. These areas will be designated or posted:

"Caution Hearing Protection Required"

The entire Turbine Building is designated a "Hearing Protection Required" area during modes 1-4.

Due to varying plant conditions, there may be times when hearing protection will be required in areas not posted as "Hearing Protection Required".

Due to very high noise levels, some plant areas will require two (2) sets of hearing protection. This will consist of one set of earplugs AND earmuffs. These areas will be designated by signs stating:

"Double Hearing Protection Required Except for Walkthroughs"

Nonstop pass through of "DOUBLE HEARING PROTECTION REQUIRED" areas without the second level of hearing protection is allowed.

In non-posted areas, notify Health Physics to determine if work activity noise level is sufficient (> 85db) for the use of hearing protection. In areas posted "DANGER – High Noise Area", contact HP for additional requirements.

CR3 Personal Protective Equipment Site Hazard Assessment
29 CFR 1910 Subpart I

1910.136 FOOT PROTECTION

Foot Protection *("hard toe safety shoes" or "foot guards")* is required when carrying or handling materials such as heavy packages, objects, parts or tools, which could be dropped onto the feet.

When used, protective footwear shall meet the criteria specified in ANSI Z41-1999, "American National Standard for Personal Protection - Protective Footwear".

The job supervisor and employee(s) must determine the need for foot protection based upon the risk of foot injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

The Site Occupational Health and Safety Specialist will work with supervision to determine individuals whose jobs require that they wear hard toe safety shoes. In accordance with the supervisor's guide to standard company attire, PROGRESS ENERGY will pay for hard toe safety shoes that are required for PROGRESS ENERGY employees whose work activities require that they wear them.

Foot guards, available from the tool rooms, can provide metatarsal protection. This equipment shall be worn when operating air or electric paving breakers, tamps, jackhammers, hydrolazers, etc. (See "Foot Protection" Matrix in Attachment 6)

Employees requiring special shoes due to a medical condition shall provide their supervisor a note from their physician prior to wearing the footwear on site.

1910.138 HAND PROTECTION

See Site Specific Procedure AI-100 for additional requirements under the Hand Protection (Use of Gloves) policy.

Hand Protection *(gloves)* is required to prevent cuts, abrasions, burns, and skin contact with hazardous chemicals.

The job supervisor and employee(s) to determine the need for eye protection based upon the risk of hand injuries from those items listed in the NGG Hazard Assessment PPE Matrix (Attachment 6).

The type of gloves selected for a particular task shall be based on the degree of protection necessary for the specific hazard and for the level of risk to the worker's hands.

Appropriate hand protection must be worn when employees' hands are exposed to hazards that could cause burns, cuts, abrasions, splinters, electrical shock, chemicals, or blood borne pathogens exposures. For hands-on-work in industrial work areas, gloves shall always be used, unless there is a valid reason not to wear them.

Finger rings, loose chains, metal wrist bands, body jewelry or key rings shall not be worn while working around moving machinery or when performing any other hands-on activity where these articles may present a hazard. Additional requirements, as addressed in SAF-NGGC-2175 Electrical Safety, apply for working on, or near energized electrical components.

ATTACHMENT 6
Sheet 1 of 2

NGG Hazard Assessment PPE Matrix
29 CFR 1910 Subpart I
Certification of Hazard Assessment - 7 September 2006

1910.133 EYE AND FACE PROTECTION

Tasks requiring eye and face protection have been identified in the matrix below.

WORKPLACE HAZARD	SOURCES OF HAZARD	PPE REQUIRED
Flying particles, pressurized liquid and air, and steam	Grinding, sanding, chipping, descaling, hammering, chiseling, drilling, etc.; *escaping compressed air steam, or* hydraulic fluids under pressure.	Safety glasses with side shields or goggles. *high risk exposures in this category, include face shield with hardhat.)*
Particles	Open sand blasting	Sandblasting hood
Molten metal	Hot sparks during an arcing flash; welding, cutting or other operation resulting in hot sparks.*(For welding, cutting, and brazing see light radiation below.)*	Safety glasses with side shields or goggles *and face shield with hardhat.*
Liquid chemicals	Water treatment chemicals, cleaning solvents, laboratory chemicals, liquid nitrogen	Safety glasses w/ side shields or goggles. *(For severe exposures in this category, include a face shield.)*
Acid or caustic liquids	Water treatment chemicals, battery acid, laboratory chemicals.	Safety glasses w/ side shields or goggles. *(For severe exposure include face shield).*
Chemical gases or vapors	Laboratory chemicals and their by-products, also, per chemical labels, IE Xylene from paint vapors, etc.	Per MSDS, e.g., air tight goggles or full face shield depending on exposure levels. For low exposure levels, safety glasses with side shields are allowed.
Solid chemicals	Caustics, laboratory chemicals, pesticides/herbicides	Safety glasses w/ side-shields or goggles. (Chemical resistant face-shield if splash hazard exists when adding to a liquid)
Light radiation (welding)	Electric arc or gas welding, arc gouging, etc.	Welding hood w/ dark lens and safety glasses. (For specific guidance refer to SAF-SUBS-00031.)
Light radiation (oxy/acetylene cutting)	Gas torch cutting or brazing	Welding hood with dark lens (and safety glasses) or goggles with dark lenses. (For specific guidance refer to SAF-SUBS-00031 Welding/Hot Work Safety.)
Light radiation (other)	Infrared, laser, x-ray diffraction, TEM, SEM, etc.)	See equip. manual or site Occupational & Safety Specialist for guidance.
Electrical contact	Exposed energized conductors	Refer to SAF-NGGC-2175

29 CFR 1910 Subpart I 29CFR 1910.135 HEAD PROTECTION

Instances when protective helmets are required have been identified in the matrix below.

WORKPLACE HAZARD	SOURCES OF HAZARD	PPE REQUIRED
Falling objects	Tools and materials used overhead.	Hard hat
Bumping Hazards	Plant structures, equipment, etc.	Hard hat
Electrical contact	Exposed Energized conductors.	Refer to SAF-NGGC-2175

ATTACHMENT 6
Sheet 2 of 2
NGG Hazard Assessment PPE Matrix

1910.136 FOOT PROTECTION
Instances when protective footwear is required have been identified in the matrix below.

WORKPLACE HAZARD	SOURCES OF HAZARD	PPE REQUIRED
Falling or rolling objects	Handling, moving or working with heavy tools and materials, barrels, spools of conductors or other materials.	Hard toe safety shoes
Vehicles	Working in close proximity to construction vehicles (backhoes, trenchers), forklifts and material lifting/handling equipment.	Hard toe safety shoes
Impact or compression machinery penetration/injection	Jack hammering, using air or electric paving breakers, tampers and hydrolazers/hydroblasters	Hard toe safety shoes with metatarsal protection
Objects piercing the sole of the foot	Nails, screws, wire, tacks or other sharp objects on the walking surface.	Hard toe safety shoes with protection afforded to the sole of the foot.
Electrical Contact	Exposed energized conductors	Full leather shoe

29 CFR 1910.138 HAND PROTECTION
Instances when hand protection is required have been identified in the matrix below.

WORKPLACE HAZARD	SOURCES OF HAZARD	PPE REQUIRED
Skin absorption or chemical contact dermatitis	Water treatment chemicals (hydrazine, ammonium hydroxide, ethylene glycol), pesticides, coatings, lab chemicals, solvents, oils, greases, caustics, alcohols, and asbestos.	Per MSDS or Site Occupational Health & Safety Specialist
Chemical burns	Water treatment chemicals, acids, caustics.	Per MSDS or Site Occupational Health & Safety Specialist
Cuts & lacerations	Grinding, using knives, shears or power cutter, working with sharp wire, sheet metal work	Leather or other appropriate work gloves. Special hand protection may be required when handling razor wire.
Abrasions	Grinding, belt sanding	Leather or other appropriate work gloves.
Abrasions	Open sand blasting	Sand blasting gloves.
Punctures	Using knives or exposing hands to sharp wire ends.	Leather or other appropriate work gloves.
Pinch Points	Rigging and lifting, heavy equipment, etc.	Leather or other appropriate work gloves.
Thermal burns	Hand contact with uninsulated portions of the steam supply system, steam leaks, mufflers on internal combustion engines.	Leather or other appropriate work gloves.
Temperature extremes	Liquid nitrogen, steam, cutting, ovens, furnaces and heating elements	Insulated gloves.
Electrical contact	Exposed energized conductors	Refer to SAF-NGGC-2175

ATTACHMENT 7
Sheet 1 of 1
Pneumatic Tool Safety Device Exemption

1) Specifically Identify Tool: _____

Verified By: _____ Date: _____

2) The proper operating condition of the tool has been verified.

Verified By: _____ Date: _____

3) The proper air hose size has been verified.

Verified By: _____ Date: _____

4) The proper safety device size and operational condition has been verified.

Verified By: _____ Date: _____

5) No other usable tool is available on site.

Verified By: _____ Date: _____

6) Exemption Granted.

Supervisor: _____ Date: _____

NOTES: _____

_____

_____

_____

ATTACHMENT 8

Sheet 1 of 1
Personal Protective Equipment Waiver Form

Please maintain a copy of this attachment at the job site for the duration of the work taking place under this waiver.

Effective
Date(s):_____

Job Description:_____

Supervisor (print):_____

☐ **Hard Hat**

In accordance with the site hazard assessment, the work governed by this waiver is taking place where there is not risk of injury from falling objects or exposed electrical conductors.

☐ **Safety Glasses**

In accordance with the site hazard assessment, the work governed by this waiver is taking place where there is not risk of eye injury from flying particles, metal, chemicals, acids or caustics, or light radiation.

☐ **Other (specify):** _____

In accordance with the site hazard assessment, the work governed by this waiver is taking place where there is not risk of injury from (specify hazard)_____

_____

_____

Therefore the use of _____is waived.

☐ **Compensatory Measures/Comments**

_____

_____

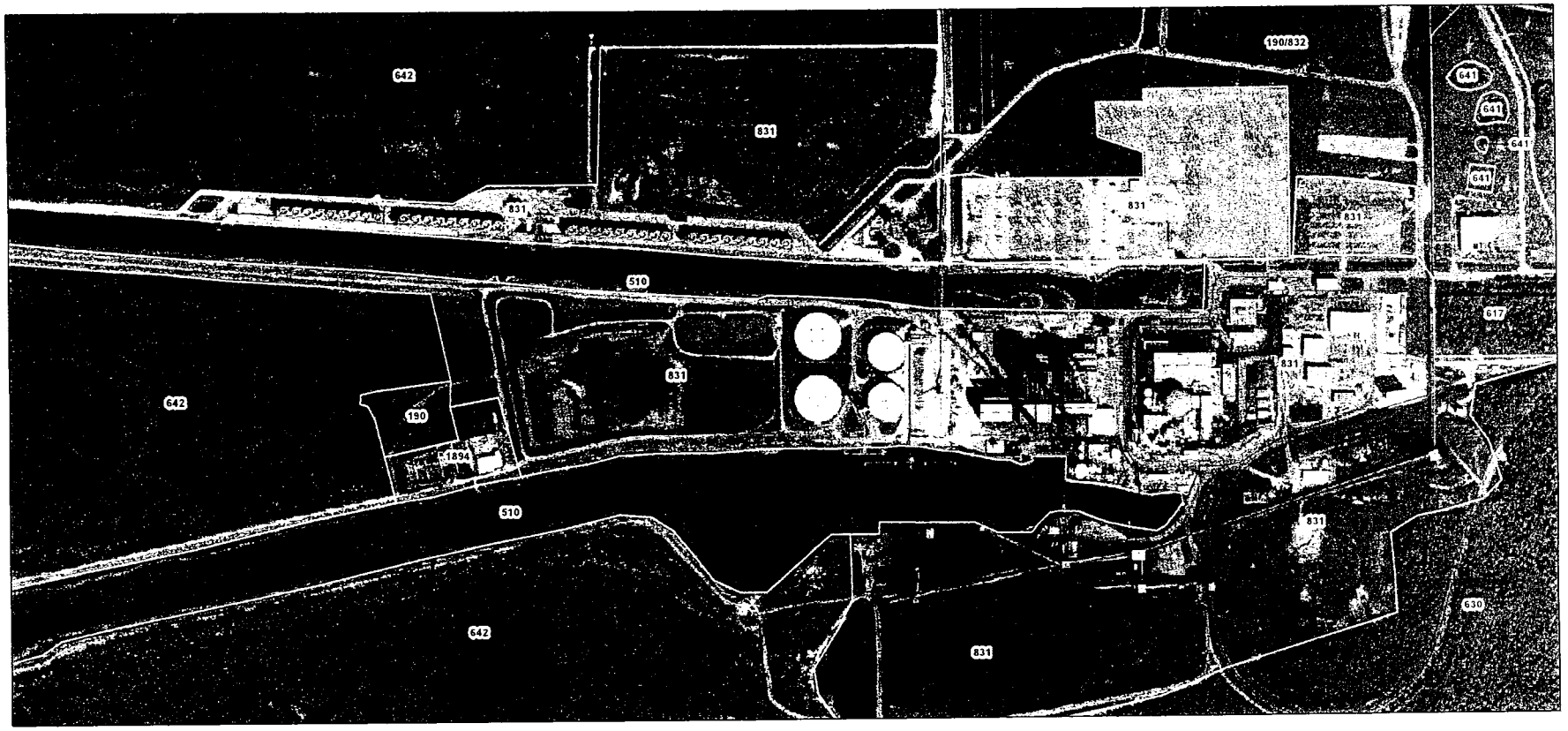
Approved by (supervisor's signature):_____

Revision Summary	
Section	**Description of Change**
2.61	Added reference
2.62	Added reference
3.8	Added MSDS
4.2	Added "and the requirements contained within this procedure."
4.3	Added "and for following the requirements contained within this procedure."
9.1.1	Added "this procedure as well as
9.3.1	Changed "may" to "must" and added "or other similar means."
9.3.2	Changed working for clarification
9.3.4	Deleted "Pre-job briefings at the HE&RC need only be conducted when special WORK hazards exist."
9.3.5	Replaced "tape" with "ribbon".
9.3.6	Changed "should" to "shall."
9.4.6	Added "or liners designed to be worn under hard hats for cold weather protection."
9.3.10	Added "Use MSDS for use of hazardous chemicals."
9.3.15	Added "and manufacturers' recommendations'
9.3.16	Deleted section
9.4.1	Changed "should" to "shall" and "shall be utilized in accordance with the appropriate MSDS."
9.4.4	Changed "unfeasible" to impossible".
9.4.7	Safety glasses shall be worn under welding hoods.
9.4.9	Added "9.4.9 Flame retardant PCs shall be worn while stick welding, arc-gouging and cutting activities involving oxygen/acetylene. Flame retardant PCs should be considered by supervisors when performing other types of hot work."
9.4.10	Changed "should" to "shall".
9.4.12	Added "and adequate protection is provided."
9.4.18	Changed "safety representative" to "Occupational Health and Safety Specialist"
9.5.3	Added "by elevated sound levels."
9.5.4	Changed "are expected to" to "shall"
9.5.6	Deleted section
9.7.1	Deleted "or site procedures"
9.8.2	Changed "however, may be, and may" to If, is, must".
9.8.3	Added "that needs to be removed" and "only".
9.12.7	Changed "if any electrical arc is observed" to "with the potential for an arc or in an electrical arc is observed" and Added "(e.g., around isophase bus duct)
9.12.5	Added "Avoid "daisy-chaining" multi-strip power devices or using these devices in conjunction with an extension cord.
9.14.1	Replaced "should" with "shall"
9.14.3	Replaced "should" with "shall"
9.14.4	Replaced "should" with "shall"
9.14.5	Replaced "should" with "shall"
9.14.6	Replaced "should" with "shall"

Revision Summary	
Section	**Description of Change**
9.14.8	Replaced "should" with "shall"
9.14.9	Replaced "should" with "shall"
9.14.11	Added "or be appropriately protected "
9.14.15	Replaced "should" with "shall"
9.17.1	Added SAF-ESGX-00002 Energy Supply Fall Protection Procedure
9.17.2	Added "All fall protection users must be properly trained and qualified as directed in SAF-ESGX-00002 Energy Supply Fall Protection Procedure."
9.17.4	Added "other approved attachment device"
9.17.9	Change wording from "such as piping with 3" diameter or greater, structural angles greater than or equal to 4X4 or shall comply with site requirements" to "as indicated in SAF-ESGX-00002 Energy Supply Fall Protection Procedure." Deleted "Unacceptable anchorages: Instrument lines, electrical conduit, PVC piping, and fire suppression piping."
9.18.2	Added "At a minimum, the following items should be included in the inspection: • Missing or damaged components (e.g., cracked side rails, bent or damaged rungs, missing non-slip material on feet of ladder, loose or missing rivets, screws, or bolts, etc.) • All fasteners are secure • All moving parts are in good working order • Side rails and rungs are free from dirt, oil or other foreign material And "or other suitable verbiage."
9.20.1	Added "and the site Occupational Health and Safety Specialist. Individuals working at an NGG site who do not report to the site must report all injuries occurring at the site to their CBO supervisor or site contact (so that For-Cause FFD testing requirement can be evaluated) and to the site Occupational Health and Safety Specialist as soon as possible."
9.20.3	Changed "the appropriate site emergency number" to "X5555"
9.21.2	Added "or other chemicals which are hazardous to the eyes,"
9.21.3	Added "Drench hoses meeting the requirements of ANSI Z358.1-2004 Emergency Eyewash and Shower Equipment may be used in lieu of a portable eyewash station and/or emergency shower/eyewash station."
9.22.1	Replaced "should" with "shall"
9.22.6	Added "Avoid "daisy-chaining" multi-strip power devices or using these devices in conjunction with an extension cord.
9.24.3	Added "Bodies of water which may be too small or otherwise inappropriate for accommodation of a skiff should be evaluated for alternatives."
9.26.2	Changed "should" to "shall".
9.26.3	Changed "should" to "shall".
9.26.7	Added "and other traffic regulation signs"
9.27.1	Reworded "At any excavation site there shall be"
9.29.1	Added "at a minimum,"
Attachments 1,2,3,4,& 5.	Reworded for consistency and clarity.
Attachment 2, page 1	Replaced HNP site map

Revision Summary	
Section	**Description of Change**
Attachment 3, page 1	Replaced RNP site map
Attachment 5, page 1	Replaced CR3 site map
11	Added Attachment 11.8 Personal Protective Equipment Waiver Form
Numerous	Replaced "Safety Representative" with "Occupational Health and Safety Specialist"
2.60	Added reference to 2.60 SAF-ESGX-00002 Energy Supply Fall Protection Procedure

Site Land Use Classification Map



LEGEND

Crystal River Nuclear Unit 3 Site Location

FLUCFCS

DRAFT

REFERENCE

1. 2006 Southwest Florida Water Management Aerial.
2. Crystal River Unit 3 Site Location by Golder Associates Inc.
3. FLUCFCS by Golder Associates Inc.

FLUCFCS	Description
1894	Shooting Range
190	Open Land
190/832	Open Land/Electric Power Transmission
510	Intake/Discharge Canals
617	Mixed Wetland Hardwoods
630	Wetland Forested Mixed
641	Freshwater Marsh
642	Saltwater Marsh
831	Electric Power Facilties

540 0 540 Feet

SCALE 1:6,000

N

PROJECT

PROGRESS ENERGY FLORIDA, CRYSTAL RIVER NUCLEAR UNIT 3 UPRATE PROJECT

TITLE

FLORIDA LAND USE, COVER, AND FORMS CLASSIFICATION SYSTEM MAP

Golder Associates Tampa, Florida

			PROJECT No. 073-89531	SCALE AS SHOWN	REV. 0
DESIGN	JG	June 01, 2007			
GIS	JG	June 01, 2007			
CHECK	KG	June 01, 2007			
REVIEW	MM	June 01, 2007			

FIGURE 2.3.5-1

Applicable Sections of the Site Certification Application

2.0 SITE AND VICINITY CHARACTERISTICS

2.1 Site and Associated Facilities Delineation

2.1.1 Site Location

Progress Energy Florida's CR3 is part of the larger Crystal River Energy Complex (CREC) located in Citrus County, Florida. The CREC is comprised of 4,738 acres and includes a single nuclear unit (CR3) and four coal-fired units, CR 1, 2, 4, and 5. CR3 and the four coal-fired units lie in the developed area of the site.

CR3 is in the southern (and center) part of CREC and comprises approximately 26.86 acres. This 26.86 acre site and certain related facilities are the subject of this application. These CR3 facilities are shown on Figure 2.1.2-2. CR 1 and 2 are located along the southern boundary of the CREC in between the intake and discharge canals. CR 4 and 5 are located approximately 0.5 mile north of CR3. CR 1, 2, 4 and 5 are not affected by this application.

The CREC is located in all or portions of Sections 31, 32, 33, 34, and 35, Township 17, Range 16. CR3 is located in Section 33, Township 17, Range 16 (Figure 2.1.1-1). CR 1 and 2 are located in Section 33, Township 17, Range 16, and CR 4 and 5 are located in or portions of Sections 28 and 33, Township 17, Range 16.

2.1.2 Existing CREC Site Uses

CR3 is an 838 MW pressured water reactor which began commercial operation in 1977. CR3 is not currently certified under the PPSA. CR 1 and 2 were built in the 1960s and produce 379 and 486 MW, respectively. CR 4 and 5 were built in the early 1980s and produce 717 and 720 MW, respectively. CR 4 and 5 were certified under the PPSA in 1980. The CREC also contains office buildings, warehouses, coal storage areas, ash storage, transmission, and substation facilities which support the various units (Figure 2.1.2-1).

Cooling water for CR 1, 2, and 3 is withdrawn from an intake canal which connects to Crystal Bay and the Gulf of Mexico (Figure 2.1.2-2). Florida Department of Environmental Protection (FDEP) National Pollution Discharge Elimination System (NPDES) permit FL0000159 (Appendix 10.1.2)

limits the combined condenser flow from CR 1, 2, and 3 to 1,898 million gallons per day (MGD) during the period of May 1 through October 31, and 1,613.2 MGD during the remainder of the year.

CR 1 and 2

The cooling water intake structures for CR 1 and 2 are located on the north bank of the intake canal. The design intake flow for CR 1 and 2 is 638,000 gallons per minutes (gpm), or 919 MGD.

CR3

The cooling water intake structure for CR3 is located approximately 400 ft east of the intake for CR 1 and 2. A chain link fence extends across the entire width of the intake canal upstream of the intakes for CR 1 and 2. The fence restricts access to CR3 and collects floating or partially submerged debris. CR3 has four pump bays and seven traveling screen bays separated from the pump bays by a common plenum. An eighth traveling screen bay provides service water. Similar to CR 1 and 2, the traveling screen trays are three meters wide and have 9.5 millimeter (mm) (3/8 inch) mesh. They are operated once every eight hours and cleaned by a front spray wash system. The screenwash trough slopes to the west were material is collected in a sump prior to discharge to the intake canal. The trough receives combined wash water from all screens.

CR3 operates with four circulating water pumps, each rated 170,000 gpm. The design intake flow for CR3 is 680,000 gpm or 979 MGD. The three units have a maximum permitted flow of 1,898 MGD and a total nameplate rating of 1,854.8 MW. Additionally, CR3 has a low flow nuclear services water pumping capacity of 10,000 to 20,000 gpm, depending on system demand.

Cooling water for CR 1, 2, and 3 is withdrawn by a common intake canal south of the units that extends into the Gulf of Mexico. The 14-mile-long intake canal is dredged to a depth of approximately 20 feet (ft) to also accommodate coal barges which unload and dock on the south side of the canal, just west of the intakes for CR 1 and 2 (Figure 2.1.2-2). The intake canal is defined by northern and southern dikes. The northern dike continues along the channel for another 5.3 miles. There are openings in the dikes at irregular intervals to allow north-south boat traffic in the area of CREC. Movement of water into the canal is tidally influenced; at the mouth of the canal, current velocities ranged from 0.6 to 2.6 feet per second (fps) when last measured in 1983-1984 (Golder 2005).

The head of the common discharge canal for all units is located just north of the discharge from CR3. The canal extends west for approximately 1.6 mile to the point of discharge, where it opens into a bay. The dredged channel, bordered to the south by a spoil bank, continues for another 1.2 miles. Water in the discharge canal is maintained by dredging to a depth of approximately 10 ft.

Helper cooling towers currently line the northern bank of the discharge canal and receive a portion of the circulating water flow from CR 1, 2, and 3 including cooling tower blowdown from CR 4 and 5. The helper cooling towers are operated as necessary to ensure that the discharge temperature does not exceed 96.5°F (as a three-hour rolling average) at the point of discharge into the Gulf of Mexico. In February 2006, PEF received approval from the state of Florida to install modular cooling towers which CR 1 and 2 operate during the warmest times of the year. CR 4 and 5 are closed-cycle units that withdraw water for cooling tower makeup from the discharge canal, downstream of CR 1, 2, and 3 and discharge cooling tower blowdown to the discharge canal (Figure 2.1.2-2).

CR 1, 2, and 3 are authorized to operate via several common environmental permits issued by the FDEP and other agencies (Appendices 10.1.2 and 10.4). Figure 2.1.2-1 depicts the site layout and Figure 2.1.2-2 is an aerial photograph of CR3.

2.1.3 Adjacent Properties

CR3 is located within the CREC and is adjacent to CR 1 and 2. The intake canal is located south of CR3 and the discharge canal is located north of CR3. PEF operates a mariculture center approximately one mile east of CR3. The Crystal River Mariculture Center is a multi-species marine hatchery originally established in the early 1990s to mitigate fisheries impacts related to the once-through cooling water system at Crystal River Units 1, 2, and 3. The Mariculture Center operations focus on the successful husbandry, culture, grow-out, harvest, and release into local waters of those selected species. Land use surrounding the CREC is predominantly undeveloped land. Active mines are located to the north and east of CREC.

. The Central Florida Barge Canal is located approximately 3.2 miles north of CR3. There is relatively low-density residential housing north of the Central Florida Barge Canal and east of U.S. Highway 19

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Figure 3.5.4-1 CR 1, 2, 3 NPDES Discharge Points

APPENDICES

Appendix 10.1.5 PSD Permit Application

3.0 THE PLANT AND DIRECTLY ASSOCIATED FACILITIES

3.1 Background

PEF plans to add 180 MW of electrical generation resources to its system in order to continue to provide reliable, safe, and cost-effective service to its customers. The CR3 Uprate Project is an innovative application of technological advancements and efficiencies that will increase the power output of the plant approximately 180 MW, from 900 MW to 1,080 MW. The extra power output will result from using more highly enriched fuel which will result in increased thermal MWs produced in the reactor core. The additional heat will raise the temperature exchange between the primary and secondary systems, creating more steam for turning the turbines.

To safely proceed with the uprate, modifications to supporting equipment are necessary to accommodate the additional heat created from the more highly enriched fuel and to accommodate all designed conditions in the plant.

The uprate project will occur over two phases. The first phase (Phase I) will occur during a 2009 planned refueling outage and scheduled steam generator replacement. The improvement to the turbine line components will increase the efficiency of power production resulting in decreasing consumer costs. The existing steam turbine high-pressure rotor was designed in the 1960s and is a multi-piece assembly which causes more drag than current technology deems necessary. PEF will replace the outdated rotor with current rotor blade technology, a single piece model, which will effectively decrease the drag factor. Replacing the outdated turbine technology will enable the turbines to increase megawatt output by 40 MW with the same steam input.

Phase II will take place during the 2011 planned refueling outage. The second phase will result in an additional 140 MW of power and include alterations that will elevate temperatures within the reactor and the use of the enriched uranium fuel. In order to ensure that fusion reactions inside the core are maintained safely, cooling water flow rates will be increased and adjustments will be made to the safety systems. A larger pumping capacity than currently exists in the water flow system supplying the steam generators is required in order to elevate the flow rate. Therefore, modifications to or replacement of pumps and heat exchangers will occur. In order to determine appropriate replacement and modification needs, an engineering evaluation will be conducted to characterize the most cost effective upgrade necessary for each motor and pump to achieve the optimal flow rate.

3.1.1 Description of Other Onsite Projects

There are a number of projects which are currently being implemented at CR3 over the next several years. Several of the projects are ongoing and are described below as current and base-line conditions and may be referenced throughout the SCA. None of these projects are the subject of this SCA.

- Main step-up transformer replacement. The main step-up transformer will be replaced due to degradation which has led to recent on-line failures which adversely impact plant availability.

- Measurement Uncertainty Recapture. Since 2002, CR3 has been licensed to 2,568 MWt based on maintaining a standard two percent measurement uncertainty margin to the requisite analyses and system evaluations performed at 2,619 MWt. Relatively recent guidance allows a reduction of this margin based on improved instrumentation so the plant can be licensed to operate at a slightly higher power level. The application for this increase was submitted to the NRC on April 25, 2007 to allow a restart from the 2007 outage at this slightly higher power level. This project can be implemented with existing permits and regulatory approvals.

- CR3 License Renewal. The license renewal is a comprehensive assessment of CR3 operations to demonstrate compliance with NRC regulatory requirements. The relicensing process will allow an additional 20 years of plant operation beyond the current CR3 licensed operating period of 40 years. It is anticipated that the License Renewal Application will be submitted to the NRC early in 2009.

- Steam Generator Replacement Project (SGRP). The once-through steam generators will be replaced in 2009 due to long-term degradation that will not support reliable operation to the end of plant life. The project will necessitate the utilization a number of undisturbed areas for lay-down areas, transportation off-loading and equipment assembly areas. Many of these same areas will also be utilized to support the CR3 Uprate Project. The appropriate environmental permits to authorize the disturbance of these areas will be obtained separate from the site certification process.

3.1.2 Description of CR3 Uprate Project

The project that triggers the need for this application is power level upgrades scheduled for 2009 through 2012. The most substantial of the plant modifications will be installed during the refueling outages scheduled for 2009 and 2011. While not all the final decisions have been made, the current plans include:

- In 2009, CR3 is planning to refurbish the low pressure turbines and electrical generator. Several main feed-water heat exchangers and main steam re-heaters will be modified or replaced. The net impact of these modifications is a substantially more efficient secondary plant. Thus, while the NRC licensed power level will remain constant; the electrical generation will be increased and the heat released to the environment will be

lessened. The net generation increase from current levels is expected to be approximately 40 MW.

- Leading up to 2011 CR3 seek NRC license changes to allow operation at the increased output. It will be necessary to make a large number of smaller, yet substantial, modifications to assure long term reliability of all plant systems at the conditions necessary to support this higher licensed power level. The most environmentally significant of these modifications is an increase in circulating water flow and an increase in discharge temperatures. The higher, licensed power level is currently anticipated to result in a net electrical generation increase of 180 MW above current levels.

3.2 Site Layout

The CREC contains four coal-fired steam electric generating units - CR 1, 2, 4, and 5, and a single nuclear unit - CR3. The CREC is the largest power-producing complex in the state of Florida with a total generating capacity of 3,140 MW. Figure 3.2.1-1 provides the property boundary and Figure 3.2.1-2 provides the general layout of the various facilities within the CREC.

3.3 Fuel

The CR3 Uprate Project will not significantly alter fuel utilization as part of any of the above referenced projects. The primary fuel involved is the nuclear fuel used directly in power production. There will be no change in the nature of the fuel; no increase in maximum fuel enrichment and no substantial change in fuel assembly mechanical design will be required. There will be increases in the size of the refueling batch necessary to supply the necessary energy to support operation at the higher power levels.

Diesel fuel is used in a number of emergency generators. The main station emergency generators may be increased in capacity which will increase fuel use. However, these generators are for stand-by use only. Other than testing, these diesels, as well as a number of others, which power fire and emergency feedwater pumps, etc, are not routinely operated. Diesel fuel is delivered and unloaded as needed. The size of storage and refilling frequency is not expected to change significantly. There is no expected increase in use of other fuels.

3.4 Air Emissions and Controls

3.4.1 Air Emission Types and Sources

The entire CREC, including the nuclear unit's associated process equipment, is currently addressed under the site's Title V (TV) air operating permit. This permit (Final Permit No. 0170004-015-AV) is active until December 31, 2009, when renewal is required. The TV permit addresses four coal-fired fossil fuel steam generating units; two natural draft cooling towers; a helper mechanical draft cooling tower; a modular cooling tower; coal, fly ash and bottom ash handling facilities and relocatable diesel-fired generators. Although CR3 (the nuclear generating unit) is not considered an emission generating unit under the TV permit, certain emissions units associated with CR3 are appropriately considered.

The CREC is classified as an existing major facility. A "major facility" is defined as any 1 of 28 named source categories that have the potential to emit 100 tons per year (TPY) or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. A modification to an existing major facility that results in a significant net emissions increase equal to or exceeding the significant emissions rates (SER) listed in Section 62-212.400, Table 62-212.400-2, F.A.C., is classified as a major modification and will be subject to the PSD preconstruction permitting program for those pollutants that exceed the PSD SERs. The procedures for determining applicability of the Prevention of Significant Deterioration (PSD) permitting program to the project are specified in Rule 62-212.400(2), F.A.C. For each regulated pollutant, PSD is triggered as a result of a modification at an existing unit if the difference between the projected actual emissions and the baseline actual emissions equals or exceeds the SER for that pollutant, as defined at Rule 62-210.200(243), F.A.C.

The scope of the proposed project includes an uprate of 40 MW associated with equipment modifications made during the 2009 refueling outage and 140 MW to be added after upgrades to the reactor during the 2011 refueling outage. The uprate will increase the output from CR3 and the associated circulating intake water flow rate will also increase. The air emission impacts associated with increased intake water flow (i.e., increased flow through additional new cooling towers) will trigger PSD for particulate matter (PM), but not for PM less than 10 microns (PM_{10}). Other regulated air emissions (e.g., NO_x and SO_2) will not be affected, as there will be no additional fuel combustion sources (e.g., additional diesel generator capacity) that may trigger PSD for these pollutants.

The project design is still evolving; however, as stated above, the engineering and design data currently indicate that the Project will be characterized as a major source subject to PSD. Therefore, this SCA addresses Best Available Control Technology (BACT) for PM emissions, which are the significant emission increase of concern. Federal PSD requirements are contained in 40 CFR 51.166, *Prevention of Significant Deterioration of Air Quality*. The state of Florida's PSD regulations are found in Rule 62-212.400, F.A.C.

The types and sources of air emissions associated with the CR3 Upgrade Project will consist of a new mechanical draft cooling tower to be designated the South Cooling Towers (SCT). PM and PM_{10} emissions will result from cooling tower operation in the form of drift. Drift is water aerosols emitted from the cooling tower containing dissolved minerals from the water circulating in the cooling tower. The dissolved minerals become PM, including PM_{10}, when the water in the drift is evaporated. Cooling tower drift will be controlled using mist eliminators that will be designed to limit drift to no more than 0.0005 percent of the circulating water rate of the cooling tower.

In addition to adding a cooling tower to remove the incremental heat required to be dissipated by the uprate project, PEF is considering replacement of the existing modular cooling towers with additional permanent cooling towers (the South Cooling Tower (SCT)). Based on the relative design heat dissipation rates, approximately 11 additional cells similar to the existing permanent helper cooling tower cells will be required to replace the modular cooling tower in full. Coupled with the six cells required to dissipate the incremental heat rejected due to the uprate project, a total of 17 cells would be required. The status of the existing modular cooling tower is unknown, therefore, in order to present a worst-case air quality assessment, it is assumed that the new SCT will include a safety factor (of at least one cell) and consist of 18 cells arranged in a 9 by 2 configuration. The estimated cooling water flow into the proposed 18 cell SCT is estimated at approximately 342,306 gpm. Again, this estimate assumes that the existing bank of modular towers would be replaced by the proposed SCT associated with this uprate project, which may not necessarily be the case.

Figure 3.4.1-1 presents the proposed location of the air emission sources. Estimated hourly emission rates, as a result of the proposed cooling tower addition are presented in Table 3.4.1-1, for both PM and PM_{10} emissions. In addition, the proposed cooling tower design parameters and annual PM/PM_{10} emissions estimates are provided in Table 3.4.1-2 for the maximum operating load. That is, the information presented is for the proposed cooling tower design that represents the worst-case emissions and flow characteristics. Appendix 10.1.5, the PSD Application, presents the basis for the

emission rates and maximum annual emissions of regulated pollutants, as well as unit performance. As indicated, PSD review is triggered for PM (i.e., due to cooling tower impacts associated with the uprate).

3.4.2 Air Emission Controls

State-of-the-art air pollution control equipment will be installed on the project to minimize air emissions. The control techniques proposed for this project are based on an evaluation of economic, energy, and environmental impacts and have been determined to represent BACT on similar projects. The following subsection presents a summary of the Control Technology and the BACT analysis, which is presented in the PSD permit application in Appendix 10.1.5.

3.4.3 Control Technology Description/Best Available Control Technology

BACT review is required under FDEP rules and EPA regulations pertaining to PSD. Federal regulations are codified in 40 Code of Federal Regulations (CFR) Parts 51.166 and 52.21, and FDEP has adopted PSD rules in Rule 62-212.400, F.A.C. The BACT review is part of the evaluation of control technology under the Florida PSD rules. BACT is applicable to all pollutants for which PSD review is required and is pollutant-specific. It is an emission limitation that is based on the maximum degree of reduction for each regulated pollutant, which is determined to be appropriate after taking into account energy, environmental, economic impacts, and other costs. BACT cannot be any less stringent than the federal New Source Performance Standards (NSPS) applicable to the source under evaluation.

The FDEP and EPA have established a policy for BACT review in which the most stringent control alternatives are evaluated first. The alternatives are either rejected based on technological, environmental, energy or economic reasons or they are proposed as BACT. This procedure is referred to as the "top-down" approach. For the project, BACT is applicable for emissions of PM.

Appendix 10.1.5 of the SCA for the project contains a complete PSD Application. The PSD Application includes the BACT evaluation for the project and addresses those pollutants for which BACT is applicable. A discussion of the environmental, economic, and energy aspects of alternative control techniques and methods are included. The remainder of this section briefly describes those control technologies that are proposed for the CR3 Uprate Project.

PM emissions will be emitted from the cooling towers in the form of drift. Cooling tower drift will be controlled through the use of mist eliminators that will be designed to limit drift to no more than 0.0005 percent of the circulating water rate of the cooling tower. This level of control represents the best that is currently available. The total circulation water use will be limited to 1.8 E11 gallons per year, based on 8,760 hours per year at a maximum circulation rate of 342,306 gallons per minute (gpm).

3.4.4 Design Data for Control Equipment

Design information for the air pollution control equipment is presented in Section 5.0 of Appendix 10.1.5 (PSD Application).

3.4.5 Design Philosophy

The project minimizes air pollutant emissions by using efficient design and state-of-the-art air pollution control equipment that will meet a BACT emission rate. In addition, by maximizing the megawatt output per unit of cooling water consumed, the air pollutant emissions per megawatt output are minimized. Collectively, the design of the CR3 Uprate Project will incorporate features that will make it one of the most efficient and lowest emitting, with respect to the amount of air emissions emitted per MWs produced.

3.5 Plant Water Use

The primary water use for the CR3 Uprate Project will be an increase in cooling water flow through the CR3 condenser to cool the increased heat rejected by the CR3 condenser. The quantitative water use diagram for the existing CR 1, 2, and 3 is shown in Figure 2.3.4-4. This figure does not show the evaporative losses from the existing HCTs, however, that evaporation is estimated to range up to a maximum of only about 9,957 gpm. The only significant change in flow rates anticipated as a result of the CR3 Uprate Project is that of the potential increase of condenser cooling water flow for CR3 by up to about 150,000 gpm.

A new SCT has been proposed both to offset the increased circulating water rejected heat and to replace the existing modular HCT. A small portion of the increased flow associated with the uprate project (up to about 1,288 gpm) will be evaporated in the recirculating portion of the new SCT, which will be used year-round to dissipate the increase in rejected heat. The new SCT has also been

designed to avoid any increase in flow into the intake canal from Crystal Bay/Gulf of Mexico, and to avoid any increase in heat load or temperature rise leaving the discharge canal to Crystal Bay/Gulf of Mexico. For the purpose of this SCA, a conservative and conceptual design plan for the South Cooling Tower has been proposed. Detailed design will be addressed as part of the NPDES renewal process in 2009.

3.5.1 Heat Dissipation System

In Section 2.3.4, the design value of the existing heat rejection rate via the condenser cooling water for CR3 was quantified as 5.88 Billion Btu per hour. CR3 currently produces approximately 900 MWe (megawatts electrical) and 2,609 MWt (megawatts thermal). The net result of the uprate project will be to increase CR3's output to approximately 1,080 MWe and 3,014 MWt. These quantities can all be converted to Btu per hour by the formula 1 watt = 3.412141 Btu/hour. The result is shown in the table below, Heat Dissipation System Comparison. The difference between MWt and MWe is the amount of heat produced by the unit that is not converted to electricity and which is therefore rejected via the condenser cooling water system. The net increase in heat rejection is 225 MWt, which is equivalent to 0.768 Billion Btu per hour, and represents an increase of about 13.2 percent relative to the current baseline heat rejection rate of 5.88 Billion Btu per hour for CR3, and about seven percent for the design three-unit heat rejection rate of 10.91 Billion Btu per hour currently leaving the discharge canal.

The size and shape of the discharge thermal plume varies with plant and meteorological conditions. The thermal plume is generally proportional to the amount of heat rejected, which is a function of the product of the flow rate and the temperature rise. PEF is proposing additional recirculating cooling towers to remove the increased rejected heat anticipated by the uprate project (0.768 Billion Btu/hour), therefore, the size of the thermal plume will not increase beyond existing conditions.

As described in Section 2.3.4, CR 1, 2 and 3 currently operate both permanent and modular HCTs. The permanent HCT consists of four separate tower structures, each containing nine cells.

Heat Dissipation System Comparison		
	Pre-Existing (Baseline) Unit 3	Post-Uprate Unit 3
MWe	900	1,080
MWt	2,609	3,014
Billion Btu per hour (electrical)	3.070	3.685
Billion Btu per hour (thermal)	5.831	6.599
Increase in Billion Btu per hour (electrical)	Base	0.615
Increase in Billion Btu per hour (thermal)	Base	0.768

Each cell has a water flow rate of 19,017 gpm, and a heat dissipation rate of 0.127 Billion Btu per hour. To achieve the dissipation of the increase of 0.768 Billion Btu per hour, a preliminary estimate indicates that a cooling tower consisting of six cells, similar to the permanent HCT cells, would be required. A six-cell cooling tower would be approximately 50 ft wide by 300 ft long by 55 ft tall, or roughly 2/3 the size of one of the existing permanent HCT.

PEF has the option during the uprate of increasing either the CR3 condenser cooling water flow rate, or temperature rise, or both. The amount of heat that the new cooling towers must dissipate is independent of the specific choice of flow rate and temperature rise. If the CR3 flow rate is held constant at the existing 680,000 gpm, the temperature rise is expected to increase from 17.5 °F to 19.8 °F for CR3, and the overall temperature rise for the 3-unit flow rate of 1,318,000 gpm *prior to the use of HCT* is expected to increase from 16.7 to 17.9 °F. The use of the existing HCT and the new SCT in the helper mode would then reduce the combined discharge temperature down to 7.7 °F, assuming the full use of all HCT and ignoring the HCT evaporation. This is the same temperature rise that would be expected under the same conditions with the existing plant configuration.

Similarly, if the condenser cooling water flow rate for CR3 is increased to 830,000 gpm, and to 1,468,000 gpm for all three units, the delta T for CR3 will be reduced to approximately 14.3 °F, whereas the combined three-unit temperature rise will decrease from 16.74 °F to 15.03 °F prior to the use of HCT. The use of the existing HCT and the new six-cell cooling tower in the helper mode would then reduce the combined discharge temperature rise down to 6.46 °F. This is a temperature 1.24 °F less than would be expected under the same conditions with the existing plant configuration, and is less because the three-unit flow rate has been increased by 150,000 gpm, which is about

11.4 percent of the present three-unit flow rate. Although the flow rate has been increased, the rate of heat rejection remains at the existing level, as evidenced by the reduction in temperature rise.

However, in order to avoid incremental intake entrainment impacts due to the uprate, PEF proposes to increase the size of the new SCT and to run a portion of the facility in the recirculating mode (i.e., with the cold water return routed back to the intake canal rather than to the discharge canal). At the maximum expected condenser cooling water flow rate increase of 150,000 gpm, the size recirculating portion of the SCT thus need to be eight cells (flow rate of 152,136 gpm).

In addition to adding the new cooling tower to remove the incremental heat required to be dissipated by the uprate project, PEF could potentially replace the existing modular cooling towers with an additional permanent HCT. Based on the relative design heat dissipation rates, approximately 11 additional cells equivalent to the existing permanent HCT cells would be required. Coupled with the six cells required to dissipate the incremental heat rejected due to the uprate project, this means a total of 17 cells would be required, assuming additional cells were not required for intake canal flow reduction. The break point for this is the six-cell flow rate of 114,102 gpm; at a condenser cooling water flow rate increase less than 114,102 gpm no additional recirculation for intake flow reduction is needed. If the condenser cooling water flow rate increase exceeds 114,102 gpm additional recirculating cells are required for intake flow reduction. In the worst case, at the maximum increase of 150,000 gpm, this would entail two additional recirculating cells. However, the other result of increasing the flow rate is that the discharge temperature is reduced. Because the HCT are designed solely to reduce the discharge temperature to not exceed a value of 96.5 °F on a rolling three-hour average, the reduced temperature rise results in the fact that less cooling is needed from the HCT. The resultant amount of reduction in HCT heat transfer is about 0.5 Billion Btu per hour, which is equivalent to about four cooling tower cells. Thus, while this case requires two extra cells for intake flow reduction, it decreases the number of helper cells required by four. In summary, the two cases are described in the following table:

Case	Minimum condenser cooling water flow increase (0 gpm)	Maximum condenser cooling water increase (150,000 gpm)
Required number of cells in recirculating mode	6	8
Required number of cells in helper mode	11	7
Total number of required cells	17	15

PEF may propose to install the new permanent SCT, between the intake and the discharge canal as shown in Figure 3.5.1-1, which will include a safety factor (of at least one cell) and consist of 18 cells arranged in a 9 by 2 configuration. Depending on the final amount of the increase in condenser cooling water, between six and eight cells will be operated full time in the recirculating mode, and from 12 to 10 respectively would be operated in the helper mode as required. Figure 3.5.1-1 provides a simplified water use diagram showing the expected division of flow for the latter case. The flow from eight cells is estimated to be 152,136 gpm, which is more than the potential maximum CR3 condenser cooling water flow rate increase of 150,000 gpm. Therefore, the CR3 Uprate Project should actually cause some slight reduction in entrainment relative to the existing conditions.

Through-screen velocity is anticipated to increase from 1.45 fps (max at MLW) to as much as 2.02 fps (max at MLW) with the CR3 Uprate Project. This is because the four existing cooling water pumps will be modified to deliver as much as 207,778 gpm each. This increased velocity could result in an increase in impingement mortality. The installation and operation of the proposed recirculating six to eight cells of the SCT will slightly reduce entrainment impacts due to the slightly reduced overall intake flow from Crystal Bay, and may also reduce impingement mortality by reducing the number of organisms available to be impinged.

PEF intends to request modification of the NPDES permit to authorize the operation of the new SCT and an increase in circulating water flow at CR3 from 680,000 gpm/923 MGD to as much as 830,000 gpm/1,195 MGD. Overall, the proposed CR3 Uprate Project will not increase flow to the intake canal from Crystal Bay and there will be no net increase in the thermal discharge at the NPDES POD. The CR3 Uprate Project will not have a negative impact to fisheries or the aquatic environment.

SECTION 5

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5.0 EFFECTS OF PLANT OPERATION

5.1 Effects of the Operation of the Heat Dissipation System

5.1.1 Temperature Effect on Receiving Body of Water

As described in Section 3.5, the final condenser cooling water flow rate for CR3 has not been determined, however, the potential will range up to a maximum expected flow rate of 830,000 gpm from the current 680,000 gpm. The corresponding flow rate for CR 1, 2, and 3 will thus range up to 1,468,000 gpm (potential maximum). The use of the proposed new SCT will ensure that the heat rejection rate from the three units will be limited so as not to exceed the present maximum rate of 10.91 Billion Btu per hour at the POD. Because the temperature rise is proportional to the heat rejection rate, the full load temperature rise at the maximum expected flow rate, without the use of the HCT but using the recirculating portion of the new SCT, will be 13.79 °F.

Since the discharge temperature from CR 1,2 and 3 prior to use of the new SCT is estimated to range between the present value of up to 16.74° F, to a future value between 13.79 ° F and 16.74 ° F, there is not expected to be any measurable impact due to change in combined flow discharge temperature. Also, because the total quantity of heat rejected via the discharge canal at the POD is not changing, the shape and extent of the thermal plume (the location and amount of acreage enclosed within each temperature isotherm) is not expected to change with the CR3 Uprate Project.

5.1.2 Effects on Aquatic Life

PEF has been in the process of quantifying baseline aquatic impingement and entrainment impacts at the CREC in order to develop a Comprehensive Demonstration Study (CDS) for submittal to the FDEP in compliance with the federal Clean Water Act 316(b) rule. However, the U.S. Court of Appeals for the Second Circuit recently remanded most of the substantive portions of the USEPA's July 2004 316(b) Rule. PEF anticipates that EPA will re-promulgate the Phase II 316(b) regulations at some time in the future. In the interim, PEF intends to continue to evaluate impingement and entrainment impacts associated with the CR3 Uprate Project within the CREC existing monitoring program. This data will be used to evaluate impacts and identify measures to reduce aquatic impacts during the next CREC NPDES permit renewal (scheduled in late 2009).

The magnitude of any changes in overall facility effects due to the uprate project is expected to be small.

There are no expected changes in effects on aquatic organisms due to changes in the release of heat, because there is no change in the quantity of heat as measured in Btu per hour, and because the temperature rise associated with the release of heat will be the same as, or slightly reduced from, the current discharge temperatures.

As described in Section 3.5, the total quantity of water withdrawn from the Gulf of Mexico through the intake canal will not be increased by the uprate project; therefore, the total rate of entrainment should also not increase. In fact, since the amount of cooling water that will be recirculated by the six-cell portion of the new cooling towers (152,136 gpm) exceeds the potential increase in cooling water flow associated with the uprate project (150,000 gpm), the net inflow into the intake canal from the Gulf of Mexico is estimated to decrease slightly with the uprate project.

Impingement mortality is generally considered a function of both through-screen velocity and of total flow rate. Although the uprate may cause the through-screen velocity to increase by as much as 22 percent (from 1.65 fps maximum to 2.02 fps maximum), the actual concentration of impingeable organisms is more likely controlled by the velocity entering the intake canal, as that is the velocity those organisms must overcome to escape impingement. As described in Section 2.3.4, the existing intake canal velocity which corresponds with the maximum through-screen velocity (at MLW) is estimated to be about 1.3 fps. Since the uprate project will actually reduce the overall cooling water flow into the intake canal from 1,318,000 gpm to at most 1,315,684 gpm (1,468,000 gpm – 152,136 gpm), the maximum intake canal velocity would be expected to be reduced slightly, on the order of about 0.002 fps.

Based on the discussion above, PEF proposes to continue to evaluate the entrainment and impingement impacts associated with CREC ongoing facility operations as well as the impacts associated with the CR3 Uprate Project. PEF intends to quantify aquatic impacts to offset impacts during the CREC NPDES renewal (scheduled for submittal in 2009) process. Pending the outcome of the ongoing studies, PEF will propose the best technology available for minimizing impacts. Based on current information, the proposal may include a physical barrier, diversion technology or expanded onsite restoration (i.e., expansion of the Mariculture Center).

5.1.3 Biological Effects of Modified Circulation

The CR3 uprate project is not expected to cause any significant modification to water circulation in the site vicinity. The existing condition includes the circulation patterns superimposed by the CREC on the ambient environment. As described in section 5.1.2 above, the magnitude of the change to the velocity entering the intake canal is estimated to be a reduction of approximately 0.002 fps. Changes of this magnitude are not measurable.

5.1.4 Effects of Offstream Cooling

Because the new SCT withdraws water from the discharge canal, it is withdrawing water that has already been screened and passed through a condenser. Therefore, that withdrawal of water will not cause any increase in impingement mortality or entrainment relative to the existing levels.

5.2 Effects of Chemical and Biocide Discharges

5.2.1 Industrial Wastewater Discharges

Compliance with applicable state and federal discharge regulations and water quality standards for industrial wastewaters, is presently being achieved through the implementation of the CR 1, 2, and 3 NPDES permit. The CR3 Uprate Project will not cause any changes in the quantity or characteristics of industrial wastewaters generated by the facility; therefore, no change in that compliance achievement status due to the uprate project is expected.

5.2.2 Cooling Tower Blowdown

The proposed new SCT associated with the CR3 Uprate Project will not generate any "blowdown". Additionally, the evaporation associated with the recirculating portion of the new SCT is not expected to exceed 1,718 gpm, an amount that will not significantly increase the TDS of the cooling water discharge. At this maximum expected evaporation rate, the change in TDS concentration assuming an existing value of 28,000 mg/L would only be about 37 mg/L or 0.1 percent. This effect is insignificant relative to the natural range of TDS of 7,000 mg/L (31,000 – 24,000) as shown on Figure 2.3.4-6.

Historical Data of Circulating Water Temperatures

Figure 2.3.4-5 Once Through Cooling Water Flow

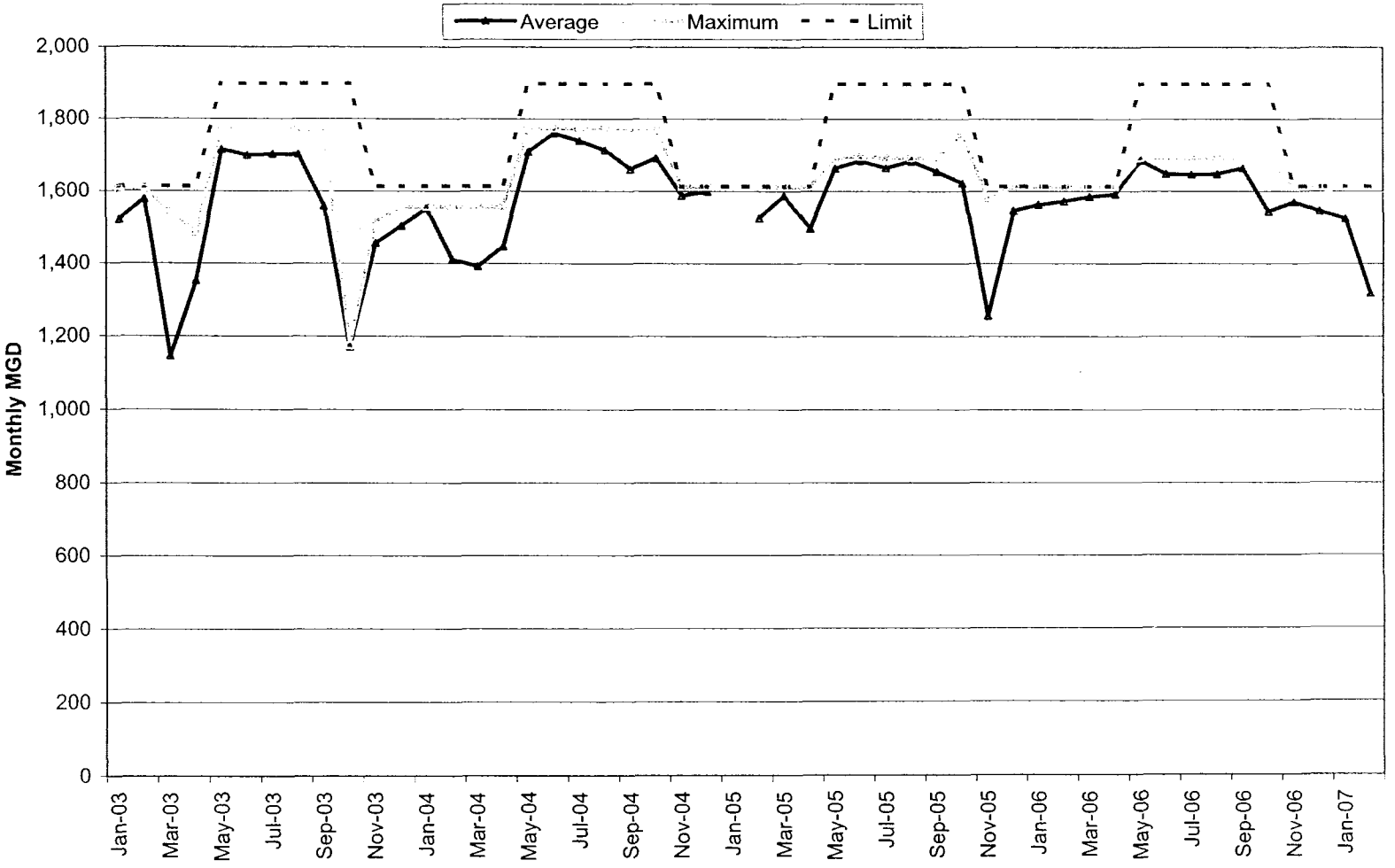
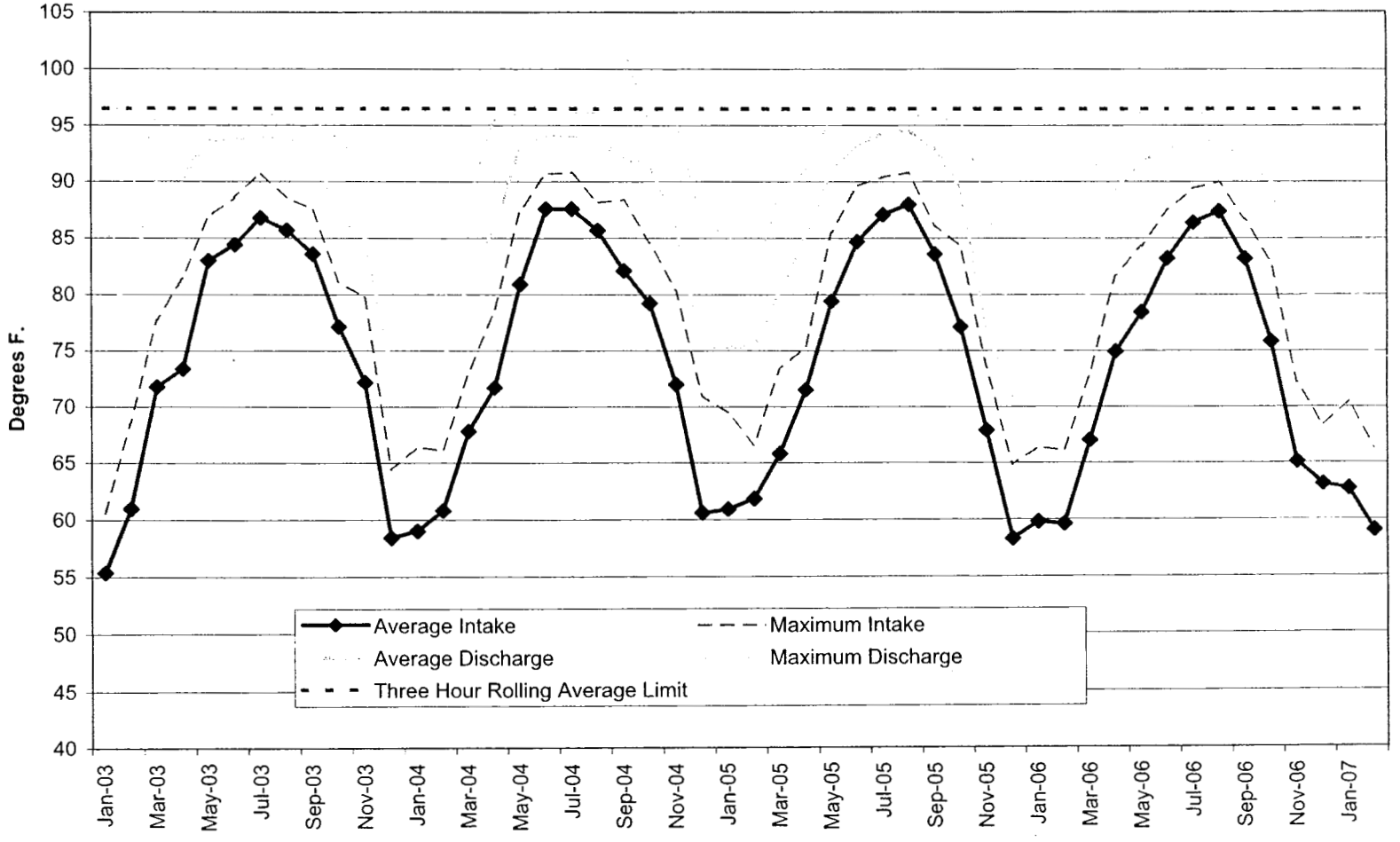
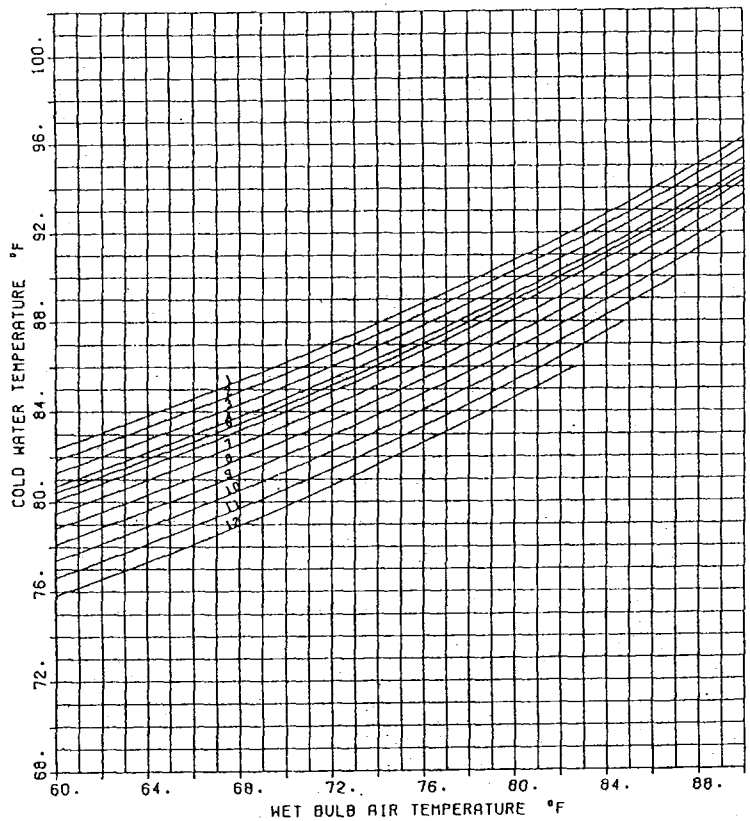


Figure 2.3.4-7 Once Through Cooling Water Temperatures



Helper Cooling Tower Performance Curves



HOT WATER TEMPERATURE

1	110.0	°F
2	108.0	°F
3	106.0	°F
4	104.0	°F
5	103.0	°F
6	102.0	°F
7	100.0	°F
8	98.0	°F
9	96.0	°F
10	94.0	°F
11	92.0	°F
12	90.0	°F

DESIGN CONDITIONS

WATERFLOW	171750.	USGPM
RELATIVE HUMIDITY	66	%
COLD WATER	89.50	°F
HOT WATER	103.00	°F
WET BULB	81.00	°F
BAROMETRIC PRESSURE	1013	MB.

INDUCED DRAFT COOLING TOWER

PERFORMANCE CURVES COLD WATER TEMPERATURE AS A FUNCTION OF WET BULB AIR TEMPERATURE AND HOT WATER TEMPERATURE

WATERFLOW 171750.USGPM

HAMON COOLING TOWERS

246 U.S. HIGHWAY 22 WEST.BRIDGEWATER N.J. 08807 USA

CRYSTAL RIVER - BASE OFFERING

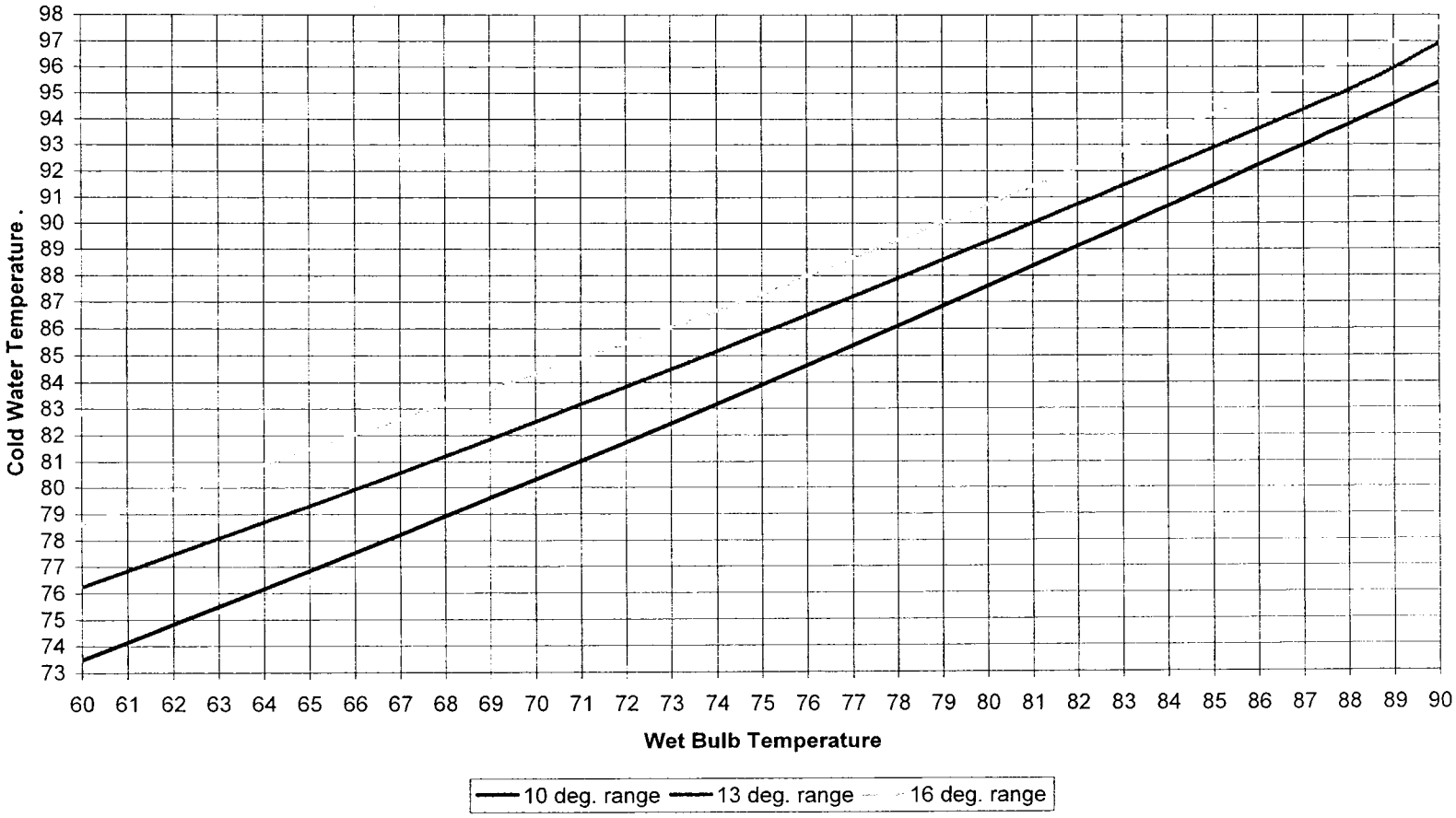
OWNER'S MARGIN - ONE TOWER

MARCH 1990

10410 HUT578

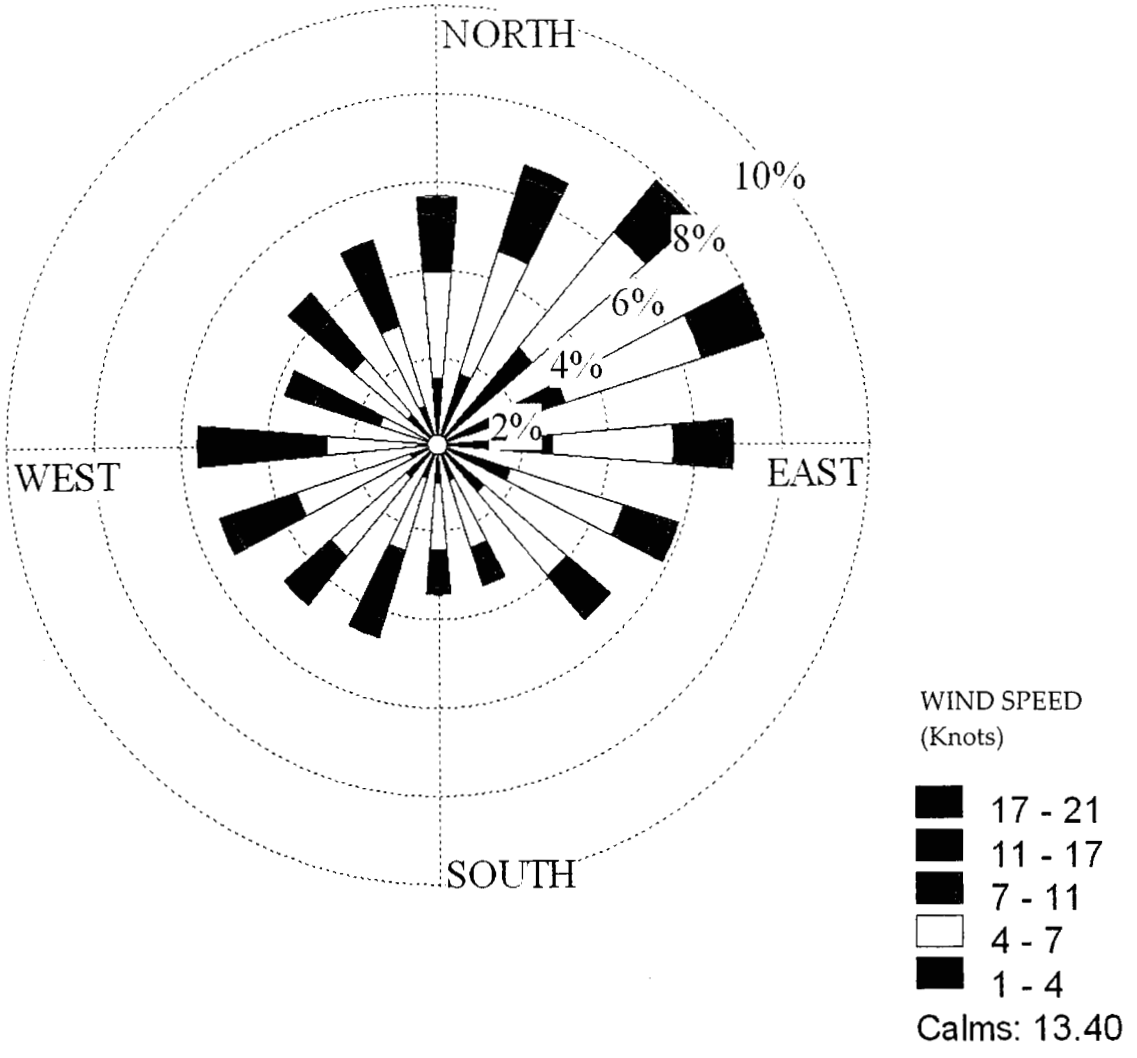
Modular Cooling Tower Performance Curves

Aggreko Performance Curves
100% Water Flow
180,000 GPM



PEF-NCR-00686

Local Annual Windrose

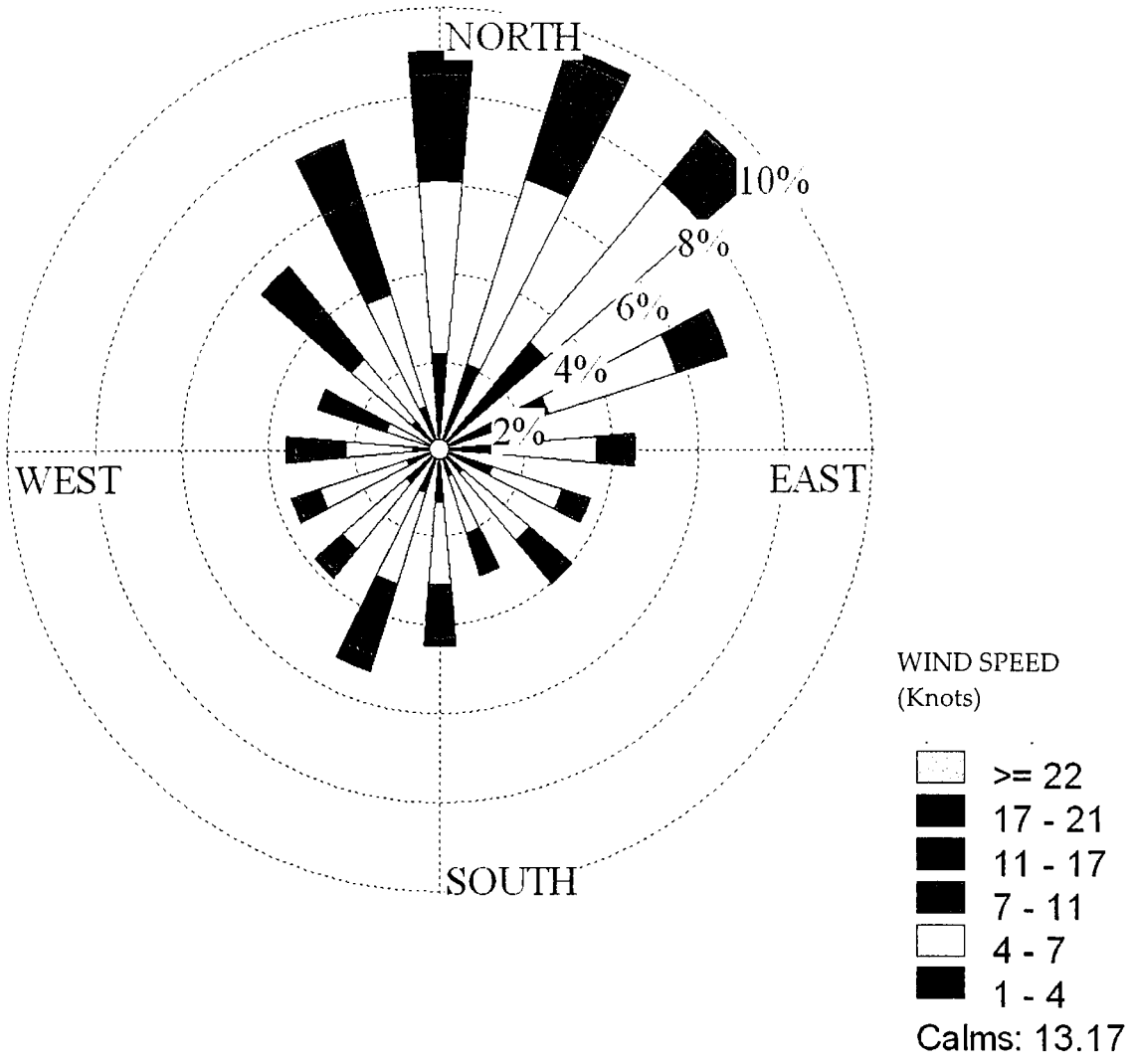


Average Wind Speed	5.73 Knots
Calm Winds	13.4 %

Note: 1 knot = 1.151 miles per hour.

Figure 2.3.7-1.
Annual Wind Rose for 2001 to 2005
Tampa International Airport (Station No. 12842)

Source: National Climatic Data Center. 2001-2005.

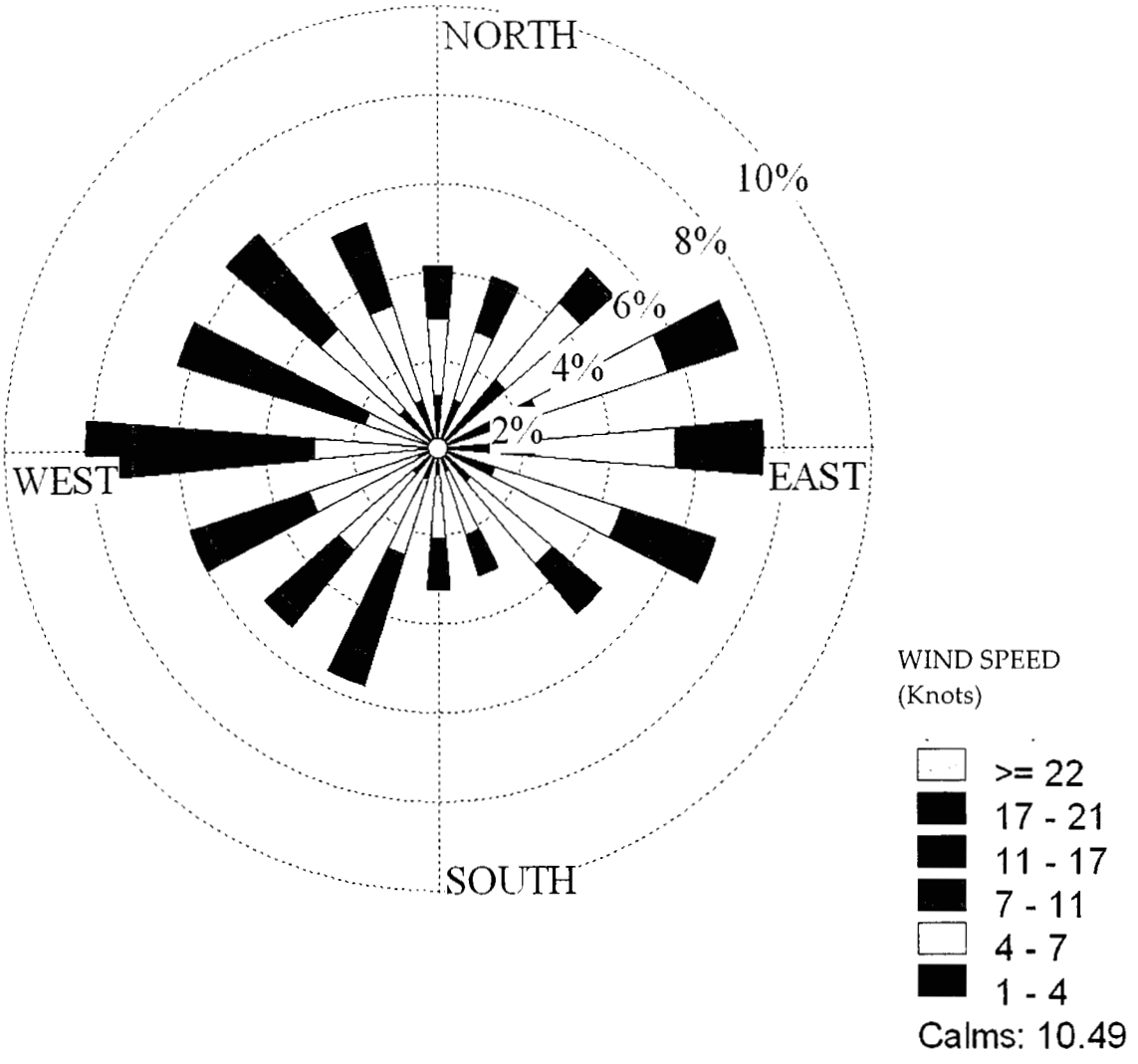


Average Wind Speed	5.74 Knots
Calm Winds	13.17 %

Note: 1 knot = 1.151 miles per hour.

Figure 2.3.7-2.
Winter Wind Rose for 2001 to 2005
Tampa International Airport (Station No. 12842)

Source: National Climatic Data Center. 2001-2005.

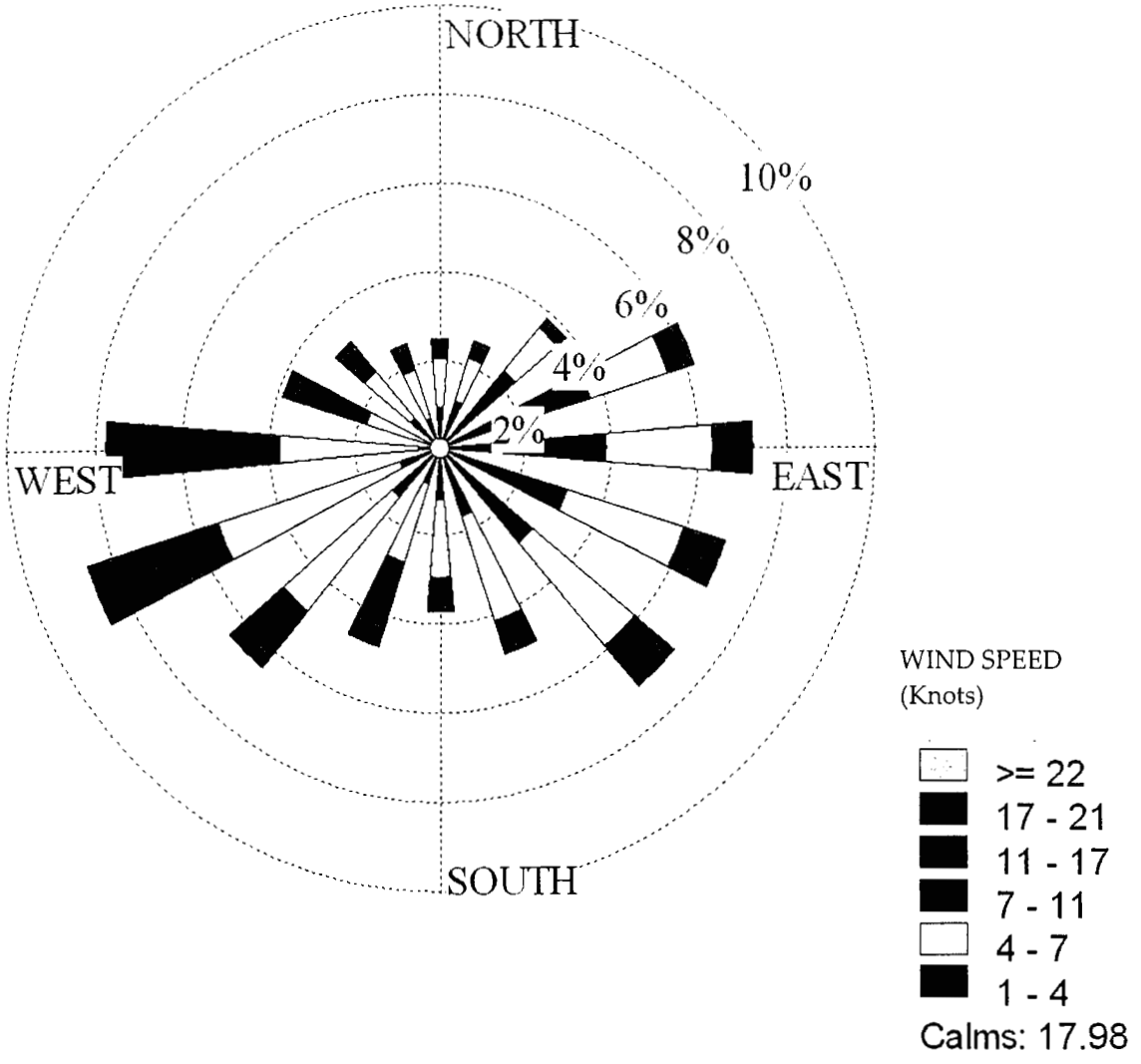


Average Wind Speed	6.39 Knots
Calm Winds	10.49 %

Note: 1 knot = 1.151 miles per hour.

Figure 2.3.7-3.
Spring Wind Rose for 2001 to 2005
Tampa International Airport (Station No. 12842)

Source: National Climatic Data Center. 2001-2005.

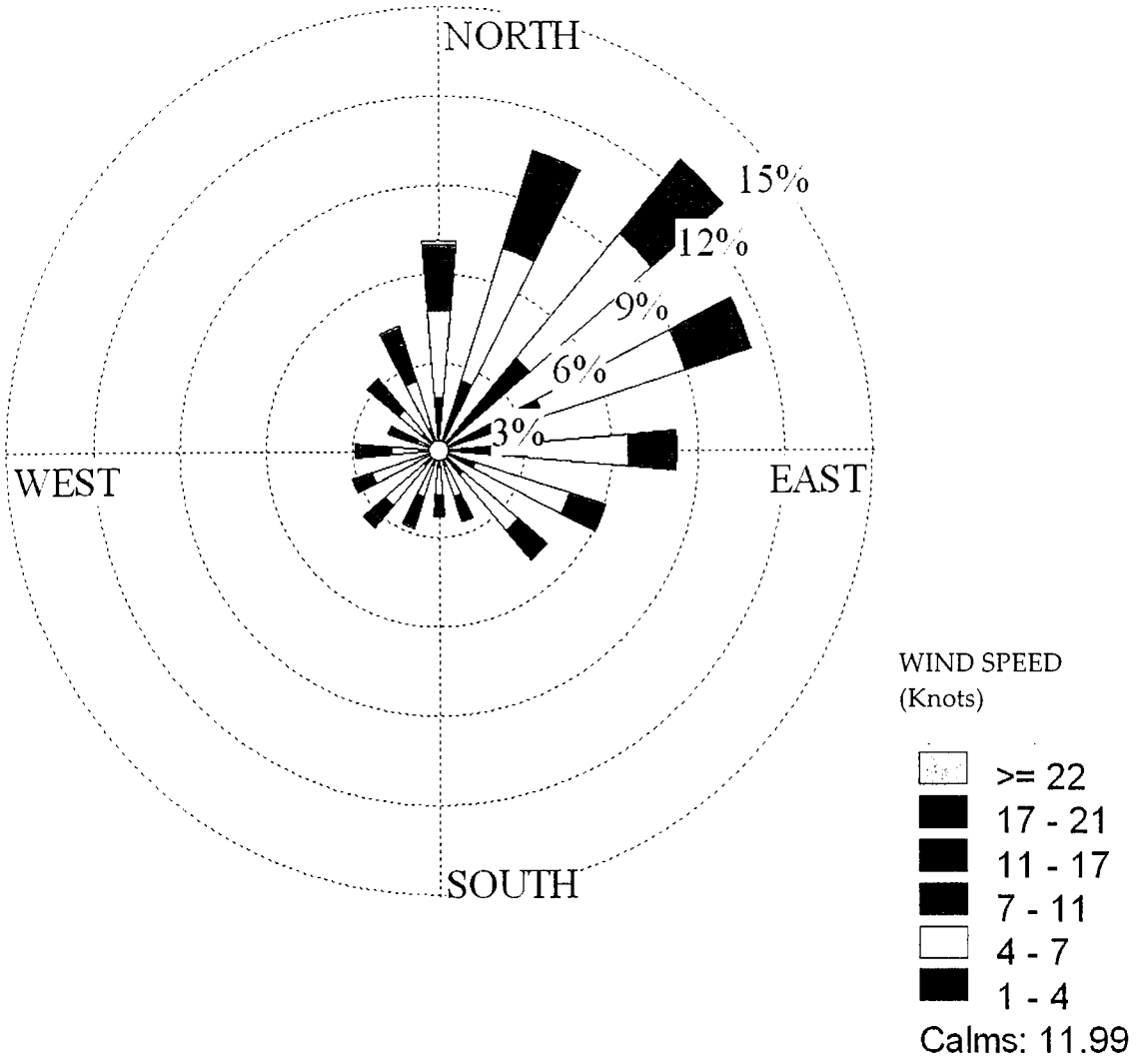


Average Wind Speed	4.98 Knots
Calm Winds	17.98 %

Note: 1 knot = 1.151 miles per hour.

Figure 2.3.7-4.
Summer Wind Rose for 2001 to 2005
Tampa International Airport (Station No. 12842)

Source: National Climatic Data Center. 2001-2005.



Average Wind Speed	5.78 Knots
Calm Winds	11.99 %

Note: 1 knot = 1.151 miles per hour.

Figure 2.3.7-5.
Fall Wind Rose for 2001 to 2005
Tampa International Airport (Station No. 12842)

Source: National Climatic Data Center, 2001-2005.

RFI Number:	
Discharge Canal Thermal Mitigation Project Request for Information (RFI) Form	
Date: Initiator:	Contractor's Project Manager Approval:
Description of Request, Issue, Concern	
Suggested resolution:	
Date that response is needed by to prevent Project impact:	

Potential Impact											
Scope			Schedule			Cost			Safety		

Description of Impact:
Progress Energy Direction, Resolution, Clarification
Approval:
Project Manager:
Procurement Specialist:

Q Qualitätsicherung
Quality Assurance

S Spezifikation
Specification

T Turbinenanlagen
Turbine Plants

Kennwort:
Job Name:

Typ:
Type:

Auftragsnummer: 10588
Order-No.:

Index / gültig ab:
Issue / Date:

Erstellt Prepared	S 314	12.01.2004	Gerdemann	gez. Gerdemann
Geprüft Approved	S 314	12.01.2004	Weinzierl	gez. Weinzierl
Freigegeben Released	S 314	12.01.2004	Winkler,F.J	gez. Winkler
Freigegeben Kunde / Abnahmegesellschaft Released Customer/Acceptance auth				
	Abteilung / Department	Datum / Date	Name / Name	Unterschrift / Signature

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Power Generation (PG)

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CLERK

Q Qualitätsicherung
Quality assurance

S Spezifikation
Specification

T Turbinenanlagen
Turbine Plants

Inhaltsverzeichnis / Table of contents

Auftragsnummer: 10588
Order-No.

Typ:
Type:

Blatt-Nr. Sheet-No.	Bauteil Component	Werkstoff Material	TLV Purchase Specification	Datum Date	Index Issue
121120	Turbinenwelle Turbine shaft	NiCrMoV	PD 10325UB		
121300	Turbinenlaeufer Turbine rotor	NiCrMoV			
131110	Leitschaufeln Stufe 1-8 L+R Stationary blades stage 1-8 L+R	X20Cr13	9238 01		
131301	Leitschaufeln (gefräst) Stationary blades (milled)	X20Cr13	9238 01		
132120	Laufschaufeln Stufe 1-8 L+R Rotor blades stage 1-8 L+R	X20Cr13	9238 01		
132301	Laufschaufeln (gefräst) Rotor blades (milled)	X20Cr13	9238 01		
161140	Leitschaufelträger (TE1/TE2/GE1/GE2) Guide blade carrier (TE1/TE2/GE1/GE2)	GX4CrNi13-4	TLV 9254.04		

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Q Qualitätsicherungs
Quality assurance

S Spezifikation
Specification

T Turbinenanlagen
Turbine Plants

Qualitätsprüfblatt/Quality Test Sheet

Kennwort: Job Name:	**KennNr.:** ID Number: **Typ:** Type: **Bauteil:** Component: Turbinenwelle / Turbine shaft **Werkstoff:** Material: NiCrMoV **Index:** 0 **TLV:** Purchase Specification: PD 10325UB	**Q-Blatt Nr:** Q-sheet No.: 121120 **Datum:** Date: **Blatt:** Page: 1 **von** of 1
Auftrags-Nr.: Order No.: 10588		
Baugruppe: Des. Gr.-No.:		

Prüfungen / Tests		Prüfanforderung / Test specification	Prüfung durch: Tested by Hersteller / Manufact.	Siemens	Teilnahme / Participation	Dokumentation / Documentation	Bemerkungen / Remarks	Index
1	**Pruefungen beim Lieferanten** **Tests at supplier**							
1.1	Mass- und Sichtpruefung Dimensional and visual inspection		x					
1.2	Chemische Zusammensetzung Chemical composition	PD-spec	z			z		
1.3	Mechanische Eigenschaften Mechanical properties	PD-spec	z			z		
1.4	Ultraschallpruefung - Nach dem Vergueten Ultrasonic test - After quality heat treatment	UT 84357GS	z			z		
1.5	Dokumentationskontrolle Check of documentation		x					

x	= nichtprotokollierte Prüfung	Examination (no certificate required)
p	= protokollierte Prüfung	Examination (certificate required)
z	= Zeugnis nach EN 10204	Certificate acc. to EN 10204
w	= Teilnahme Siemens/Kunde	Witness point with Siemens/customer agreement
coc	= Bescheinigung nach EN 10204/2.1	Certificate of compliance acc. to EN 10204/2.1
sw	= Siemens Teilnahme-Option	Siemens witness point
cw	= Kunden Teilnahme-Option	Customer witness point
sr	= Siemens Dokumentationskontrolle	Siemens review of documentation
cr	= Kunden Dokumentationskontrolle	Customer review of documentation

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Power Generation (PG)

PEF-NCR-00696

Q Qualitätsicherung / Quality assurance

S Spezifikation / Specification

T Turbinenanlagen / Turbine Plants

Qualitätsprüfblatt/Quality Test Sheet

Kennwort: Job Name:	**KennNr.:** ID Number:	**Index:** 0	**Q-Blatt Nr:** 121300 Q-sheet No.:
Auftrags-Nr.: 10588 Order No.:	**Typ:** Type:		**Datum:** Date:
Baugruppe: Des. Gr.-No.:	**Bauteil:** Component: Turbinenlaeufer Turbine rotor		**Blatt:** 1 Page: **von** 2 of
	Werkstoff: Material: NiCrMoV	**TLV:** Purchase Specification:	

Prüfungen / Tests		Prüfanforderung / Test specification	Prüfung durch: / Tested by		Teilnahme / Participation	Dokumentation / Documentation	Bemerkungen / Remarks	Index
			Hersteller / Manufact.	Siemens				
1	**Pruefungen nach dem Drehen der Dichtbaender des Turbinenlaeufers** **Tests after turning of seal strips on turbine rotor**							
1.1	Mass- und Sichtpruefung In-process dimensional and visual inspection	Zeichnung / Drawing		x				
2	**Pruefungen waehrend und nach dem Beschaufeln des Turbinenlaeufers** **Tests during and after blading of turbine rotor**							
2.1	Schaufelkontrolle In-process blading check	Zeichnung / Drawing		x				
3	**Pruefungen zum, waehrend und nach dem Wuchten des Turbinenlaeufers** **Tests to, during and after balancing of turbine rotor**							
3.1	Schleuderpruefung - Turbinenlaeufer - 1,20 x Nenndrehzahl, 2 min. Over speed test - Turbine rotor - 1.20 x nominal speed, 2 min.			p	w	p	Kundensonderforderung Customer special requirement	
3.2	Wuchtpruefung - Turbinenlaeufer - Schwingungsanalyse, Restunwucht Balance test - Turbine rotor - Vibration analyses, remaining imbalance			p		p		

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Kennwort: Job Name:	**KennNr.:** ID Number: **Typ:** Type: **Bauteil:** Turbinenlaeufer Component: Turbine rotor **Werkstoff:** NiCrMoV Material: **TLV:** Purchase Specification: **Index:** 0	**Q-Blatt Nr:** 121300 Q-sheet No.: **Datum:** Date: **Blatt:** 2 von 2 Page: of
Auftrags-Nr.: 10588 Order No.:		
Baugruppe: Des. Gr.-No.:		

Prüfungen / Tests		Prüfanforderung / Test specification	Prüfung durch: / Tested by		Teilnahme / Participation	Dokumentation / Documentation	Bemerkungen / Remarks	Index
			Hersteller / Manufact.	Siemens				
4	**Pruefungen vor dem Versand des Turbinenlaeufers** **Tests before shipment ex factory of turbine rotor**							
4.1	Rund- und Planlaufpruefung - Vor dem Versand Radial- and axial run out check - Before despatch	Zeichnung / Drawing		p	w	p	Kundensonderforderung with Extension shaft Customer special requirement	
4.2	Endpruefung - Vor dem Versand des Turbinenlaeufers Final inspection - Before despatch of turbine rotor			x				

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Qualitätsprüfblatt/Quality Test Sheet

Kennwort: Job Name:	**KennNr.:** ID Number: **Typ:** Type: **Bauteil:** Component: Leitschaufeln Stufe 1-8 L+R / Stationary blades stage 1-8 L+R **Werkstoff:** Material: X20Cr13 **TLV:** Purchase Specification: 9238 01	**Index:** **Q-Blatt Nr:** Q-sheet No.: 131110 **Datum:** Date: **Blatt:** Page: 1 **von** of 1
Auftrags-Nr.: Order No.: 10588		
Baugruppe: Des. Gr.-No.: 12600		

Prüfungen / Tests		Prüfanforderung / Test specification	Prüfung durch: / Tested by		Teilnahme / Participation	Dokumentation / Documentation	Bemerkungen / Remarks	Index
			Hersteller / Manufact.	Siemens				
1	**Pruefungen des Vormaterials** **Tests long-lead material**							
1.1	Chemische Zusammensetzung - Schmelzanalyse Chemical composition - Melt analysis	TLV	z					
1.2	Mechanische Eigenschaften Mechanical properties	TLV	z					
1.3	Sichtpruefung Visual inspection	TLV	z					
1.4	Masspruefung Dimensional inspection	Zeichnung / Drawing TLV	x					
2	**Wareneingangspruefung (Vormaterial)** **Receiving inspection (Pre-material)**							
2.1	Dokumentationskontrolle Check of documentation	TLV		x				

x	= nichtprotokollierte Prüfung	Examination (no certificate required)
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Turbine Plants

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Kennwort: Job Name:	**KennNr.:** ID Number: **Typ:** Type:	**Index:**	**Q-Blatt Nr:** 131301 Q-sheet No.: **Datum:** Date:
Auftrags-Nr.: 10588 Order No.:	**Bauteil:** Leitschaufeln (gefräst) Component: Stationary blades (milled)		
Baugruppe: 12600 Des. Gr.-No.:	**Werkstoff:** X20Cr13 Material:	**TLV:** 9238 01 Purchase Specification:	**Blatt:** 1 **von** 1 Page: of

Prüfungen Tests		Prüfanforderung Test specification	Prüfung durch: Tested by Hersteller Manufact.	Prüfung durch: Tested by Siemens	Teilnahme Participation	Dokumentation Documentation	Bemerkungen Remarks	Index
1	**Pruefungen waehrend der Fertigung** **Tests during manufacturing**							
1.1	Maßprüfung Dimensional inspection	M-4-3.004		p				
2	**Pruefungen nach der Fertigung** **Tests after manufacturing**							
2.1	Sichtprüfung - 100 % Visual inspection - 100 %	M-4-3.001		x				
2.2	Überprüfung der Dokomentation auf Vollständig- und Richtigkeit Final check of documentation for correctness and completeness	M-4-3.001		p				

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Kennwort: Job Name:	**KennNr.:** ID Number: **Typ:** Type:	**Index:**	**Q-Blatt Nr:** 132120 Q-sheet No.: **Datum:** Date:
Auftrags-Nr.: 10588 Order No.:	**Bauteil:** Component: Laufschaufeln Stufe 1-8 L+R / Rotor blades stage 1-8 L+R		
Baugruppe: 14600 Des. Gr.-No.:	**Werkstoff:** X20Cr13 Material:	**TLV:** 9238 01 Purchase Specification:	**Blatt:** 1 von 1 Page: of

Prüfungen / Tests		Prüfanforderung / Test specification	Prüfung durch: / Tested by		Teilnahme / Participation	Dokumentation / Documentation	Bemerkungen / Remarks	Index
			Hersteller / Manufact.	Siemens				
1	**Pruefungen des Vormaterials** **Tests long-lead material**							
1.1	Chemische Zusammensetzung - Schmelzanalyse Chemical composition - Melt analysis	TLV	z					
1.2	Mechanische Eigenschaften Mechanical properties	TLV	z					
1.3	Sichtpruefung Visual inspection	TLV	z					
1.4	Masspruefung Dimensional inspection	Zeichnung / Drawing	x					
2	**Wareneingangspruefung (Vormaterial)** **Receiving inspection (Pre-material)**							
2.1	Dokumentationskontrolle Check of documentation	TLV		x				

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Kennwort: Job Name:	**KennNr.:** ID Number: **Typ:** Type: **Bauteil:** Component: Laufschaufeln (gefräst) Rotor blades (milled) **Werkstoff:** Material: X20Cr13 **TLV:** Purchase Specification: 9238 01	**Index:**	**Q-Blatt Nr:** Q-sheet No.: 132301 **Datum:** Date: **Blatt:** Page: 1 **von** of 1
Auftrags-Nr.: Order No.: 10588			
Baugruppe: Des. Gr.-No.: 14600			

Prüfungen Tests		Prüfanforderung Test specification	Prüfung durch: Tested by Hersteller Manufact.	Siemens	Teilnahme Participation	Dokumentation Documentation	Bemerkungen Remarks	Index
1	**Pruefungen waehrend der Fertigung** **Tests during manufacturing**							
1.1	Maßprüfung Dimensional inspection	M-4-3.004		p				
2	**Pruefungen nach der Fertigung** **Tests after manufacturing**							
2.1	Sichtprüfung - 100 % Visual inspection - 100 %	M-4-3.001		x				
2.2	Überprüfung der Dokomentation auf Vollständig- und Richtigkeit Final check of documentation for correctness and completeness	M-4-3.001		p				

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Qualitätsprüfblatt/Quality Test Sheet

Kennwort:
Job Name:

Auftrags-Nr.: 10588
Order No.:

Baugruppe:
Des. Gr.-No.:

KennNr.:
ID Number:

Typ:
Type:

Bauteil: Leitschaufelträger (TE1/TE2/GE1/GE2)
Component: Guide blade carrier (TE1/TE2/GE1/GE2)

Werkstoff: GX4CrNi13-4
Material:

TLV: TLV 9254.04
Purchase Specification:

Index:

Q-Blatt Nr: 161140
Q-sheet No.:

Datum:
Date:

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Page: of

Prüfungen Tests		Prüfanforderung Test specification	Prüfung durch: Tested by Hersteller Manufact.	 Siemens	Teilnahme Participation	Dokumentation Documentation	Bemerkungen Remarks	Index
1	**Pruefungen beim Lieferanten** **Tests at supplier**							
1.1	Chemische Zusammensetzung - Schmelzanalyse Chemical composition - Melt analysis	TLV	z					
1.2	Mechanische Eigenschaften Mechanical properties	TLV	z					
1.3	Zerstörungsfreie Prüfung Nondestructive test	TLV	x					
1.4	Mass- und Sichtpruefung Dimensional and visual inspection	Zeichnung / Drawing						
2	**Wareneingangspruefung** **Receiving inspection**							
2.1	Mass- und Sichtpruefung während der Fertigung Dimensional und visual inspection - In process	Zeichnung / Drawing		x				

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POTENTIAL SUB–SUPPLIER LIST

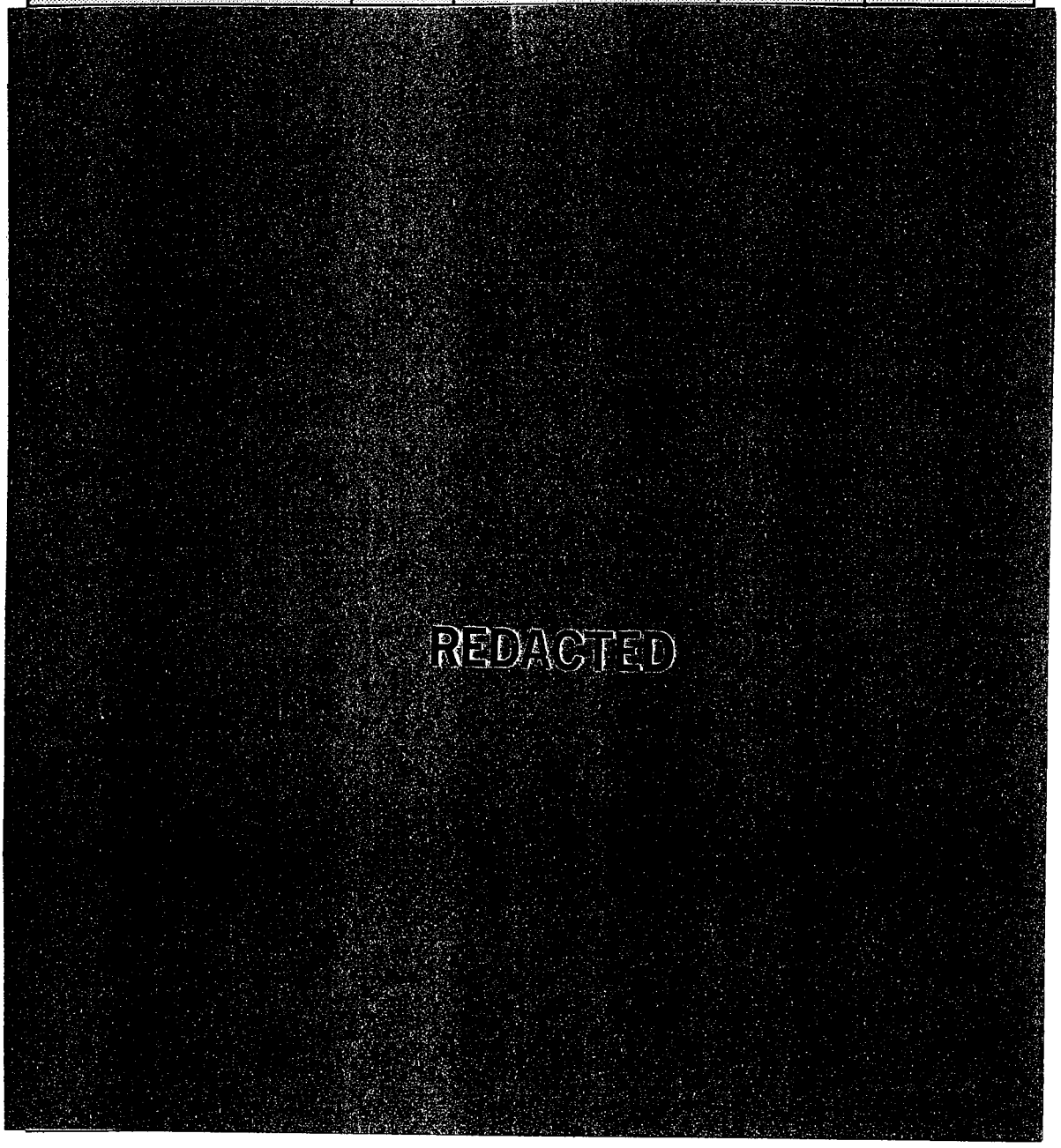
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Main Component	QST - Sh.- No.	Supplier	Machining Operation	Qualification Grade
[redacted]				

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Main Component	QST- Sh.- No.	Supplier	Machining Operation	Qualification Grade

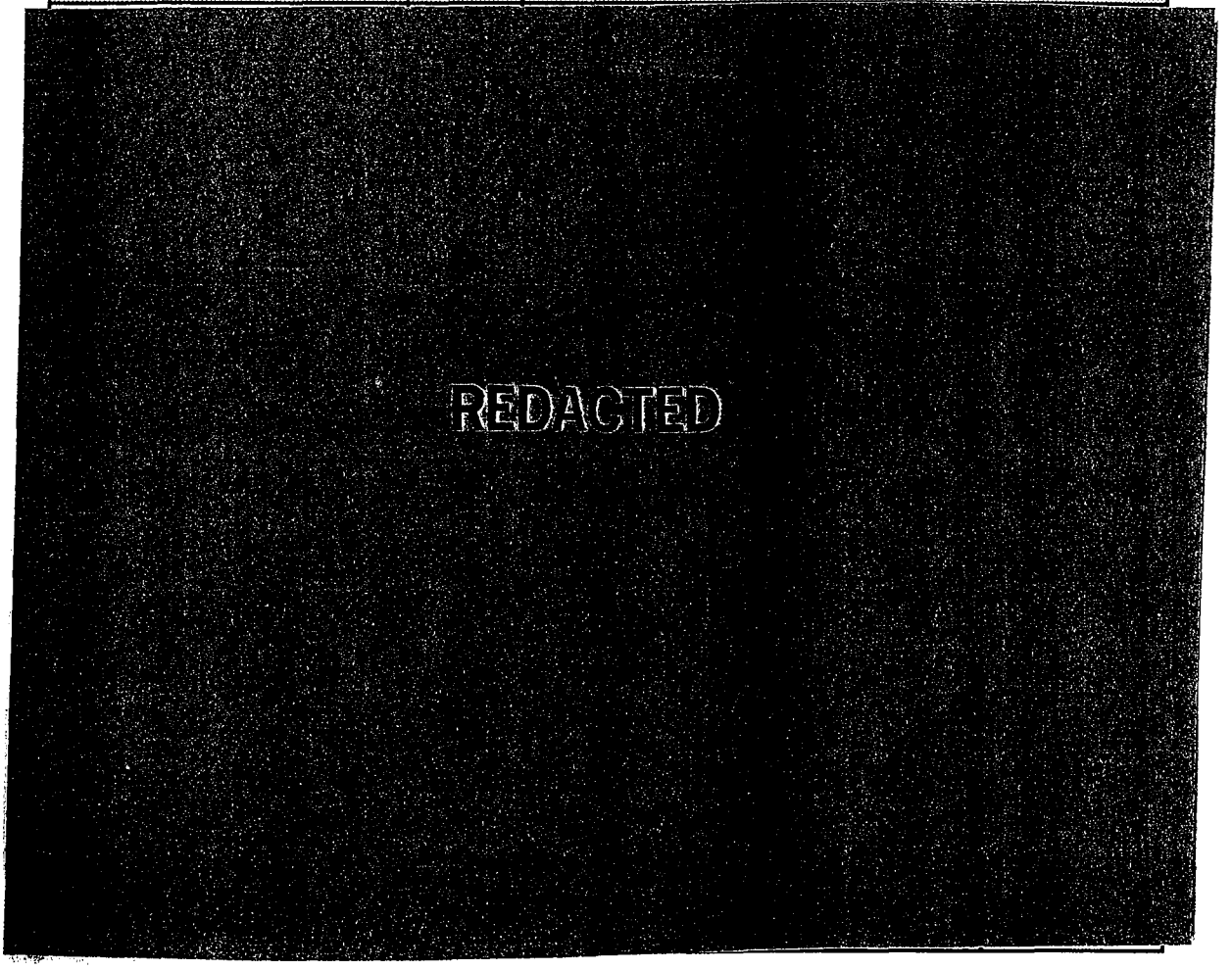


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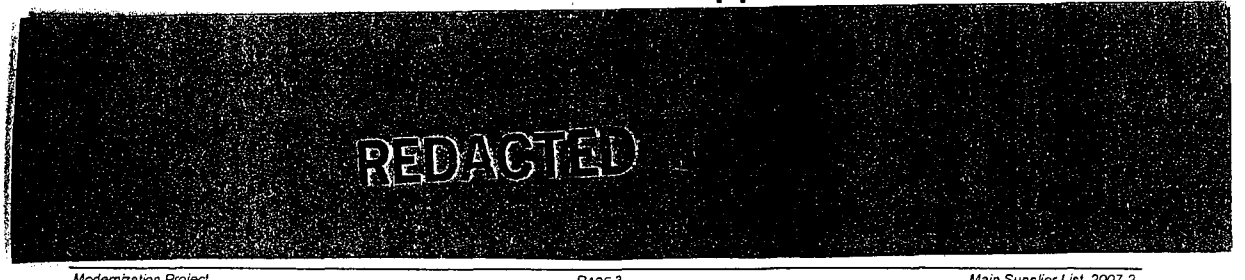
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Main Component	QST - Sh.- No.	Supplier	Machining Operation	Qualification Grade



Potential Field Sub-Supplier List



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SUSQUEHANNA STEAM ELECTRIC STATION TURBINE RETROFIT/GENERATION UPRATE:

DECISION FACTORS FOR LONG TERM RELIABILITY AND IMPROVED PERFORMANCE

Co-Authors

John A. Bartos, PPL Susquehanna, LLC
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Michael W. Smiarowski, Siemens Westinghouse Power Corporation

INTRODUCTION/ABSTRACT

Nuclear power is a cost-effective source of electric power. According to Robert Smock, editor of Power Engineering Magazine, "with almost 400,000 MW of new capacity needed to meet demand growth over the next 20 years, nuclear power must contribute to this need and it is evident that electrical utilities must increase capital investment in electrical facilities."[1] Nuclear Plant operators are relicensing and retrofitting the plants to achieve maximum output and useful life from the plants. PPL's Susquehanna Steam Electric Station (SSES) Units 1 and 2, a Boiling Water Reactor Plant in Berwick, PA, with a 1100 MWe nominal rating per unit, is such a plant looking to operate at peak efficiency and reliability for its operating life.

The Susquehanna Station was faced with long term maintenance issues on its original disc type OEM low-pressure (LP) turbines (circa 1982). The original LP rotors suffered from stress corrosion cracking (SCC) in the disc/keyway and blade attachment areas, which is a common design issue on certain rotor designs. Even though all six of the original disc type Unit #1 and #2 LP rotors were replaced with the current monoblock design in 1986 and 1988 respectively, there were still concerns that these monoblock LP rotors would develop SCC in the blade attachment areas. In addition, another significant long-term maintenance issue was LP casing erosion on the current operating LP turbines, which PPL also wanted to address.

A team was formed to investigate the long-term options for the Susquehanna plant to both increase performance and reduce long term maintenance on the turbines. In November 1999, PPL issued requests for bids to replace the six (6) low-pressure turbines with an option to replace the two (2) high-pressure turbines. Upgraded erosion resistant materials options were also part of PPL's request for the LP construction.

Although many factors are considered when developing an effective contract, the key/unique factors PPL used in the selection process of the turbine retrofit were:

[1] Smock, Robert, W., Power Engineering, July 2001 (Vol. 105, no. 7), p.3.

- Performance Improvement

- Proven Technology and Reliability (includes Material Selection/Composition and Placement)

Additional contributing factors that were involved in contract discussions between both PPL and the turbine supplier were:

- Performance Warranty/Testing Criteria
- Scope of Supply
- Installation Scope and Duration
- Equipment Warranty
- Design Alternatives Incorporating Current and Potential Future Station Uprates (in essence, Strategic Planning)

On January 23, 2001, PPL awarded the turbine retrofit contract to Siemens-Westinghouse Power Corporation (SWPC). The new turbines will use Advanced Disc Design LP rotors and have upgraded casing materials for erosion resistance. The HP turbine retrofit provides a portion of the additional MWe's and optimizes the turbine to the uprated steam conditions. This paper will share, to the extent possible, the details on the key decision factors to provide insight regarding the magnitude and breadth of such a project.

LP ROTOR DISC CRACKING EXPERIENCE

Several manufacturers' turbines with shrink fit discs on solid rotors, such as at the original turbines at Susquehanna Steam Electric Station (SSES), had a history of disc inside diameter cracking in the keyway areas. Such disc cracking is a well-known problem in the industry caused by stress corrosion. Three basic factors: susceptible material, wet corrosive environment, and high tensile stress at the surface are necessary to support stress corrosion cracking. In this design, the original keyway provided a location for steam contaminants to concentrate, thereby creating a corrosive environment. Most importantly, the geometry of the keyway and the shrink fit of the disc onto the rotor shaft contributed to high tensile stress at the disc surface.

Disc cracking has been an issue on many low-pressure turbine rotor designs with shrink fit discs, with some exceptions, such as the Siemens design. This has led to replacement, or planned near term replacement, of many nuclear low-pressure turbine rotors. Susquehanna, in fact, had replaced the original disc type LP turbine rotors after only nominally 4 years of operation, with in-kind monoblock replacements supplied by the OEM. The replacement monoblock rotors had a six-year inspection interval. This inspection interval was later extended to eight years. In addition to the LP rotor inspection, a boresonic inspection is required every 10 years.

OTHER LONG TERM RELIABILITY ISSUES

Disc keyway cracking was the most serious risk to long term reliability and economical operation of the original Susquehanna LP turbines which led to their replacement. On the current operating LP turbine, the main concerns that were a challenge to long term operation were:

Dovetail Cracking: Dovetail cracking is stress corrosion cracking that occurs at the rim of a turbine disc, which is the attachment for the turbine blades. This type of failure is not as serious because it cannot generate missiles that would be potentially dangerous to plant safety systems. Nevertheless, this is becoming a significant industry concern and is causing some utilities to implement repair programs to prevent further damage to their turbine rotors. Typical repair costs could be $5 million per rotor and may require extended refueling outages to implement. The current SSES LP turbine rotors, which are a monoblock design, have not exhibited dovetail cracking. A crack mitigation program was in process at Susquehanna. The dovetail inspection and crack mitigation programs were discontinued after the decision to replace the turbines was formally approved.

Inner Casing Erosion: Casing erosion was also a serious long-term reliability issue on the current LP turbines at Susquehanna Steam Electric Station. Many nuclear operators, especially BWRs, are considering replacement or have replaced their older turbine rotors and inner casings because of high cost repairs associated with the severe erosion and loss of generation. Again, this was a major consideration in the turbine retrofit.

TURBINE BID REQUEST ISSUANCE AND MILESTONE DATES

In November 1999, PPL Susquehanna LLC issued a request for bids to four vendors for retrofit LP turbines at the Susquehanna site. This bid request also gave the bidders flexibility to quote on options such as improved materials, high-pressure turbine components, and installation services.

Bids were received in late February 2000 with PPL project evaluations extending through November 2000. The selection process entailed:

- Technical Evaluations
- Design Considerations and Clarification Meetings with Vendors
- Options Assessments
- Internal Meetings to Discuss Potential Future Station Uprates and Other Equipment Limitations

The evaluation period was extended by these considerations plus the need to analyze and incorporate information from an LP turbine inspection during the Spring 2000 Unit 1 refuel outage. In addition, meetings were held with the vendors submitting quotations to ensure their offerings were accurately being evaluated.

A letter of intent was issued to Siemens Westinghouse on November 17th, 2000. After two months of detailed negotiations and contract language review, the project agreement between PPL and Siemens Westinghouse Power Corporation (SWPC) was signed on January 23, 2001.

PERFORMANCE IMPROVEMENT/AWARD DECISION

The decision was made to proceed with the retrofit of the HP and LP rotors and inner casings. This would not only resolve the dovetail cracking concerns, but would additionally minimize future casing erosion problems. PPL's technical specification sought "a more efficient steam path for the main steam turbine, including all related accessories and auxiliaries required for a complete and operable system, to be installed as a replacement for the existing steam paths."[2] An additional annual average of 50 MWe output gain for each unit is anticipated from the advanced technology turbine train.

Although there were no long-term maintenance reasons to retrofit the HP turbines, a decision was made to proceed with their retrofit because the increased MWe that the HP turbine added to the total project upgrade justified their retrofit.

PROVEN TECHNOLOGY AND RELIABILITY

In conjunction with the increased performance provided by the improved technology turbine train, a proven, reliable turbine design was given equal importance as a success factor. Again, PPL's turbine specification stipulated that the retrofit turbine equipment "must maintain the existing unit availability while eliminating stress corrosion cracking (SCC) in both the blade attachment and disc/keyway areas, eliminating erosion of turbine stationary parts, while providing an increase in time between maintenance intervals."[3] Meeting this criterion is discussed below.

SWPC's LP Advanced Disc Rotor and Turbine Design Highlights

The retrofit LP design completely replaces the original rotors and inner casings, with minor structural modifications to the LP exhaust hoods. The figure below shows a representative LP steam path cross-section that will be used at Susquehanna. SWPC will be providing its $13m^2$ LP turbine design, which refers to the approximate exhaust area of each LP flow. The retrofit turbines will be designed to fit into the existing turbine bearings and operate with all the existing auxiliary systems. The SSES original seven blade stage LP design will be replaced with nine blade stages.

The LP rotor features the SWPC advanced disc design. The Susquehanna LP rotors will use a three disc per flow design, which was introduced to the U.S. market at the Siemens Westinghouse upgrade of the Limerick Generating Station turbines in 1998/1999. This advanced disc design LP rotor is the standard product offering for large nuclear LP rotor retrofits. As part of the SWPC best practices initiatives after uniting the respective Siemens and Westinghouse organizations in 1998, this advanced disc LP rotor design has become the standard offering for such applications.

[2] Technical Specification for the Replacement of the Main Turbine M-1549 rev.1, Nov. 1999, p.3.
[3] Ibid, p.3.

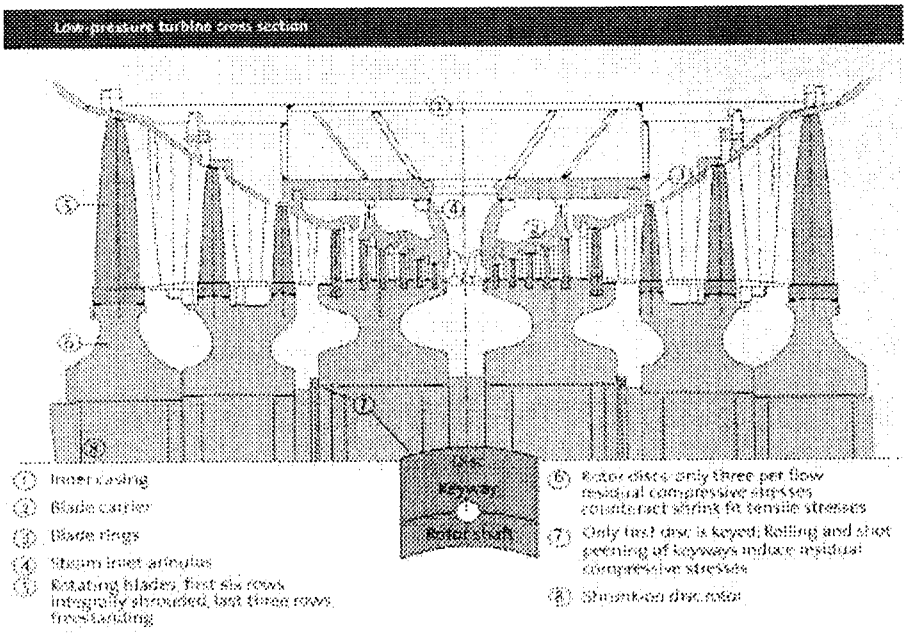


Figure 1 – Advanced Disc Design LP Turbine Cross Section

PPL benefited from previous application and analyses performed on the Limerick project to assess the design claims of the SWPC advanced LP disc design. Two major points that were highlighted by a previous independent evaluation of SWPC design claims were:

Pertaining to SCC in the Disc Inlet:

The SPC (SWPC) design addresses those areas in other manufacturers' designs that have led to early retirement of those rotors due to SCC in their shrunk-on discs.[4]

Pertaining to SCC in the Blade Attachment Area:

SPC stresses are low compared to similar stresses which we have calculated for other manufacturer's designs in the equivalent areas. The lower stress states combined with the manufacturing procedure which results in residual compressive stresses in the periphery of the disc should provide good resistance to SCC in the attachment area.[5]

Noteworthy LP Turbine Design Features

Other noteworthy design features that were incorporated into the LP turbine design are as summarized as follows:

[4] "Limerick LP Turbine Replacement Rotor Proposed by Siemens Power Corporation Evaluation of Margin With Respect to Disc SCC", MPR Report, December 1995.
[5] Ibid.

- Integrally shrouded stationary and rotating drum stages. In addition, interstage sealing is accomplished through the "see-thru" or parallel seal strip arrangement.
- Free standing LP rotating section blades (3 stages per flow) with 46-inch last stage blades
- Flame hardened leading edges of the LP freestanding rotating blades to mitigate moisture erosion.
- Forward leaning last stage stationary blades for improved last stage rotating stage flow distribution.
- Moisture removal slots in the last stage stationary blade ring to reduce moisture erosion.
- Boroscopic inspection ports in the inner casing, to allow for blade inspection without casing disassembly.
- Asymmetric steam extraction locations to allow compact design and match existing extraction pipe locations.

Features that contributed to the increased performance improvement are:

- Able to use larger back-end blading 46-inch.
- Flexibility to increase number of blade stages.
- Optimized turbine design for the available steam conditions or uprate.

Surface Stress Management To Avoid Stress Corrosion Cracking (SCC)

In addition to careful selection of materials and strength levels, several techniques are used to further enhance resistance to SCC:

- All of the LP discs receive special heat treatment to impart residual compressive stress on the disc surfaces.
- Disc 1 (innermost) is shot peened on its side surfaces and in areas of the blade grooves and entering slots. Keyways, located only on this first disc, which are in fact cylindrical for pin insertion, are bored, rolled, and honed.
- Disc 2 is shot peened on its side surfaces and in the caulking piece grooves.
- Disc 3 has no additional shot peening, but the last row of rotating blade roots are rolled.

LP Inner Casing Erosion and Material Composition and Placement

The existing Susquehanna LP turbines had shown increasing signs of LP casing erosion of their carbon steel inner casing components. Such casing erosion was a repair cost problem at Susquehanna and is a potential issue at other BWR power plants. Therefore, PPL included a request in its bid specification for options to improve the composition of the inner casing materials. SWPC standard design nuclear LP turbines have, as a minimum, the blade path constructed from erosion resistant material such as an ASTM A487, gr. CA6NM and A276, type 403, which are used in the construction of the blade rings and carriers. After evaluating inner casing options that included up to an all

stainless steel inner casing construction, PPL selected the hybrid inner casing design which included upgraded materials in the high velocity areas. The dark shaded areas on ***Figure 1*** represent the use and placement of erosion resistant materials.

Maintenance Intervals/Valve Testing

PPL stipulated in its specification that the retrofit turbine components have at a minimum a 10-year inspection interval. SWPC LP turbines of such design as selected for Susquehanna, have been approved by the NRC for 10-year inspection intervals. It is worth noting that from a turbine design standpoint, the SWPC LP design could justify maintenance intervals up to 100,000 operating hours, which is typically over 12 calendar years.

Also, reducing the frequency of control valve testing often results in operating cost savings. A majority of turbine vendors can offer turbine equipment that requires only quarterly valve testing. SWPC's full arc admission design HP turbines support such a testing regimen, while requiring less power reduction due to the full arc all reaction design, as compared to partial arc and impulse designs.

The main points of an LP casing retrofit that contribute to the reliability and extended maintenance intervals are:

1. Entire steam path is replaced which minimizes/eliminates the need for repairs in the future.
2. Existing original SSES LP casings represented 20+ year old technology where issues are increasing, e.g. steam wash, erosion, etc.
3. Entire turbine is ready for 40+ years service life that fits into license extension plans.
4. Proactive approach to eliminate future concerns, which are a real possibility with reuse of existing LPT components.
5. Design is for 100,000 equivalent operating hour (EOH) inspection intervals/10 year approval from the NRC.

Advanced Disc Type LP Rotors in Service

Thirty-three (33) nuclear units are in service worldwide, which use the Siemens Advanced disc technology LP rotors introduced since 1972. Siemens has not experienced the extensive stress corrosion cracking of disc-type rotor as other suppliers and no Siemens-design LP rotor required replacement due to SCC concerns.[6] In fact, recent replacement of Siemens disc design LP rotors have been solely for performance improvement reasons due to the availability and application of improved blade technology.

[6] Oeynhausen, H., Roettger, G., Meade, W., Termuehlen, H. "Replacement of Nuclear LP Turbine Rotors and Inner Casings", American Power Conference Proceedings, April 1-3, 1997, p.1.

There are six operating units in the United States with the advanced disc design LP turbines, which are listed below:

SWPC OEM

- Grand Gulf Nuclear Station (Three LPs)
- Comanche Peak Steam Electric Station1 (Two LPs)
- Comanche Peak Steam Electric 2 (Two LPs)

Retrofits

- Limerick Generating Station 1 (Three LPs)
- Limerick Generating Station 2 (Three LPs)
- Palisades Nuclear Station(Two LPs which are formerly the Connecticut Yankee LP turbines)
- Susquehanna Steam Electric Station 1 & 2 (Six LPs on order for 2003/2004 installation)

It is interesting to note that the LP turbines operating at the Palisades Nuclear Station in South Haven, Michigan were the first application of the Siemens advanced disc design LPs in the United States. These were originally installed at the now decommissioned Connecticut Yankee (CY) Atomic Power Station in 1987. These turbines were removed from CY and inspected and modified for installation at the Palisades site in 1998/1999. The rotors were given a full ultrasonic inspection at this time and showed no indications due to SCC.

High Pressure (HP) Turbine Design Highlights

As mentioned earlier, the HP turbine was retrofitted for the performance improvement benefit. Some of the design highlights of the HP turbine include:

- Mono-block design without bore
- Stainless steel inner casing and blade carriers in existing outer casing, bearings, flow guide, etc.
- SWPC inlet "L" seal design, providing sealing between the inner and outer casing.
- Single piece inlet admission ring
- Full reaction blade path
- Advanced blade designs using SWPC's "3DS" blading.
- Five strip inter-stage seals.
- Existing seven blade stage design will be replaced with 12 blade stages per flow.

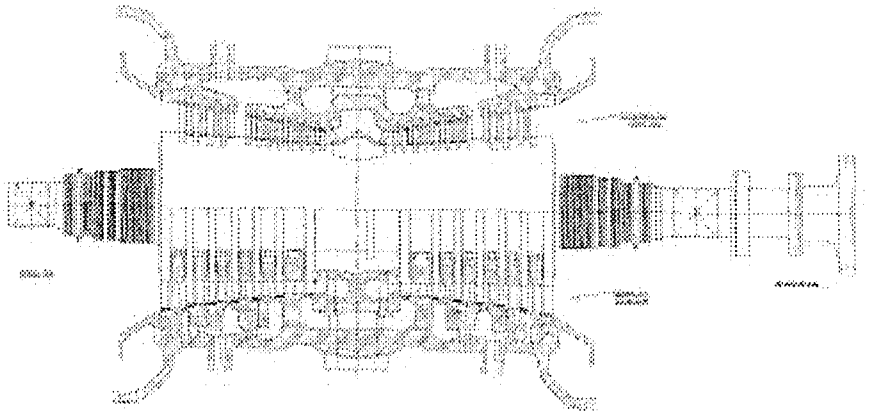


Figure 2 – HP Turbine Comparison (Upper: SWPC Design; Lower: Original)

PERFORMANCE WARRANTY/PERFORMANCE TESTING CRITERIA

Since the majority of this project's economic justification was based on increased generation, a performance warranty was established to provide an added incentive to achieve the generation improvement. To adequately/fairly enforce this performance warranty, it was imperative that the achieved megawatt improvement be accurately measured. SWPC and PPL mutually agreed to performance test language and procedures as part of the final contract negotiations. PPL agreed to SWPC's recommendation that a pre-test be performed prior to the turbine upgrade, and that a post-test be performed after the new turbine components are installed. By implementation of a "pre and post" test, after each respective refueling outages, the net MWe improvement provided from the turbine alone is verified. This method of testing is felt to be the most accurate and mutually beneficial test method since steam cycle inefficiencies, not easily quantified, will be comparable in each test.

INSTALLATION SCOPE AND DURATION

Originally, PPL requested that installation be considered as an option. The initial belief in the early stages of the project evaluation was that installation would be similar to an LP rotor replacement, which PPL had experienced with their Units 1 & 2 LP rotor replacement years earlier, in 1986 and 1988, respectively. After detailed discussions and a transfer of "lessons learned" between PPL and SWPC, PPL installation personnel agreed that such a project was akin to a construction effort as opposed to a more familiar maintenance outage. The LP turbine retrofit will require cutting and rewelding of all inlet and extraction piping, in addition to the installation and alignment of the new turbine components. The HP turbine retrofit will require specialty machining to modify and reuse the original outer casing.

After the PPL and SWPC team mutually reviewed the installation workscope and respective responsibilities, a comprehensive installation specification was developed for the project. Defined installation services for the retrofit high pressure and three low-pressure turbines per

unit were therefore included in the total project effort. Using SWPC's experience on both its own units and most recently at the Limerick Turbine Retrofit Project, it is estimated that the Susquehanna turbine train retrofit could be accomplished in 38-days, turning gear to turning gear.

Such aggressive installation outage durations, which were unheard of just a few years ago, are possible with an entire LP casing change-out due to the following:

- Reduced risk of encountering components that require repair, which would increase outage critical path.
- LP turbine lower-half components can be pre-aligned and installed as a single unit/lift.
- Dedicated and experienced (owner and vendor) project teams that are committed to thorough and rigorous pre-planning.

This approach has been already proven by the successful Limerick 1 & 2 installations. In fact, a number of participants in the Susquehanna project have previous experience from the Limerick installations.

CONCLUSIONS

As with most major purchase decisions, the key issues are product features, price, and performance. SWPC's advanced disc design LP turbines and its full reaction HP turbine provides the reliability and performance improvement that PPL required, with features that addressed their long-term maintenance concerns.

A turbine retrofit project is a major undertaking for both the plant owner and the turbine vendor. For PPL, the Susquehanna Turbine Retrofit/Generation Uprate project began as a project evaluation/uprate program and transformed into a strategic planning initiative for PPL. Long term maintenance issues were considered as well as current and future electric power market conditions. Turbine retrofit decisions had to consider the long-term operation, including uprate plans, for the life of the station.

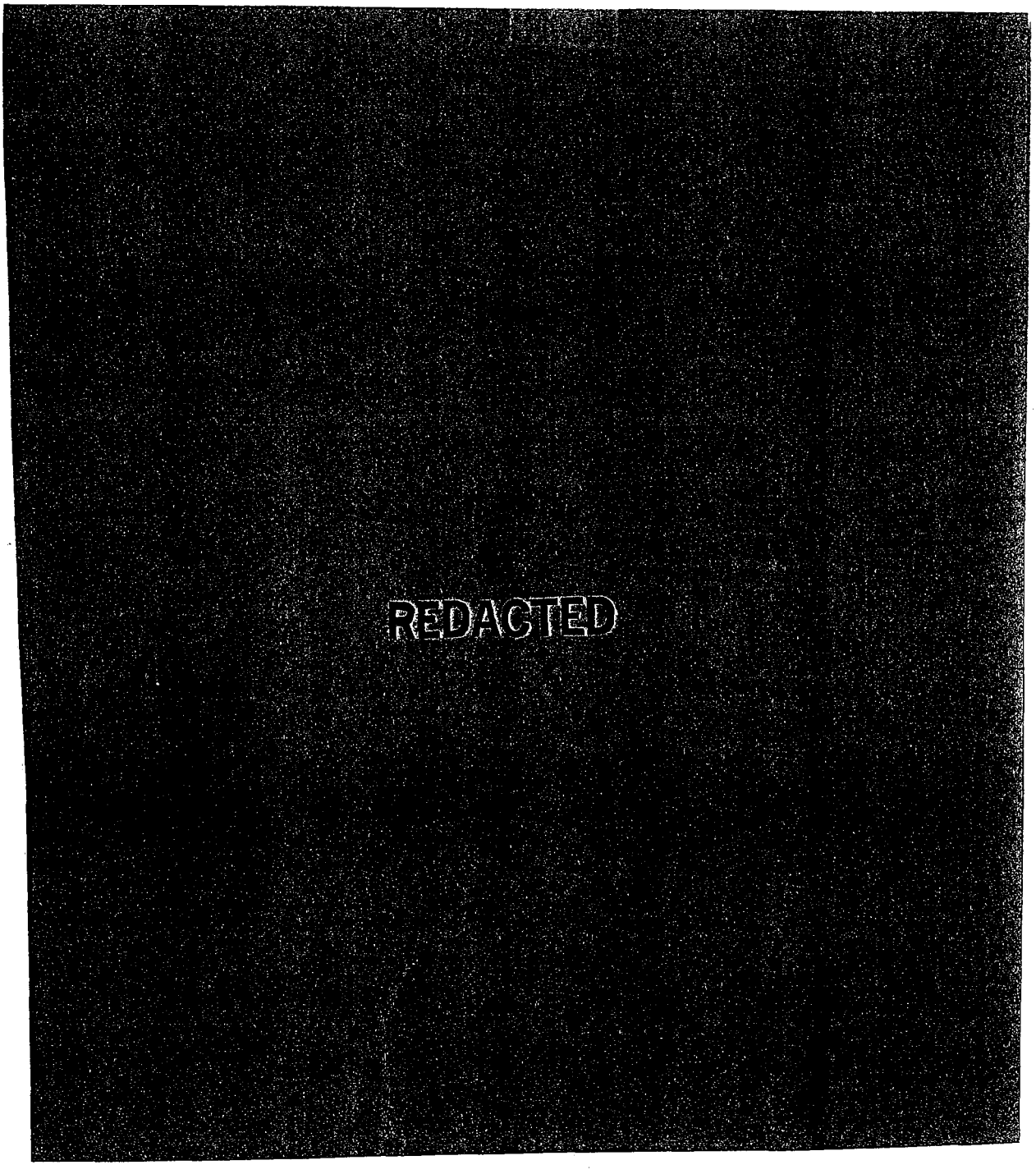
From a project evaluation standpoint, PPL took a global perspective to assure that all alternatives were properly assessed and considered and all bidders were evaluated fairly.

From a long-term reliability standpoint, the Susquehanna station project goal is to address the long-term maintenance issues and provide significant performance improvements using the latest design turbine technology. Through a team approach and flexibility, the project is poised to provide excellent value to all the project stakeholders. The increased asset value of the project has not gone unnoticed by the shareholders of PPL as well.

The first Susquehanna turbine retrofit installation, on Unit #2, is planned for March 2003 with the Unit 1 installation scheduled one year later. The project team plans to share and report the successes and lessons-learned from those installations in such a similar industry-wide format and forum.

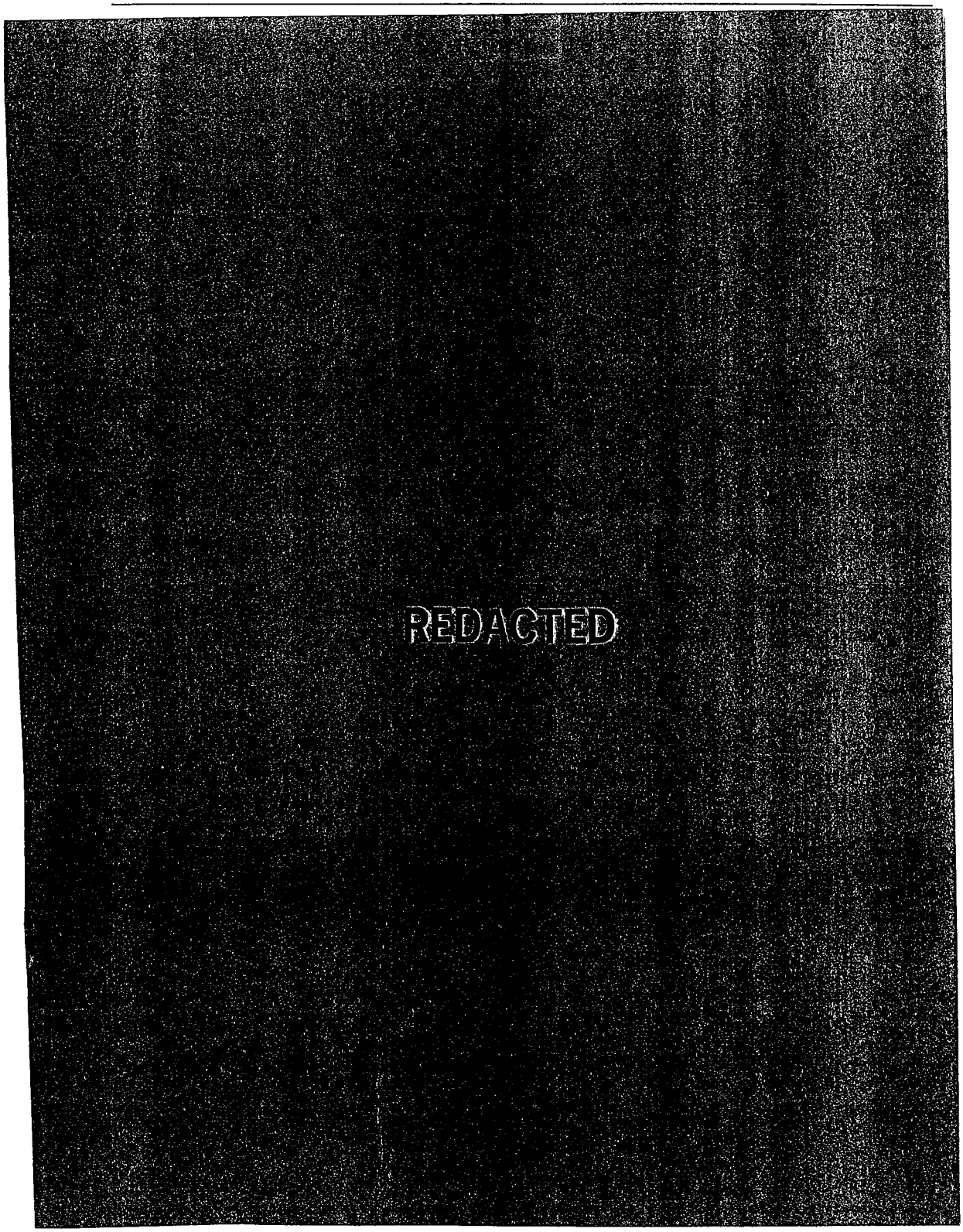
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SCOPE OF SUPPLY - HARDWARE



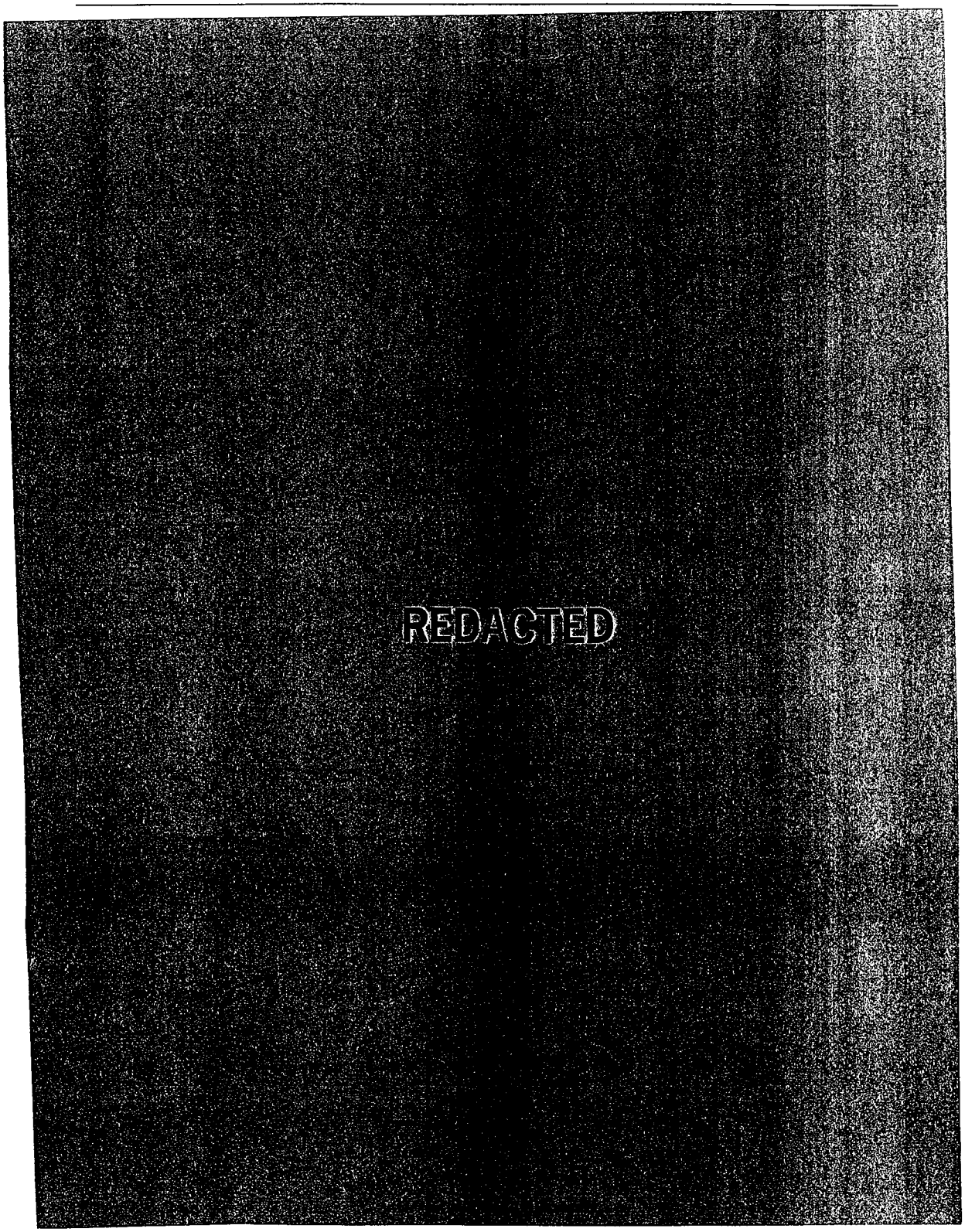
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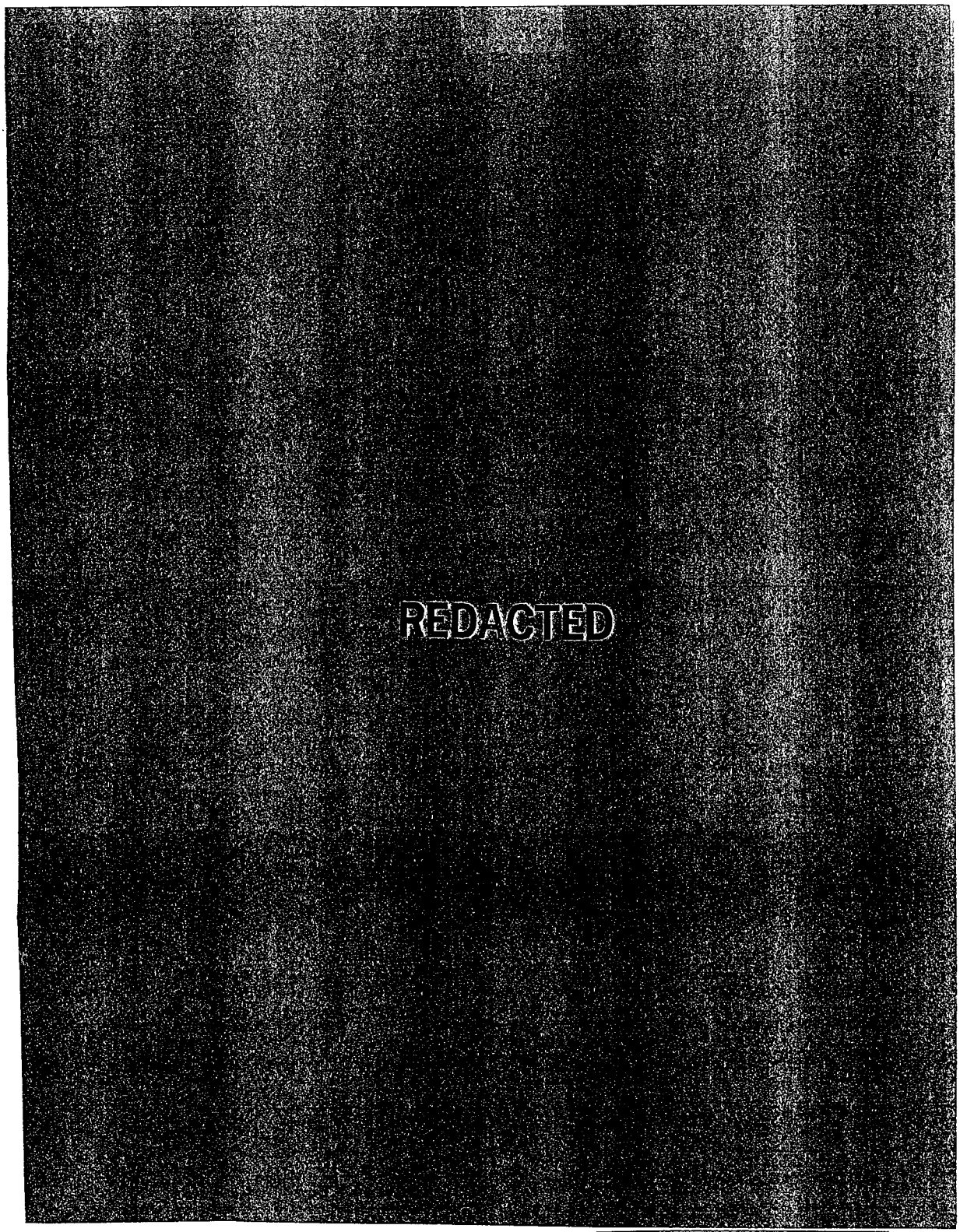
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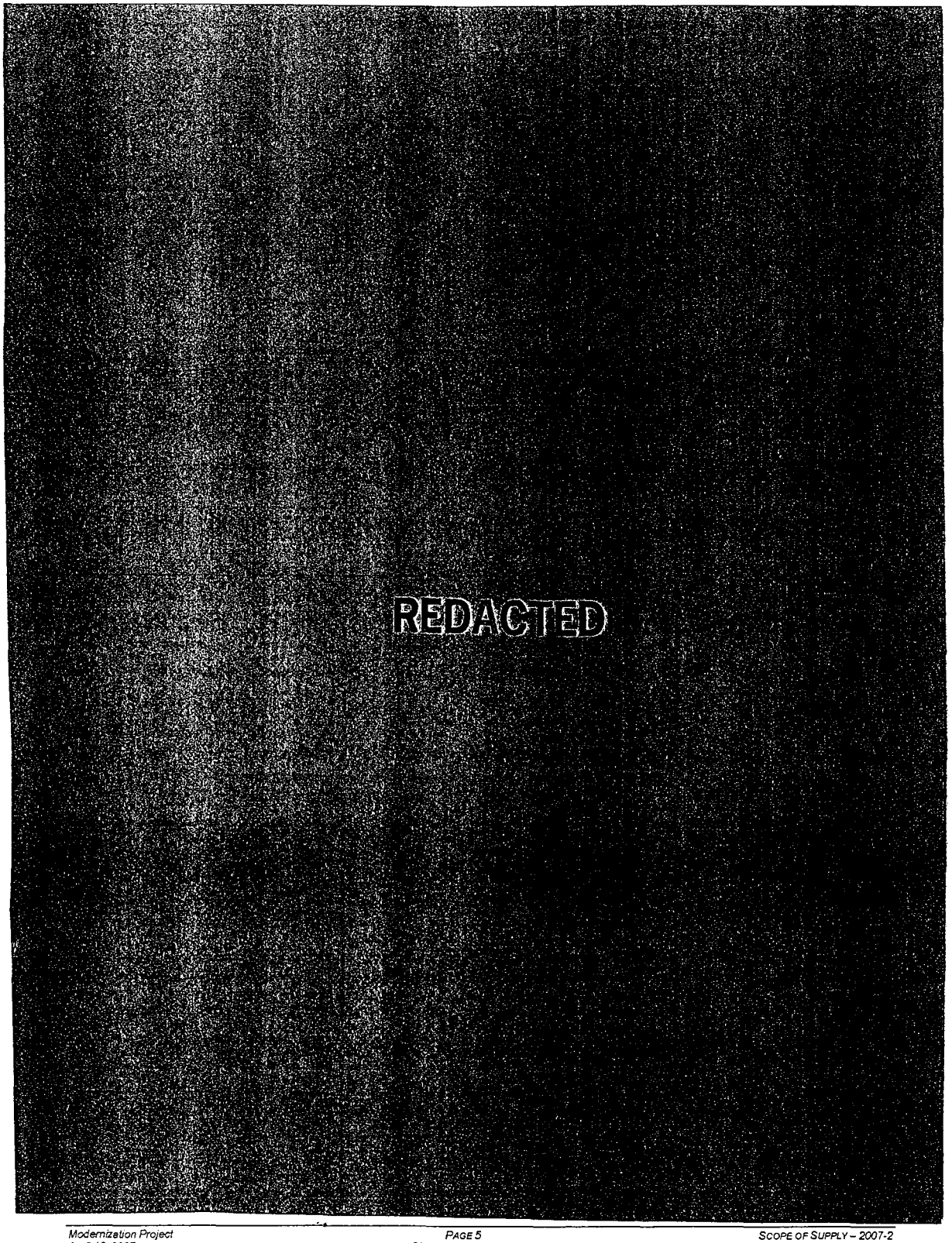
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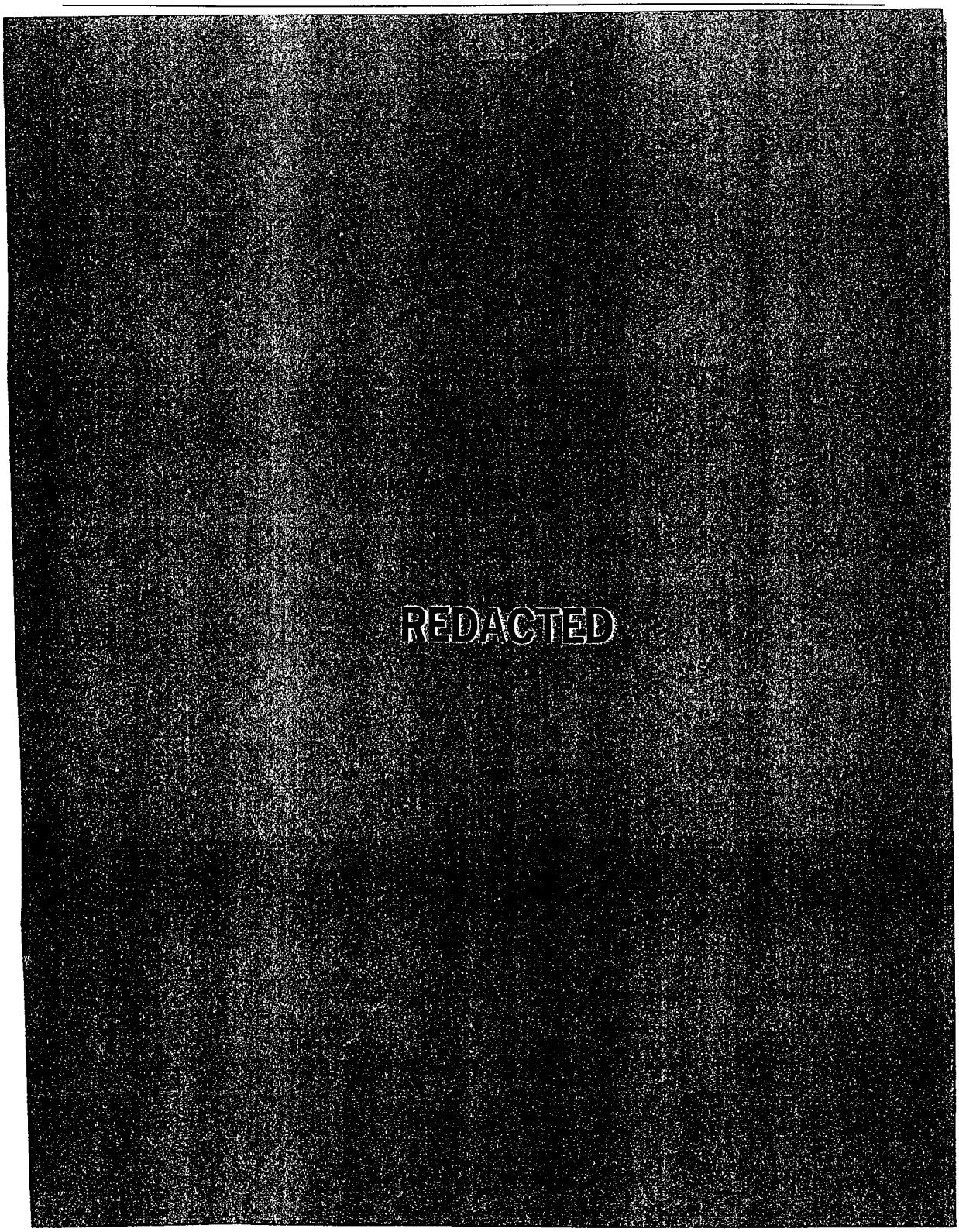
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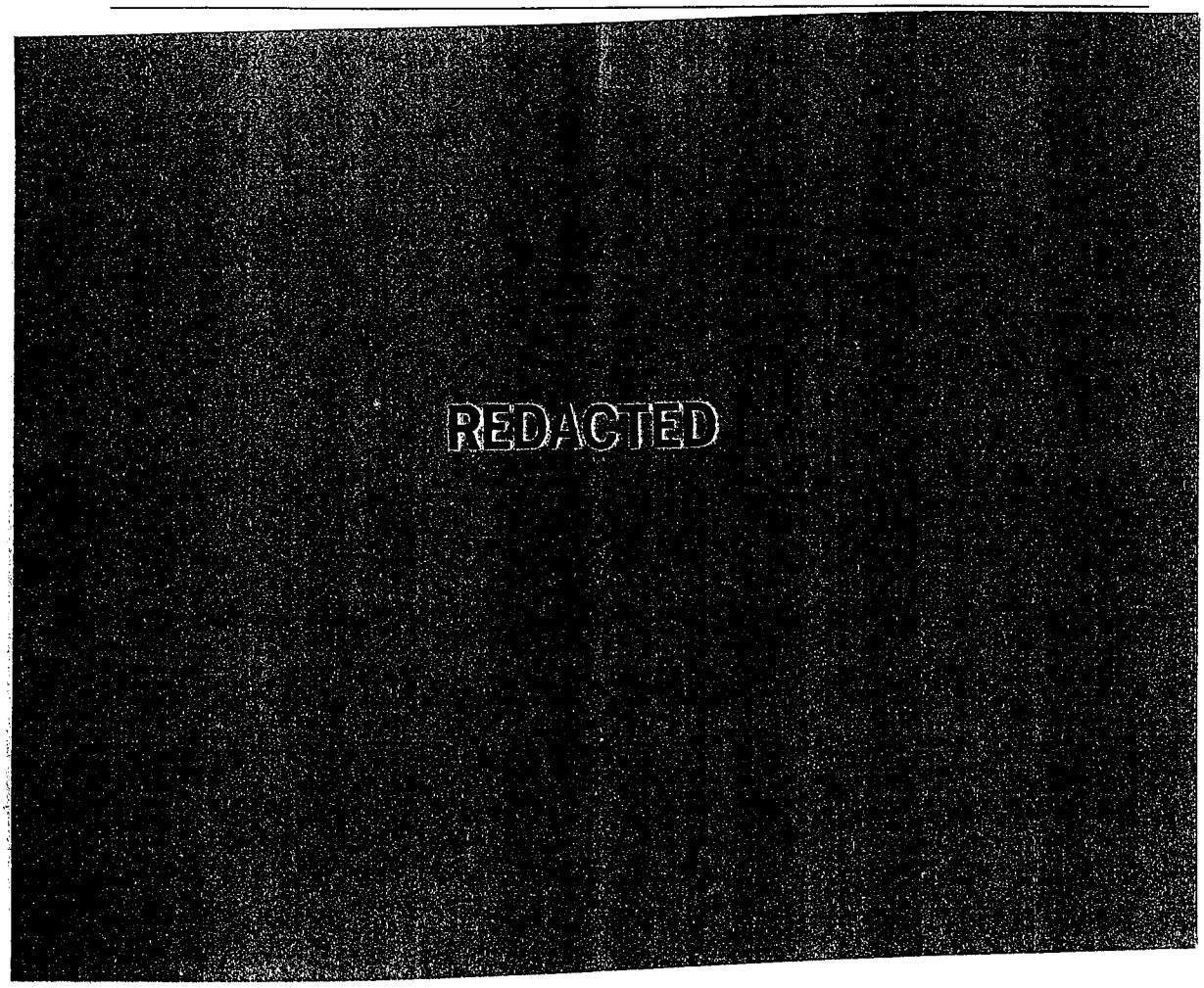
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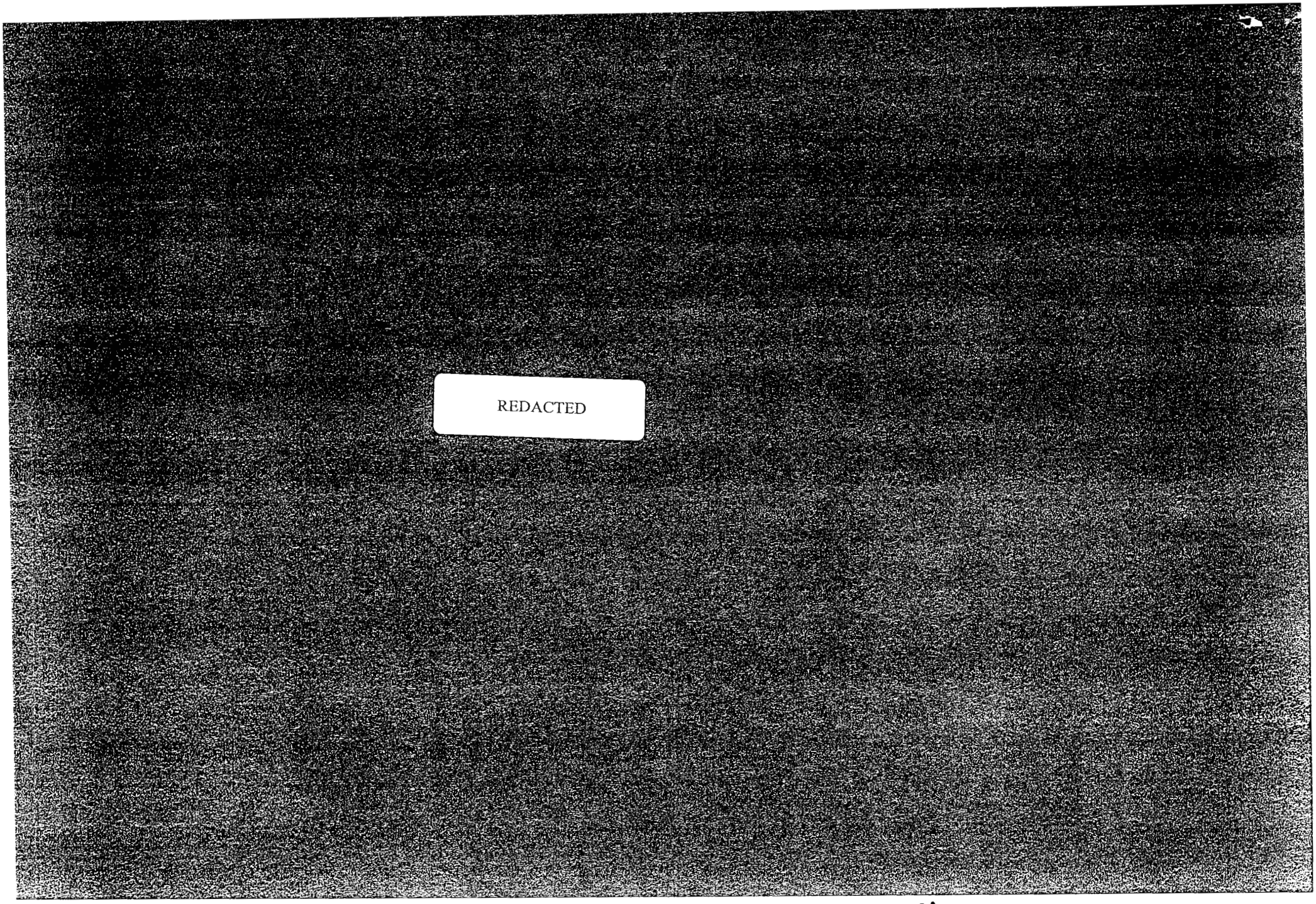
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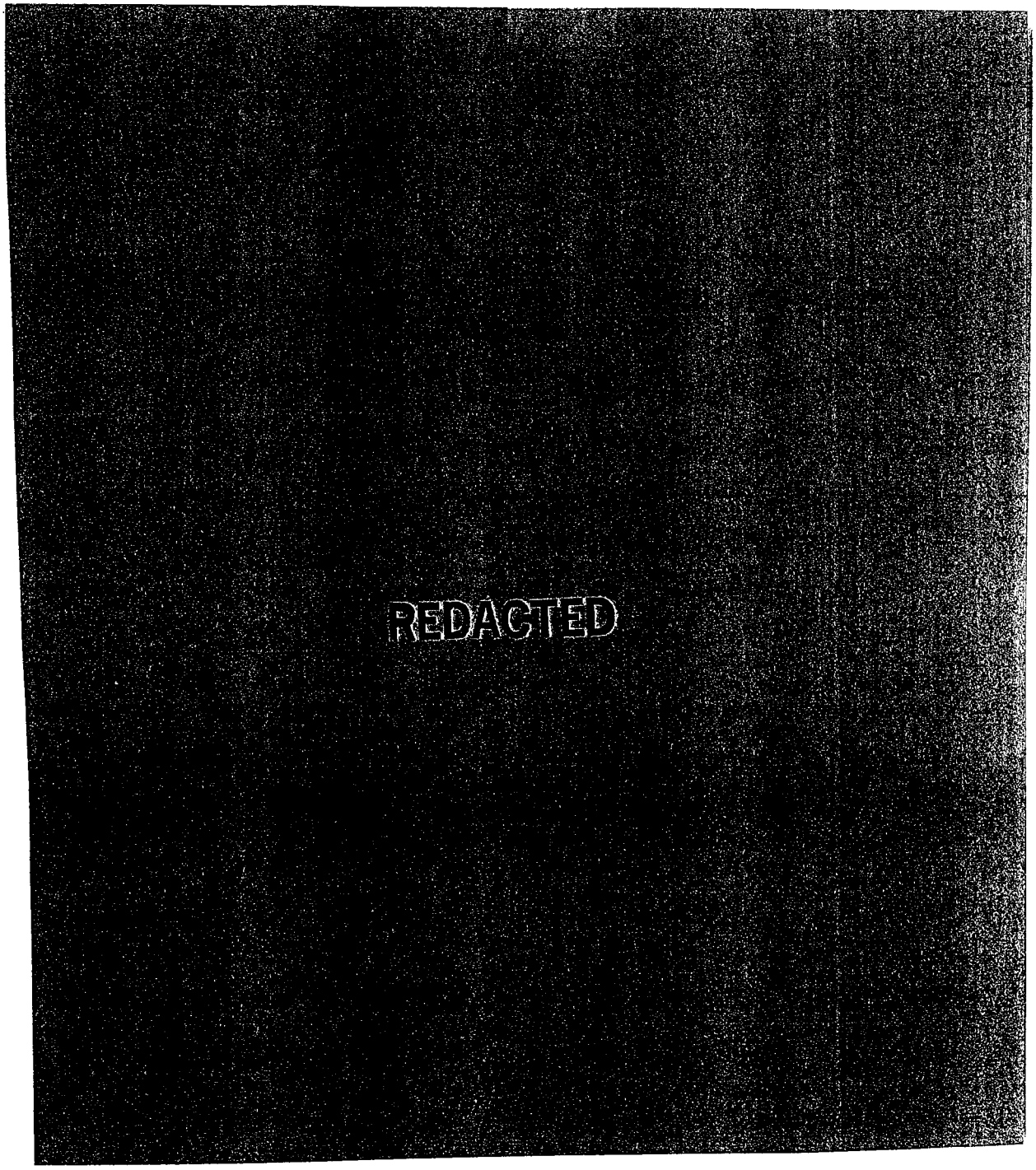
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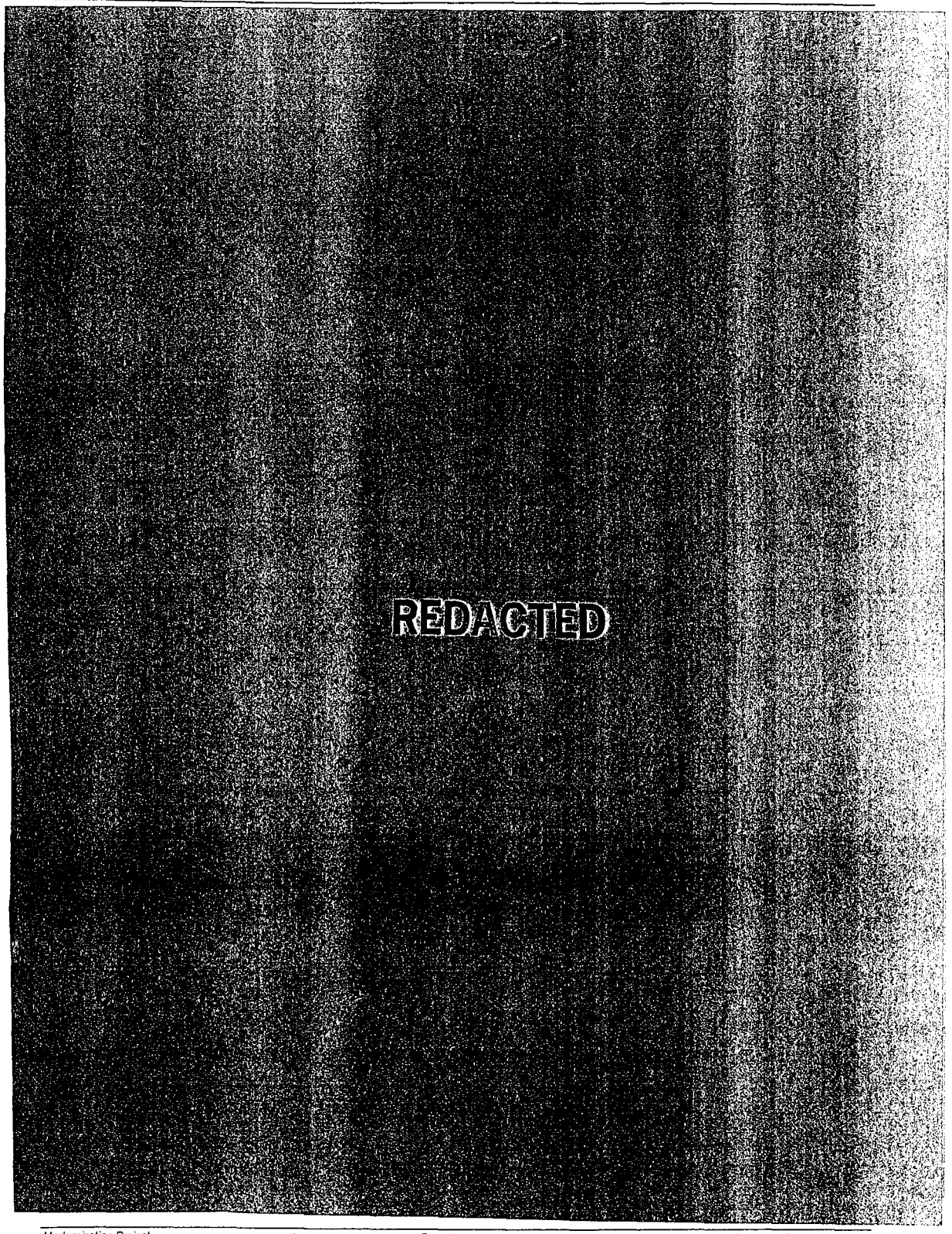
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SCOPE OF SUPPLY - HARDWARE



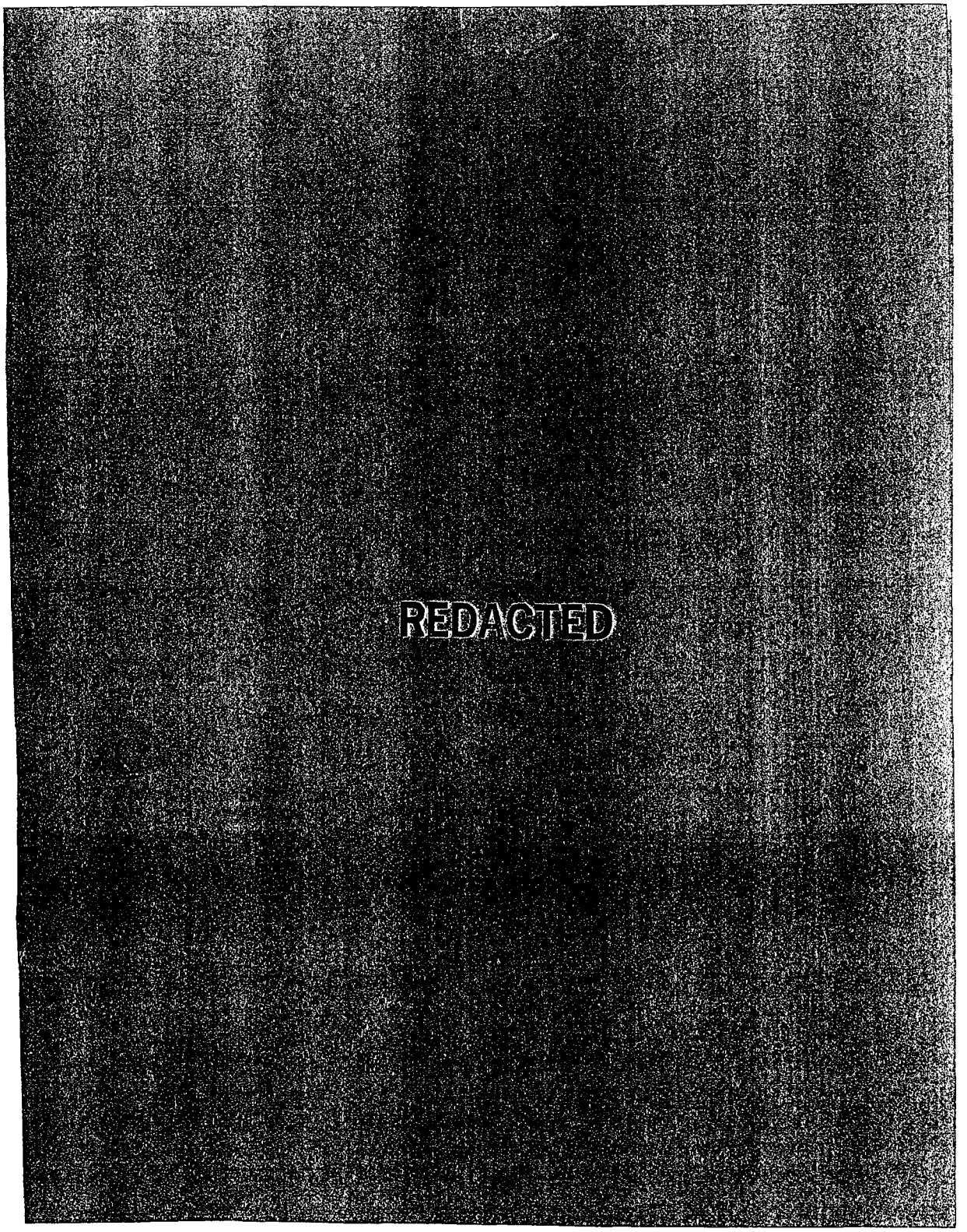
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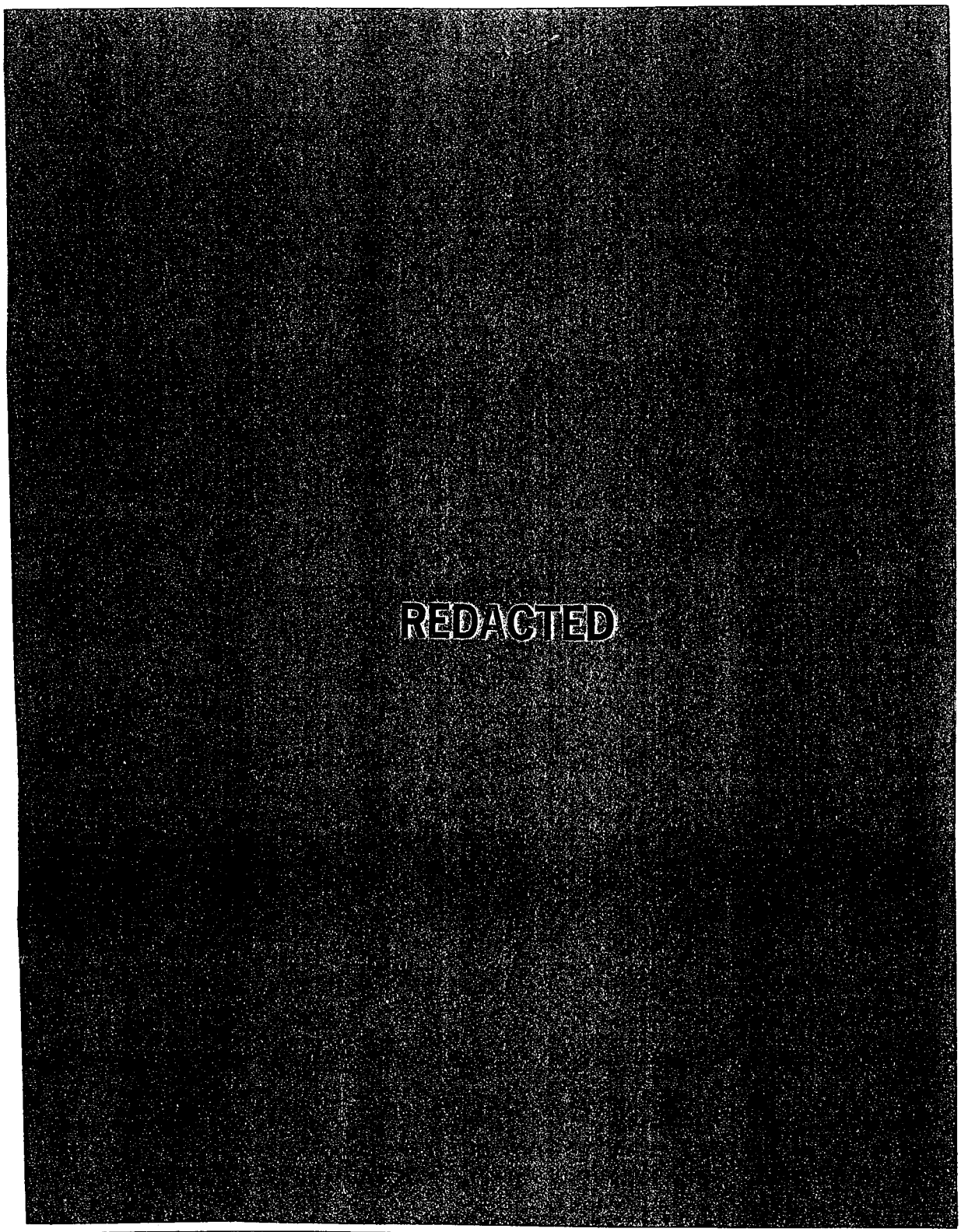
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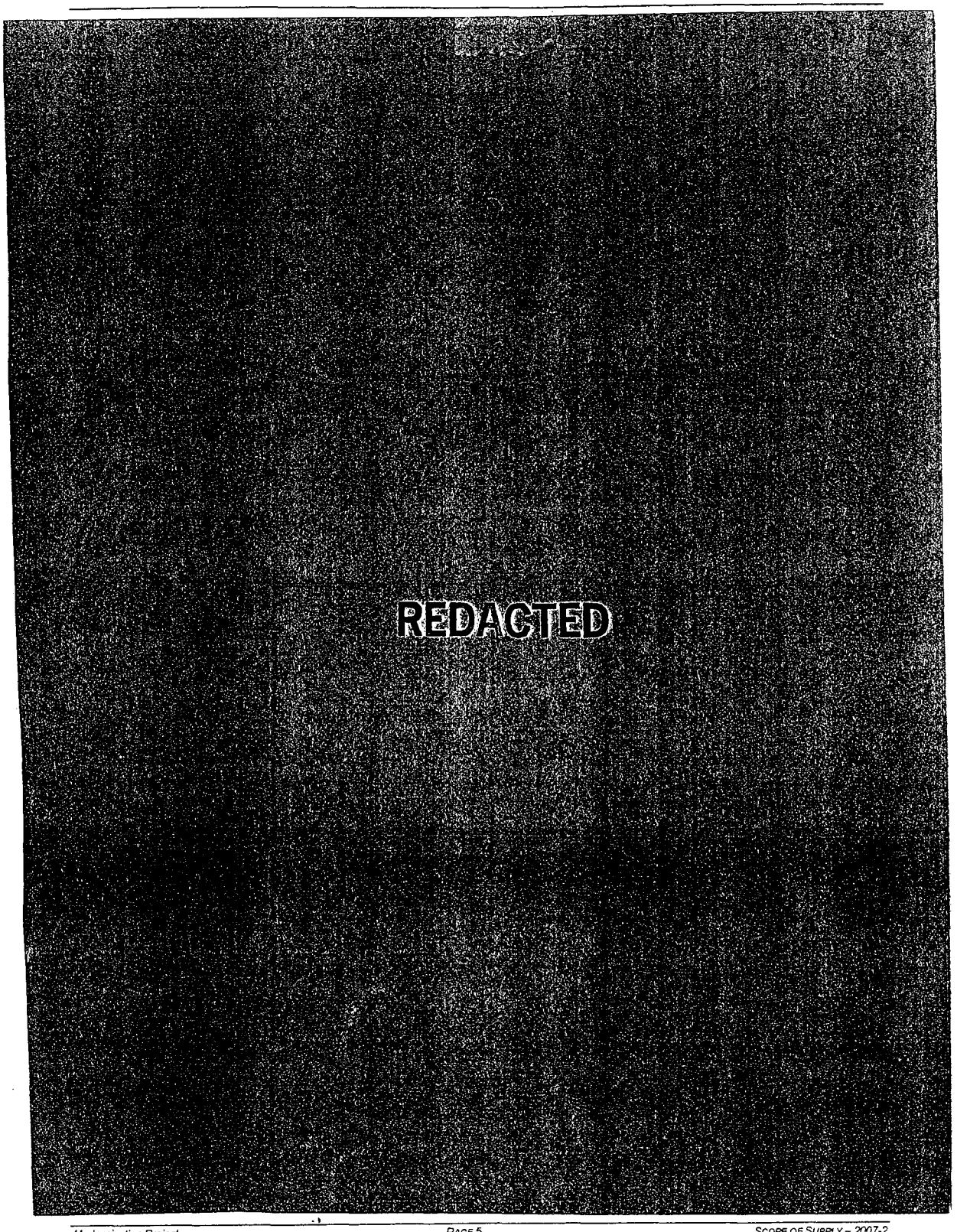
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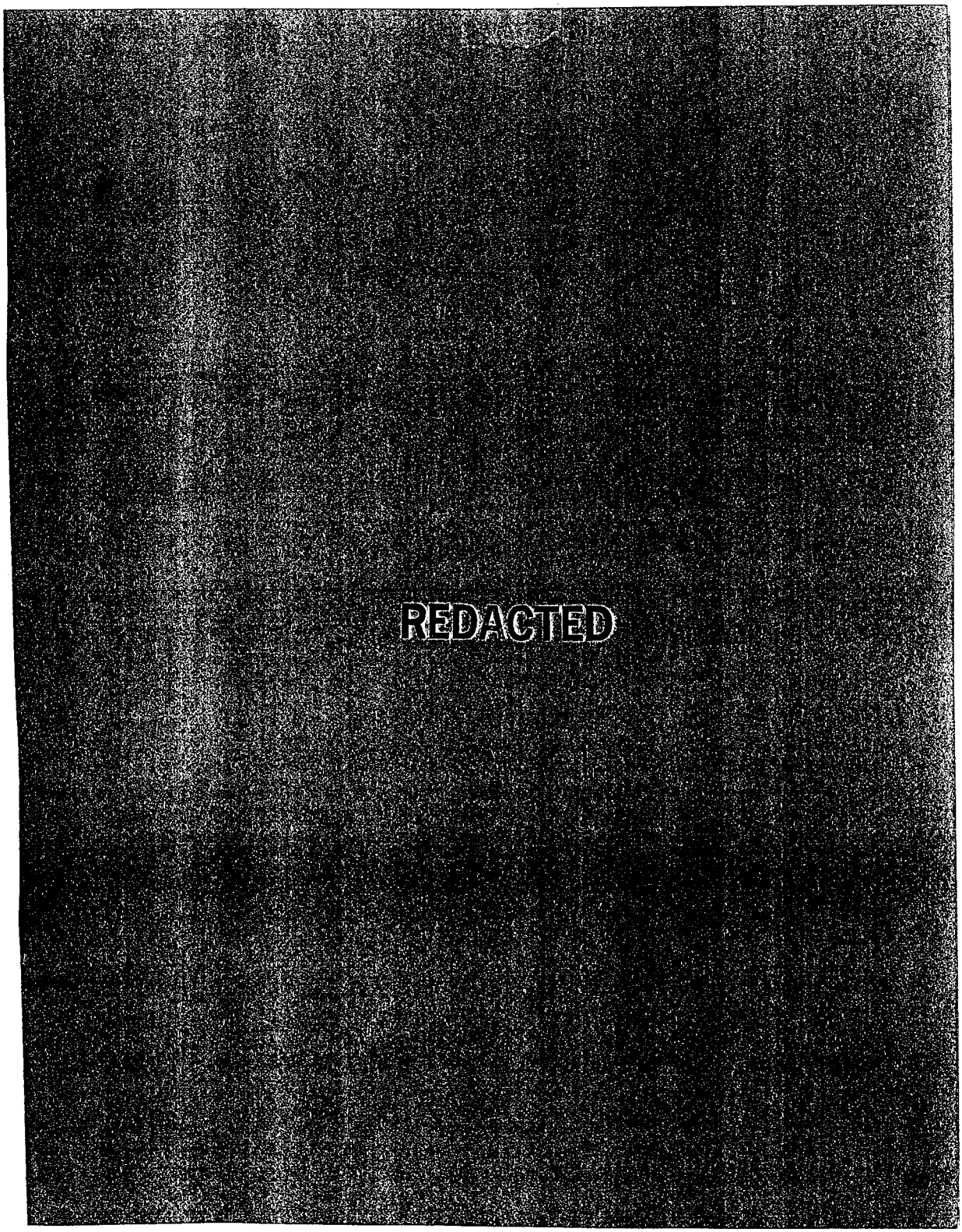
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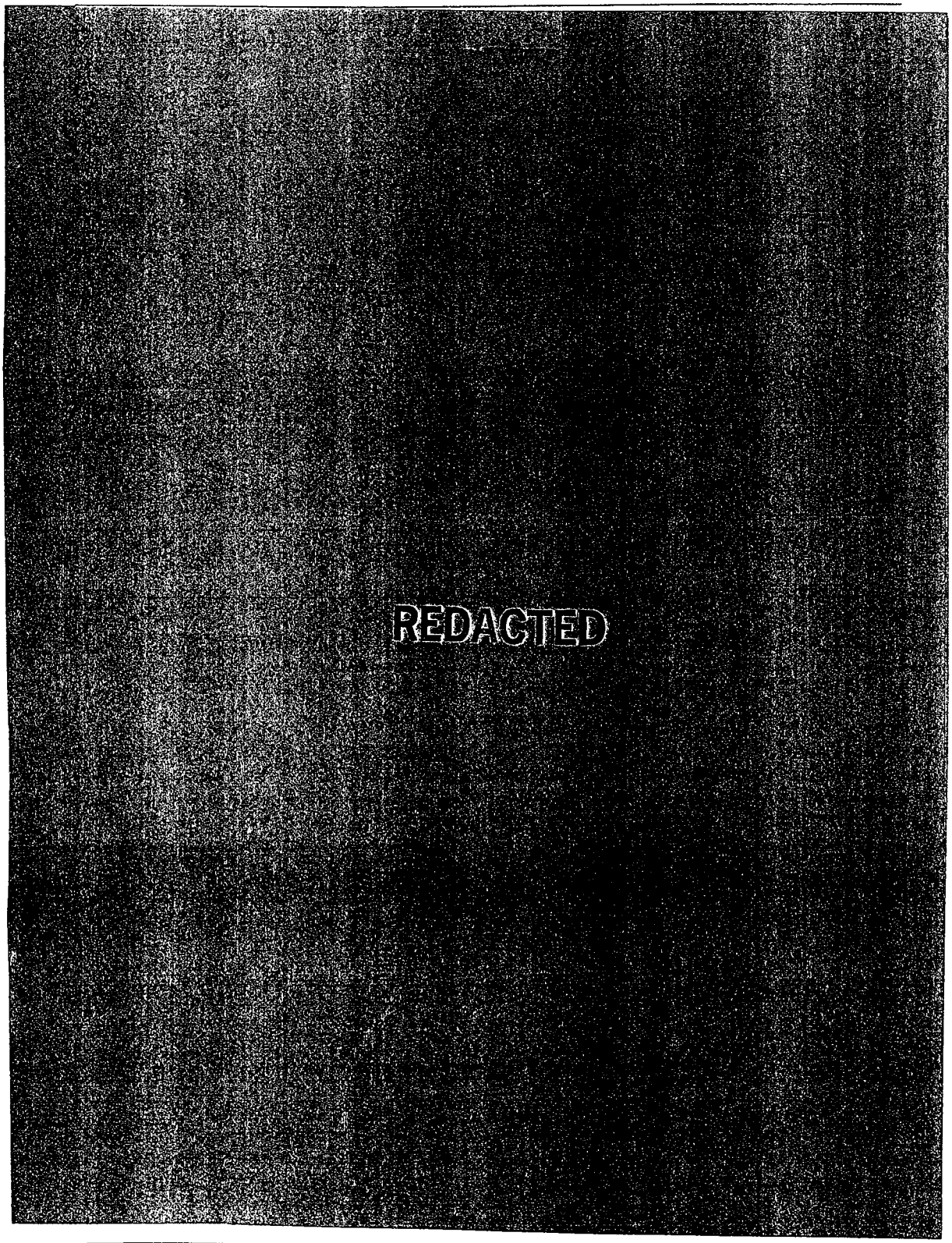
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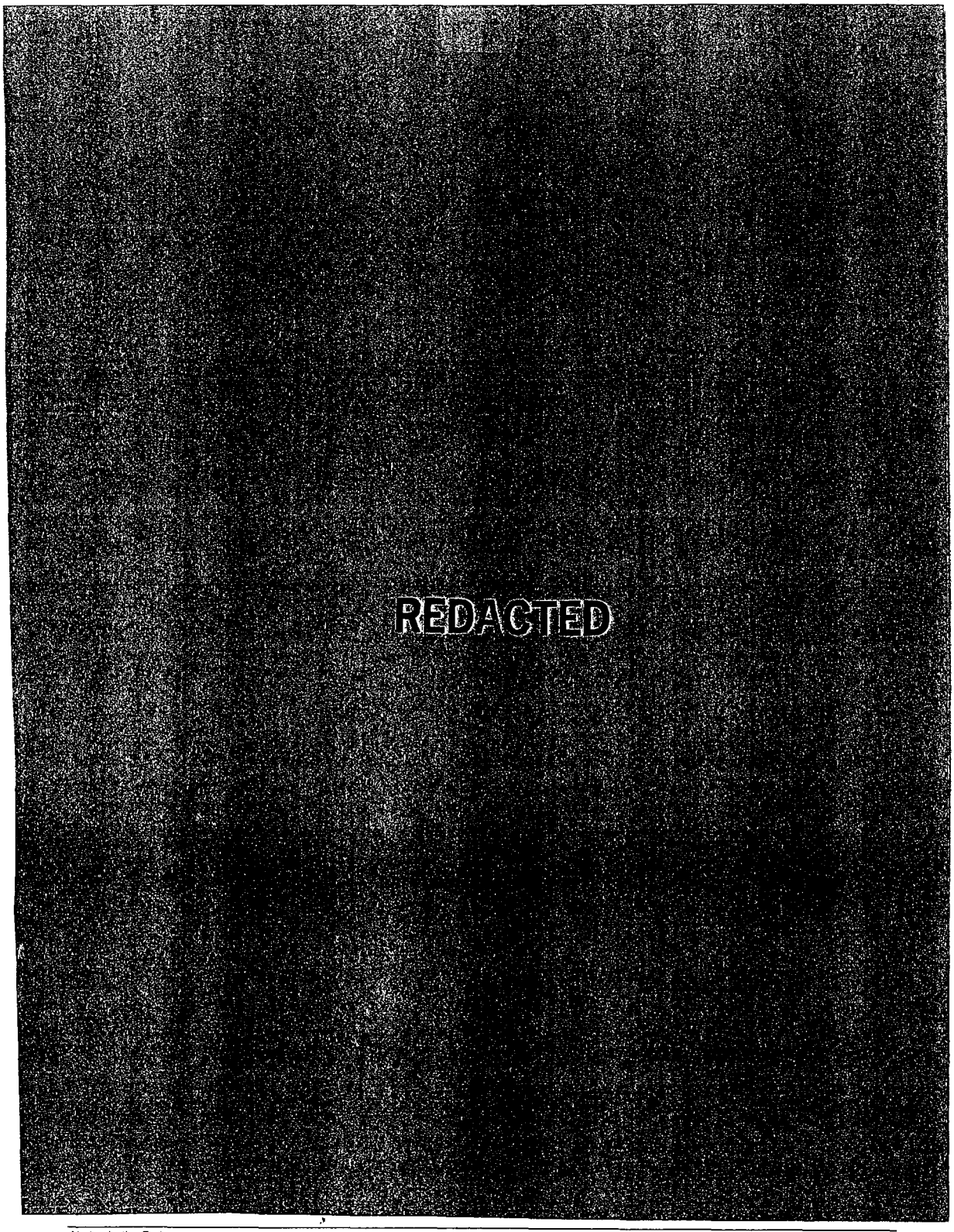
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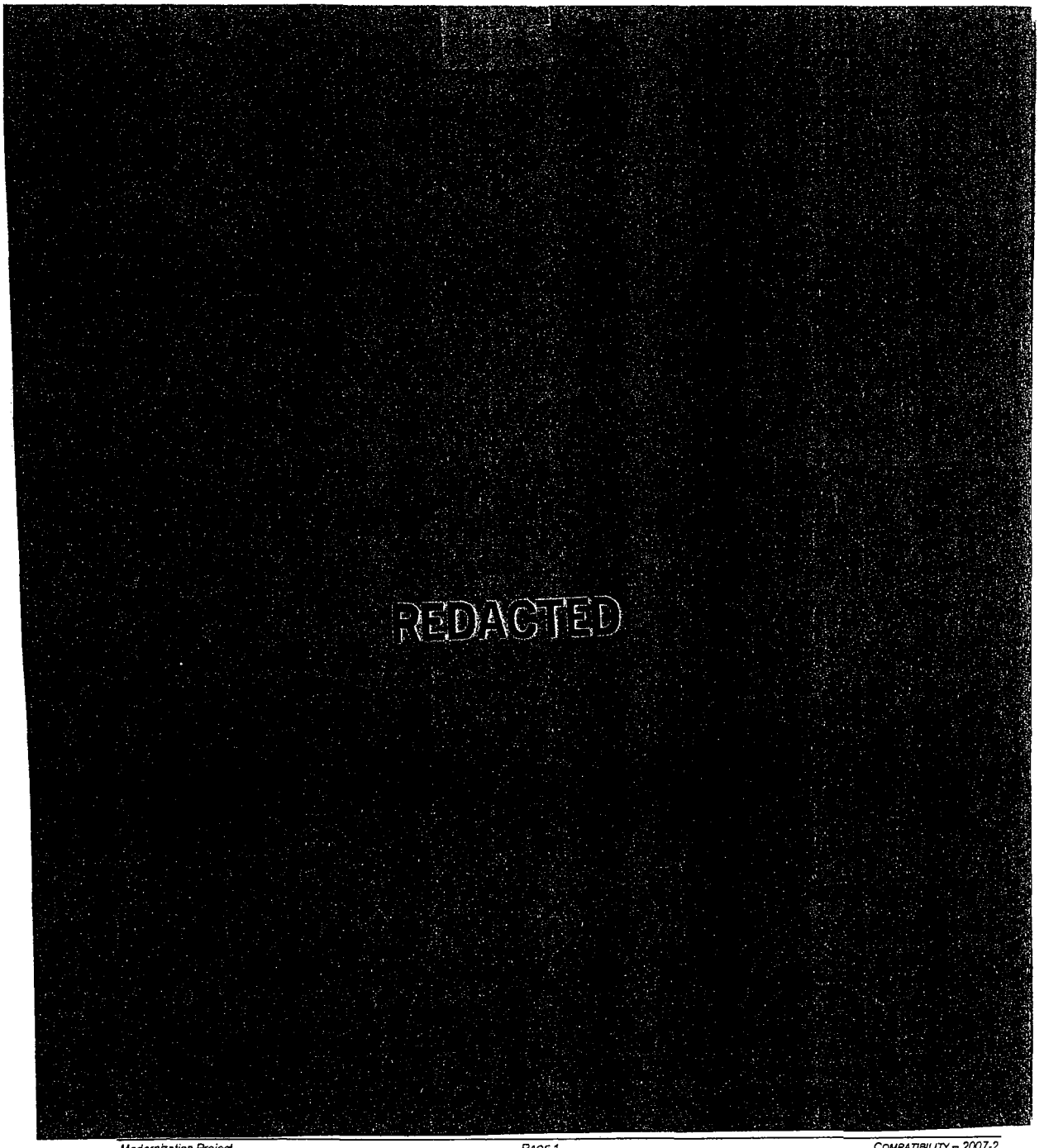
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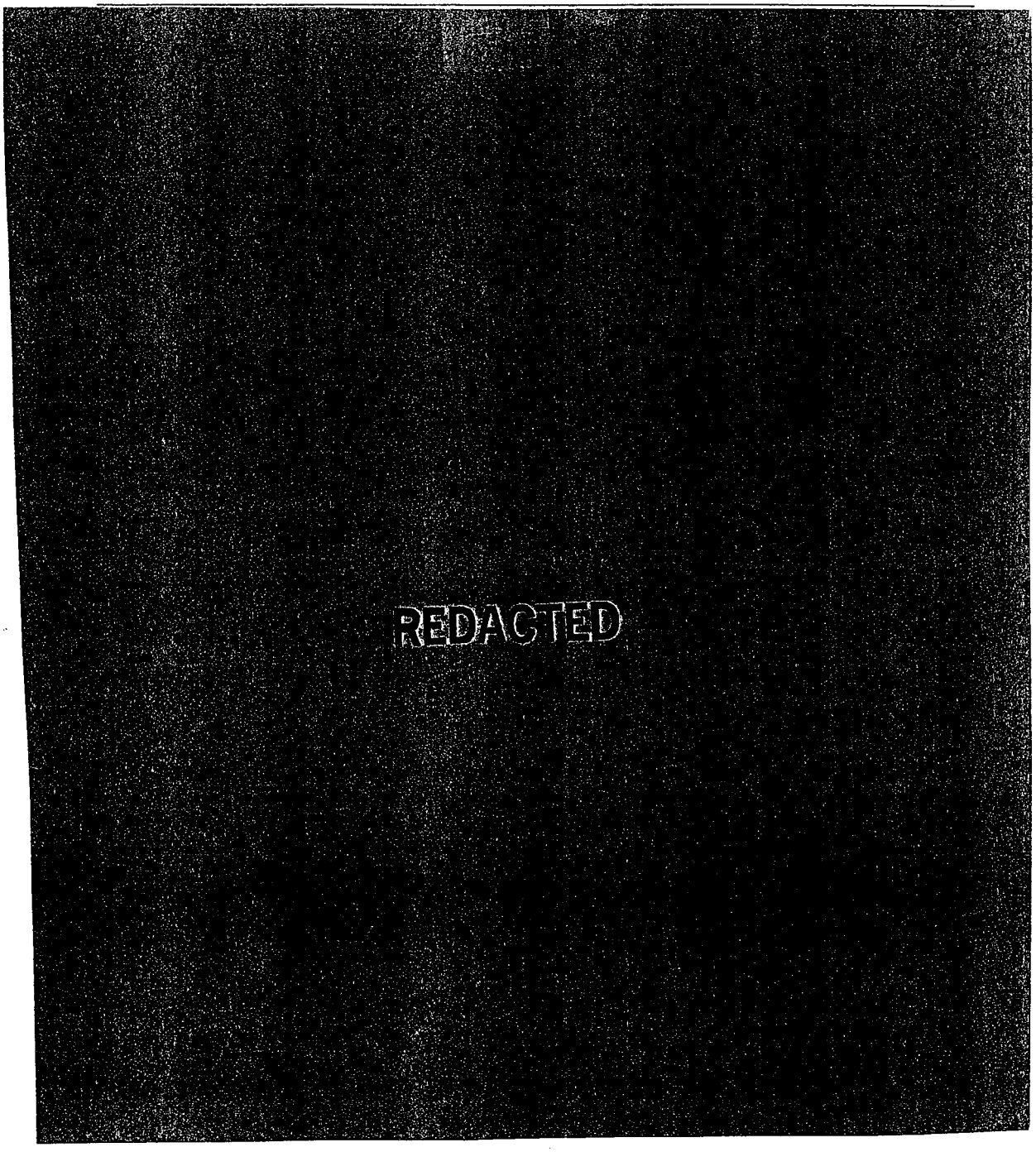
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COMPATIBILITY WITH EXISTING PLANT



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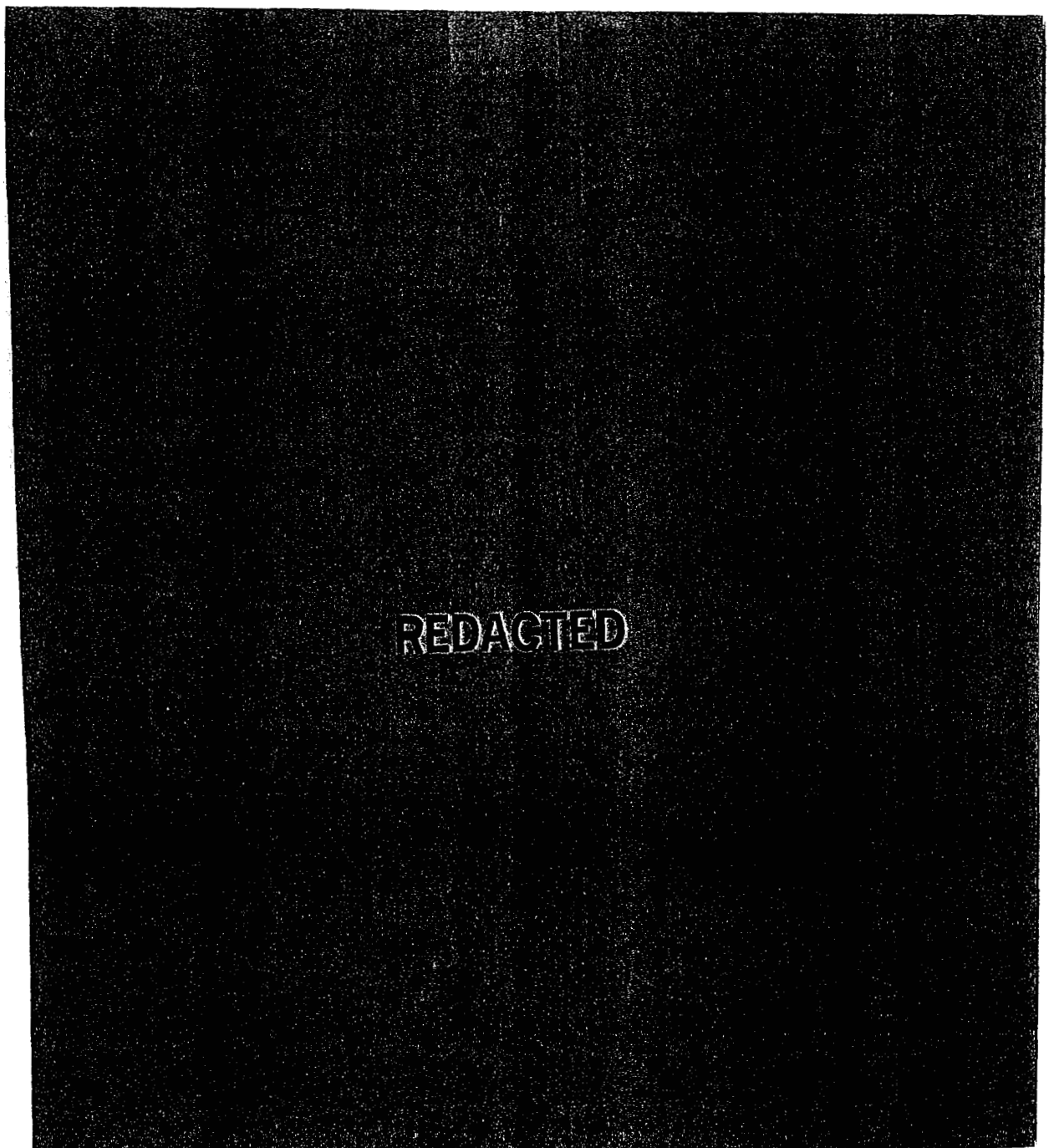
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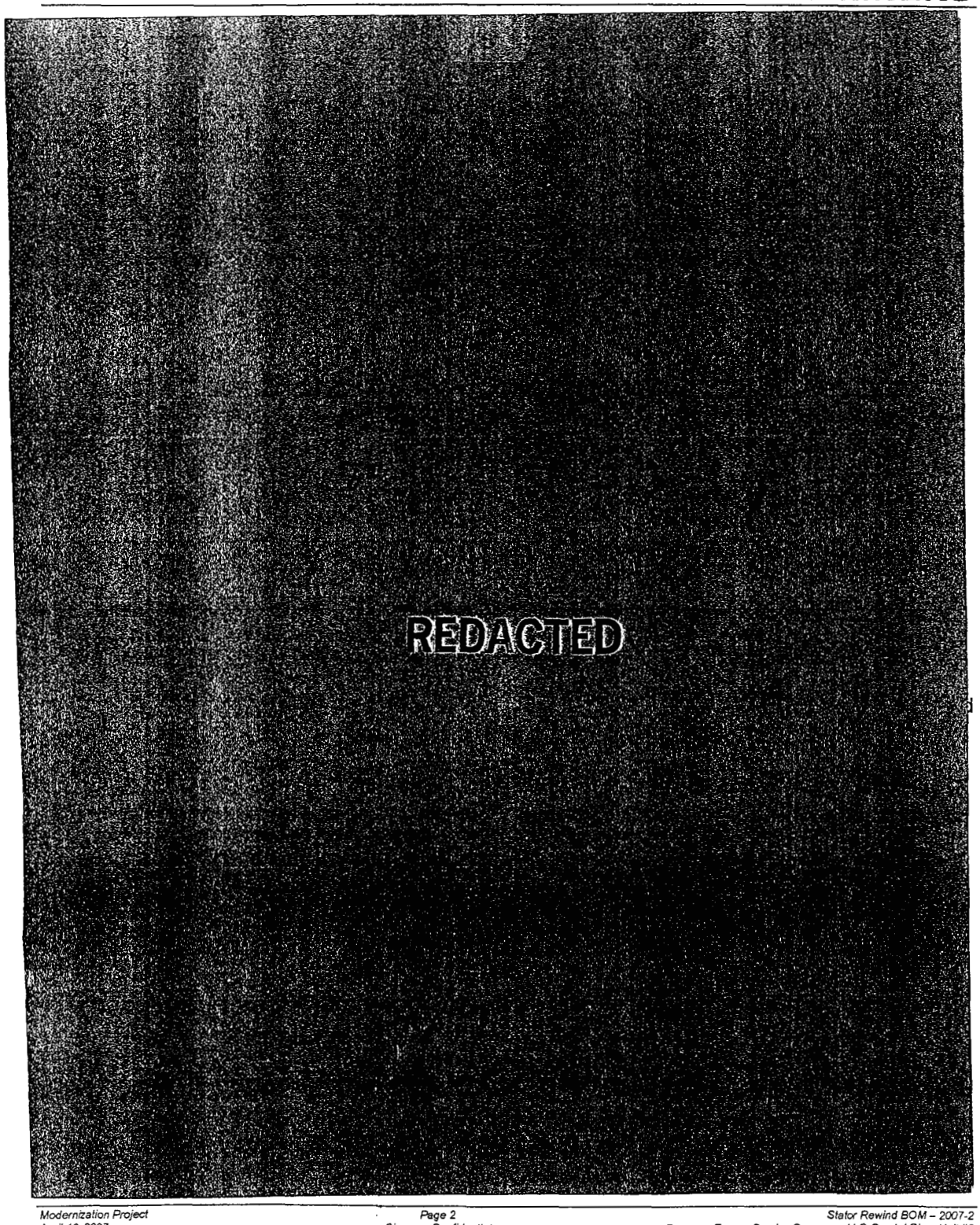
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Scope of Supply
GENERATOR STATOR REWIND



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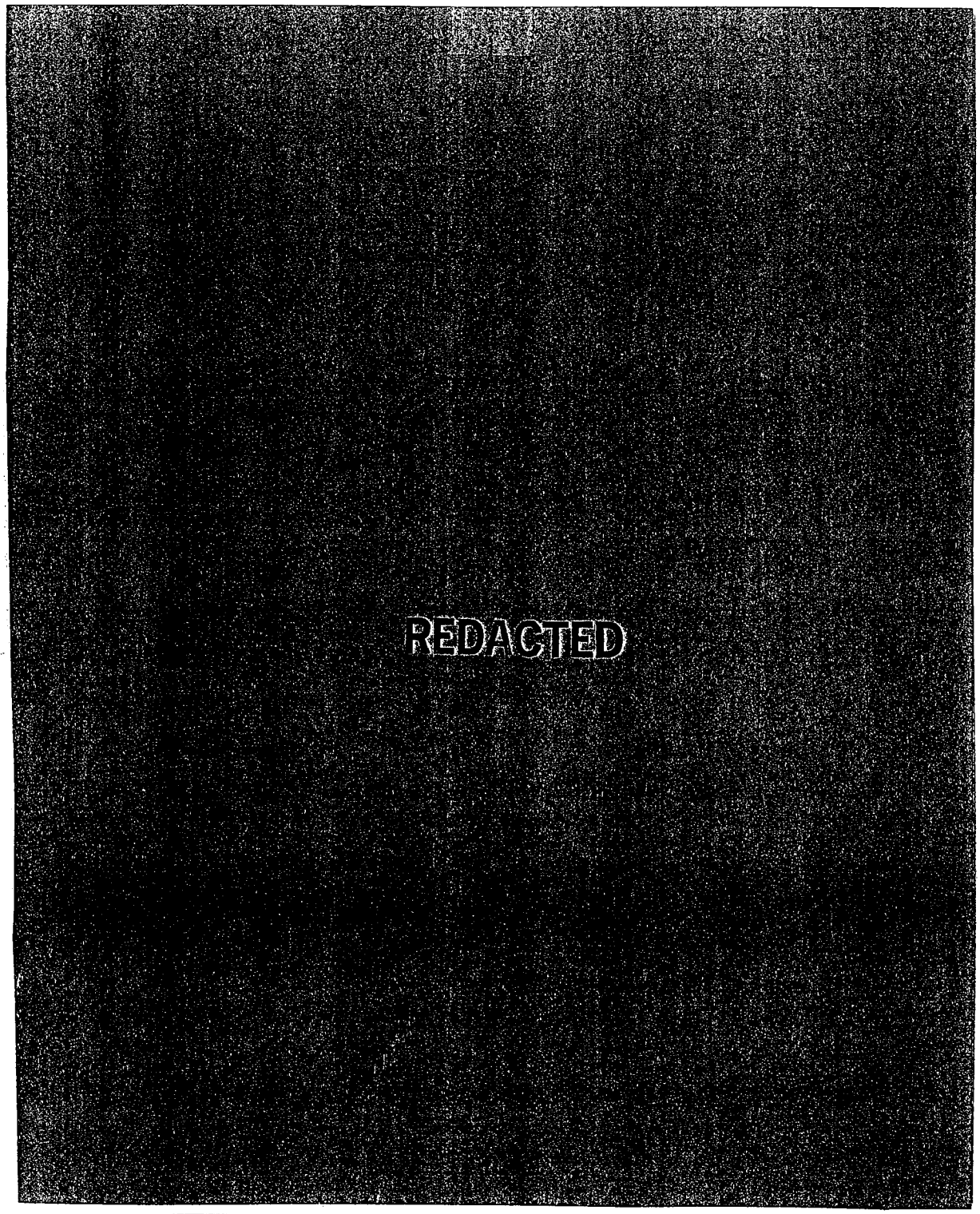
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Don Cunningham

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Altamonte Springs, Fl., 32714
Hm Ph: (407) 294-2486
Office: (407) 736-3540
don.cunningham@swpc.siemens.com

Date: 04/09/2007
Subject: Employment Resume

EXPERIENCE:

8/2/02 to Present: **Siemens Power Generation**
Steam Turbine Mod and Up-grades (O24)
Project Manager

Responsibilities Include:

Assist Steam Turbine and Gas Turbine marketing during final stages of negotiations
In General, receive contract transfer from marketing and implement the contract.
Single point contact for SPG with the customer and internal resources for the duration of the contract.
Represent SPG at customer meetings and provide monthly project status reports
Coordinate internal resources (Engineering, Purchasing, Transportation, Drafting, Order Management, Field Service, etc) to respond to commercial and technical issues.
Perform project management of forced outages for large steam turbines, gas turbines and generators.
Attend Customer Witness Points with the customer.
Initiate invoices.
Initiate and implement contract change orders.
Use SPG systems to obtain quotations and large proposals for up-ratings and normal outage work.
Initiate FDR's, EFAR, Warranty Claims, RFQ's, WRITS, QIRS, PWCS, etc.
Perform schedule tracking function for all internal resources.
Initiate and complete negotiations to close out the project with a satisfied customer.
Assume the correct commercial and technical positions with the customers to bring about the best resolution possible when SWPC is being taken advantage of.
Constantly monitor the bottom line to achieve project margin and ebit.
Create/update and present monthly project status (Commercial and Technical)

EXPERIENCE:

4/9/01 to 8/2/02: **Siemens Westinghouse Corp.**
Power Projects Implementation – A5
Project Engineer

Responsibilities Include:

Supply of Equipment Contracts for new Combined Cycle Power Plants
Interpret and apply the contract within the SWPC organization
Single point interface for the customer and their A/E
Provide all contract deliverables in the proper format and on time
Provide timely response to customers technical and commercial questions and concerns.
Manage various SWPC organizations to provide contract deliverables
Manage quotation process for contract change orders (DCCD's)
Manage Field service to perform unit installation and commissioning
Perform plant turnover to Warranty or O&M group
Monthly progress meetings with the customer
Use various databases available to complete my scope of work
(PID/IDEA/ERSR/ERS/LN,/DCCD/EFAR,FDR etc.)

4/9/98 to 4/9/01: **Alstom Power Generation - ABB**
Industrial Service Department
Customer Service Manager

Responsibilities Include:

- Provide technical support to a group of 36 customers. Industrial steam turbine and utility combined cycle plants.
- Provide solutions to customer technical/commercial problems
- Attend customer meetings, make technical presentations and produce quotations for service outages, unit up-ratings and new products.
- Schedule and coordinate requests for field service engineers, outages, major parts orders and shop repairs.
- In office, outage/project manager with commercial and financial responsibility to insure project success.
- Coordinate and manage required support outage support personal including customer, manufacturing and repair facilities, finance, contracts, design engineering, outside contracts and vendors and parts suppliers.
- Provide short term and long term financial forecast and business plans. Update forecast and plans on a quarterly basis.
- Contact negotiations
- Verification of accurate invoici9ng and timely payment of same
- Processing and resolution of warranty claims and deficiencies
- Personal evaluation and interview of prospective employees

3/97 – 4/98: **Westinghouse International Service Co.**
Power Generation Department
Customer Service Assistant – S. America Region

Responsibilities Include:

- Provide technical support for over 80 customers located in S. America. Utility steam turbines and combined cycle facilities.
- Provide field service support for new combined cycle installations

- Provide solutions to customers technical problems
- Schedule and coordinate requests for field service engineers, outages and major parts orders.
- Coordinate with related departments, customers, manufacturing facilities and repair shops, finance, outside contractors, vendors and parts suppliers.
- Verification of accurate invoicing for service and parts and timely payment of same
- Processing of warranty claims

7/95 – 3/97: **Westinghouse Elec. Corp.**
Power Projects Implementation
Project Engineer

Responsibilities Include:

- Project engineer for the development of two, turn - key, combined cycle power plants. The Whitewater facility in Wisconsin and the Cottage Grove facility in Minnesota.
- Verify technical accuracy of the contract with regard to the Westinghouse manufactured/purchased items (Turbines, Generators and Auxiliary components).
- Respond to owners technical and commercial questions
- Schedule responsibility to ensure on time delivery of drawings, specifications and manufacturing schedules for the turbines, generators and auxiliary components
- Interface with architectural engineer to provide engineering for primary equipment interface points for mechanical, electrical and controls scopes.
- Schedule and follow manufacture of primary components to ensure timely delivery to site and insure quality of manufacturing efforts.
- Traveled to the site and performed the installation of the Whitewater combined cycle power island scope.
- Field scope at the Whitewater facility included installation of the two turbines and generators and the auxiliary components. CT was a 501F and ST was a 100MW single case design. Performed the mechanical and electrical scope from the pouring the foundations through unit commissioning.

6/89 – 7/95: **Westinghouse International Service Corp.**
Power Generation Division
Field Service Engineer – International

Responsibilities include:

- Installation of Turbines/generators and auxiliary equipment in new combined cycle power plants. Major installations include Sithe – Cardinal combined cycle plant in Ontario, Canada. The Ilsan Combined cycle plant in S. Korea.
- Major and minor service outages for large and small utility steam turbines and generators and auxiliary components.
- Major and minor service outages on Combustion Turbines, generators and CT auxiliaries.
- Service work performed internationally: Argentina S.A. Tuxpan, Mexico, Cairo Egypt, Yang Gwang, S. Korea, Cuba.

- Interface with the customer, contractor and Westinghouse Intl. to make repair recommendations and perform detailed supervision for implementation of repair scopes
- Produce a final installation or outage report
- Insure outage or installation is performed in a quality manner, on time and under budget
- Work with ISO auditors to perform site inspections
- Areas of special expertise- Blading repairs, unit alignment, H2 cooled generator inspections.

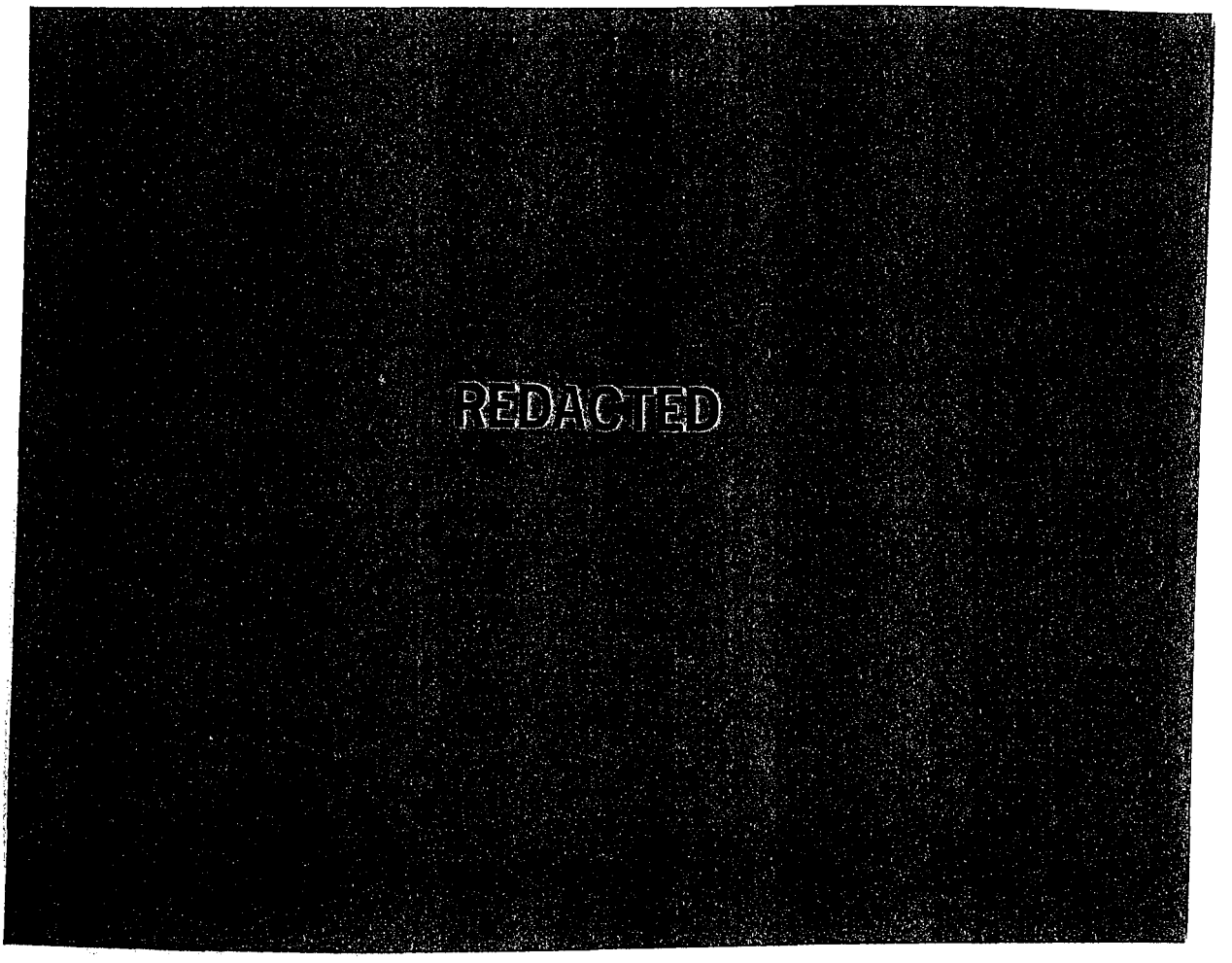
Education

- Bachelor of Science Degree in Mechanical Engineering – Lamar University, Beaumont Tx. 3.0 GPA
- Westinghouse Training Program from June of 1988 to June of 1989
- Advanced Combustion Turbine Familiarization Course
- Siemens Project Management Certification completed
- ESI Project Management Certification Completed
- Root cause failure analysis course
- Reliability centered maintenance course
- Balancing course
- Project management training
- SAP Training
- Database training
- Risk Management Training Course – ESI
- Project Leadership, Management and Communication Training Course – ESI
- Time Management Course – ESI
- PMP exam Preparation Course - ESI
- SCORE Release 2 Training
- TXP Introduction Course
- Management Development I

Computer Skills

- Outlook
- Lotus Notes
- Microsoft Word
- Access
- Excel
- IMS Database
- IDEA
- PID
- LN Databases
- Sure Track Scheduling

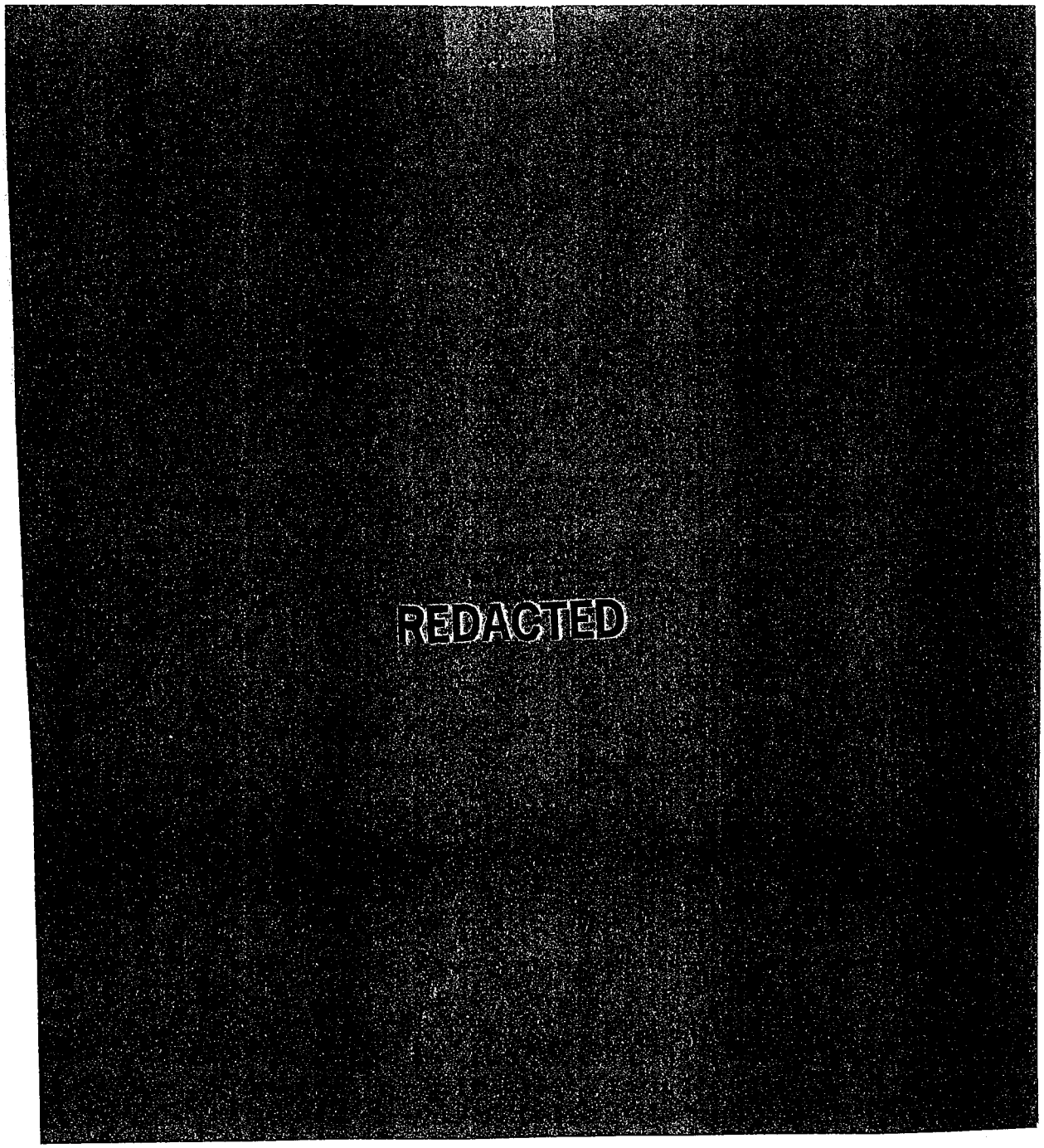
Commercial Exceptions



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CRAFT LABOR EXTRA WORK RATES

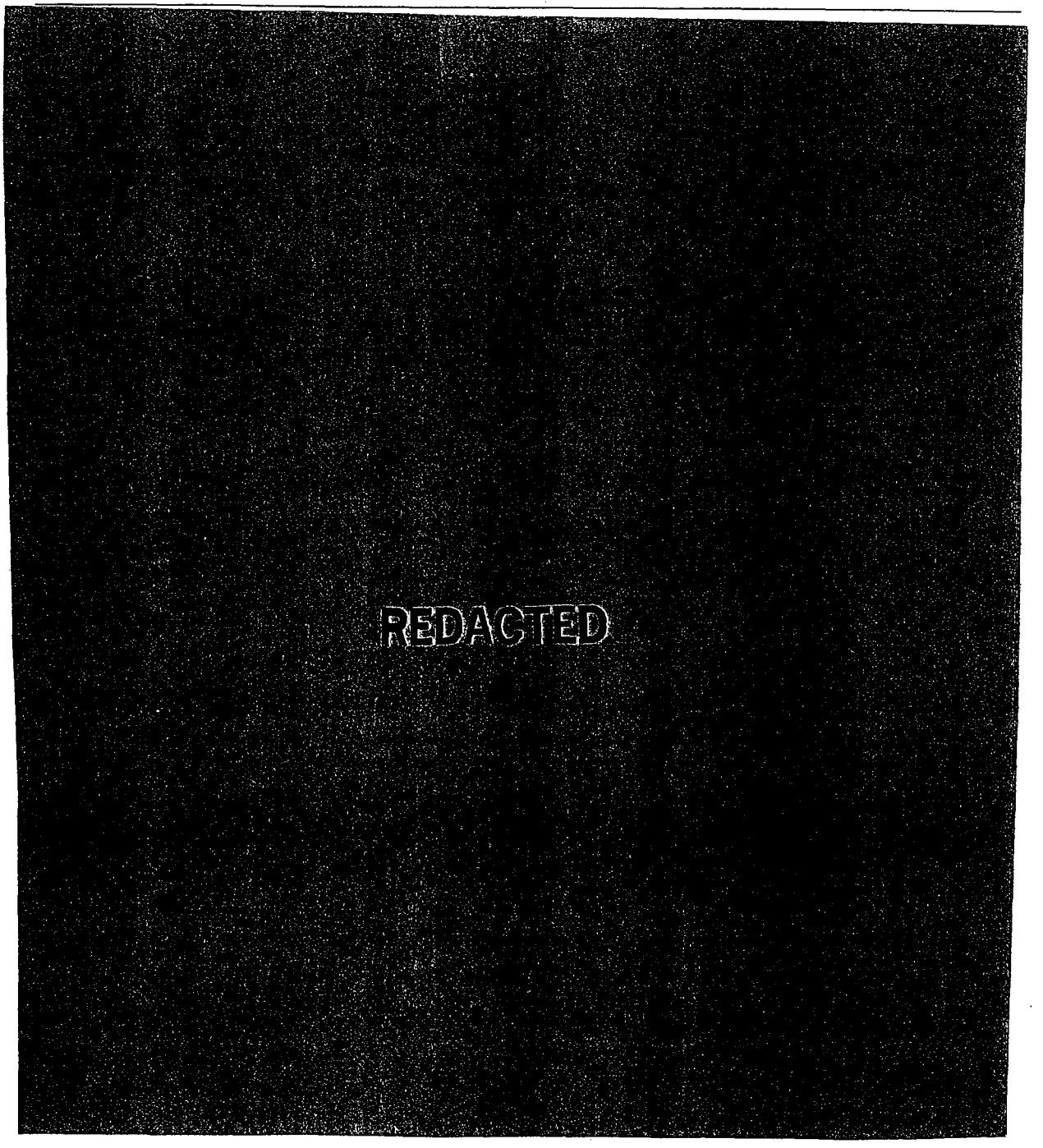


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PEF-NCR-00744

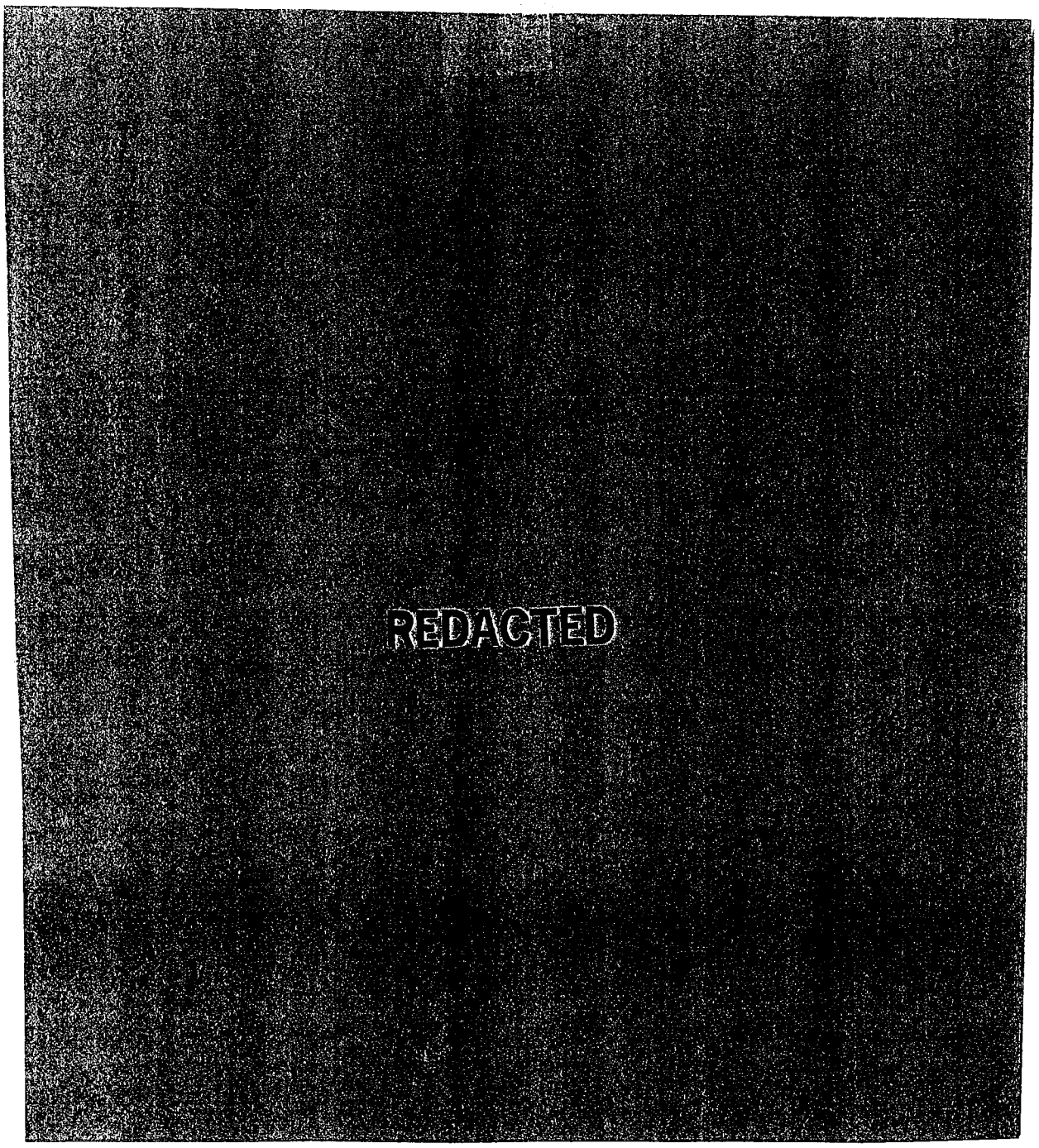
INSTALLATION CONDITIONS



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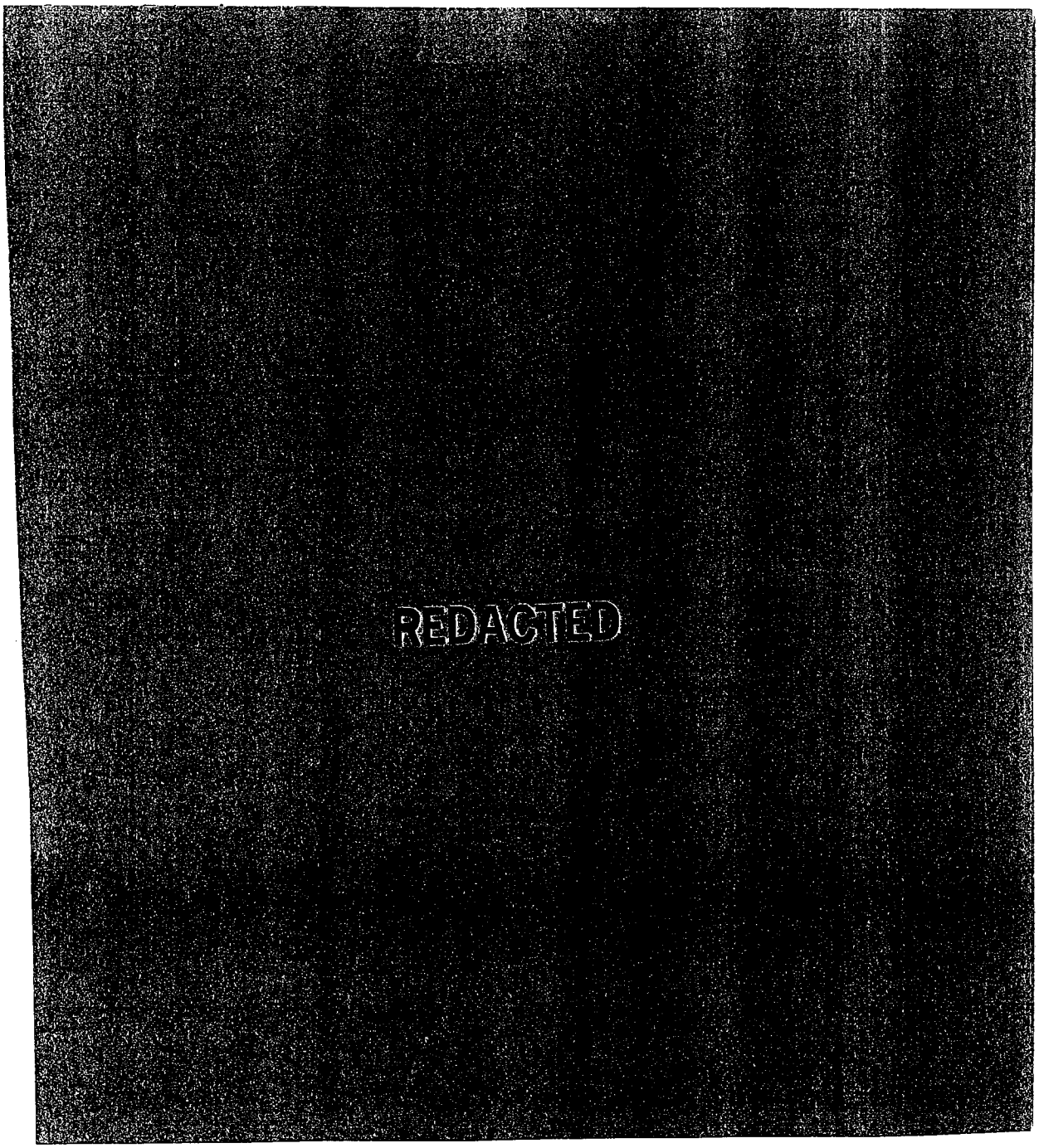
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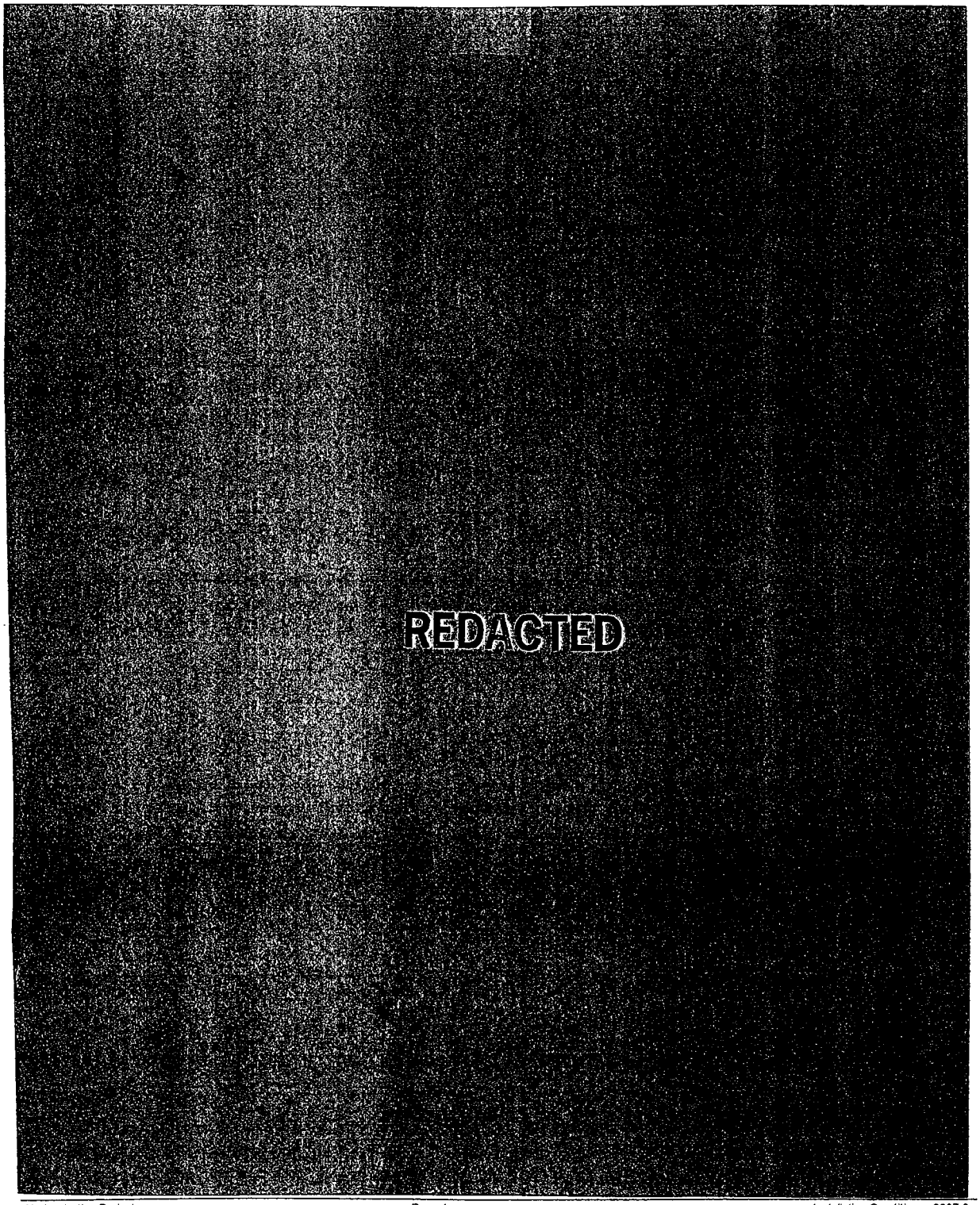
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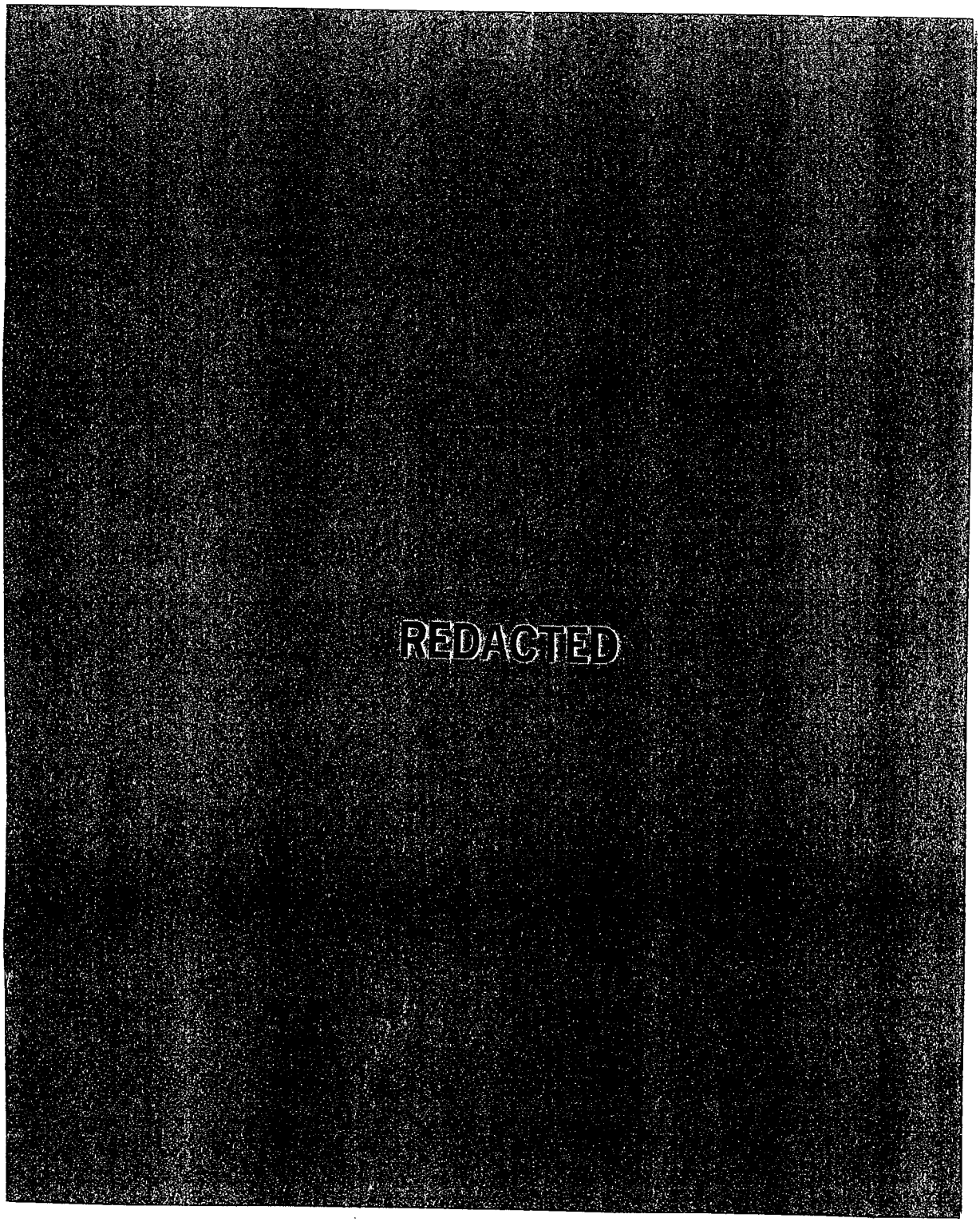
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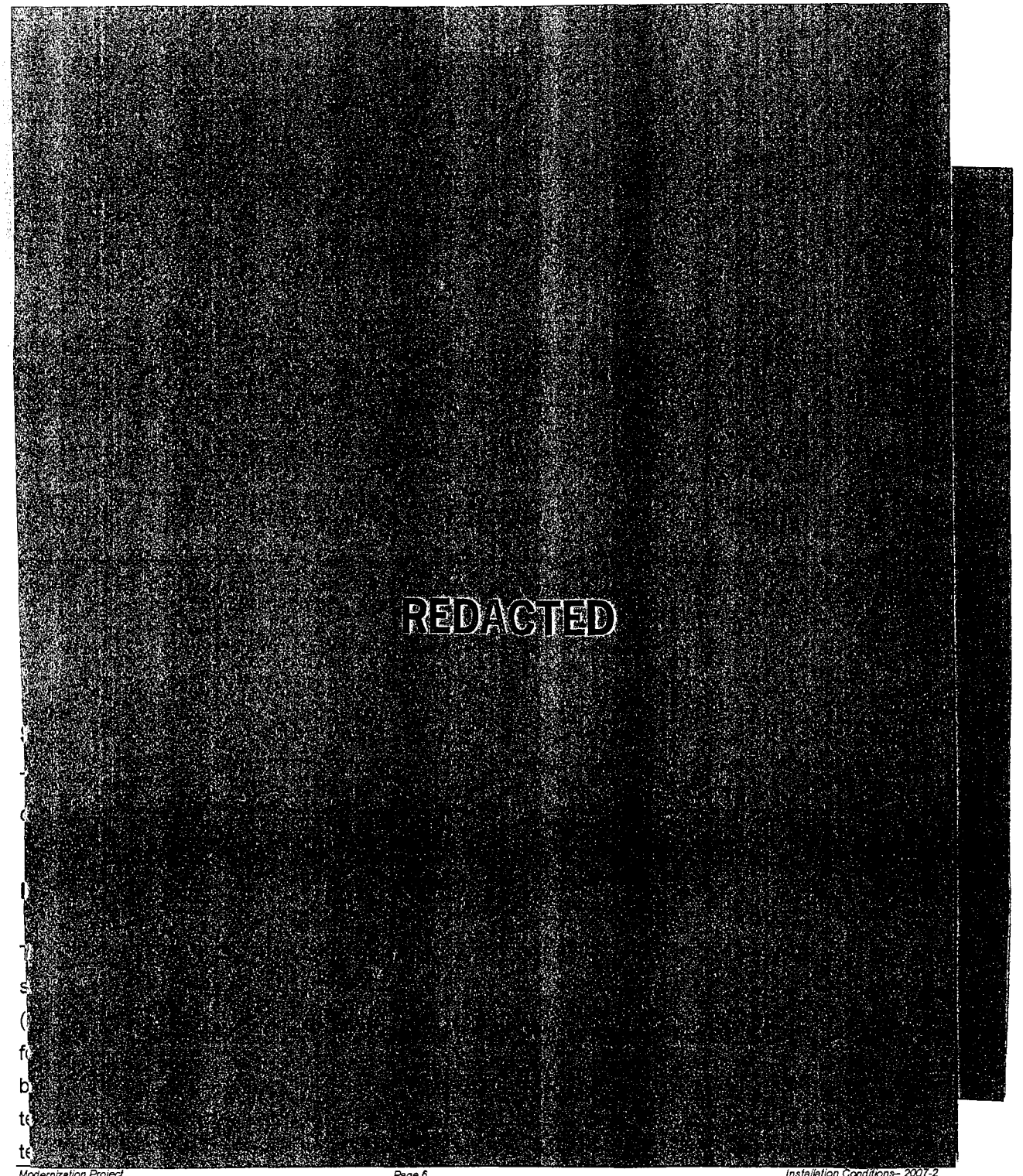
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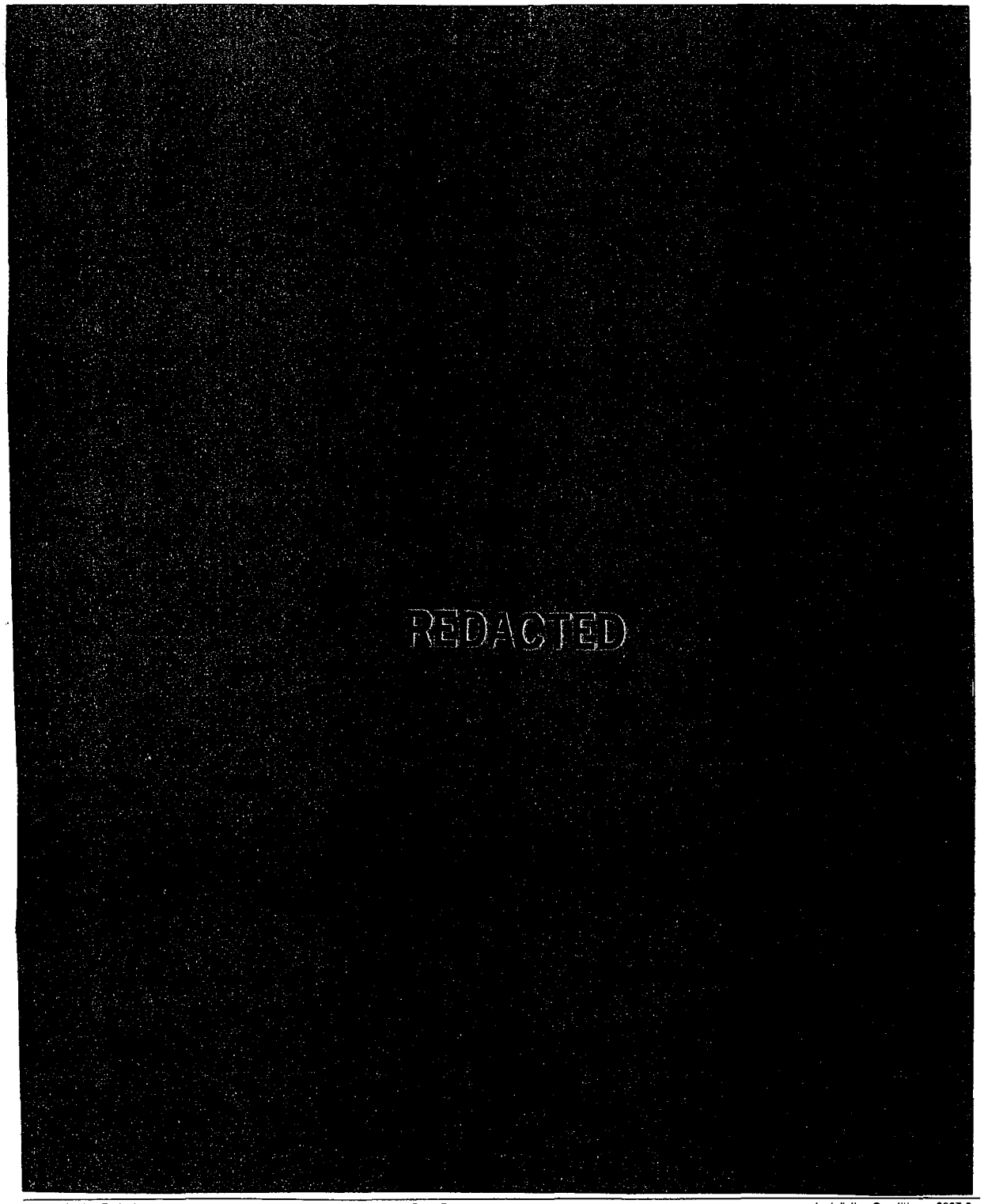
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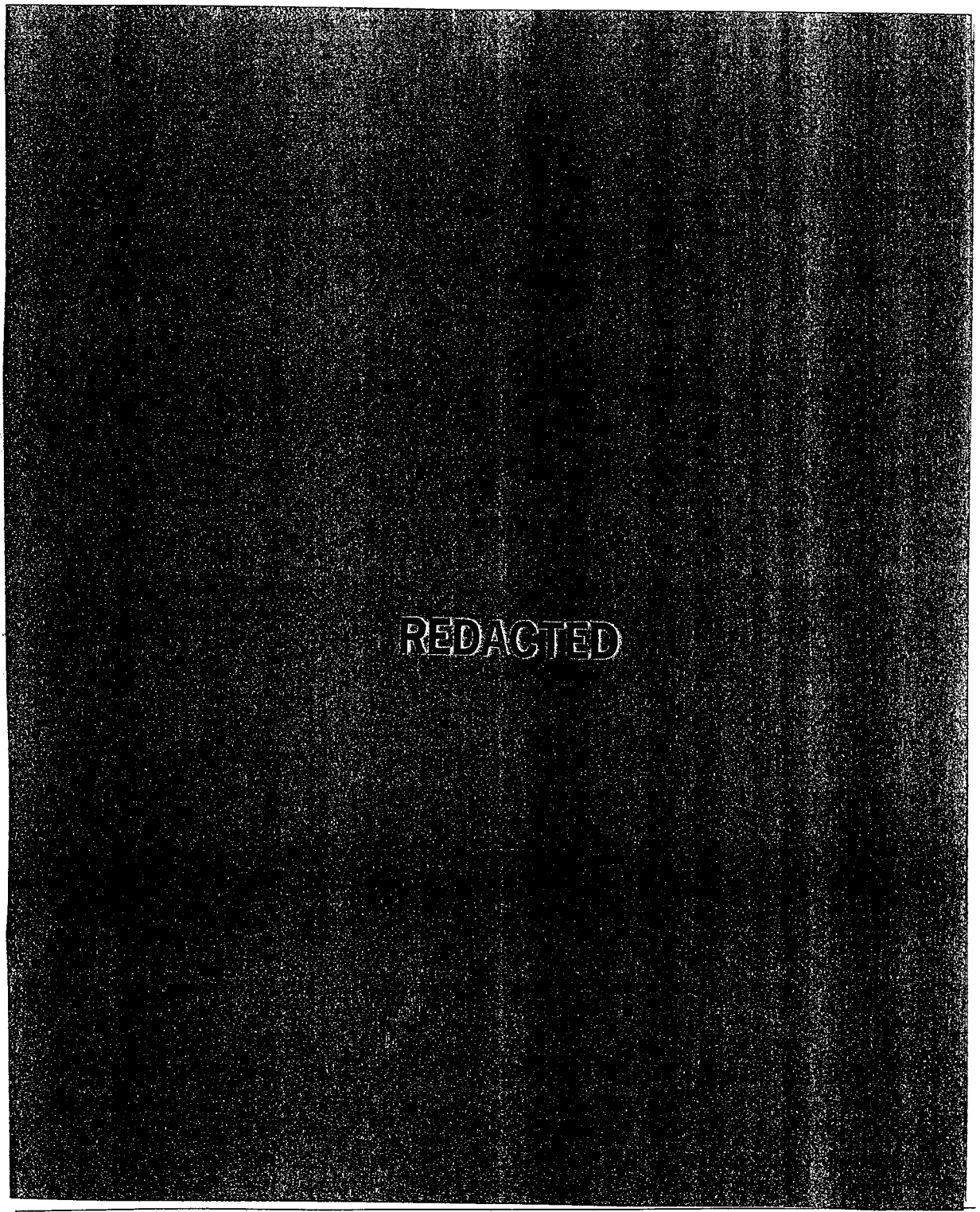
PEF-NCR-00750



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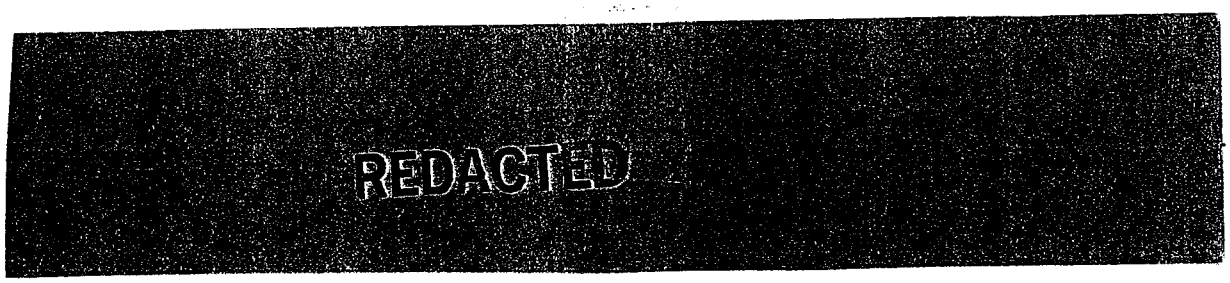
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PEF-NCR-00751



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PEF-NCR-00753

Siemens Contract #145569

Work Authorization #50

Executive Summary

August 8, 2007

Turbine Generator Retrofit

Purchase & Installation

Progress Energy

Siemens Contract Summary:

Contents:

- Scope
- Schedule
- Comparison of Bid Price
- Negotiated Savings
- Comparison of BNP Pricing
- System Bundling
- Performance Incentives
- Warranty
- Liquidated Damages/Dis-Incentive
- Limits of Liability/Extension of Insurance
- 2009 Performance Guarantee
- 2011 Performance Guarantee
- 100 Day Performance Guarantee
- Project Review Team

Siemens Contract Summary:

Project Schedule

REDACTED

- Siemens has a [redacted] day clearance window for the 2009 refueling outage scope of work and a [redacted] day clearance window for the 2011 refueling outage scope of work.

REDACTED

- The Project Schedule consists of three distinct schedules:
  - Engineering Deliverable Schedule
  - Manufacturing Schedule
  - Installation Schedule
- All three shall be submitted for owner review and approval within 60 days of contract award.

Siemens Contract Summary:

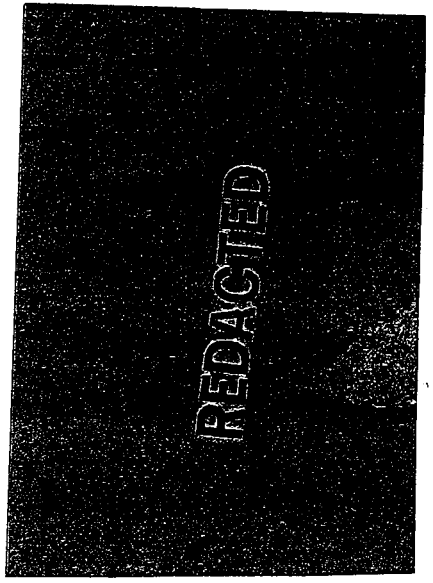
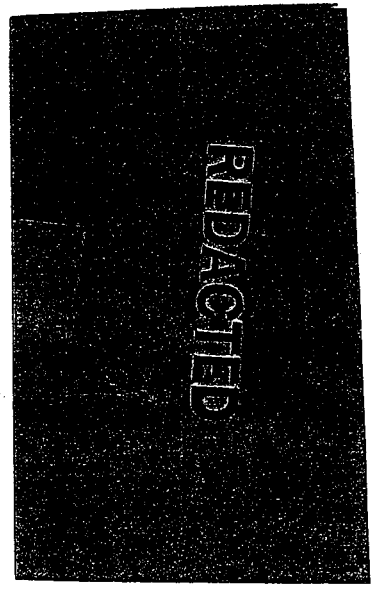
Comparison of Pricing from Bid Submittals ($000's)

Equipment Prices	Alstom	Siemens
HP & LP Turbines		
Generator		
Exciter		
Field Installation		
Total Cost	REDACTED	REDACTED

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Progress Energy

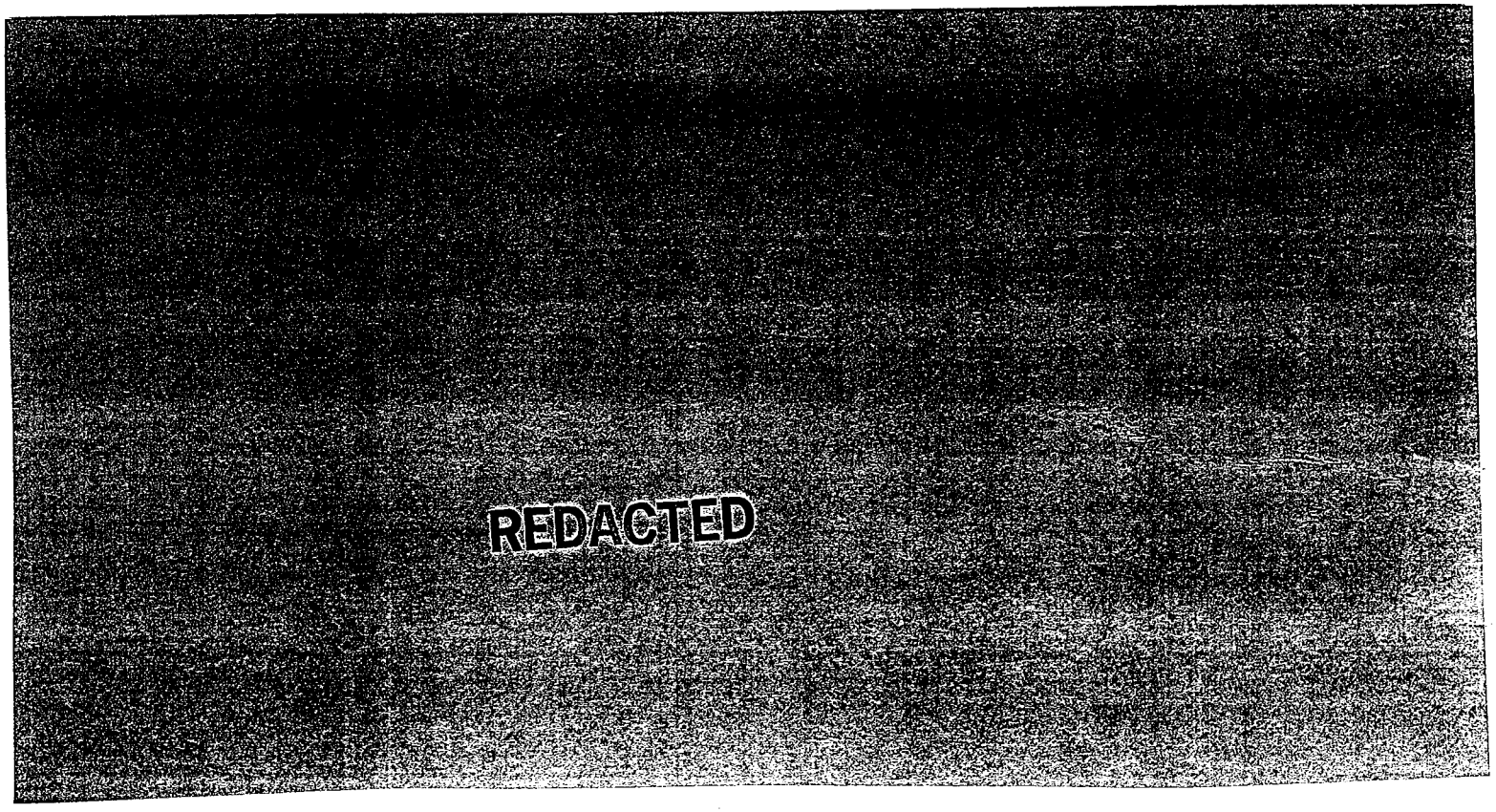
Siemens Contract Summary:
Negotiated Savings ($000's)

	Alstom	Siemens
Discounts		
Price with Labor		
Bundled Discount		
Price after Discount		
Evaluated Added Scope		
▸ HP turbine gland steam spillover valve		
▸ Machining steam lead inlet flanges		
▸ Rotor lifting beam		
▸ Extended warranty		
▸ Extended property insurance		
Total Evaluated Price		

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Siemens Contract Summary:
Corporate Bundling- 11 Rotors



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Siemens Contract Summary:
Performance Incentives ($000's)

Safety and Human Performance

	Incidents	Bonus	Rev. at Risk
Industrial – OSHA	REDACTED	REDACTED	REDACTED
Lost Time Accidents			

Human Performance Index

*Index	1.15	1.30	1.45	2	≥2
Bonus	REDACTED				

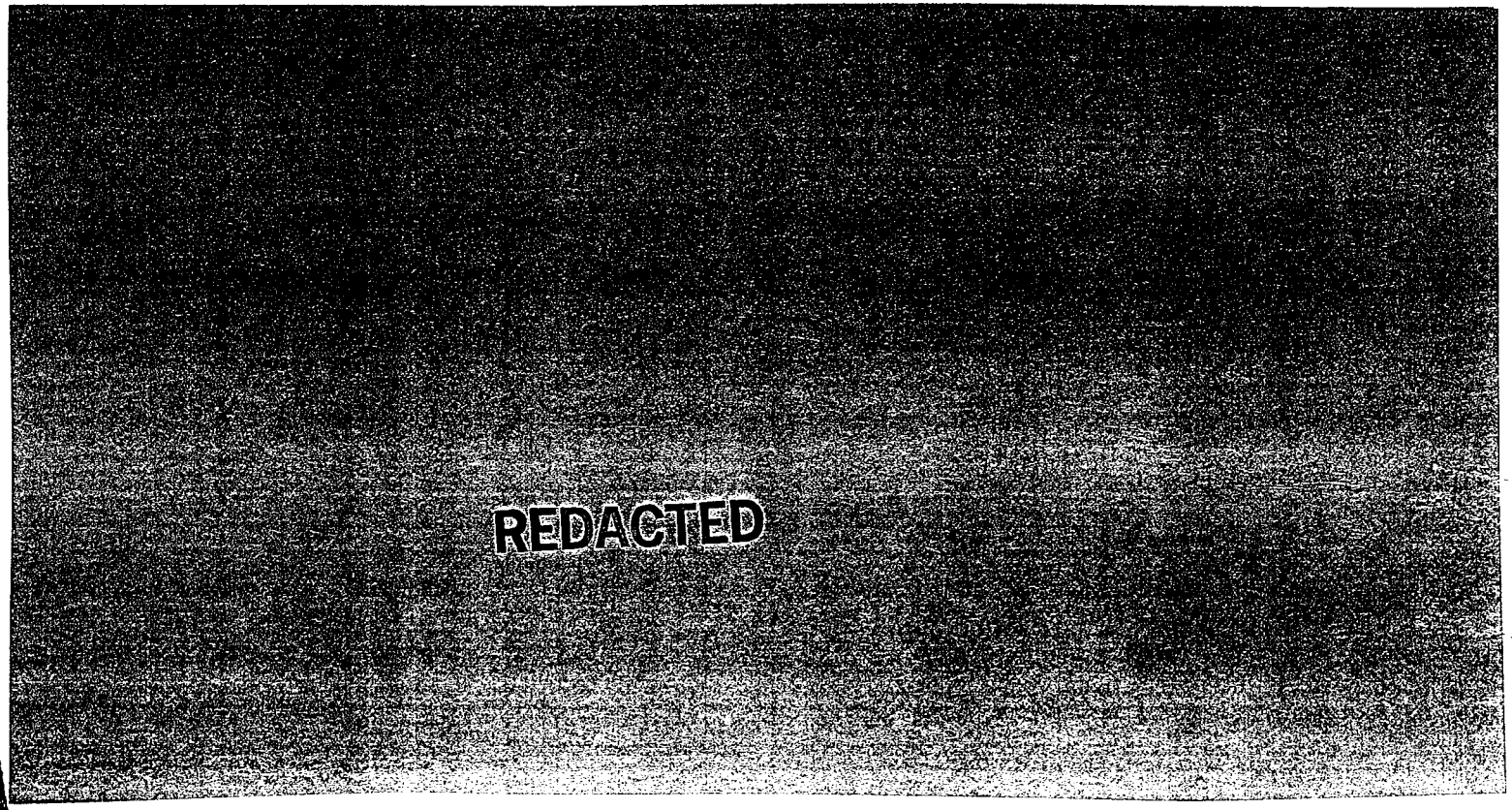
Note: A fatality nullifies all Incentive Bonus, a station level event nullifies HP Bonus

* Based on Events/10,000 work hours

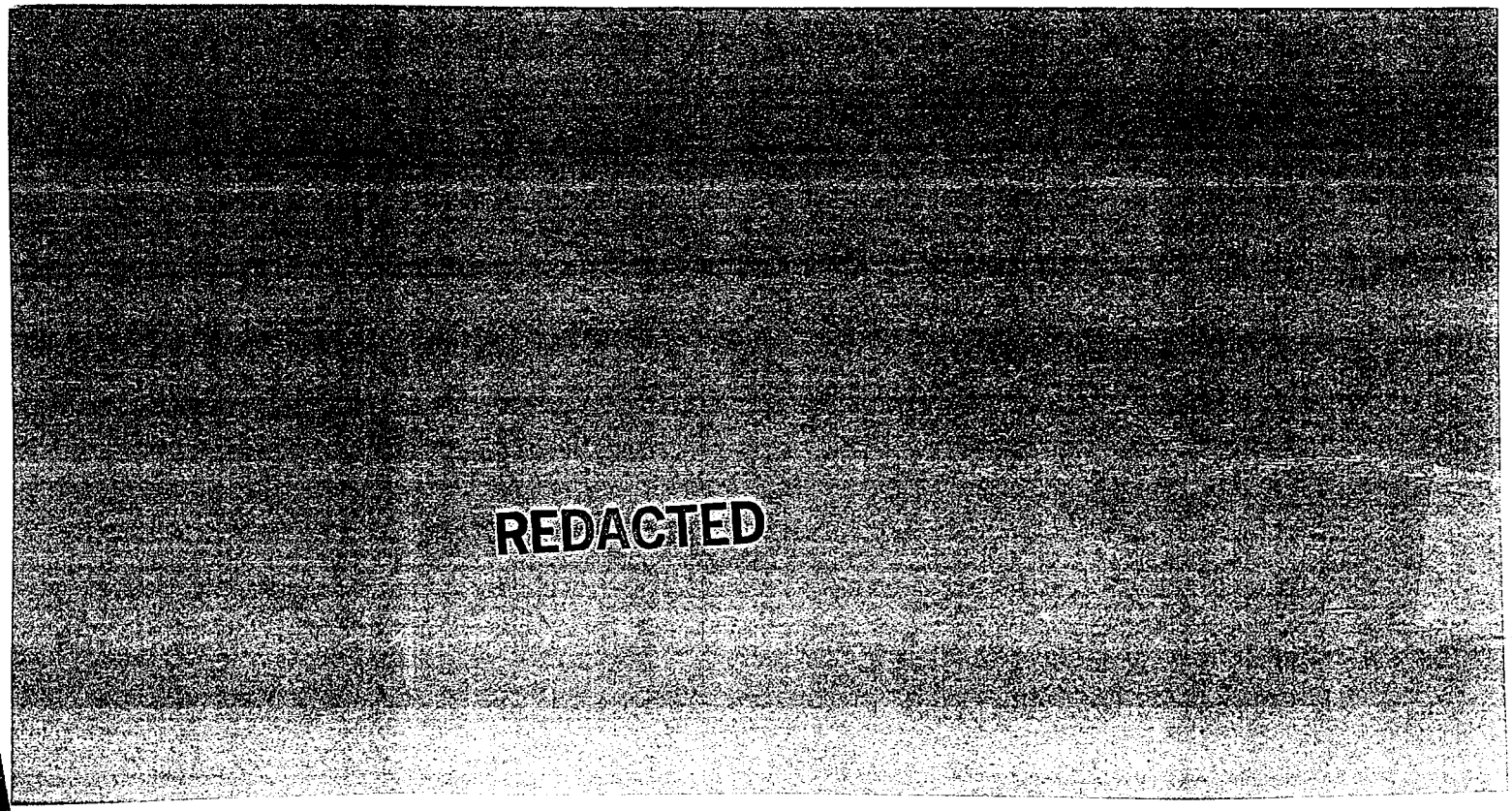
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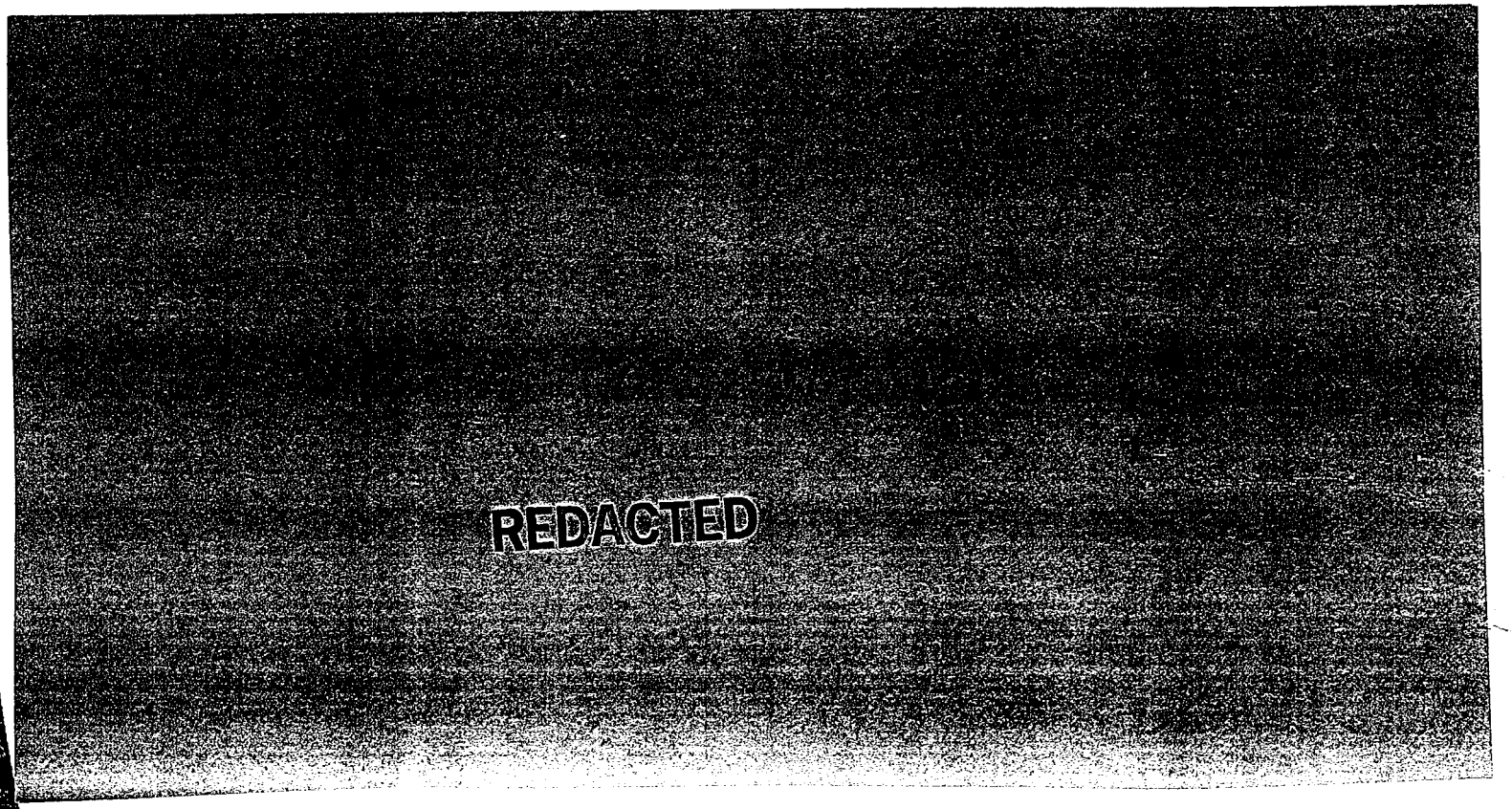
Siemens Contract Summary:
Warranty



Siemens Contract Summary:
Liquidated Damages



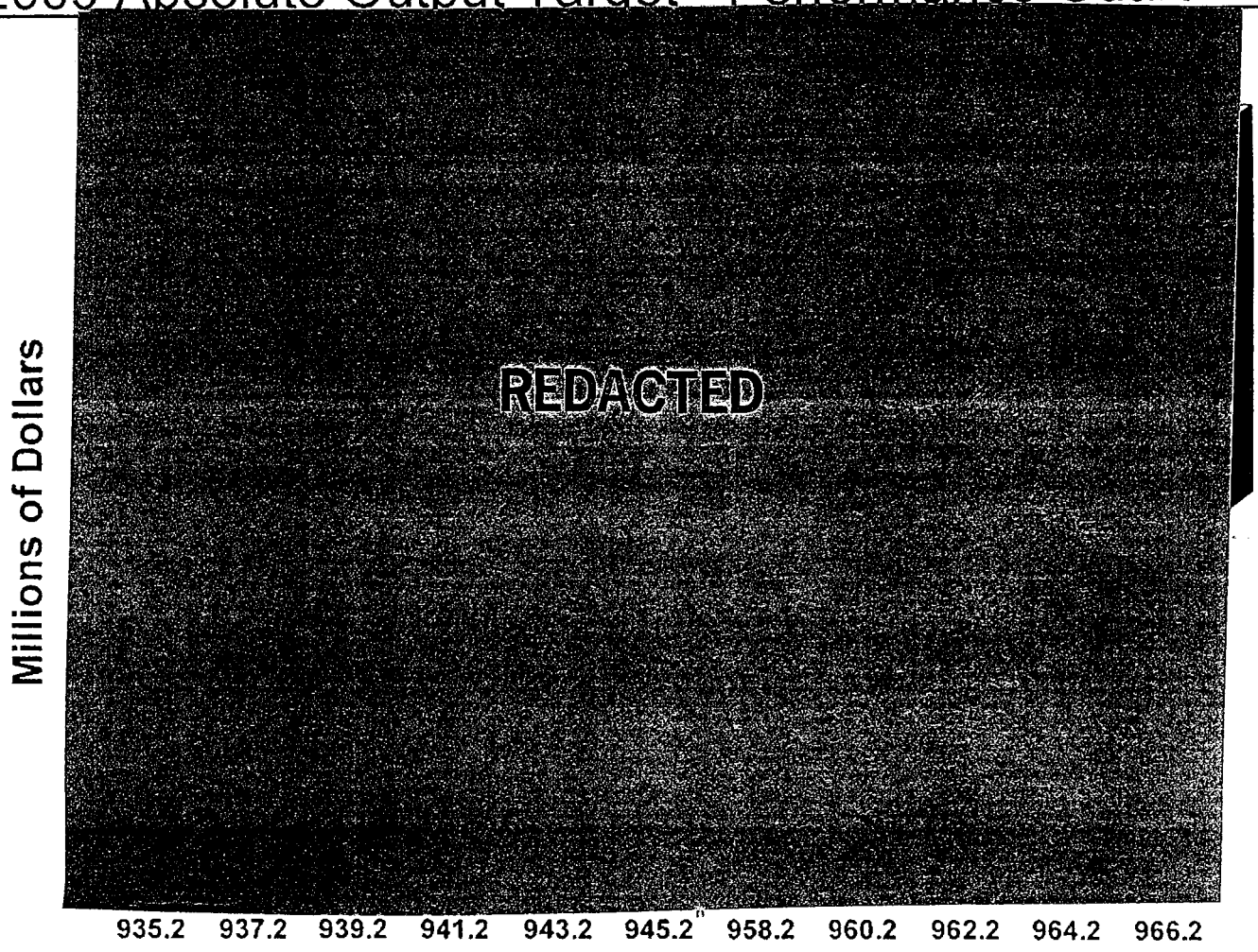
Siemens Contract Summary:
Limits of Liability



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Siemens Contract Summary:

2009 Absolute Output Target - Performance Guarantee

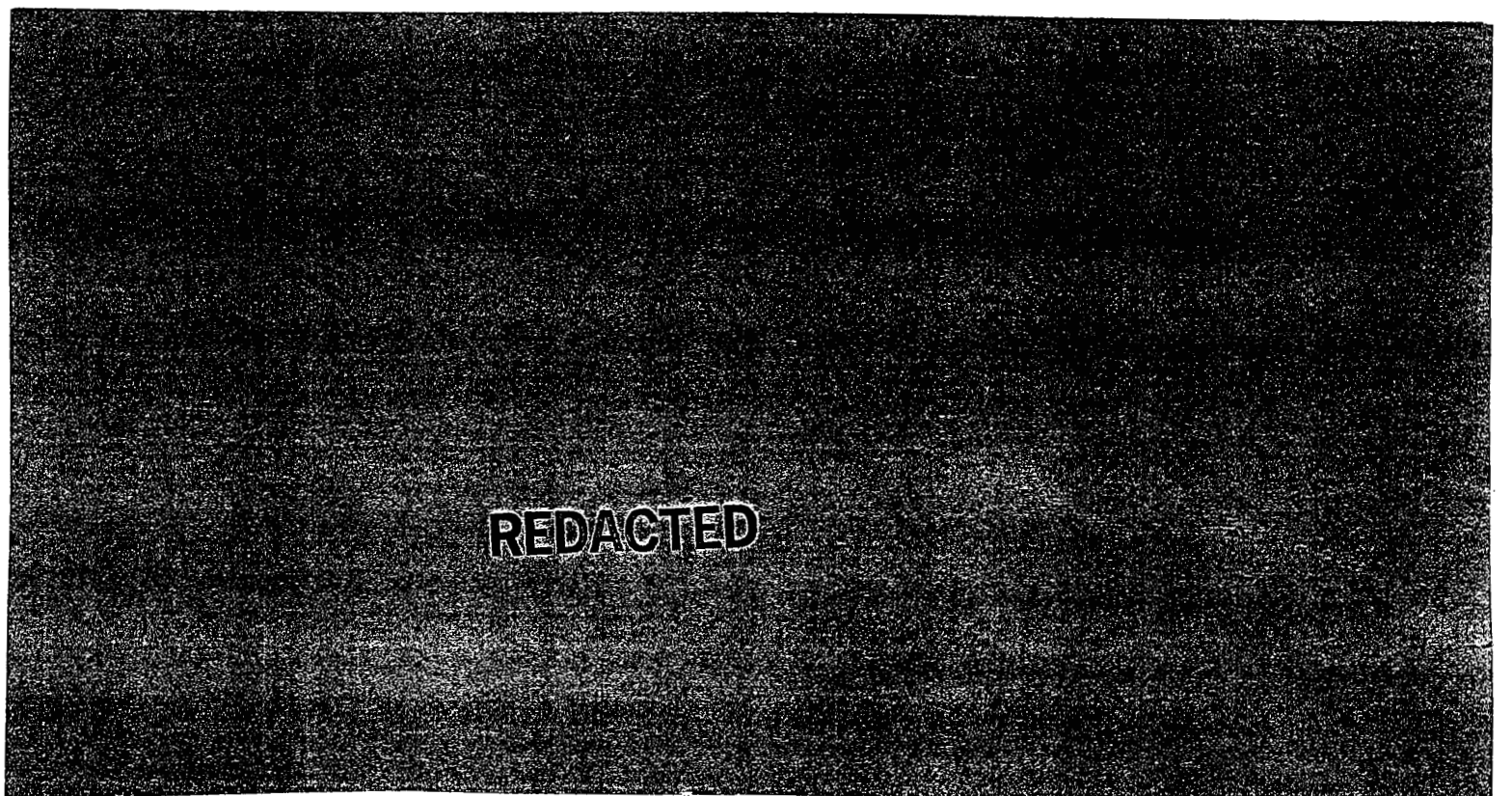


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Siemens Contract Summary:

2011 Delta Target Output – Performance Guarantee



1082

L81 ohm

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Siemens Contract Summary:
100 Day Performance Guarantee

For 100 days of Continuous Operation Contractor places [redacted] at risk for each outage (2009, 2011) REDACTED

- The 100 day period begins after completion of commissioning and Unit has reached 100% power
- The unit must be removed from services based on the Contractor's Instruction Manual

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Siemens Contract Summary:
Project Review Team

Project Manager – Ted Williams
Project Technical Lead – Scott Deahna
Legal – Dave Conley
Tax – Paul Matthews
Financial – Gerry Dowd
Audit – Elwyn Wood
Contracts – Tony Owen
Executive Sponsor – Danny Roderick

Final
Eval

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Crystal River Unit 3 Extended Power Uprate Project, Turbine Generator Retrofit Proposal Evaluation

Progress Energy issued Crystal River Unit 3 (CR3) Turbine Generator Retrofit Request for Proposal # SD22007 on February 16, 2007. The request for proposal was issued to Siemens Power Generation, Alstom Power Systems, Mitsubishi Heavy Industries and Westinghouse Nuclear (Toshiba). The CR3 turbine generator was originally supplied by Westinghouse Power Generation (i.e. Siemens). The CR3 low pressure turbines were retrofit in 1996 with Brown Boveri (i.e. Alstom) turbines. CR3 Turbine Generator Retrofit Proposals were received from Siemens Power Generation (Siemens) and Alstom Power Systems (Alstom) on April 16, 2007.

REDACTED

Siemens Proposal Summary:

REDACTED

Alstom Initial Proposal Summary:

REDACTED

Alstom Amended Proposal Summary:

REDACTED

REDACTED

Westinghouse Electric Company LLC

Fax

To:	Mr. Tony Owen	From:	J.P. Sechrist
Fax:	919-546-6750	Pages:	
Phone:		Date:	February 28, 2007
Re:		CC:	

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• Comments:

Mr. Owen,

Westinghouse appreciates your inclusion of our company on this request for bid. Under our new parent company Toshiba, Westinghouse now has additional capabilities and is interested in these types of opportunities. Unfortunately, Toshiba's unfamiliarity with the Siemens Turbine-generator and the lead times required for forging would not allow us to support Progress Energy's desired schedule for delivery of the components specified in the bid request. As a result, we will not be submitting a bid for this work.

ACKNOWLEDGEMENT

Mr. Tony Owen
Progress Energy Service Company, LLC
P. O. Box 1551 (PEB 2C3)
Raleigh, NC 27602
Fax: 919-546-6750

PROGRESS ENERGY SERVICE COMPANY, LLC
CRYSTAL RIVER NUCLEAR PLANT, UNIT #3
REQUEST NO. SD22007

I acknowledge receipt of the subject proposal package and have indicated my bidding intentions as follows:

__X__ I have reviewed the proposal documents and will not be submitting a bid for this work. Proposal documents are being returned under separate cover.

_____ I have reviewed the proposal documents and intend to submit a bid for this work and will make arrangements to contact or visit the site as requested.

James P. Sechrist
(Signature)

James P. Sechrist
(Name)

Manager, Major Programs Group
(Title)

Westinghouse Electric Company
(Company)

February 28, 2007
(Date)

Siemens Contract Negotiations

05/03/07

Those in attendance were:

Tony Owens	Dan Smith
Scott Deahna	Mike O'Leary
Ted Williams	Shay Foley
Mike Morin	Kebris Miller
	Al Batista
	Puneet Bahl
	Steve Blevins
	Don DiAntonio

HPT should be acceptable for 2009-2011. All components can meet 1165MVA based on current installed.

Major Components core iron, stator, exciter, rotor can meet 1200 MVA. Other Aux. components are under evaluation e.g. H_2 gas cooler. Can scope prior to avoid. Blower should be OK by may need to be modified. Bushings need to determine by June 8th.

Need to identify critical path efficiencies. Challenge 69 day duration target 58 days. Can a midsection replacement be estimated?

Use 95°F for the gas SC Cooling

Siemens Engineering Comments

Turbine Rotor weight and TEGO Babbit.
Installed on similar type frame supports.
Babbit will support higher loads and temps. No new bearings required if needed will be included by Siemens not PGN.

Generator frame design can meet 75 psig requirement. Original design 60 psig. Seal oil system Mods are included in base price.

Laser alignment of LPT Included
Gen Alignment should be included
HP needs to be checked
New Canto nary Curves will require alignment
Generator exciter front foot alignment.

300 amp rating power amp drawers need to be verified @ 1200 MVA and single failure capability to carry full excitation.

Do not anticipate TGV control problems with full arc control.

Need generator Neutral analyzed for shorts transients. Protective relay set points will be provided.

Siemens Scope of Supply Comments

Generator bushings need to be replaced for 1165 MVA.
Need to be evaluated for 1200MVA and included in base cost list.

At minimum new H_2 seal rings not necessarily new performance seals. Need new seals for Rotor replacement. Labyrinth seals.

Item 3	Confirmed to be in base price
Item 4	Larger gland steam spill over valve include
(included)	HP turbine flextallic gasket modification
	HP turbine erosion protection.
(included)	Rebabbit bearings as contingency risk
	Lead free rupture disks
(included)	Lower generator leads box/Asbestos •
Item 5	Included
Item 6	New Tech Manual provide
Item 7	No Environment Monitor in proposal
	Include flux probes, do not use slot couplers
	instead use bus couplers
[included]	Fiber Optic Vibration Monitoring
[in base price]	Gas discharge RTDs (24)
	(2) New terminal boards included

Siemens Contract Negotiations

Instruments and piping under generator should not be replaced.

H_2 Cooler included price will be evaluated prior to contract award.

MSR installation 21 days parallel critical path.

Millwrights, Crane Operator, rigging,
TEI to install MSRs, Siemens to manage Scaffolders, HP, insulation, handlers.

Need Scaffold/Insulation resource loaded plans. Siemens to check with contracts personnel.

Barge costs are more than rail costs. No concern with last blade removal/installation and factory balance.

Any seal surface machine field work scope is included in base cost.

Siemens responsible for dehumidifier and no delays.

Generator Core Iron loop test requires 4160V~3MW 850 amps single phase. Site to provide power.

Siemens to provide requirements for oil flushes and should be included as part of the base project costs. No adder

Ventilation testing requirements need pressure taps in 8 areas back to manifold. Requires 1/4 , 1/3 speed in air to verify proper ventilation. Need to include in scope for outage and build into critical path. Aux. Steam to Main Steam back feed to spin turbine. Need operating experience to justify. Performed as part of 1990 mid section replacement and orifices needed adjustment.

Siemens Commercial Comments

Proposal costs include return of rotor to seed program. No risk with availability and is interchangeable. Same warranty applies.

Overall Megawatt output secondary heat balance reactor power. Incentive and penalty deadband. Use existing higher accuracy heat balance and Megawatt instrumentation.

Need date for final data for LPT design. CR3 to provide MSR drain reroute and FWHE design Specs.

Retained component study $100k Tab 1 C.
How many hours and rate to establish costs? Support equipment.

Need to breakout Digital Voltage Regulators ($625k) and why do we need hardened cabinets. Includes installation and start up testing.

Evaluate "traveling craft labor" adder
All costs are firm fixed price for year of installation
Estimate fixed assuming all are traveling

CR3 provide onsite training and vendor for badges.

Siemens Final Notes

HP LP hold points witness points should not be limited.

Final Design is independent and Siemens has right to change design.

Need to establish scope of liability with respect to uprate interface fit up & modification of as found conditions.

Siemens will participate in design review mtgs.

Amendment to be written by Siemens by Friday. 5/18/07

We owe our notes and actions to Dan by next Friday 5/11/07.

Siemens Proposal #SD22007, CR3 Turbine Generator Retrofit 5/3/07 Review Meeting Open Items Continued:

Siemens to provide proposal amendment letter by 05/18/07.

Siemens to provide 1200 MVA generator component evaluation by 06/08/07.

Siemens to address project schedule:
Generator field installation schedule is 69 days, including 48 days for generator stator winding and core iron replacement working 24 x 7. Siemens to review generator schedule to identify a ten day reduction. If generator outage schedule does not fit inside revised plant steam generator replacement schedule, then evaluate stator midsection replacement. Siemens mentioned the possibility of a seed stator frame becoming available.

Siemens to include the following in the proposal at current price point:

1. Generator main lead bushing replacement.
2. Replace generator H2 seal rings and seal strips on H2 gland, bearing oil catcher and outer oil seal.
3. Generator Ventilation Testing. Add description of requirements.
4. Complete rotor train center line laser alignment and generator frame foot loading alignment.
5. Replacement of the HP turbine gland steam spillover control valve with larger capacity valve.
6. Machining of the HP turbine steam lead inlet flanges for flexitalic gasket modification.
7. Rebabbit HP turbine and generator bearings due to new rotor journals.
8. New style LP turbine lead free rupture discs.
9. Lowering of the generator leads box to clean and pump sealing groove.
10. A complete new technical manual for the turbine generator (excluding the AEH controller volumes) and electronic spare parts catalog.
11. Material to support lube oil flush.
12. Seal oil skid modifications to support 75psi generator H2 pressure.
13. The Generator Neutral Transformer will be included in the Siemens electrical evaluation for 1200MVA generator short circuit conditions. Generator protective relay set points will be provided.
14. All LP cylinder alignment and installation features (material and modifications) to install new turbines are included in proposal.
15. All HP turbine cylinder steam seal surfaces will be checked and machined as necessary.
16. The Generator Neutral Transformer will be included in the Siemens electrical evaluation for 1200MVA generator short circuit conditions. Generator protective relay set points will also be provided.
17. All LP cylinder alignment and installation features (material and modifications) to install new turbines are included in proposal.
18. All HP turbine cylinder steam seal surfaces will be checked and machined as necessary.

Siemens to review the following concepts/issues:
Project Management: PE desires "turnkey" project management with minimal PE support responsibilities. Siemens to provide millwrights, riggers, welders, pipe fitters, crane operators and winders. TEI may provide the craft to install the MSRs. Siemens overall project management to include control of additional support craft provided by PE (mechanics, electricians, I&C, scaffold, insulators, pipe fitters, health physics, laborers, confined space attendants, fire watch, etc.). This will eliminate any delays due to "support requirements by others". Siemens to discuss this concept with their contracts personnel and provide their position.

CR3 Alloy 600 PWSCC Mitigation Project Pressurizer and Surge Line Modifications			
#	**Description**	**C, X, A, and E**	**Proposal Section**
1	Project Description		
1.1.	Introduction/Project Background:		
	Crystal River Unit 3 will be undertaking a series of component replacement and reinforcement activities during the 15th refueling outage (RFO15) currently scheduled for late 2007. These activities are intended to reduce the risk of Alloy 600/82/182 Primary Water Stress Corrosion Cracking (PWSCC) associated with the Pressurizer and Surge Line. When complete, all susceptible components/regions in the Pressurizer and Surge Line will have been replaced, reinforced or will have been reconfigured such that no Alloy 600/82/182 will be performing a Reactor Coolant Pressure Boundary function.	C	4.0
	The Bidder is requested to submit a comprehensive proposal based on the requirements contained herein and on the previous experience of the Bidder with similar proposals and/or projects. The Bidder is requested to bid the scope of work described to optimize the overall Alloy 600 Mitigation program for Progress Energy.		
1.2.	Scope of Work - Bidder:	C	4.0
	The scope of work includes all design, material acquisition, mobilization, installation, Nondestructive Evaluation (NDE), and demobilization activities associated with the modification of the following components:		
	Pressurizer Relief Valve Butt Welds (total of 3)		
	Pressurizer Spray Line Extension Pin and Safe End		
	Pressurizer Vent Nozzle		
	Pressurizer Sample Tap Nozzle		
	Pressurizer Lower Level Tap Nozzles (total of 3)		
	Pressurizer Thermowell		
	Pressurizer Surge Line Nozzle Butt Weld		
	Hot Leg Surge Line Nozzle Butt Weld		
1.2.1.	The Relief Valve Butt Welds are to be modified by removing the existing Alloy 82/182 welds and flanges and replacing with equivalent flanges attached with Alloy 52/152 welds.	C	4.0
1.2.1.1.	The bidder may propose a weld inlay technique for these locations.	C	4.0
1.2.2.	The Spray line Extension Pin and Safe End and attachment welds are to be replaced with Alloy 690 components attached with Alloy 52/152 welds.	C	4.0
1.2.3.	The Vent, Sample Tap, and Lower Level Tap Nozzles are to be modified using a half-nozzle replacement methodology employing Alloy 690 components attached with Alloy 52/152 welds.	C	4.0
1.2.3.1.	The preferred half-nozzle replacement methodology is to use a mid-wall weld as opposed to an external weld build-up and attachment weld. The proposal may contain either methodology at the Bidder's discretion.	A	4.0

*C (Conform) - The Bidder meets the requirement in the manner indicated.

X (Exception) - An approach which does not meet the requirements or a requirement the Bidder declines to meet.
A (Alternate) - An approach which is substantially different from the suggested approach but which meets the stated requirements.
E (Enhancement) - An element not required by the Requirements Documents but offered for consideration.

Siemens Proposal #SD22007, CR3 Turbine Generator Retrofit 5/3/07 Review Meeting
[redacted]pen Items Continued:

REDACTED

Turbine Testing: Proposal pricing includes [redacted] for ASME PTC 6 turbine performance testing. Following discussion the prevailing approach is not to perform a full ASME PTC 6 performance test. Consideration is to use the PTC 6 - 2004 Alternate Test. Key parameters will be megawatt output and reactor thermal. PE will have high accuracy instruments for feedwater flow, main steam pressure, main steam RTD's, condenser back pressure and high accuracy megawatt meters. This approach will reduce the price by the amount included to perform the full PTC 6.

Performance bonus / penalty clause should have a performance dead band. Review dollars tied to performance testing result. The fact that the multiple changes to the plant will make exact megawatt contribution from a single source difficult to evaluate. A deadband of +/- 0.7% (test accuracy) has been discussed as an amount to account for these uncertainties and then a bonus could be considered for megawatts achieved above that value.

Siemens to review the following concepts/issues:

Is replacement of the generator WTA voltage regulator required to support the 1200MVA generator rating excitation requirements? WTA power amp drawers are uprated from 200 amps to 300 amps. Are the power amp drawers fully redundant at 300 amps? Siemens to unbundle the Digital Voltage Regulator and price it separately. Provide basis for recommending the EMI / RFI hardened cabinets. Verify the estimated cost for AVR replacement at [redacted] including installation and startup support.

REDACTED

[redacted]isting generator rotor must be returned to Siemens. Transportation costs are included in the current price to return the existing CR3 generator rotor back to Charlotte. The Shipping and Handling estimated costs are high. Heavy hauling on site is largest cost portion. Agree to review transportation and handling plan. Evaluate Mammoat (bundled contract) for on site heavy hauling.

The final Secondary Plant design configuration must be provided to Siemens to support turbine blade path design. This includes the MSR drains re-route and feed water heater specifications. Siemens to provide a date when the information is needed for the final turbine steam path design.

REDACTED

Siemens to evaluate the remaining turbine generator equipment and support systems for EPU impact. The basis for this cost [redacted] is the number of hours projected to perform the study. PE requests Seimens to re-consider the magnitude of this expense in light of all the other work required to define the turbine peripherals and include as baseline to the overall project.

Provide basis for consideration of adding the generator "Performance Plus H2 Seal Package" to proposal. Document advantages / benefits associated with this seal package. Provide a list of users with large generators equipped with performance plus seal installed.

Siemens will provide dehumidification for the generator and no delays of high pot testing due to winding moisture. Electrical Power required for generator core iron loop test will be by PE.

[redacted]nerator instrumentation will include installation of two flux probes, fiber optic vibration probes and 24 Gas [redacted]scharge RTD's with new terminal boards. Flux probes and fiber optic vibration pickups will be monitored using portable test equipment. Include providing the required portable test equipment for monitoring. Partial discharge slot coupler pickups are not required.

APPENDIX A
PROGRESS ENERGY TABLE OF CONFORMANCE

Siemens Proposal #SD22007, CR3 Turbine Generator Retrofit 5/3/07 Review Meeting Open Items Continued:

Siemens to review the following concepts/issues:

The extra charge for traveling personnel was defined as the per diem and mobilization costs that could occur to bring in some of the Siemens "regular" craftsman similar to AREVA specialty welders. This will be further defined by Siemens.

Progress Energy access to the manufacturing facilities cannot be limited to just five visits for HP and LP turbines.

LP turbine construction "is final design dependent and Siemens reserves the right to make changes to the number and style of components noted above without impact to performance guarantee values." "Price" to be added to the statement.

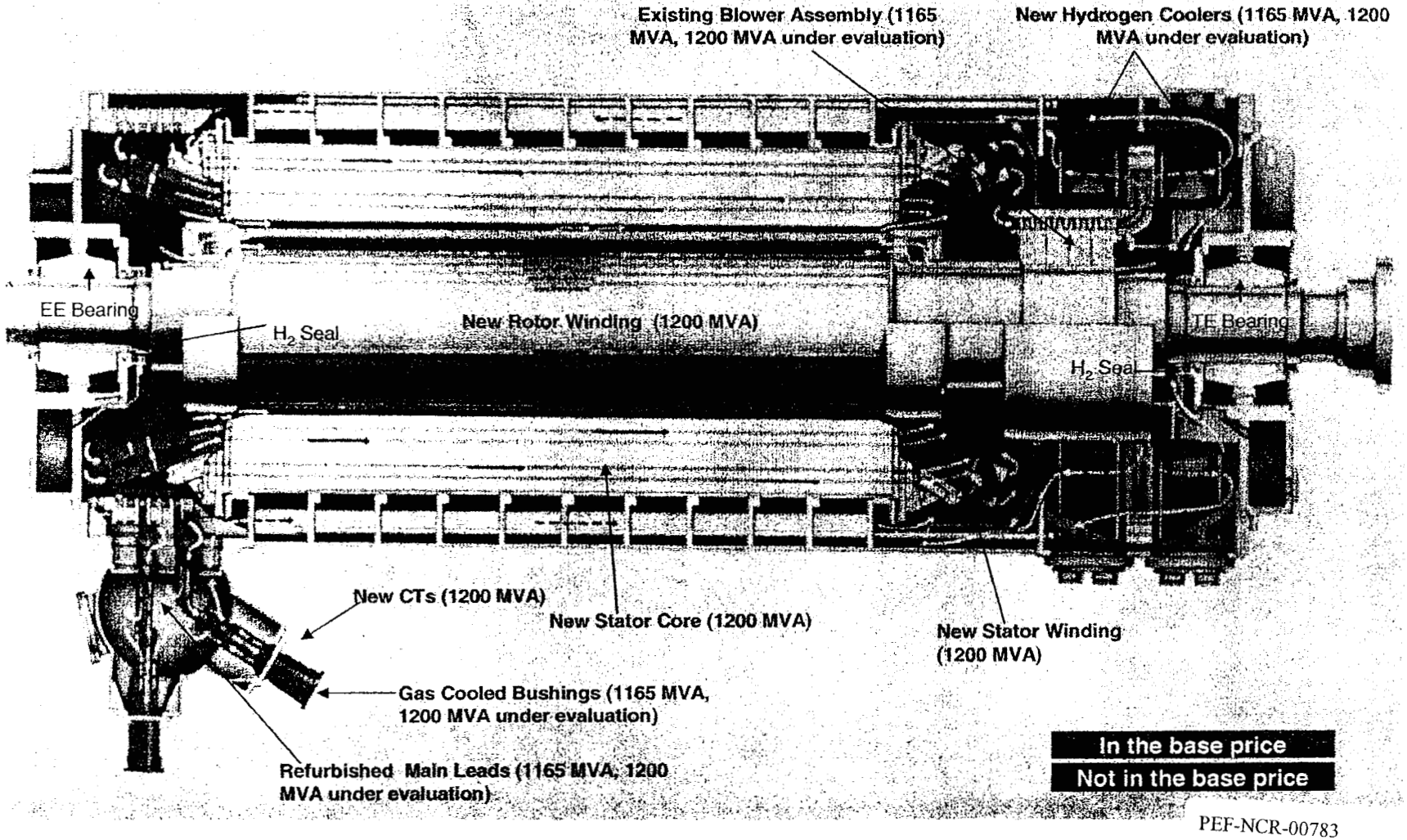
13.0 TERMS AND CONDITIONS

13.1 GOVERNING AGREEMENT

13.2 VALIDITY

SIEMENS

Crystal River 3 Generator Cross Section



PEF-NCR-00783

Based upon seminar information and CR3 power uprate project the following work scope is recommended:

Jeb's notes

CR3 Recommended work scope for 16R .

In field Stator rewind
Stator End Iron Replacement
Factory rotor and exciter rewind
Output bolting/bushing replacement
New Hydrogen Seals and Duplex Oil Filters
Hydrogen Cooler drop in tube sheet
Digital voltage regulator

Based upon attendance at Seminar the following items are considered as part of TG Bid Spec and work for 16R in 2009.

In field Stator rewind
Stator End Iron Replacement
Factory rotor and exciter rewind
Output bolting/bushing replacement
New Hydrogen Seals and Duplex Oil Filters
Hydrogen Cooler drop in tube sheet
Digital voltage regulator

The following estimates should be used for scheduling purposes based best performance durations

Core Replacement 18 days
Stator Rewind < 20 days
Rotor Rewind 29 days
Exciter Rewind 28 days
J Strap Change out 15 days
Balancing 20 moves < 24 hours
Coil Lead time 9 months minimum prefer one year
Shipping of components requires dedicated rail and at least 5 days on each end.

Siemens Generator Workshop
Feb 5-7, 2007
Charlotte NC

Mark Pringle - Director Charlotte Fort Payne Operations
Opening Remarks and Agenda
Power Uprates and retrofit and upgrade capabilities
Tour of Siemens Turbine Generator Service center

Andrew Medla - Director Generator Engineering
Generator Developments and Implications for Operating Fleet
Overview of World Wide Operations and facilities

Computational Tools
3D Finite element analysis of turbine blading, Improved efficiencies and reliability in severe thermal cycles, load following
Computational Fluid Dynamics, allows for increased cooling less heating, allows for increased design capabilities, then compared to actual field data results.

New design 2200 MVA 50 Hz, new design technologies and materials directly applicabl to uprates and upgrades.

Objectives - Speed, Dependable Generation, Life Extension, Capacity Increase
Strategy - Fast Rewinds, Air/Liquid Cooled upgrades, stacked core replacements

Core Replacement 18 days
Stator Rewind < 20 days
Rotor Rewind 29 days
Exciter Rewind 28 days
J Strap Change out 15 days
Balancing 20 moves < 24 hours
Coil Lead time 9 months minimum prefer one year
Shipping of components requires dedicated rail and at least 5 days on each end.

Performance Plus Seal State of Art Carbon seal technology greatly reduces oil consumption by a factor 50:1. Can be used with increased H2 pressure up to 75 psig.

How do we increase MVAR loading capability on existing machines? Additional windings. Who should pay for upfront design (vendor or industry)?

Mark Pringle - Director Charlotte Fort Payne Operations
Generator Factory Services

Quality Culture, Manufacturing technologies, Upgrades/Uprates, Repairs

Safety, Reliability (> 400 gen/exciter in 5 years), Dependability (>90% on time), Trust (open and transparent)

Typically Generator Rewind performed in 12 weeks, with customer input reduced time less than 6 weeks.

Only 84% on time in 2006, Target for 2007 is 96%.

Rotor and Exciter Seed Program. Purchase old machines completely refurbish and sell to customers with credit exchange program. CR3 components readily available on the shelf. Are they shelf ready for power level uprate?

Dennis Cadwell – Director Steam Turbine Generator Specialty Services
Field Service capabilities use same engineering organization as factory services. Specialty tooling and services must meet same quality and technical requirements as in the factory.

Inspection/Testing
Maintenance/Repairs
Rewinds – RIGI FLEX Rapid Field Rewind 20 days

Mark Musulin – Project Manager Beaver Valley Nuclear Stator Rewind and Rotor Modernization

Gas Inner cooled, stator rotor replacement

Original 1026 MVA, 0.9 pf
New Rating 1070 MVA, 0.92 pf

Why rewind?

Insulation limited to 30 years design life
Extend inspection frequency from 6 to 10 years
Upgrade RTD, fiber Optic,
Shorted pole, Original design end winding vibrations
Core End Iron heating issues
Coordinate with RSG and RVCH
Increased Operating capabilities
Scheduled to avoid future outage duration impact
New Improved components and monitoring capabilities

Scope of work was Siemens H2 cooled RIGI Flex

ANSI class F Insulation
Flux probe
RTD, fiber optics

H2 gland seal rings
Bearing refurbishment

Turbine Generator Window 57 days
Actual Rewind duration 37 days, this rewind time only does not include disassembly reassembly and other scheduled maintenance

Resource Impact

Determined to perform 6 months prior to outage
Design Calcs and set points
Project management, design, field, test engineers
Laborers and technicians all supplied by Siemens
Integrated effort with site personnel for support organizations

Extensive testing

QA coil
EL Cid
Hi pot
Core tightening
Loop heat thermo-vision
RTD and fiber optic
Ventilation testing

Ventilation testing requires rolling turbine with Aux steam, risk that may need to shutdown readjust and re-perform. Why does it need to be done?

Challenges

Short planning period
Loop Heat power supply (4160v 700 amps)
Lay down area
Clearances and back feed requirements
Equipment security screening, inspected at factory and closed with seals by security
Ventilation test
Chemical control first time use of site of most chemicals

Lessons Learned

Support work
Material receipt
Coils skids disposal
Lumber for platforms, FME for all screws used
Loop heat power supply
Core Hot Spot acceptance criteria

Time for cleaning, painting
Belly cover installation
Fresh crew for reassembly
Ops must own ventilation test
Obtain MSDS and chemical list early
Replace bushings and CTs

Tom Schubert - Manager Global Generator Service Engineering
Industry Trends and fleet demographics

Global Overall Electrical yearly output 9% Increase over 5 years
Average US base load is currently 32 years in service
This base 20-40 years in service equates to approximately 80% of total base load
30-40 years is approximately 45% of US base load
Typical Life Cycle for large frame generators is 30-40 years

Alex Christodoulo – Manager Generator Services Engineering
Modernizing and Servicing generator stators

Overview of Water and Hydrogen cooled stator
Recommended maintenance to extend life cycle an additional 30 years

Stator Windings – End connection strand cracking, End winding loosening, parallel ring looseness, and phase lead cracks. These are caused by thermal stresses and age degradation, mechanical forces caused by electromagnetic forces in natural frequency ranges. Transient damage caused by severe fault electro-mechanical stresses. These mechanisms can today be controlled by the advancement of material composition and design modeling. Generator is designed to withstand a 3 phase short.

Stator Core - Only 5 Major core losses over last 50 years, foreign object 5, Over fluxing 5, Looseness 3, Installation 1, Unknown 1.

Recommended Maintenance
El-cid < 100milliamp – look for hot spots with thermo vision inspection
Shorted laminations – grind out make field repairs or terminate
Core Looseness and Length – through bolts may bottom out need to add more iron plates
Core End Iron heating – new designs are more adequately cooled
End Shield laminations - end shield replacement

3 Options
Onsite Stator rewind and core refurbishment
Onsite Stator rewind and core replacement with donut stacking replacement
Onsite replacement with seed or new components

Advanced Hydrogen Cooled Stator

Dynamically tuned
Brazed connections
New Materials ANSI Material Type F
Advance support plate construction, and bolting output connections/bushings

Generator Uprate Studies

More Copper in stator slots
More ventilation today's designs
Higher rated exciters
If required, new forgings for rotors, more core iron added by donut stacking replacement

Bill Gardner – Manager Generator Rotor and Exciter Engineering
Modernizing and Servicing hydrogen generator rotors

Rotor Retaining Ring tooth top cracking repairs requires rotor rewind and possibly new forging. Two Mods Short and Long Ring Modifications. Short Mod for small cracks grinds out existing flaws and leaves in compression vice tensile stresses. Long Ring Modification removes entire tooth top, re-establish a new shrink fit area, fillet enlargement. CR3 performed Long Ring Modification. Provides best start stop cycle operation of 10,000 cycles compared to 1,000 cycles for short mod.

Randy Whitener – Engineer Generator Services Engineering
Air cooled generator rotor update

N/A

Kip Madeira – Manager Exciter Services
Modernizing and servicing exciters and collectors

CR3 Exciter 161C average 32 Years
Domestic Exciter Unplanned outages (50%)
Age related –banding separation, phase leads, insulation, bearings
Ops and Maint – FME
Localized overheating causing lifting of end winding
Severed flexible lead riser laminations
Diode wheel Component Cleanliness
Fuse resistance checks

Eric McDonald – Manager Advanced Products Development
Automatic Voltage Regulators Upgrades
Analog WTA and Power System Stabilizers are obsolete and at age for replacement upgrade. Upgrades can remove single point vulnerabilities.

Brushless Exciter Replacement Voltage Regulator (RG3)
Designed in a modular package to replace WTA (Plug and Play) 2 days

Sam Farley – Senior Engineer Generator Services Engineering
Modernizing Generator auxiliaries, hydrogen seals, water and hydrogen systems
Seal Rubs, Oil ingress
Segmented Carbon Seal design installed in 2003,
Loss of oil pressure good to 75 psig minimizes hydrogen loss on loss of seal oil
Duplex filters reduces single point vulnerability
Hydrogen purity monitors

King Chan – Senior Engineer Generator Services Engineering
Modernizing Generator and Exciter coolers
Coolers are specifically designed for machine output. Over designed causes condensation and corrosion within generator. Under designed causes overheating. Need to redesign or replace cooler as part of generator uprate. Must stay within original shell constraints. Make more small tubes more surface area. Drop in cooler design. Fabricated and pressure tested in shop. Fin design less expensive, helical design more efficient but can be debris trap.

Glenn Gamble – Manager Generator Modernization
Responding to Forced Outages

Forced Outage Plan- What Happened, How did it Happen, How much and How Long,
Need forced outage checklist

Collect data- MW/MVA, pf, voltage current Hz vibration, trends
Mode of Operation – Base , Start Up, Load change
Auxiliary Equipment data and trends – Water skid, seal oil, voltage regulator, Exciter Hydrogen system
System data – One line diagram, SWYD, relays, control scheme
Records – Oscillographs, Sequence of events, operator interviews, last outage data
SMEs input
Root cause investigation photos, videos, quarantine area and equipments
Take samples
Mechanical failure typically leads to electrical failure
Define Scope identify options
Know your inventory, know the vendors inventory
The decision of what and when to repair is the critical path

Progress Energy

February 16, 2007

Siemens Power Generator, Inc.
7309 Egypt Lake Drive
Tampa, FL 33614

Attention: Dan Smith

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
TURBINE GENERATOR REPLACEMENT & RETROFIT
REQUEST NO. SD22007

Dear Mr. Smith:

You are invited to submit a proposal for Replacement of the Turbine Generator and the performance of related work (see the Scope attached for additional details) for Progress Energy's Crystal River Nuclear Power Station, Unit 3 site located at 15760 West Powerline Street in Crystal River, Florida 34428. Two (2), signed copies of the proposal (one priced and one unpriced) shall be sealed and marked "CONFIDENTIAL" and submitted to Tony Owen, Progress Energy Service Company, LLC, P. O. Box 1551 (PEB 2C1), Raleigh, NC 27602. Overnight delivery should be sent to 410 S. Wilmington Street (PEB 2C3), Raleigh, NC 27601. The proposal must be sealed and marked as noted above in a separate envelope inside the overnight envelope. No copies of the proposal shall be distributed to any other Progress Energy personnel by the bidder. Your proposal must be received no later than 12:00 noon, March 30, 2007. If your proposal is received after that day or time, it will not be considered for the described work. Telephoned or faxed proposals or proposal information is unacceptable and will not be considered. No modifications to the bidder's proposal will be accepted after the bid due date and time specified above unless specifically requested by Progress Energy in writing.

Bidder is requested to complete, sign, and return the General Information form attached in its entirety and to furnish all information requested by this form. Bids will not be considered when submitted on forms other than those provided.

It is intended that a Contract in the form of the attached specimen Contract will be awarded for this Work and quotations shall be made accordingly, unless the successful bidder has an existing Master Contract with Progress Energy, in which case a Work Authorization will be released against that Master Contract incorporating the details of this Inquiry.

Progress Energy does not obligate itself to accept the lowest or any other bid and specifically reserves the right to reject any and all bids. Bidders are advised that all bids will be opened and evaluated solely by Progress Energy. All information contained in the bids submitted to Progress Energy and Progress Energy's evaluation, including any bidder's relative position to the successful bidder, is considered exclusive information of Progress Energy and will not be made available to any of the bidders. All unsuccessful bidders will be notified by Progress Energy in writing of the award of the work to another firm.

Progress Energy Service Company, LLC
P.O. Box 1551
Raleigh, NC 27602

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the commercial aspect

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the commercial aspect of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Tony Owen, Tony.owen@pgnmail.com (919) 546-2933 by the bidder only.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the technical aspect of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Scott T. Deahna at the Crystal River Nuclear Plant (CNP) at (352) 563-2943, extension 4234, or email address Scott.deahna@pgnmail.com by the bidder only.

It is the bidder's responsibility to advise his potential subcontractors, suppliers, and other subvendors that information will be available only through the bidder and that no direct contacts with Progress Energy by subtier firms shall be initiated. Information exchange shall be between Progress Energy and bidder, and bidder and his potential subcontractors. No work shall be subcontracted without the approval of Progress Energy. Subcontract work and proposed subcontractors must be identified in bidder's proposal.

As a prerequisite for consideration of a bidder's proposal, bidder must contact the site of the proposed work, discuss job conditions with Progress Energy's designated representative, become acquainted with the technical requirements of the work and all available information and local conditions which may possibly occur in the course of the work, and make his choice of methods and equipment accordingly. Contact appointments must be made with Scott Deahna at the Crystal River Nuclear Plant. No site visits will be allowed without prior appointment with the above named person.

Please acknowledge receipt of this proposal and your bidding intentions by completing the attached Acknowledgement and faxing to Tony Owen at (919) 546-6750 by two business days.

PROGRESS ENERGY SERVICE COMPANY, LLC

By: _____

Tony Owen
Supply Chain Management

Attachments to this RFP:

Acknowledgement
General Information
Scope and Other Requirements
Sample Contract
Bid Specification
Table of Conformance
Safety Evaluation Form
Attachments to Bid Specifications
- 10.1 CR3 Turbine Generator Operating Data (Electronic Only)
- 10.2 MUR Power Uprate PEPSE Analysis (Electronic Only)
- 10.3 CR3 P&ID's (Electronic Only)
- 10.4 CR3 Turbine Generator Layout Drawings (Electronic Only)

OPC

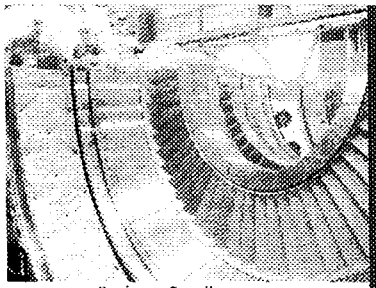
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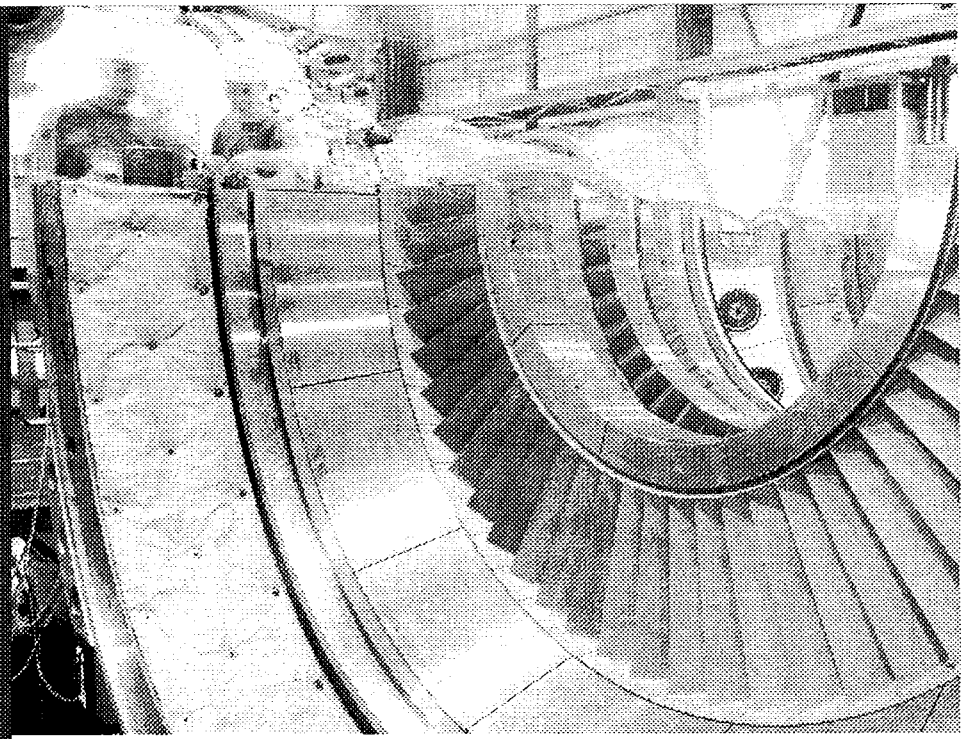
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Order No.: A96001-S90-A000-X-4A00
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Business Excellence

Quality Policy Principles of Siemens Power Generation

Issue 01/2006

Power Generation

SIEMENS

Declaration of policy

Siemens Power Generation is engaged in all types of business related to the power plant sector, serving our customers.

The range of our activities covers the development, sales, engineering, fabrication and supply of key components, purchasing of systems and equipment, up to and including service/Enginneering, Purchasing and Construction (EPC)/turnkey contracts and all related order fulfillments.

Our commitment to customers' competitiveness and profitability and our sense of social responsibility, not to mention statutory requirements, call for ongoing optimization of our products and processes in terms of reliability, availability, maintainability, operating safety and efficiency.

The approach of our value proposition is our driving force for sustainable success:
"The most responsive source of solutions to improve customer operating plant competitiveness and profitability."

With this in mind, the Group Executive Management formulates the strategic focuses:

- **Global** in vision, capabilities, and performance
- **Locally focused** by remaining field based and through **customer intimacy**
- Committed to operating plant **service**
- A supplier of **innovative** and **environmentally responsible** technology-based **solutions** to enable our customers to improve profitability
- A company which enhances **group financial performance** to maintain long-term industry leadership and market success

Deployment is focused by our comprehensive, total quality management (TQM) based *"top"* philosophy united through our four strategic **quality objectives** in terms of:

- **Customer orientation:** We maintain long-term customer relationships by meeting customer expectations.
- **Consequent action:** We take decisions and rigorously execute them.
- **Responsibility:** We promote ownership by actively taking and giving responsibility.
- **Openness:** We push for continuous improvement based on an open and trustful culture.

Quality management as part of this philosophy means recognizing main problems, detecting quality potentials, prioritization of improvement levers, definition of measurement and its deployment, monitoring of progress. This improvement is established as a closed loop in order to deploy the objectives we have set ourselves systematically in our operative business to achieve profitability and business success.

To this end, we establish an organizational, technical and personnel framework which makes it possible to successfully achieve these objectives, and self-assessment procedures based on business excellence ensure and improve continuously the sustained success of our organization.

These policy principles establish duties and responsibilities for the planning and implementation of a quality management system.

Klaus Voges Ralf Guntermann Norbert König Randy Zwirn


Klaus Voges


Ralf Guntermann


Norbert König


Randy Zwirn

Main areas of activity

These Quality Policy Principles demonstrate the capability to meet customer requirements for products, plants and services, and for assessment of those capabilities by internal and external parties.

The following groups of products are covered:

- Gas and steam turbines, electrical generators, manufacturing/services
- Complete fossil power plants
- Operating plant service and project management
- Instrumentation & controls
- Industrial applications
- Wind power
- Stationary fuel cells
- Decommissioning projects

Duties and responsibilities

- The Group Executive Management assumes the business responsibility for the main areas of activity with respect to customers, personnel and the public. One member of the Group Executive Management ("management representative") assumes responsibility for quality management and establishes the group's own measurable quality objectives. As part of his organizational and supervisory authority, this management representative assigns responsibilities (including for quality), necessary organizational and supervisory duties and needed resources to the heads of divisions and to major function/process owners. He agrees with them concrete and measurable targets in accordance with their specific activities and expected results e.g. with "Balanced Scorecards".
  He periodically reviews the results of activities for conformance with the agreed objectives and promotes if necessary improvement activities.
- The **heads of divisions** and the **major function/process owners** are responsible for planning and implementing the quality management system within their own fields of activity in accordance with the agreed targets. They are empowered to ensure that the processes, products and services comply with the quality objectives and have authorization to ensure that their management systems are established, implemented, reviewed and maintained. The assigned responsibility for quality cannot be further delegated. If an organizational unit appoints any other unit within or outside the company to perform specific tasks or duties, it nevertheless retains overall responsibility for agreed objectives.

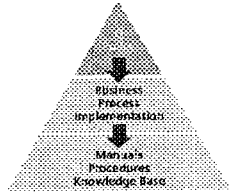
Management is supported in its efforts by quality management organizations described below:

- The **group office "Business Excellence, Quality Management" (BE)** reports to the "management representative" and supports the Group Executive Management by performing the corporate quality tasks defined in the Siemens Quality Management – Mandatory Elements.
  This office covers the following topics: process management, quality management system and business excellence program.
- **Quality offices within divisions and within major function/process owners** are set up to advise and support the heads of these units with respect to the establishment and implementation of the specific quality management measures.
  They report directly to their management. Their fields of duty and authority are defined and documented in internal rules for the respective area of activity.

The organizational units may, on a case-by-case or temporary basis, appoint **Quality Coordinators** and/or **Quality Committees** for specific QM duties. They are in charge of coordinating, advising and supporting their respective functions for quality matters.

Documentation structure

According to quality system and product safety requirements, the processes for product and service realization, such as customer-related processes, marketing & sales, proposals, execution, project management and service operations, control of measuring and monitoring devices, are described in these principles, specific QM manuals, process manuals, and knowledge bases and implemented in conformance with these documents (see figure below of our documentation structure).

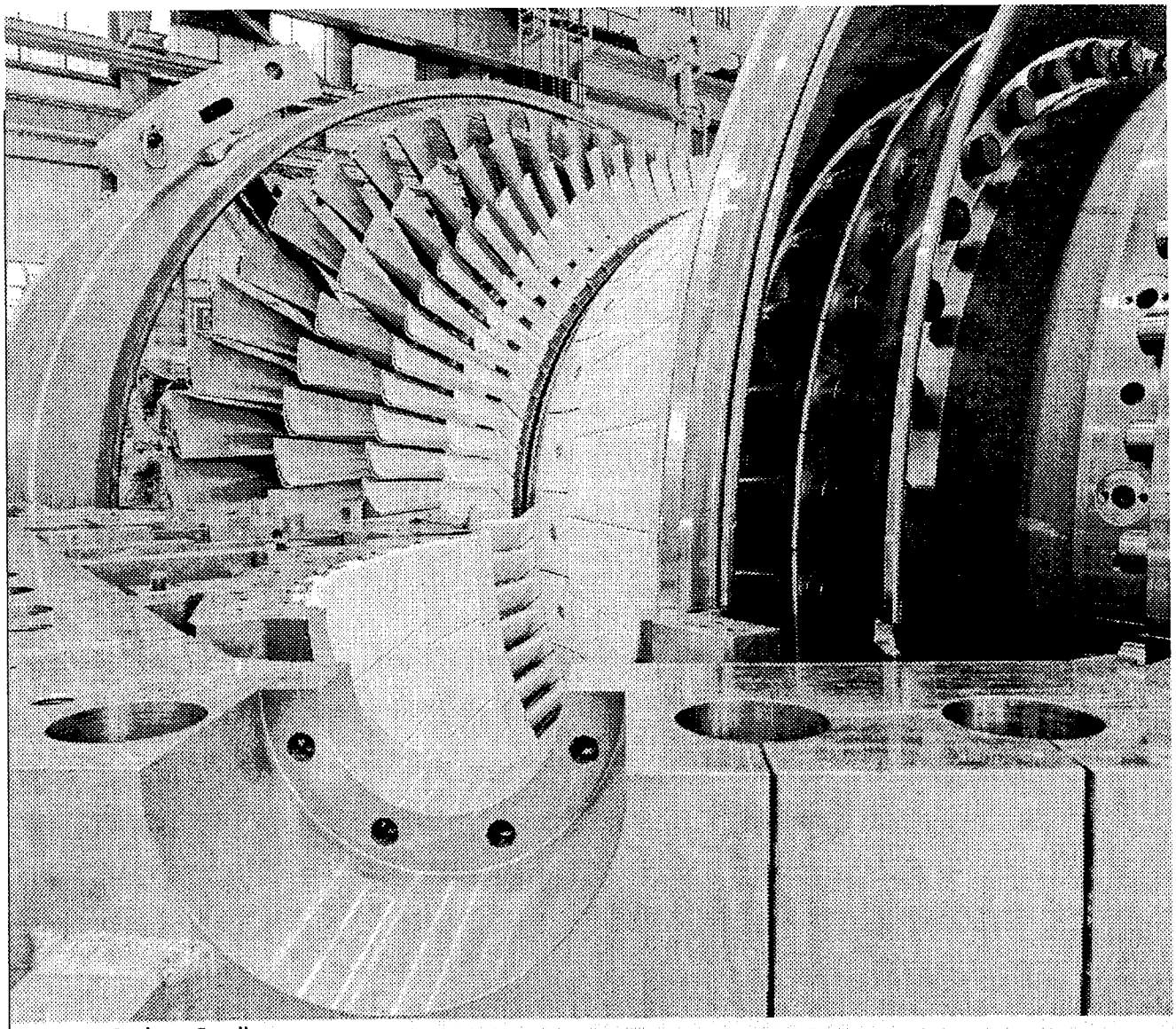


QM Documentation Structure

Continuous improvement

Quality and safety are prerequisites for the products and services developed, produced and supplied. We enforce the improvement processes through the Siemens-wide *top*® **Quality** program. All *top*® activities are focused on customer satisfaction and on increasing the Economic Value Added of our company.
To measure quality system performance, the group uses customer and employee opinion surveys, internal audits and reviews, self-assessments according to Business Excellence Models, process and product/service verifications.
Analyses of data and performance indicators, which also provide areas of improvement for the QM system, are applied.

PEF-NCR-00871



Business Excellence

Quality Management Manual

PEF-NCR-00872

Power Generation

SIEMENS

QMM 602

Quality Management Manual

for

Siemens Power Generation

Proj. Code	Type of Doc.	Contents Code
ZEN000	CH02	0087

PEF-NCR-00873

General

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Preparation, Review and Release

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O.U./Name	O.U./Name	O.U./Name
2001-05-16	2001-05-03	2001-05-03
Date	Date	Date
Voges	Gomez	Schmitt/Haack/Angermeyer

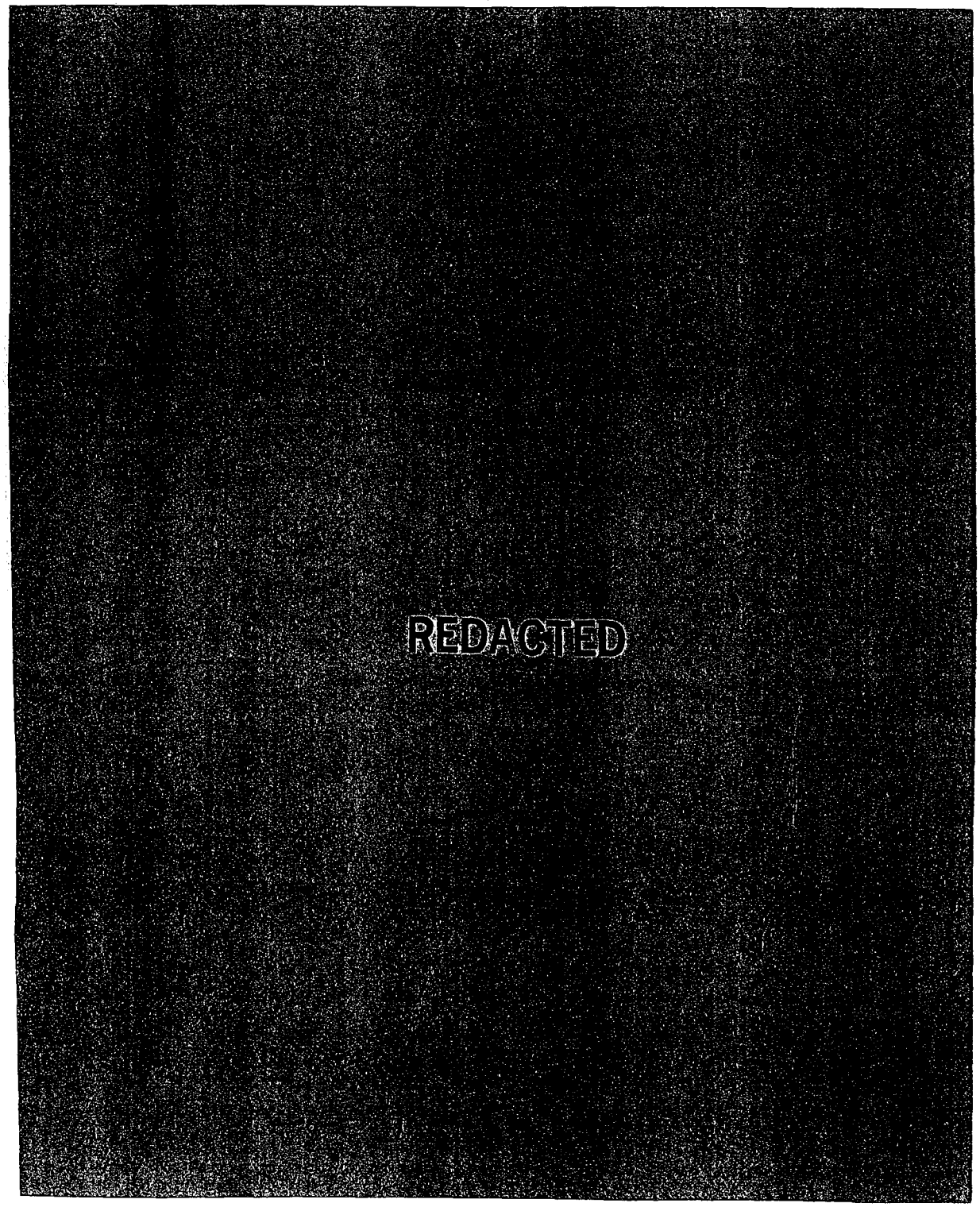
O.U. = organizational unit

Editorial revisions were introduced in 03/2006. The Declaration of Policy was revised on the basis of the latest organizational restructuring, and will be maintained as a separate document in future; a corresponding reference to this effect was added under Section 2.1. All processes described in the manual to date retain their validity.

sgd. Krüger, PG BE31

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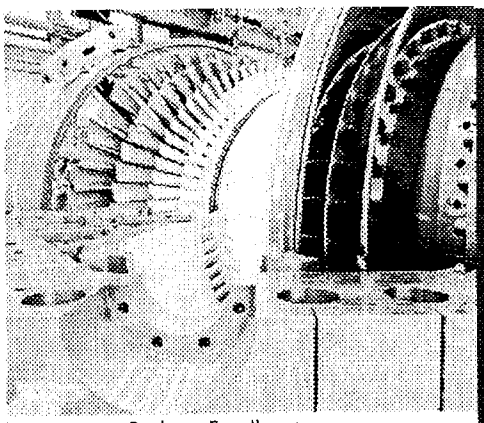
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Siemens AG
Power Generation
Freyeslebenstrasse 1
91058 Erlangen, Germany

Siemens Power Generation, Inc.
4400 Alafaya Trail
Orlando, FL 32826-2399, USA

www.siemens.com/powergeneration

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The information in this document contains general descriptions of the technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.

PEF-NCR-00884

Progress Energy

April 10, 2008

Mr. Dick Miller c/o
Bechtel Power Corp.
5275 Westview Drive, 4B1
Ferderick, MD 21703

Subject: Progress Energy Florida, Inc.
Crystal River Discharge Canal Cooling Study
Request No. DH07-003

Dear Mr. Miller:

You are invited to submit a proposal for the evaluation and conceptual design of cooling options for Progress Energy's Crystal River South and Crystal River Unit 3 sites. Two (2) signed copies of the proposal (one priced and one unpriced) shall be sealed and marked "CONFIDENTIAL" and submitted to Deborah Hanna, Progress Energy Florida, Inc., 15760 W. Powerline Street (SA2C), Crystal River, FL 34428-6708. No copies of the proposal shall be distributed to any other Progress Energy personnel. Your proposal must be received no later than close of business September 29, 2007. If your proposal is received after that day or time, it will not be considered for the described work. Telephoned or faxed proposals or proposal information are unacceptable and will not be considered. No modifications to the proposal will be accepted after the bid due date and time specified above unless specifically requested in writing and approved by Progress Energy.

It is intended that a Contract in the form of the attached sample Contract will be awarded for this scope of work and quotations shall be made accordingly, unless the successful Vendor has an existing Master Contract with Progress Energy, in which case a Work Authorization will be released against that Master Contract incorporating the details of this Request for Proposal.

Progress Energy does not obligate itself to accept the lowest or any other bid and specifically reserves the right to reject any and all bids. Vendors are advised that all bids will be opened and evaluated solely by Progress Energy. All information contained in the bids submitted to Progress Energy and Progress Energy's evaluation, including any Vendor's relative position to the successful Vendor, is considered exclusive information of Progress Energy and will not be made available to any of the Vendors. All unsuccessful Vendors will be notified by Progress Energy in writing of the award of the work to another firm.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to any of the

proposal documents or related project data furnished as part of the proposal documents shall be made directly to Deborah.Hanna@pgnmail.com, (352) 563-2943, x4547.

It is the Vendor's responsibility to advise his potential subcontractors, suppliers, and other sub-vendors that information will be available only through the Vendor and that no direct contacts with Progress Energy by other firms shall be initiated. Information exchange shall be between Progress Energy and Vendor, and Vendor and his potential subcontractors. No work shall be subcontracted without the approval of Progress Energy. Subcontract work and proposed subcontractors must be identified in Vendor's proposal.

Please acknowledge receipt of this proposal and your bidding intentions by completing the attached Acknowledgement form. Bids will not be considered when submitted on forms other than those provided. Please fax the completed Acknowledgement form to Deborah Hanna at (352) 563-4464 before the close of business on September 4, 2007. Progress Energy will host a walk through of the applicable Crystal River areas on September 6, 2007 from 1 to 3 PM. The walk through will be followed by a question and answer session to ensure all the potential vendors understand the scope of this work.

PROGRESS ENERGY FLORIDA, INC.

By:_____

Deborah Hanna

Lead Contract Management Specialist

Attachments:

Acknowledgement
General Information
Scope and Other Requirements

ACKNOWLEDGEMENT

To: Deborah Hanna
Progress Energy Florida, Inc.
15760 W. Powerline St. (SA2C)
Crystal River, FL 34428-6708
Fax: 352-563-4464

In regards to: Progress Energy Florida, Inc.
Crystal River Discharge Canal Cooling Study
Request No. DH07-003

I acknowledge receipt of the subject proposal package and have indicated my bidding intentions as follows:

☐ I have reviewed the proposal documents and will not be submitting a bid for this work.

☐ I have reviewed the proposal documents and intend to submit a bid for this work.

☐ I plan to attend the facility walkthrough and solicitation discussion on September 6, 2007.

_____
(Signature)

_____
(Name)

_____
(Title)

_____
(Company)

_____
(Date)

GENERAL INFORMATION

In the event that your Proposal is accepted and a Contract is awarded to the firm whose full legal company name appears herein below, Mr./Ms. _____, whose title is _____, will be executing the Contract on behalf of the firm. Should this person's title not indicate that he/she is a corporate officer (president, vice president, or corporate secretary), an affidavit signed by a corporate officer shall be provided along with the bid, stating that the person whose name appears above is duly authorized to execute contracts on behalf of the firm.

The Contractor is: (select appropriate line and complete information)

An Individual: _____

A Corporation of the State of: _____

A Partnership consisting of: _____

A Joint Venture comprised of: _____

Full Legal Company Name _____

Business Address _____

_____

_____

Mailing Address _____
(if different)

_____

_____

Contact Name _____

Contact Phone _____

Contact E-Mail _____

Company Website _____

Federal Tax ID Number _____

Contractor's License Number (if applicable) _____ State of Issuance _____

In accordance with the Federal Acquisition Regulation section 52.219, please check all that apply to your company. Please provide supporting documentation or certification to confirm the status for any categories checked under Small/Diverse Vendors.

[ ] Certified small business* [ ] HUBZone, 8(a) or disadvantaged business*
[ ] Veteran-owned business* [ ] Minority-owned business * *
[ ] Service-disabled veteran-owned business* [ ] Women-owned small business * *
[ ] Not a Small Business

* As defined by the Small Business Administration (SBA): www.sba.gov
* * Certified by Progress Energy and as defined by SBA.

Register online at www.progress-energy.com/supplierdiversity

BY: _____

NAME (printed): _____

TITLE: _____

DATE: _____

SCOPE AND OTHER REQUIREMENTS

I. Background

Progress Energy Florida, Inc. (PEF) plans to increase the electrical power output of its nuclear reactor – Crystal River Unit 3 (CR3) – located in Crystal River, FL via an Extended Power Uprate (EPU) scheduled for completion in 2011. The planned changes will increase the licensed core power from 2568 MWt (903 MWe) to 3014 MWt (1080 MWe), an electrical improvement of roughly 20%. A direct result of the augmented electrical generation will be an increase in heat rejected from the circulating water system through the once-through condensers and into the discharge canal. Without mitigation, the corresponding increase in dissipated heat is expected to affect the permitted discharge temperature limit of 96.5 °F.

CR3 shares a common discharge canal with two adjacent coal-fired units, CR1 (400 MW) and CR2 (500 MW). The common discharge canal currently has 36 cells of helper (mechanical draft) cooling towers plus 67 additional modular cooling towers that operate during the summer months to cool a portion of discharge canal water to comply with permit limits. However, even with the helper and modular cooling towers, high discharge canal water temperatures periodically cause CR1 and CR2 to de-rate so as not to exceed the permitted National Pollutant Discharge Elimination System (NPDES) limit. After the 2011 EPU implementation, operation of CR1 and CR2 will be further impacted by the increase in discharge canal water temperature without any mitigation.

PEF developed and submitted a Site Certification Application (SCA) to the Florida Department of Environmental Protection (FDEP) as part of the EPU permitting process. One of the possible mitigating actions submitted in the SCA was the use of additional cooling towers. Applicable sections of the SCA are included in Attachment C. Although cooling towers were mentioned in the SCA, the use of cooling towers may not be the best alternative. As a result, this Request for Proposal (RFP) has been developed to determine the best thermal mitigation alternative.

II. Vendor Scope of Work

The Scope of Work is divided into two phases. Phase I is to evaluate alternatives for reducing the discharge canal water temperature in order to (1) accommodate the planned thermal increase associated with CR3's EPU, (2) minimize the effect on full-load operation of CR1 and CR2 and potentially eliminate necessary de-rates of either unit, and (3) comply with all existing and proposed environmental permits, including re-circulating water from the discharge canal to the intake canal to offset increased condenser flow from CR3's EPU and address 316(b) requirements. The goal of this study is to evaluate the potentially viable alternatives, compare the alternatives, and recommend the most cost effective and technically feasible alternative. The Study Report will be structured using the outline provided in Attachment B. Phase II of this work scope is to develop a conceptual design, general cost estimate (±25%) and high-level

schedule for the Project's implementation.

Phase I
The alternatives analysis shall contain sufficient design consideration (e.g., equipment sizing, quantity, and materials) to determine whether it is technically and economically feasible to implement each alternative. The following list provides the expected alternatives, in whole or in combination, for this evaluation.

- Evaluation of cooling alternatives, including, but not limited to, the following:
  - ⇒ New Cooling Towers
  - ⇒ Modifying Existing Cooling Towers
    - o Upgrade Helper Cooling Towers (fans, stacks, or fill)[1]
    - o Eliminate Modular Cooling Towers
  - ⇒ Evaporative Cooling
  - ⇒ Inlet/Discharge Chillers
  - ⇒ Air Spargers/Bubblers[2]
- Analysis of each alternative including, but not limited to, the following:
  - ⇒ Economic Cost Estimate (including the basis for the estimate)
  - ⇒ Schedule Analysis
  - ⇒ Quantity and Size of Equipment
  - ⇒ Infrastructure Requirements (e.g., electrical needs)
  - ⇒ Proposed location(s) considered for the alternative
  - ⇒ Site Impacts (e.g., environmental, operational and maintenance)
  - ⇒ Advantages and Disadvantages Relative to Other Options
- Identify environmental impacts for each alternative[3]
  - ⇒ Wetlands Mitigation
  - ⇒ Biota Impingement and Entrainment Issues
- Preparation of an Alternatives Summary Report comparing the alternatives and an on-site presentation (to plant personnel) of the selection results.

Phase II
The recommended alternative shall be developed into a conceptual design, which shall contain sufficient detail to prepare a request for proposal (RFP) package for the final equipment procurement and design. Section X of this document identifies the level of detail expected in the conceptual design report. PEF expects that the conceptual design can be used as the stand alone engineering design input document for the final design.

This work is NOT nuclear safety related and does not need to be completed under the Vendor's

---

[1] Helper Cooling Tower upgrades were evaluated previously (additional References – Bechtel Cooling Water Study).
[2] Bubble cooling was previously reviewed (additional References – John Cooper & Associates Engineering Evaluation).
[3] PEF will perform detailed review of 316(b) impacts; Vendor is not expected to coordinate any interaction with permit agencies. PEF expects the Vendor to identify possible environmental impacts, as well as solutions, for each alternative.

Appendix B program.

The technical details and requirements for each of the items associated with this scope of work are discussed in the following sections.

III. Owner Scope of Work

PEF personnel will work with the selected Vendor in obtaining additional information (e.g., wetland surveys, civil engineering drawings, and plant electrical drawings) to support the evaluation. The selected Vendor should expect a one day turn around time for on site delivery of drawings and an additional one to two days time for off site delivery. PEF personnel will coordinate the Vendor's CR site indoctrinations, badging, and specific training, as required.

After the Phase I alternative selection, an economic analysis will be performed using PEF's in-house EESY+ software. PEF will input the Vendor's supplied data into EESY+ and provide the output results for incorporation into the final study report. The Vendor will review the EESY+ input for accuracy and review/incorporate the output results into the study.

IV. Technical Details

Vendor shall conduct a thorough review of design alternatives to reduce the discharge canal water temperature and satisfy the stated Project objectives following CR3's EPU. This evaluation shall include a technical analysis of design variables such as discharge canal temperature variation, ambient temperatures, and environmental restrictions. Specific data related to the unit operations following the EPU are included below. Additional information will be supplied by PEF after contract award and requested by the selected vendor.

- CR1 full-load operation
  - ⇒ 245,000 gpm Circulating Water Flow (actual)
  - ⇒ ~17 °F Circulating Water Temperature Rise Through Condenser
- CR2 full-load operation
  - ⇒ 308,000 gpm Circulating Water Flow (actual)
  - ⇒ ~14 °F Circulating Water Temperature Rise Through Condenser
- CR3 full-load operation
  - ⇒ 832,000 gpm Circulating Water Flow
  - ⇒ ~17 °F Circulating Water Temperature Rise Through Condenser
  - ⇒ .768 MBtu/hr of Additional Heat Dissipated due to EPU
- (Hamon) Helper Cooling Towers operation
  - ⇒ 4 blocks of 9 cells
  - ⇒ 686,000 gpm Total Water Flow
  - ⇒ 89.5 °F Design Outlet Temperature (based on 103 °F inlet and 81 °F wet bulb)
- (Aggreko) Modular Cooling Tower operation
  - ⇒ 67 individual cells
  - ⇒ 180,000 gpm Total Water Flow

⇒ 90 °F Design Outlet Temperature (based on 103 °F inlet and 81 °F wet bulb)

- Project Objectives
  - ⇒ Allow Full-Load Operation of CR1, CR2 and CR3 during Summer
  - ⇒ Plan for Maximum Design Intake Water Temperature of 91 °F
  - ⇒ Comply with 96.5 °F Point of Discharge (POD) 3-hr Rolling Average
  - ⇒ Maintain a maximum Permitted Discharge Flow Rate of 1,320,000 gpm (or 1,897.9 Mgpd) by returning cooled discharge canal water (approximately 152,000 gpm) to the intake canal.
- Additional Data
  - ⇒ Intake canal cannot be blocked due to barge traffic.
  - ⇒ Though additional cooling capacity is only required during summer months, re-circulating water flow back to the intake canal is necessary year round.
  - ⇒ The return water from discharge to intake canals will be designed for most efficient and cost effective mitigation of biota entrainment and impingement.

V. REFERENCES

The following reference documents are provided as part of this RFP. These documents are located in Appendix C.

1. PEF Safety Plan
2. Site Land Use Classification Map
3. Applicable Sections of the Site Certification Application
4. Historical Data of Circulating Water Temperatures
5. Helper Cooling Tower Performance Curves
6. Modular Cooling Tower Performance Curves
7. Local Annual Windrose
8. Request for Information Form

Additional documents will be provided following contract award. Other data that may be provided to facilitate technical evaluations, as requested.

- Site civil engineering drawings
- Site electrical drawings
- Wetland surveys
- Site Certification Application
- Bechtel Cooling Water Study
- John Cooper & Associates Engineering Evaluation

VI. PEF Contacts

Contractual: Deborah Hanna
Telephone: (352)563-4547
E-mail: Deborah.Hanna@pgnmail.com

Technical: Mark Gillespie or Mark Hickman

Telephone: (352) 795-0504 x6926 or (352) 795-6486 x4233
Email: mark.gillespie@pgnmail.com or mark.hickman@pgnmail.com

VII. Work Control

The majority of the work is expected to be completed at Vendor's facility. However, one cubicle with 2 desks and 2 chairs will be provided (if requested) at Crystal River for the selected Vendor's use. Vendor shall be responsible for all office supplies, equipment and personnel protective equipment (e.g., hard hat, safety glasses and safety shoes). Vendor shall be responsible for identifying personnel that need access on Site and shall coordinate temporary badges and training so as not to impact the schedule of work.

The selected Vendor shall establish a Request for Information (RFI) Log to track information transmitted between PEF and Vendor. The RFI form (see Attachment C) will be completed for all questions on the Project that need formal clarification. RFI's shall be used to resolve any questions related to Project scope, schedule or cost. Additionally, RFI's may be used to request drawings or other documents not accessible to Vendor or to document equipment or system specifications.

Vendor shall conduct weekly status meetings/teleconferences with PEF Project personnel. Vendor shall distribute an agenda (with input from PEF) prior to the meeting, take minutes and distribute the minutes after the meeting. PEF personnel will have an opportunity (1 working day minimum) to comment on the meeting minutes before they are submitted as final. Minimum topics to be covered at each meeting are:

- Safety topic
- Earned value status (cost vs. schedule)
- Projected Estimate at Completion (EAC)
- Accomplishments/Milestones
- Issues/Request for Information
- Scheduled accomplishments for next week
- Number of personnel working on the project (last week and next week)

The Vendor shall conduct a Phase I completion and 90% project completion review meetings with PEF personnel at CR. Vendor shall distribute an agenda (with input from PEF personnel) prior to the review, take minutes and distribute the minutes after the review. PEF personnel will have an opportunity (4 working days minimum) to comment on the review meeting minutes before they are submitted as final. Minimum topics to be covered at each review are:

- Safety topic
- Earned value status (cost vs. schedule)
- Projected EAC
- Accomplishments
- Presentation of completed documents for approval
- Issues
- General discussion (question & answers)

Vendor shall perform technical evaluation of cooling alternatives and complete a conceptual design of the recommended solution. Interaction between PEF and Vendor is expected to clarify any comments on alternatives as well as to identify site restrictions that may not have been considered.

Vendor shall attend a mandatory Kick-Off Meeting prior to the start of work, to be set up when the contract is issued.

VIII. Schedule:

The following sequence of activities identifies the formal reviews and deliverables for the work. Vendors are required to submit a schedule with the required time line completed. The stated scope of work is required to be complete by January 31, 2008.

- RFP sent to Vendors
- September 4, 2007 – Submit Acknowledgement & General Information Forms
- September 6, 2007 – Walkdown and RFP Discussion at Crystal River
- October 5, 2007 – Proposals Due [Approx. 4 WEEKS TO PREPARE]
- October 11, 2007 – Contract Award Notice to Proceed (NTP)
- ≤1 Week After NTP – Kick-Off Meeting (at Crystal River Site)
- ~ 5 Weeks After NTP – Phase I Completion Review (Alternative Selection on or before this review) and Presentation of Report (at Crystal River Site).
- ~ 14 Weeks After NTP – Conceptual Design Draft (90% Completion) Report
- ~ 15 Weeks After NTP – PEF comments on Draft Report
- ~ 16 Weeks After NTP – Final Report
- ~ 16 Weeks After NTP – Presentation of Report (at Crystal River Site)

The selected Vendor is required to change this time line into a schedule that contains meaningful milestone and deliverable dates within one week of NTP. Project completion must not exceed January 31, 2007.

Vendors are encouraged to identify any dates that can be improved in the above schedule.

IX. Quality Assurance

Quality Assurance (QA) and Quality Control (QC) shall be accomplished under Vendor's internal QA/QC Program. Vendor's QA/QC Program shall be submitted to PEF for review with their proposal.

X. Technical Documentation and Submittal Requirements

Phase I

Finalize the list of alternatives to be evaluated and obtain Alternative Evaluation List approval from PEF Project Manager. Complete the alternatives analysis and draft the Alternatives

Summary Report. The selected Vendor shall work with PEF personnel to determine a recommended alternative for implementation after the alternative analysis is complete. A preliminary draft of the Phase I alternatives summary report shall be submitted to PEF for review and comment 5 days prior to final document submittal and presentation at Crystal River. The final Alternatives Summary Report shall be approved by PEF before starting the conceptual design. The final alternatives analysis will identify additional testing and information that is required in order to complete the conceptual design (i.e. underground utilities location, soils sampling, etc.).

Five copies of the final Alternatives Summary Report shall be supplied to PEF.

Phase II

The Vendor shall then develop a Conceptual Design of the selected alternative. The design shall have sufficient detail that the information can be used as the primary input for the detailed design. PEF personnel will supply site specific criteria for Vendor inclusion in the conceptual design document as identified below. At a minimum, the Conceptual Design will include the following:

- Provide a detailed scope description. The description should include the boundaries and interfaces with existing systems (i.e., site electrical, helper and modular cooling towers).
- Identify the location(s) for installation and reason for selection, including any testing data that was used to aid in the site selection.
- Identify any exclusions or caveats that were considered during alternative selection.
- Identify applicable codes and standards.
    - State design conditions such as seismic loads, wind speeds, thermal and dynamic loads, system pressure and temperatures, and chemical considerations.
- Identify installation requirements that are unique to the proposed design, installation, and/or startup of the equipment. Include specific direction if field routing is not acceptable.
- Identify any assumptions made during the alternative selection.
    - State environmental conditions anticipated during storage, construction, and operation.
    - Identify environmentally sensitive areas near the construction areas. Identify the environmental permitting requirements for the construction.
    - Identify any interface requirements including definition of the functional and physical interfaces involving structures, systems and components.
- Identify any precautions or limitations that need to be considered in completing the design.
    - Identify environmental considerations (e.g., maximum particulate carry over during evaporative processes).
- Provide installation sketches and marked up drawings for electrical, I&C, and mechanical systems. Develop P&ID of recommended system(s).
- Provide installation sketches and marked up drawings with civil/structural details.
- Provide calculations developed during the alternative evaluation and selection process.
- Provide suggested component and equipment selection and specifications.
    - Identify the performance requirements of the selected alternative systems and

equipment, such as capacity, rating, and system output.
    - Identify material requirements such as electrical insulation properties, protective coating and corrosion resistance.
    - State mechanical requirements such as vibration, stress, shock, and reaction forces.
    - Identify Structural requirements covering items such as equipment foundations and pipe supports.
    - Identify hydraulic requirements such as pump net positive suction heads, allowable pressure drops, and allowable fluid velocities.
    - Identify electrical requirements such as source of power, voltage, conduit requirements, electrical insulation and motor requirements. Provide the electrical power supply for each component and calculation of the total electrical power required for the project.
    - State the on-site electrical power source that will be used to supply the project. List the major pieces of electrical equipment to be procured and installed in order to provide electrical power to the major electrical components.
    - Identify of the electrical power routing from the main distribution switchgear to transformer(s) and load center(s) to be used for the project.
    - Provide layout and general arrangement requirements.
    - Additional requirements such as inadvertent activation prevention devices, such as switch covers, key lock switches and other human factors considerations (i.e. handwheel locks) may be provided by PEF personnel.
- Identify operational requirements and sequencing under various conditions, such as plant start-up, normal plant operation, plant shutdown, plant emergency operation, special or infrequent operation, and system abnormal or emergency operation, including postulated accident conditions. PEF personnel will assist in determining these criteria.
- State instrumentation and control requirements, including indicating instruments, controls, and alarms for operation, testing, and maintenance. Other requirements such as the type of instrument, installed spares, range of measurement, and location of indication should also be included. PEF personnel will identify desired instrumentation and alarms. The instrumentation and controls should be similar to existing equipment monitoring and control schemes.
- Access and administrative control requirements for plant security (PEF personnel to identify).
- If applicable, state redundancy, diversity and separation requirements of structures, systems, and components.
- Identify the failure effects on the requirements of structures, systems, and components, including a definition of those events and accidents that they must be designed to withstand (i.e. hurricane winds).
- Identify system and component test requirements and the conditions under which they will be performed.
- Identify accessibility, maintenance, repair, and in-service inspection requirements for the equipment, including the conditions under which these will be performed (PEF personnel to assist).
- Identify the on-site transportability requirements such as size and shipping weight,

limitations.

- Identify the fire protection or resistance requirements.
- State that the design is to identify the handling, storage, and shipping requirements of procured material.
- Identify safety requirements for preventing personnel injury including such items as restricting the use of dangerous materials, escape provisions from enclosures, and grounding of electrical systems. Identify plant procedures that address these hazards (i.e. Chemical Control). PEF personnel will assist in identifying site requirements and procedures.
- Provide an Affected Documents List of site drawings and procedures.
- Provide an estimate of new drawings that will be generated during the detailed design phase.
- Prepare a Conceptual Design Report Package.

Drawings shall be performed and submitted in US standard units (i.e. feet, lbs, kips, inches). All engineering drawings and calculations will be reviewed and approved by a registered Professional Engineer.

Five copies of the final conceptual design documents shall be supplied to PEF.

XI. Deliverables:

Phase I
Kickoff meeting agenda and minutes
List of alternatives to be analyzed
Weekly meeting agenda, status, & minutes
Draft Alternatives Summary Report (5 copies)
Final Alternatives Summary Report (5 copies) and Presentation

Phase II
Updated project schedule
Weekly meeting agenda, status, & minutes
Draft Conceptual Design Report (5 copies)
Final Conceptual Design Report (5 copies) and Presentation

XII. Additional Information:

PEF will hold a pre-bid meeting with interested Vendors to clarify questions and expected scope. The meeting will be held on September 6, 2007 from 1 to 3 pm.

XIII. Attachments:

A. Bid Requirements
B. General Study Outline
C. PEF Technical Documentation

Attachment A. Bid Requirements

Vendor shall provide the following information with their proposals.

1. Company's resume providing qualifications and references that demonstrate Vendor's capability to complete the work.
2. Vendor's organization chart identifying how this work will be managed as well as interface points with PEF.
3. Resumes of personnel intended to be used on this project. These resumes will be evaluated as part Vendor's qualification to accomplish the stated scope of work.
4. Commitment to start work within ten (10) days of the Notice to Proceed.
5. Company safety statistics.
6. Classification of each type person associated with the work scope.
7. Hourly billing rates for each classification (straight time/overtime or all-hours rate)
8. Billable travel and living expenses.
9. Estimated man-hours for each personnel classification.
10. This contract will be completed as a Time & Materials contract, divided into two phases. Provide a maximum not-to-exceed contract dollar amount for each phase of the work described in this RFP.
11. Provide a description of the suggested approach the Vendor will take to complete this work. The approach description should:
    - be consistent with the estimated cost and schedule,
    - include the expected manpower (by classification) needed for each phase of the work,
    - demonstrate that the Vendor understands the work scope & schedule requirements,
    - identify what work will be completed at Crystal River and the work to be completed at the Vendor's facility,
    - include potential problems that could affect the project cost or schedule,
    - include methods to control contract costs,
    - describe the Vendor's earned value system that will be used to monitor and report project cost (this description should demonstrate that the Vendor has the capability to properly identify, monitor, collect, analyze, and report project costs),
    - identify opportunities to improve the project's completion.
12. Provide a schedule for accomplishing this scope of work that contains the sequence of activities in Section VIII.
13. QA/QC Program Manual &/or Procedures to be followed in completing the work.
14. Health & Safety (H&S) Plan or agreement to comply with the PEF's H&S Plan.

SPECIAL REQUIREMENTS:

Confidentiality:
All RFP drawings, specifications, and contractual documents will remain the property of Progress Energy and are to be returned in good condition within ten (10) days after the date set

for receiving bids. RFP documents shall not be reproduced or used for any purpose other than for the preparation of a proposal in accordance with this request. The information contained in these documents is proprietary and confidential and shall be maintained in strict confidence.

RFP Interpretation:
An interpretation request shall be made to Progress Energy if a Vendor is in doubt as to the true meaning of any part of the drawings, specifications, or contractual documents. Modification of the documents will be made only by written addendum issued to each Vendor as described below.

RFP Exceptions:
If a Vendor's proposal contains any deviations or exceptions, those deviations or exceptions must be specifically identified on a single separate attachment to the proposal in order to be considered in the evaluation. If not so identified, the deviations or exceptions will not be considered part of the proposal. Conditional proposals based on Vendor-generated clarifications may not be accepted. If a Vendor takes any exceptions in addition to those submitted in accordance with this section, that Vendor's proposal may be rejected by Progress Energy.

RFP Approved Equal Evaluation:
Submittals by Vendor for evaluation of products as "approved equal" shall be made to the appropriate designated individual listed in the Request for Proposal at least ten (10) days prior to the proposal due date. Results of evaluations will be provided no later than seven (7) days prior to the proposal due date. Submittals made later than ten (10) days prior to the proposal due date will not be considered.

RFP Addenda:
Progress Energy reserves the right to amend or clarify requirements herein by Addenda. An addendum may be issued at any time prior to the date for receipt of proposals and may be mailed or otherwise delivered to all Vendors who have been invited to bid. Request by a Vendor for extension of the proposal due date shall be received by Progress Energy at least one week prior to the then scheduled date. If revisions or clarifications are of magnitude to warrant, in the opinion of Progress Energy, the extension of the date set for receipt of proposals, an addendum will be issued announcing the new date. Failure of a Vendor to acknowledge receipt of any addendum in the space provided on the proposal form may result in rejection of that proposal.

Safety:
Progress Energy is committed to using safety conscious contractors. To this end, Progress Energy collects safety-related data voluntarily provided by all persons performing or desiring to perform Progress Energy work. This data is compiled and made available to Progress Energy employees via Progress Energy's intranet. This intranet system is accessible by non-Progress Energy employees, and thus, so will be any safety-related information you provide. In providing the safety-related information requested herein, to Progress Energy or to any other person doing business, directly or indirectly, with Progress Energy, the undersigned contractor explicitly authorizes Progress Energy to disclose said information to non-Progress Energy persons and hereby releases Progress Energy and its agents and employees from any cause of action or claim

for damages related to said disclosures.

Nuclear Requirements:
This work is NOT classified as Nuclear Safety Related and does not need to be accomplished under the vendor's Appendix B Program.

Attachment B. Alternatives Analysis Report Outline

1. Title/Signature Page
   i. Contact Information
2. Executive Summary
3. Table of Contents
4. Introduction
   i. Project Description
   ii. Preliminary Scope Statement
   iii. References
   iv. Existing Unit Overview
5. Design Criteria
   i. Design Objectives
   ii. Design Parameters
6. Evaluation of Alternatives
   i. General Descriptions
      - Equipment
      - General layout
   ii. Technical Evaluation
      - Operating parameters
      - Ability to meet project requirements
   iii. Economic Analysis
      - Equipment
      - Site preparation
      - Installation/construction
      - Operating costs
   iv. Environmental Issues
      - Location / site preparation
      - Operating
      - Potential mitigation actions required
   v. Estimated Cost
      - Equipment
      - Site Preparation
      - Installation / construction
      - Operation
      - Maintenance
   vi. Estimated Schedule
7. Recommended Solution
8. Attachments

Attachment C. PEF Technical Documentation

1. PEF Safety Plan
2. Site Land Use Classification Map
3. Applicable Sections of the Site Certification Application
4. Historical Data of Circulating Water Temperatures
5. Helper Cooling Tower Performance Curves
6. Modular Cooling Tower Performance Curves
7. Local Annual Windrose
8. Request for Information Form

PEF Safety Plan

Site Land Use Classification Map

Applicable Sections of the Site Certification Application

Historical Data of Circulating Water Temperatures

Helper Cooling Tower Performance Curves

Modular Cooling Tower Performance Curves

Local Annual Windrose

RFI Number:	
Discharge Canal Thermal Mitigation Project Request for Information (RFI) Form	
Date: Initiator:	Contractor's Project Manager Approval:
Description of Request, Issue, Concern	
Suggested resolution:	
Date that response is needed by to prevent Project impact:	

Potential Impact											
Scope			Schedule			Cost			Safety		
Description of Impact:											
Progress Energy Direction, Resolution, Clarification											
Approval:											
Project Manager:											
Procurement Specialist:											

Progress Energy

April 10, 2008

_____

_____

_____

Attn:_____

Subject: Progress Energy Florida, Inc.
Crystal River Discharge Canal Cooling Study
Request No. DH07-003

Dear Mr._____:

You are invited to submit a proposal for the evaluation and conceptual design of cooling options for Progress Energy's Crystal River South and Crystal River Unit 3 sites. Two (2) signed copies of the proposal (one priced and one unpriced) shall be sealed and marked "CONFIDENTIAL" and submitted to Deborah Hanna, Progress Energy Florida, Inc., 15760 W. Powerline Street (SA2C), Crystal River, FL 34428-6708. No copies of the proposal shall be distributed to any other Progress Energy personnel. Your proposal must be received no later than close of business September 29, 2007. If your proposal is received after that day or time, it will not be considered for the described work. Telephoned or faxed proposals or proposal information are unacceptable and will not be considered. No modifications to the proposal will be accepted after the bid due date and time specified above unless specifically requested in writing and approved by Progress Energy.

It is intended that a Contract in the form of the attached sample Contract will be awarded for this scope of work and quotations shall be made accordingly, unless the successful Vendor has an existing Master Contract with Progress Energy, in which case a Work Authorization will be released against that Master Contract incorporating the details of this Request for Proposal.

Progress Energy does not obligate itself to accept the lowest or any other bid and specifically reserves the right to reject any and all bids. Vendors are advised that all bids will be opened and evaluated solely by Progress Energy. All information contained in the bids submitted to Progress Energy and Progress Energy's evaluation, including any Vendor's relative position to the successful Vendor, is considered exclusive information of Progress Energy and will not be made available to any of the Vendors. All unsuccessful Vendors will be notified by Progress Energy in writing of the award of the work to another firm.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to any of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Deborah.Hanna@pgnmail.com, (352) 563-4547.

It is the Vendor's responsibility to advise his potential subcontractors, suppliers, and other sub-vendors that information will be available only through the Vendor and that no direct contacts with Progress Energy by other firms shall be initiated. Information exchange shall be between Progress Energy and Vendor, and Vendor and his potential subcontractors. No work shall be subcontracted without the approval of Progress Energy. Subcontract work and proposed subcontractors must be identified in Vendor's proposal.

Please acknowledge receipt of this proposal and your bidding intentions by completing the attached Acknowledgement form. Bids will not be considered when submitted on forms other than those provided. Please fax the completed Acknowledgement form to Deborah Hanna at (352) 563-4464 before the close of business on September 4, 2007. Progress Energy will host a walk through of the applicable Crystal River areas on September 6, 2007 from 1 to 3 PM. The walk through will be followed by a question and answer session to ensure all the potential vendors understand the scope of this work.

PROGRESS ENERGY FLORIDA, INC.

By: _____

Deborah Hanna

Lead Contract Management Specialist

Attachments:

Acknowledgement
General Information
Scope and Other Requirements

ACKNOWLEDGEMENT

To: Deborah Hanna
Progress Energy Florida, Inc.
15760 W. Powerline St. (SA2C)
Crystal River, FL 34428-6708
Fax: 352-563-4464

In regards to: Progress Energy Florida, Inc.
Crystal River Discharge Canal Cooling Study
Request No. DH07-003

I acknowledge receipt of the subject proposal package and have indicated my bidding intentions as follows:

☐ I have reviewed the proposal documents and will not be submitting a bid for this work.

☐ I have reviewed the proposal documents and intend to submit a bid for this work.

☐ I plan to attend the facility walkthrough and solicitation discussion on September 6, 2007.

_____
(Signature)

_____
(Name)

_____
(Title)

_____
(Company)

_____
(Date)

GENERAL INFORMATION

In the event that your Proposal is accepted and a Contract is awarded to the firm whose full legal company name appears herein below, Mr./Ms. _____, whose title is _____, will be executing the Contract on behalf of the firm. Should this person's title not indicate that he/she is a corporate officer (president, vice president, or corporate secretary), an affidavit signed by a corporate officer shall be provided along with the bid, stating that the person whose name appears above is duly authorized to execute contracts on behalf of the firm.

The Contractor is: (select appropriate line and complete information)

An Individual: _____

A Corporation of the State of: _____

A Partnership consisting of: _____

A Joint Venture comprised of: _____

Full Legal Company Name _____

Business Address _____

_____

_____

Mailing Address _____
(if different)

_____

_____

Contact Name _____

Contact Phone _____

Contact E-Mail _____

Company Website _____

Federal Tax ID Number _____

Contractor's License Number (if applicable) _____ State of Issuance _____

In accordance with the Federal Acquisition Regulation section 52.219, please check all that apply to your company. Please provide supporting documentation or certification to confirm the status for any categories checked under Small/Diverse Vendors.

[ ] Certified small business* [ ] HUBZone, 8(a) or disadvantaged business*
[ ] Veteran-owned business* [ ] Minority-owned business * *
[ ] Service-disabled veteran-owned business* [ ] Women-owned small business * *
[ ] Not a Small Business

* As defined by the Small Business Administration (SBA): www.sba.gov
* * Certified by Progress Energy and as defined by SBA.

Register online at www.progress-energy.com/supplierdiversity

BY: _____

NAME (printed): _____

TITLE: _____

DATE: _____

SCOPE AND OTHER REQUIREMENTS

I. Background

Progress Energy Florida, Inc. (PEF) plans to increase the electrical power output of its nuclear reactor – Crystal River Unit 3 (CR3) – located in Crystal River, FL via an Extended Power Uprate (EPU) scheduled for completion in 2011. The planned changes will increase the licensed core power from 2568 MWt (903 MWe) to 3014 MWt (1080 MWe), an electrical improvement of roughly 20%. A direct result of the augmented electrical generation will be an increase in heat rejected from the circulating water system through the once-through condensers and into the discharge canal. Without mitigation, the corresponding increase in dissipated heat is expected to affect the permitted discharge temperature limit of 96.5 °F.

CR3 shares a common discharge canal with two adjacent coal-fired units, CR1 (400 MW) and CR2 (500 MW). The common discharge canal currently has 36 cells of helper (mechanical draft) cooling towers plus 67 additional modular cooling towers that operate during the summer months to cool a portion of discharge canal water to comply with permit limits. However, even with the helper and modular cooling towers, high discharge canal water temperatures periodically cause CR1 and CR2 to de-rate so as not to exceed the permitted National Pollutant Discharge Elimination System (NPDES) limit. After the 2011 EPU implementation, operation of CR1 and CR2 will be further impacted by the increase in discharge canal water temperature without any mitigation.

PEF developed and submitted a Site Certification Application (SCA) to the Florida Department of Environmental Protection (FDEP) as part of the EPU permitting process. One of the possible mitigating actions submitted in the SCA was the use of additional cooling towers. Applicable sections of the SCA are included in Attachment C. Although cooling towers were mentioned in the SCA, the use of cooling towers may not be the best alternative. As a result, this Request for Proposal (RFP) has been developed to determine the best thermal mitigation alternative.

II. Vendor Scope of Work

The Scope of Work is divided into two phases. Phase I is to evaluate alternatives for reducing the discharge canal water temperature in order to (1) accommodate the planned thermal increase associated with CR3's EPU, (2) minimize the effect on full-load operation of CR1 and CR2 and potentially eliminate necessary de-rates of either unit, and (3) comply with all existing and proposed environmental permits, including re-circulating water from the discharge canal to the intake canal to offset increased condenser flow from CR3's EPU and address 316(b) requirements. The goal of this study is to evaluate the potentially viable alternatives, compare the alternatives, and recommend the most cost effective and technically feasible alternative. The Study Report will be structured using the outline provided in Attachment B. Phase II of this work scope is to develop a conceptual design, general cost estimate (±25%) and high-level

schedule for the Project's implementation.

Phase I
The alternatives analysis shall contain sufficient design consideration (e.g., equipment sizing, quantity, and materials) to determine whether it is technically and economically feasible to implement each alternative. The following list provides the expected alternatives, in whole or in combination, for this evaluation.

- Evaluation of cooling alternatives, including, but not limited to, the following:
  - ⇒ New Cooling Towers
  - ⇒ Modifying Existing Cooling Towers
    - o Upgrade Helper Cooling Towers (fans, stacks, or fill)[1]
    - o Eliminate Modular Cooling Towers
  - ⇒ Evaporative Cooling
  - ⇒ Inlet/Discharge Chillers
  - ⇒ Air Spargers/Bubblers[2]
- Analysis of each alternative including, but not limited to, the following:
  - ⇒ Economic Cost Estimate (including the basis for the estimate)
  - ⇒ Schedule Analysis
  - ⇒ Quantity and Size of Equipment
  - ⇒ Infrastructure Requirements (e.g., electrical needs)
  - ⇒ Proposed location(s) considered for the alternative
  - ⇒ Site Impacts (e.g., environmental, operational and maintenance)
  - ⇒ Advantages and Disadvantages Relative to Other Options
- Identify environmental impacts for each alternative[3]
  - ⇒ Wetlands Mitigation
  - ⇒ Biota Impingement and Entrainment Issues
- Preparation of an Alternatives Summary Report comparing the alternatives and an on-site presentation (to plant personnel) of the selection results.

Phase II
The recommended alternative shall be developed into a conceptual design, which shall contain sufficient detail to prepare a request for proposal (RFP) package for the final equipment procurement and design. Section X of this document identifies the level of detail expected in the conceptual design report. PEF expects that the conceptual design can be used as the stand alone engineering design input document for the final design.

This work is NOT nuclear safety related and does not need to be completed under the Vendor's

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[1] Helper Cooling Tower upgrades were evaluated previously (additional References – Bechtel Cooling Water Study).
[2] Bubble cooling was previously reviewed (additional References – John Cooper & Associates Engineering Evaluation).
[3] PEF will perform detailed review of 316(b) impacts; Vendor is not expected to coordinate any interaction with permit agencies. PEF expects the Vendor to identify possible environmental impacts, as well as solutions, for each alternative.

Appendix B program.

The technical details and requirements for each of the items associated with this scope of work are discussed in the following sections.

III. Owner Scope of Work

PEF personnel will work with the selected Vendor in obtaining additional information (e.g., wetland surveys, civil engineering drawings, and plant electrical drawings) to support the evaluation. The selected Vendor should expect a one day turn around time for on site delivery of drawings and an additional one to two days time for off site delivery. PEF personnel will coordinate the Vendor's CR site indoctrinations, badging, and specific training, as required.

After the Phase I alternative selection, an economic analysis will be performed using PEF's in-house EESY+ software. PEF will input the Vendor's supplied data into EESY+ and provide the output results for incorporation into the final study report. The Vendor will review the EESY+ input for accuracy and review/incorporate the output results into the study.

IV. Technical Details

Vendor shall conduct a thorough review of design alternatives to reduce the discharge canal water temperature and satisfy the stated Project objectives following CR3's EPU. This evaluation shall include a technical analysis of design variables such as discharge canal temperature variation, ambient temperatures, and environmental restrictions. Specific data related to the unit operations following the EPU are included below. Additional information will be supplied by PEF after contract award and requested by the selected vendor.

- CR1 full-load operation
  - ⇒ 245,000 gpm Circulating Water Flow (actual)
  - ⇒ ~17 °F Circulating Water Temperature Rise Through Condenser
- CR2 full-load operation
  - ⇒ 308,000 gpm Circulating Water Flow (actual)
  - ⇒ ~14 °F Circulating Water Temperature Rise Through Condenser
- CR3 full-load operation
  - ⇒ 832,000 gpm Circulating Water Flow
  - ⇒ ~17 °F Circulating Water Temperature Rise Through Condenser
  - ⇒ .768 MBtu/hr of Additional Heat Dissipated due to EPU
- (Hamon) Helper Cooling Towers operation
  - ⇒ 4 blocks of 9 cells
  - ⇒ 686,000 gpm Total Water Flow
  - ⇒ 89.5 °F Design Outlet Temperature (based on 103 °F inlet and 81 °F wet bulb)
- (Aggreko) Modular Cooling Tower operation
  - ⇒ 67 individual cells
  - ⇒ 180,000 gpm Total Water Flow

⇒ 90 °F Design Outlet Temperature (based on 103 °F inlet and 81 °F wet bulb)

- Project Objectives
  - ⇒ Allow Full-Load Operation of CR1, CR2 and CR3 during Summer
  - ⇒ Plan for Maximum Design Intake Water Temperature of 91 °F
  - ⇒ Comply with 96.5 °F Point of Discharge (POD) 3-hr Rolling Average
  - ⇒ Maintain a maximum Permitted Discharge Flow Rate of 1,320,000 gpm (or 1,897.9 Mgpd) by returning cooled discharge canal water (approximately 152,000 gpm) to the intake canal.
- Additional Data
  - ⇒ Intake canal cannot be blocked due to barge traffic.
  - ⇒ Though additional cooling capacity is only required during summer months, re-circulating water flow back to the intake canal is necessary year round.
  - ⇒ The return water from discharge to intake canals will be designed for most efficient and cost effective mitigation of biota entrainment and impingement.

V. REFERENCES

The following reference documents are provided as part of this RFP. These documents are located in Appendix C.

1. PEF Safety Plan
2. Site Land Use Classification Map
3. Applicable Sections of the Site Certification Application
4. Historical Data of Circulating Water Temperatures
5. Helper Cooling Tower Performance Curves
6. Modular Cooling Tower Performance Curves
7. Local Annual Windrose
8. Request for Information Form

Additional documents will be provided following contract award. Other data that may be provided to facilitate technical evaluations, as requested.

- Site civil engineering drawings
- Site electrical drawings
- Wetland surveys
- Site Certification Application
- Bechtel Cooling Water Study
- John Cooper & Associates Engineering Evaluation

VI. PEF Contacts

Contractual: Deborah Hanna
Telephone: (352)563-4547
E-mail: Deborah.Hanna@pgnmail.com

Technical: Mark Gillespie or Mark Hickman
Telephone: (352) 795-0504 x6926 or (352) 563-2943 x4233
Email: mark.gillespie@pgnmail.com or mark.hickman@pgnmail.com

VII. Work Control

The majority of the work is expected to be completed at Vendor's facility. However, one cubicle with 2 desks and 2 chairs will be provided (if requested) at Crystal River for the selected Vendor's use. Vendor shall be responsible for all office supplies, equipment and personnel protective equipment (e.g., hard hat, safety glasses and safety shoes). Vendor shall be responsible for identifying personnel that need access on Site and shall coordinate temporary badges and training so as not to impact the schedule of work.

The selected Vendor shall establish a Request for Information (RFI) Log to track information transmitted between PEF and Vendor. The RFI form (see Attachment C) will be completed for all questions on the Project that need formal clarification. RFI's shall be used to resolve any questions related to Project scope, schedule or cost. Additionally, RFI's may be used to request drawings or other documents not accessible to Vendor or to document equipment or system specifications.

Vendor shall conduct weekly status meetings/teleconferences with PEF Project personnel. Vendor shall distribute an agenda (with input from PEF) prior to the meeting, take minutes and distribute the minutes after the meeting. PEF personnel will have an opportunity (1 working day minimum) to comment on the meeting minutes before they are submitted as final. Minimum topics to be covered at each meeting are:

- Safety topic
- Earned value status (cost vs. schedule)
- Projected Estimate at Completion (EAC)
- Accomplishments/Milestones
- Issues/Request for Information
- Scheduled accomplishments for next week
- Number of personnel working on the project (last week and next week)

The Vendor shall conduct a Phase I completion and 90% project completion review meetings with PEF personnel at CR. Vendor shall distribute an agenda (with input from PEF personnel) prior to the review, take minutes and distribute the minutes after the review. PEF personnel will have an opportunity (4 working days minimum) to comment on the review meeting minutes before they are submitted as final. Minimum topics to be covered at each review are:

- Safety topic
- Earned value status (cost vs. schedule)

- Projected EAC
- Accomplishments
- Presentation of completed documents for approval
- Issues
- General discussion (question & answers)

Vendor shall perform technical evaluation of cooling alternatives and complete a conceptual design of the recommended solution. Interaction between PEF and Vendor is expected to clarify any comments on alternatives as well as to identify site restrictions that may not have been considered.

Vendor shall attend a mandatory Kick-Off Meeting prior to the start of work, to be set up when the contract is issued.

VIII. Schedule:

The following sequence of activities identifies the formal reviews and deliverables for the work. Vendors are required to submit a schedule with the required time line completed. The stated scope of work is required to be complete by January 31, 2008.

- RFP sent to Vendors
- September 4, 2007 – Submit Acknowledgement Form
- September 6, 2007 – Walkdown and RFP Discussion at Crystal River
- October 5, 2007 – Proposals Due [Approx. 4 WEEKS TO PREPARE]
- October 11, 2007 – Contract Award Notice to Proceed (NTP)
- ≤1 Week After NTP – Kick-Off Meeting (at Crystal River Site)
- ~ 5 Weeks After NTP – Phase I Completion Review (Alternative Selection on or before this review) and Presentation of Report (at Crystal River Site).
- ~ 14 Weeks After NTP – Conceptual Design Draft (90% Completion) Report
- ~ 15 Weeks After NTP – PEF comments on Draft Report
- ~ 16 Weeks After NTP – Final Report
- ~ 16 Weeks After NTP – Presentation of Report (at Crystal River Site)

The selected Vendor is required to change this time line into a schedule that contains meaningful milestone and deliverable dates within one week of NTP. Project completion must not exceed January 31, 2007.

Vendors are encouraged to identify any dates that can be improved in the above schedule.

IX. Quality Assurance

Quality Assurance (QA) and Quality Control (QC) shall be accomplished under Vendor's internal QA/QC Program. Vendor's QA/QC Program shall be submitted to PEF for review with their proposal.

X. Technical Documentation and Submittal Requirements

Phase I

Finalize the list of alternatives to be evaluated and obtain Alternative Evaluation List approval from PEF Project Manager. Complete the alternatives analysis and draft the Alternatives Summary Report. The selected Vendor shall work with PEF personnel to determine a recommended alternative for implementation after the alternative analysis is complete. A preliminary draft of the Phase I alternatives summary report shall be submitted to PEF for review and comment 5 days prior to final document submittal and presentation at Crystal River. The final Alternatives Summary Report shall be approved by PEF before starting the conceptual design. The final alternatives analysis will identify additional testing and information that is required in order to complete the conceptual design (i.e. underground utilities location, soils sampling, etc.).

Five copies of the final Alternatives Summary Report shall be supplied to PEF.

Phase II

The Vendor shall then develop a Conceptual Design of the selected alternative. The design shall have sufficient detail that the information can be used as the primary input for the detailed design. PEF personnel will supply site specific criteria for Vendor inclusion in the conceptual design document as identified below. At a minimum, the Conceptual Design will include the following:

- Provide a detailed scope description. The description should include the boundaries and interfaces with existing systems (i.e., site electrical, helper and modular cooling towers).
- Identify the location(s) for installation and reason for selection, including any testing data that was used to aid in the site selection.
- Identify any exclusions or caveats that were considered during alternative selection.
- Identify applicable codes and standards.
    - State design conditions such as seismic loads, wind speeds, thermal and dynamic loads, system pressure and temperatures, and chemical considerations.
- Identify installation requirements that are unique to the proposed design, installation, and/or startup of the equipment. Include specific direction if field routing is not acceptable.
- Identify any assumptions made during the alternative selection.
    - State environmental conditions anticipated during storage, construction, and operation.
    - Identify environmentally sensitive areas near the construction areas. Identify the environmental permitting requirements for the construction.

October 13, 2006
AREVA-06-2792

AREVA

Mr. Danny Roderick
Director – Site Operations
Progress Energy
Crystal River Nuclear Plant
15760 West Power Line Street
Crystal River, FL 34428-6708

Subject: Proposal for CR-3 Engineering Design and Licensing Measurement Uncertainty Recapture (MUR) Power Uprate Project

Attachment: 1. AREVA NP Proposal for "MUR Power Uprate Project"

Dear Mr. Roderick:

AREVA NP Inc. (AREVA NP), an AREVA and Siemens company, is pleased to provide you the attached proposal for CR-3 Engineering Design and Licensing MUR Power Uprate Project. We look forward to your favorable acceptance of this proposal and appreciate this opportunity to work with you on this project.

The attached submittal is a non-priced version of our proposal for your technical review. The priced version will be hand carried and presented at the executive meeting on Monday, October 16th.

This proposal is valid until December 15, 2006 except that AREVA NP reserves the right to withdraw or amend at any time prior to approval by Progress Energy and subsequent written acceptance by an authorized representative of AREVA NP.

This proposal is proprietary to AREVA NP. If you have any questions concerning this proposal, please contact Dallas Scott at (434) 832-2937 or me at (434) 832-2948.

Sincerely,

Dennis A. Napior
Manager, NSSS Engineering Services
Nuclear Engineering

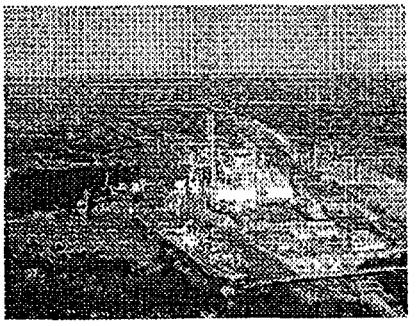
cc: Jim Terry – CR-3
Ted Williams – CR-3
Debbie Hanna -CR-3
Skip Hudson – AREVA
Dallas Scott – AREVA
Ed – Kane - AREVA

AREVA NP INC.
3315 Old Forest Road, P.O. Box 10935, Lynchburg, VA 24506-0935
Tel.: (434) 832-3000 - Fax: (434) 832-3840 www.areva.com

3238 APR 22 80
FPSC-COMMISSION CLERK

AREVA

Engineering Design and Licensing
For CR-3
Measurement Uncertainty Recapture (MUR)
Power Uprate Project
For CR-3 Nuclear Power Station



Proposal Request from:
Progress Energy

AREVA Proposal
#4161084

Dated: October 11, 2006
Validity: December 15, 2006

Prepared By:

AREVA NP Inc.
3315 Old Forest Road
P.O. Box 10935
Lynchburg, Virginia 24506-0935

This proposal, including any drawings submitted to or pertaining thereto, is the property of AREVA. It contains confidential information and is provided to Progress Energy on condition that it, or its representatives by receiving the Proposal, agree not to reproduce or copy in whole or in part or to furnish information from it to others without permission, or to make any use of the Proposal other than for the evaluation of the Proposal.

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1.0 INTRODUCTION 1
2.0 WORKSCOPE 2

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3.0 COMMERCIAL 45

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CONFIDENTIAL PEF-NCR-00926

REDACTED

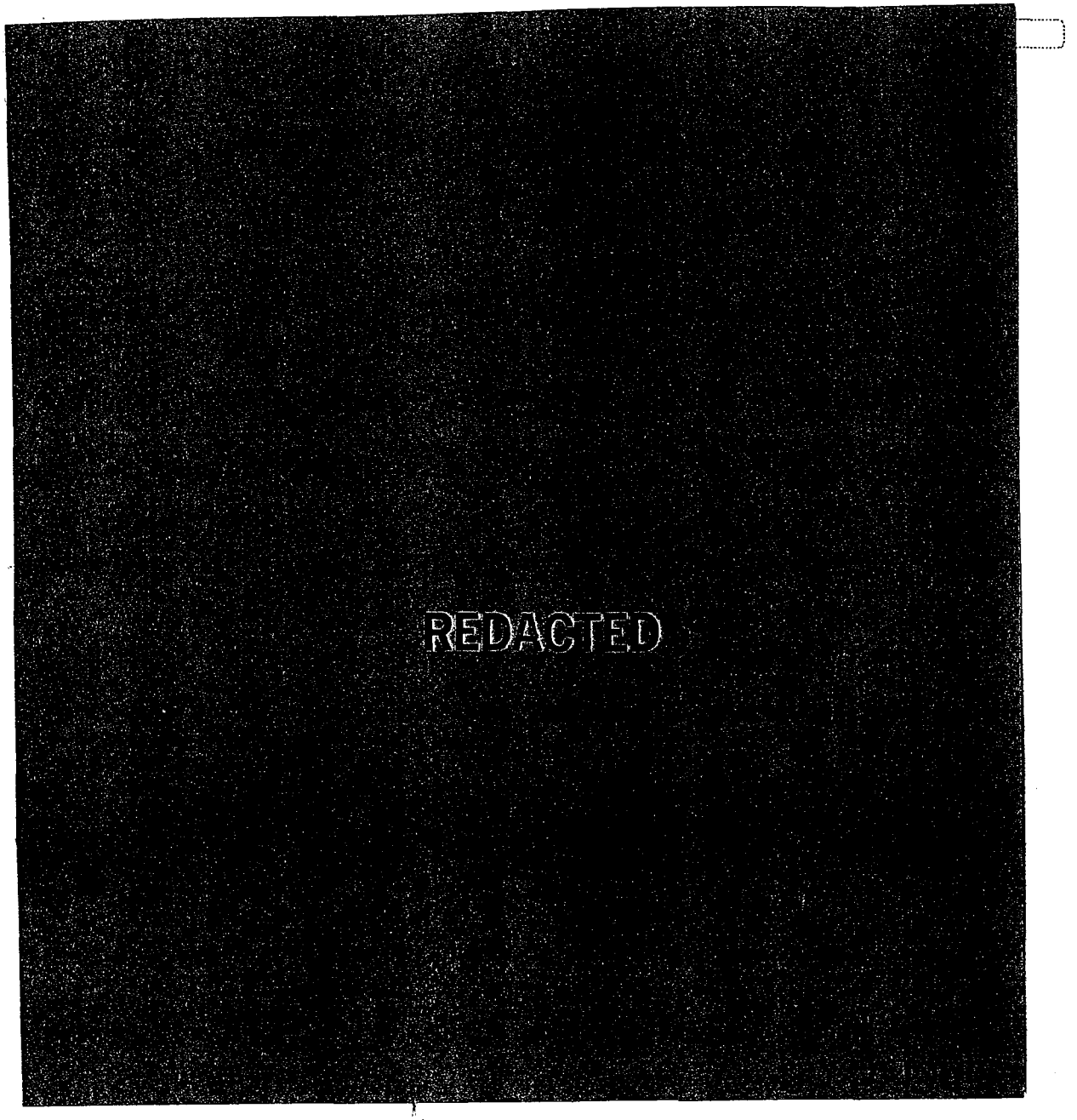
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Attachment 1 Responsibility Tables Licensing Activities 48
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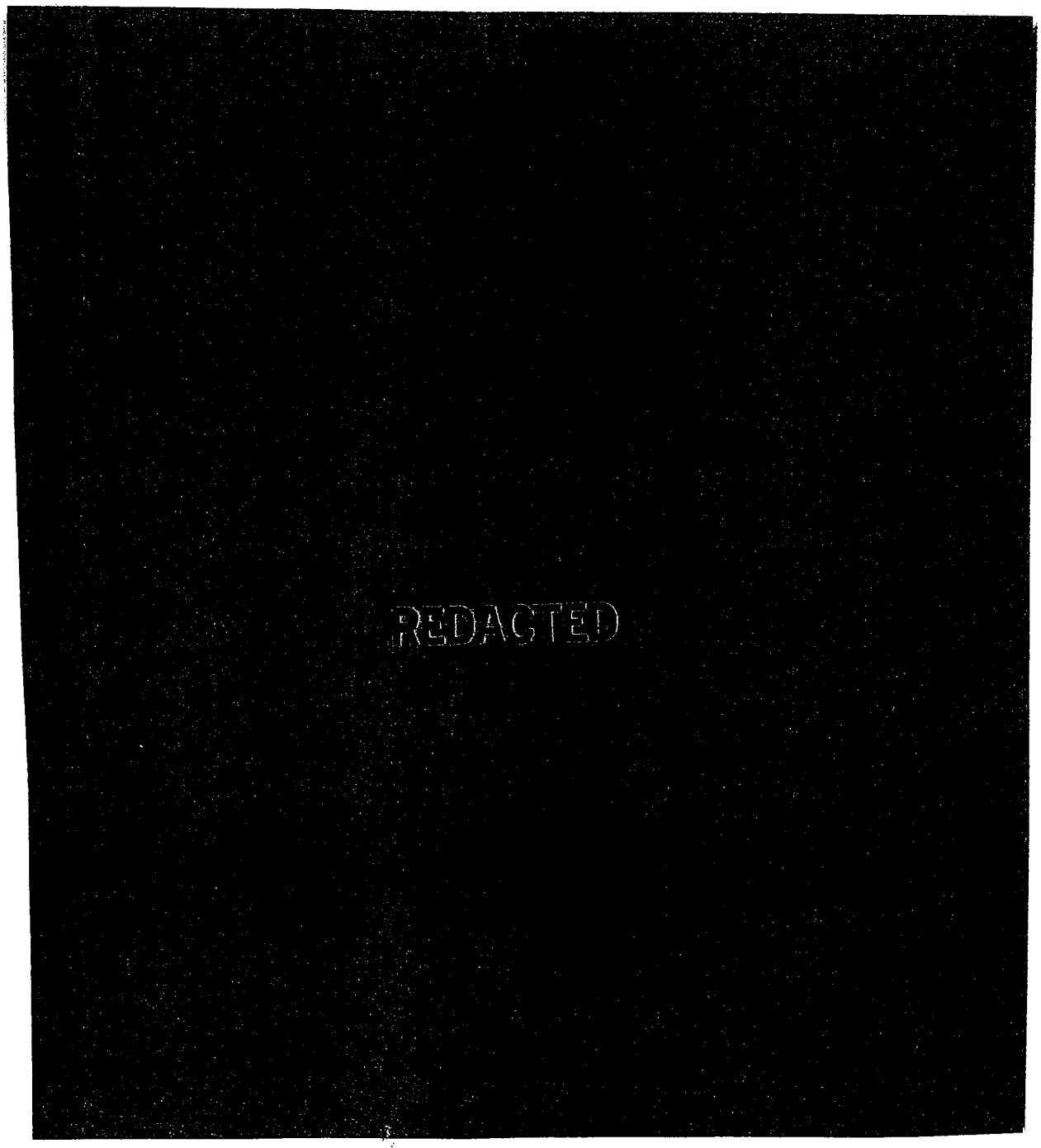
Figure 1 Proposed Configuration 23
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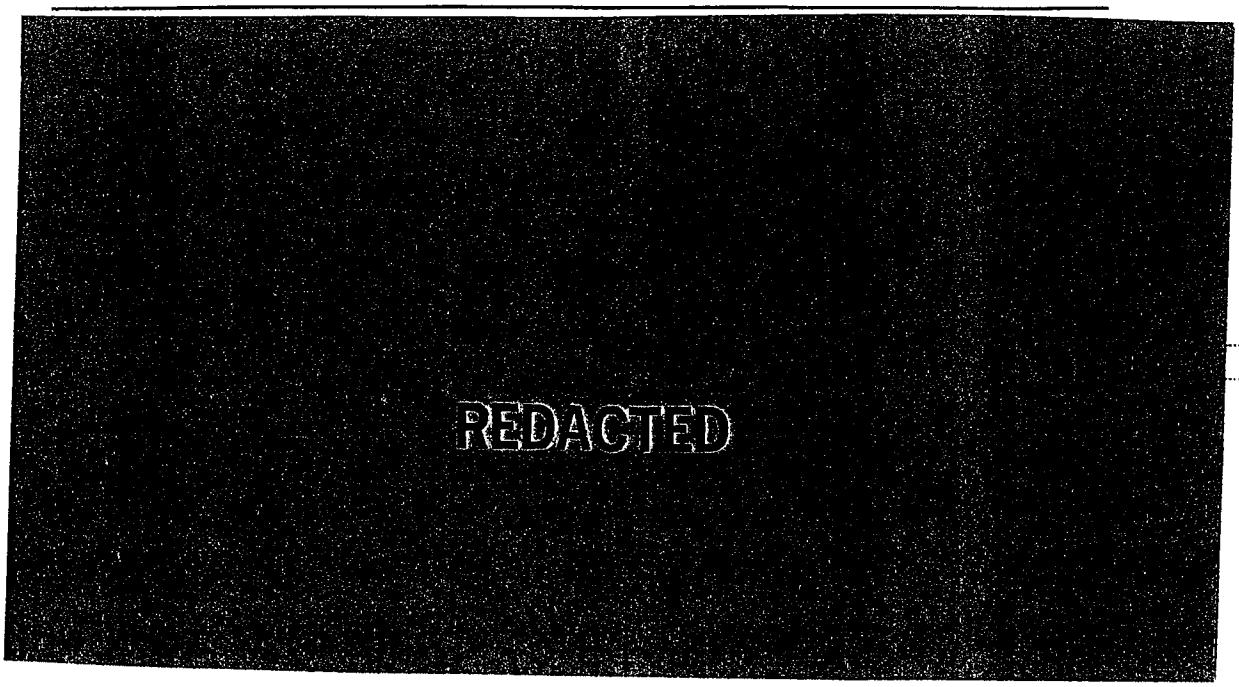
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Executive Summary

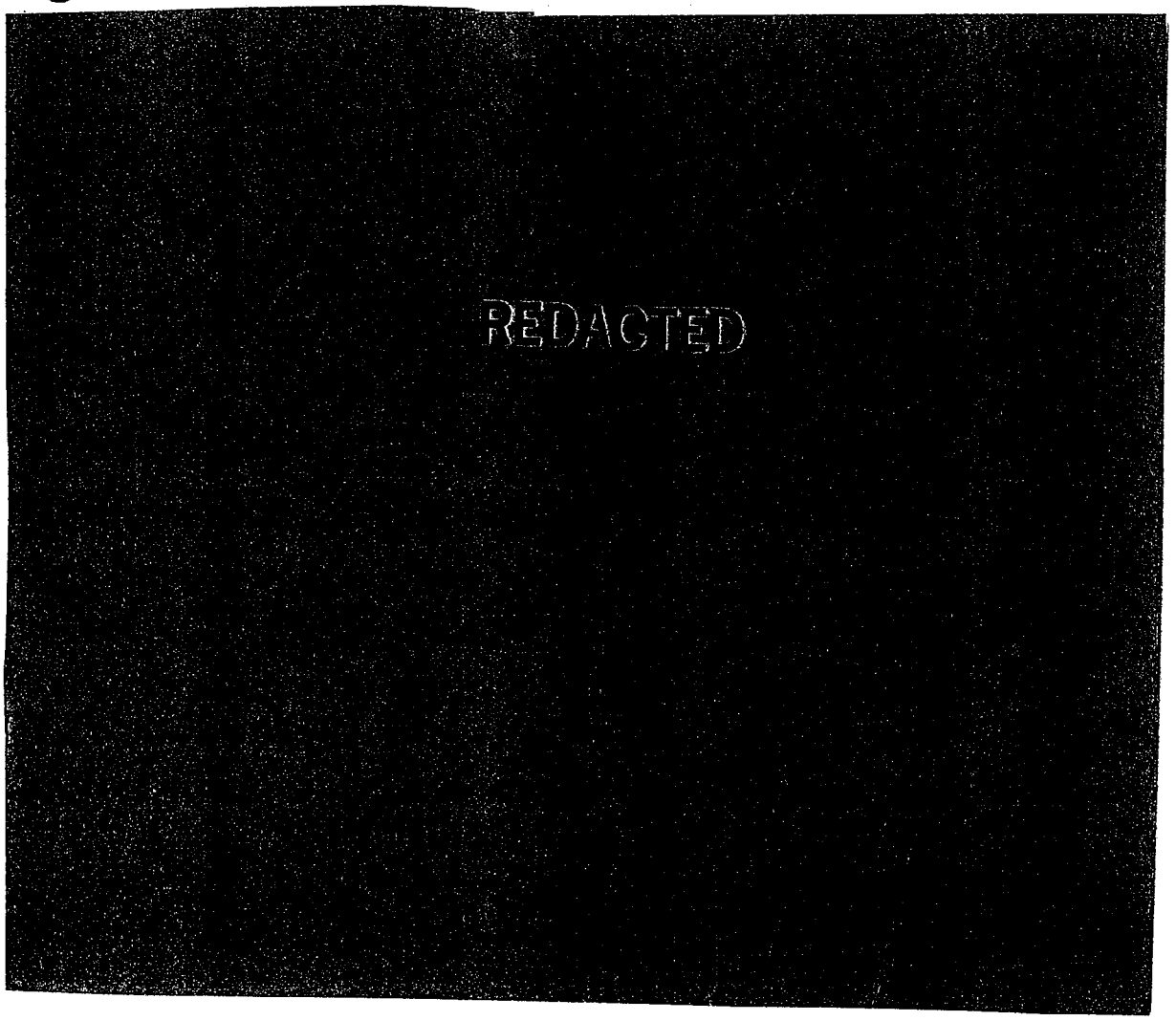


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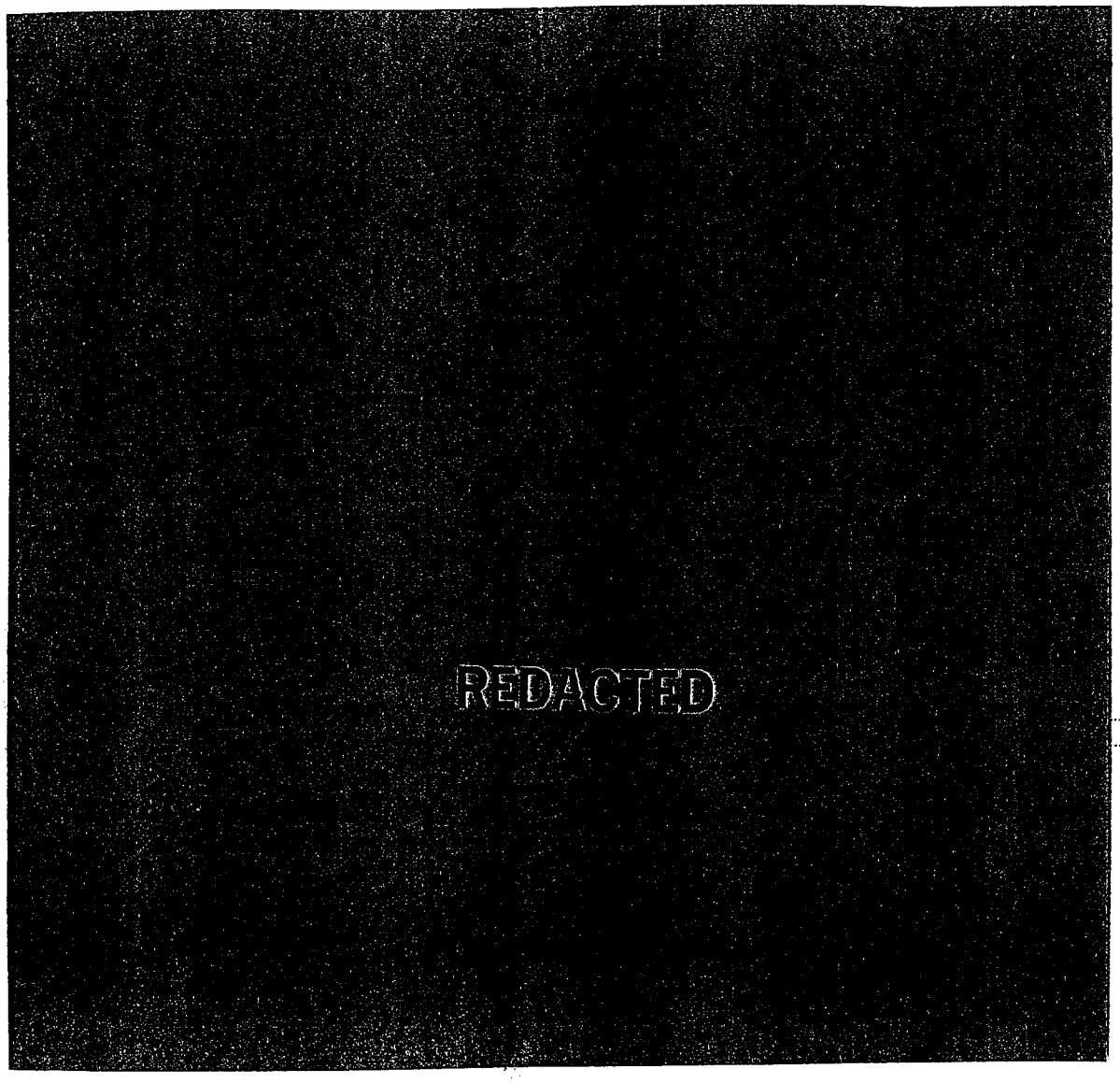

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1.0 INTRODUCTION

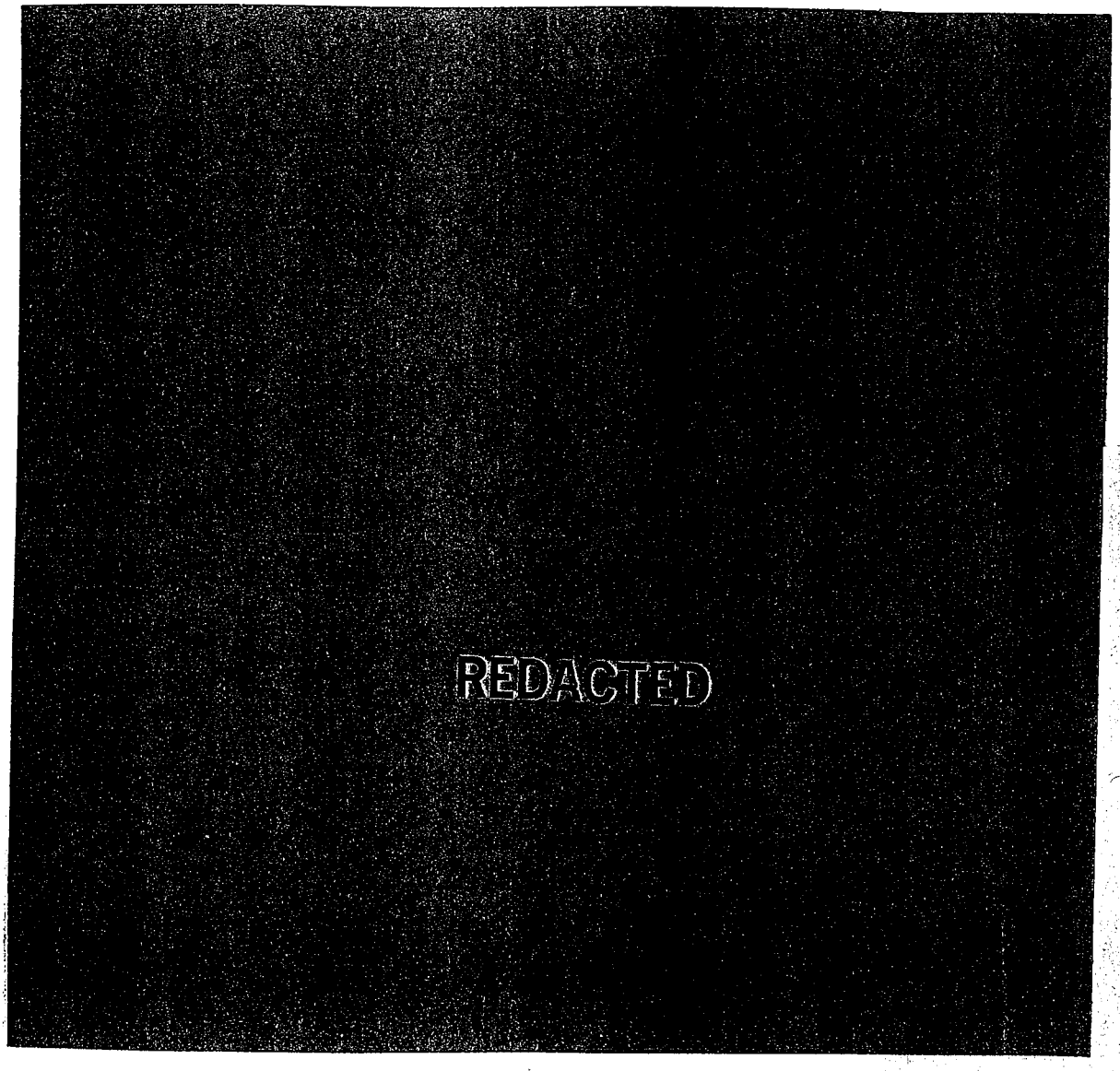


CONFIDENTIAL
PEF-NCR-00931

2.0 WORKSCOPE

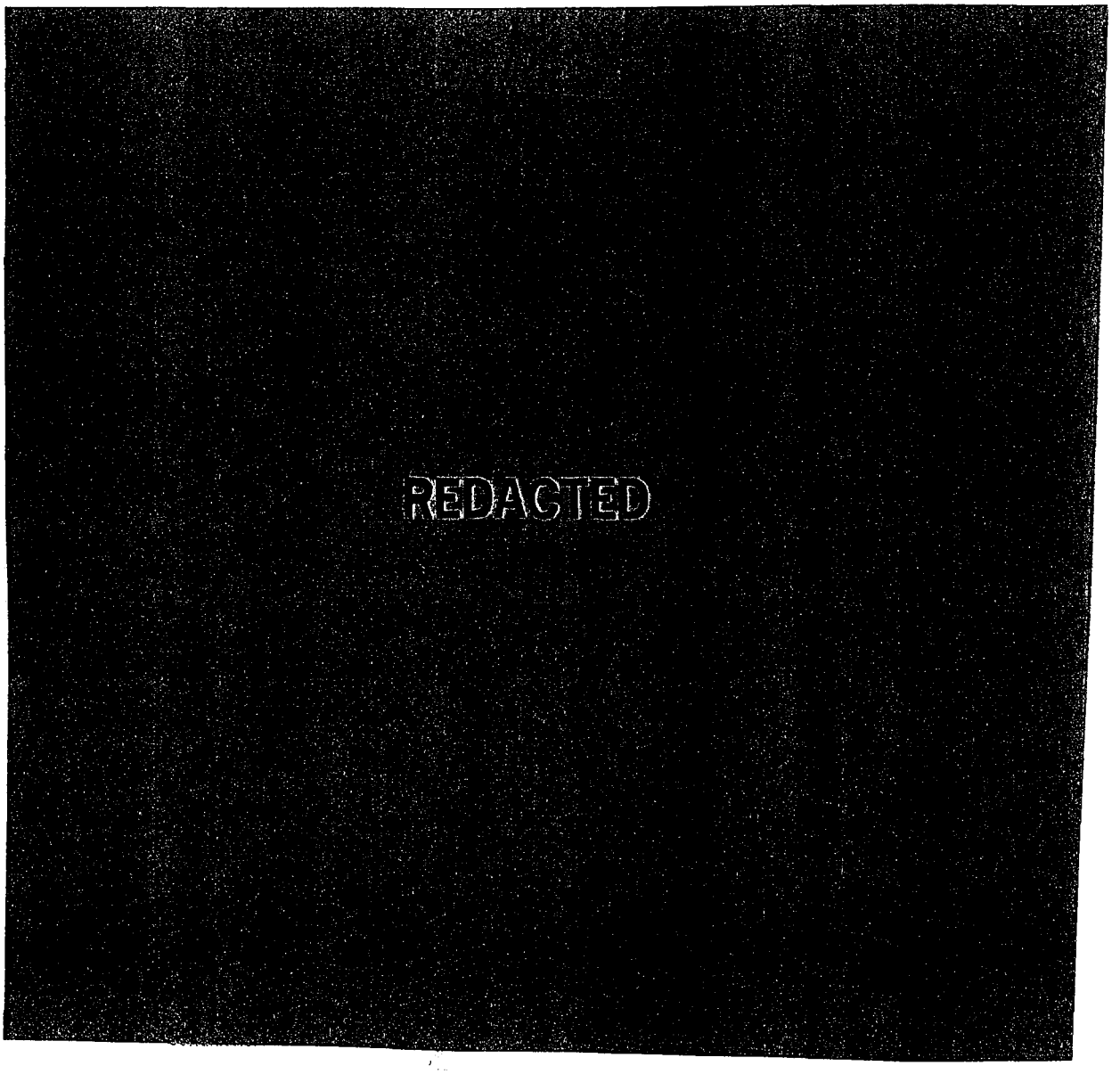


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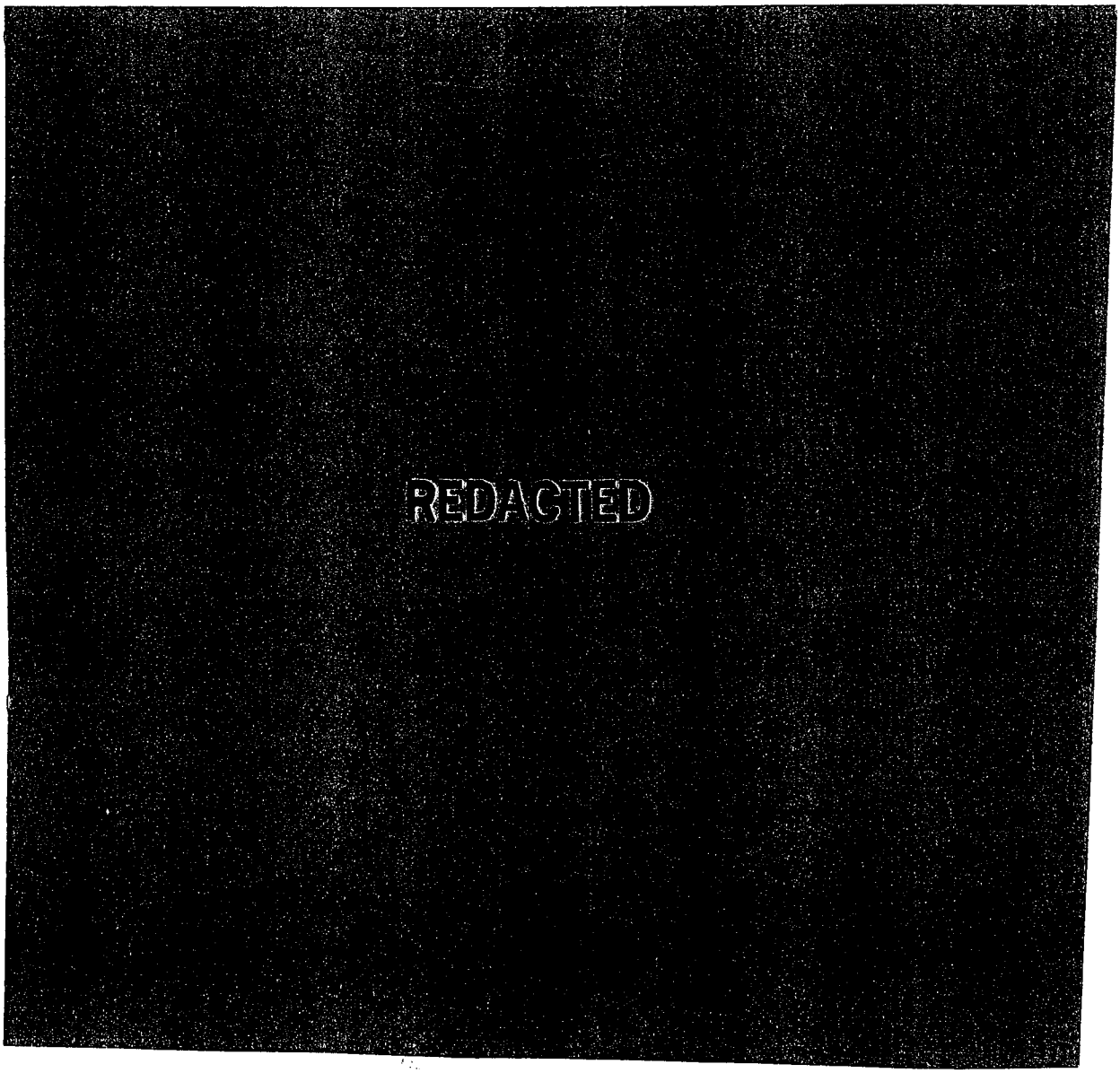
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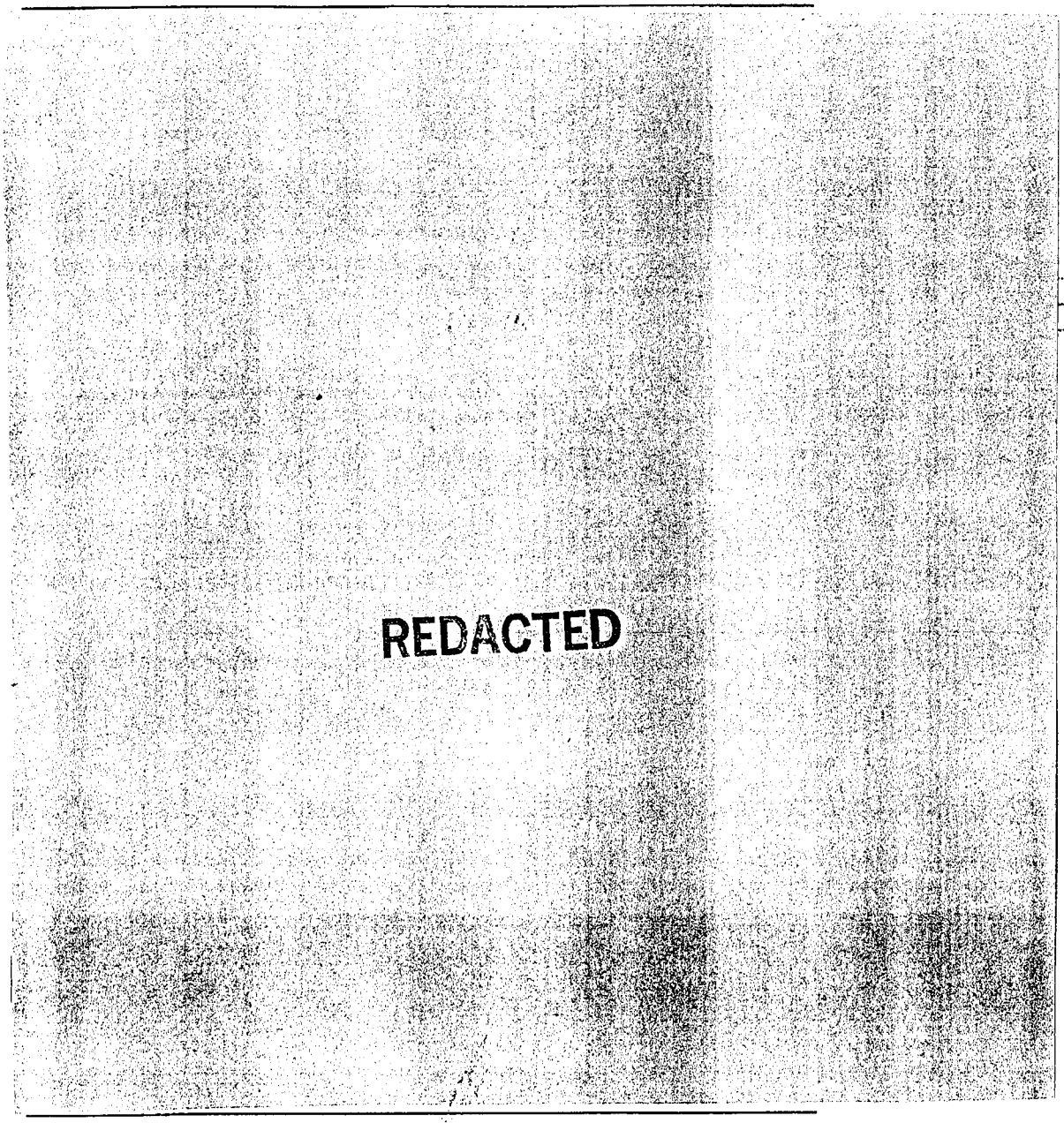


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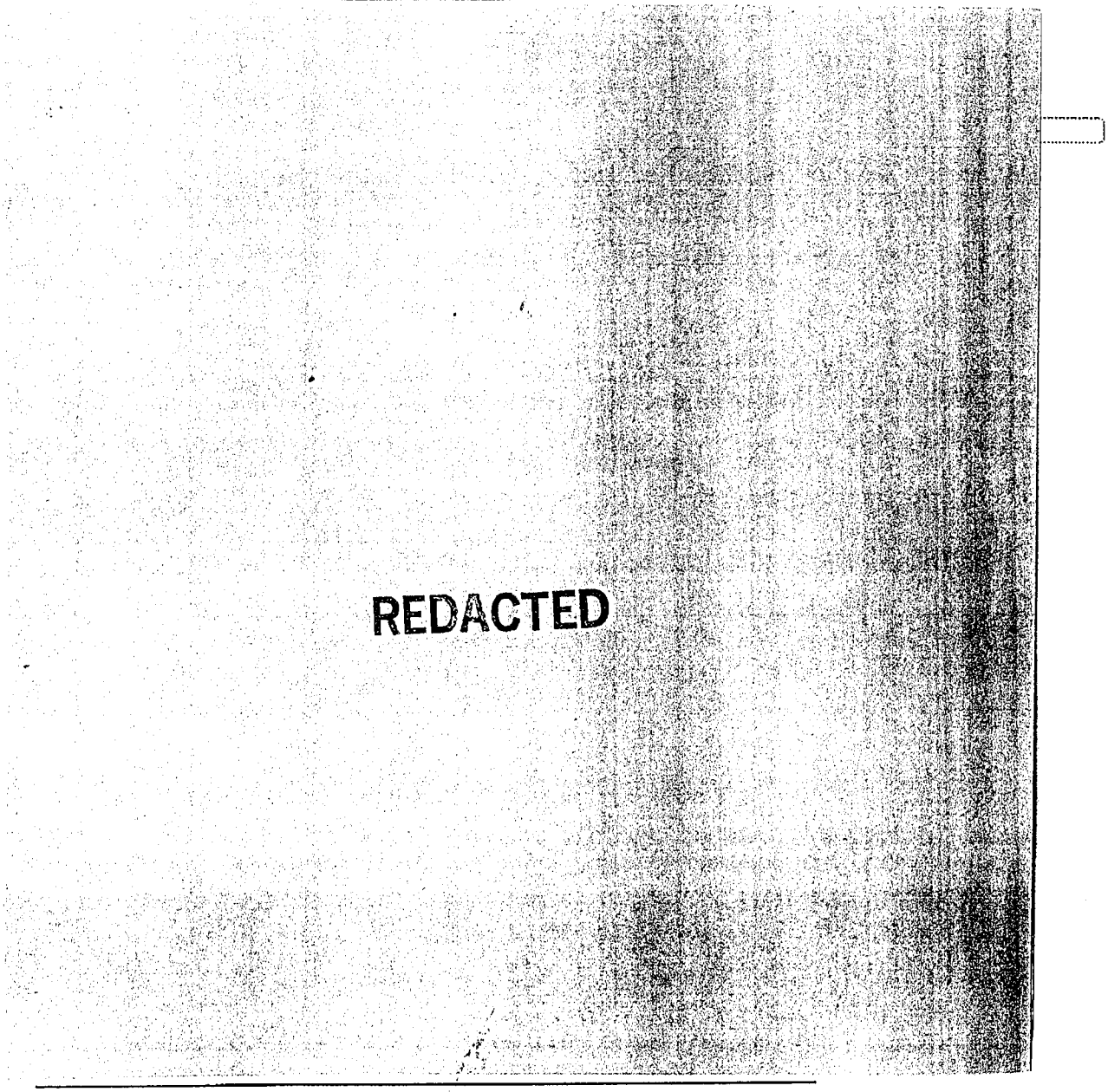
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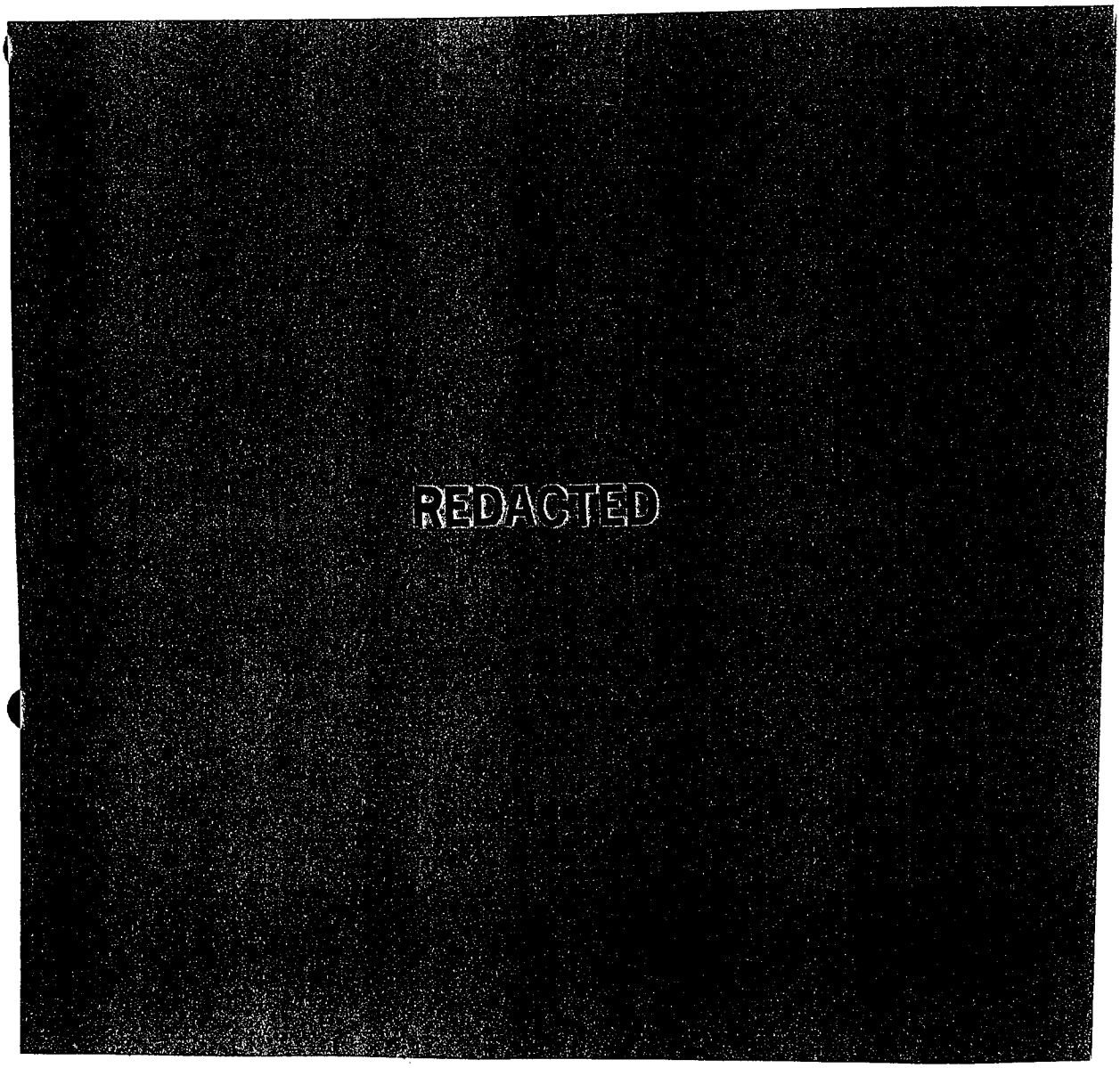
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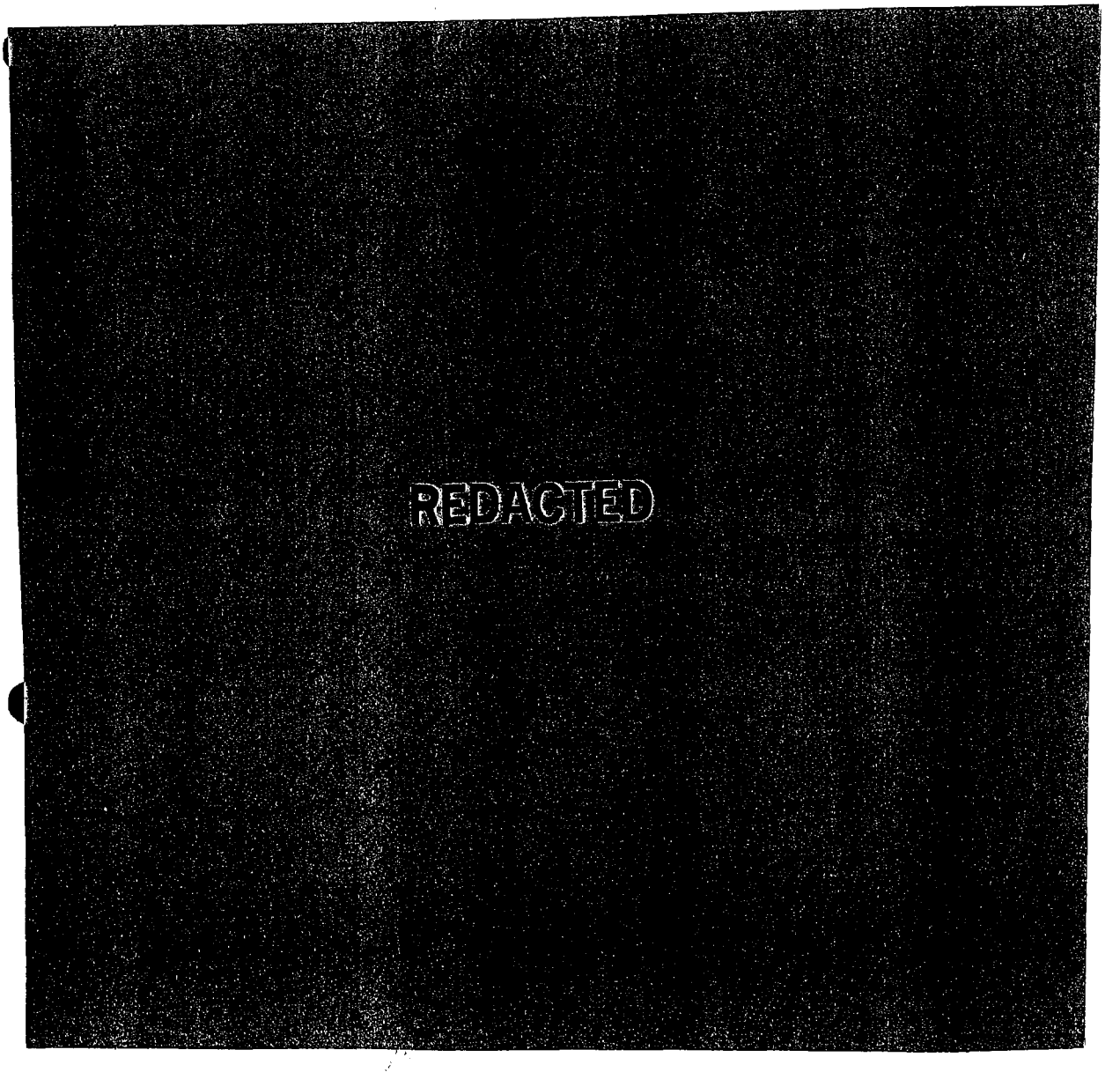
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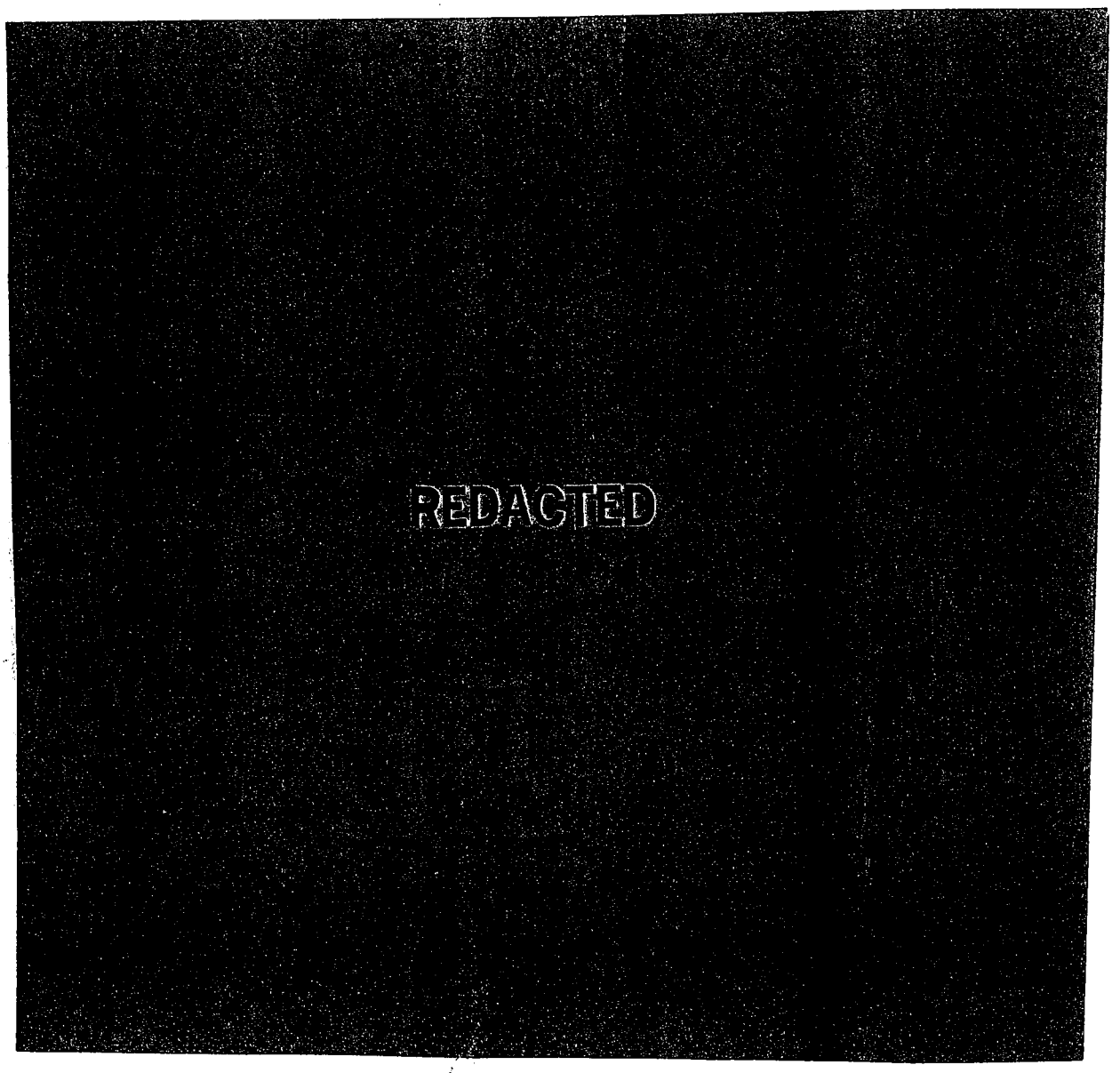


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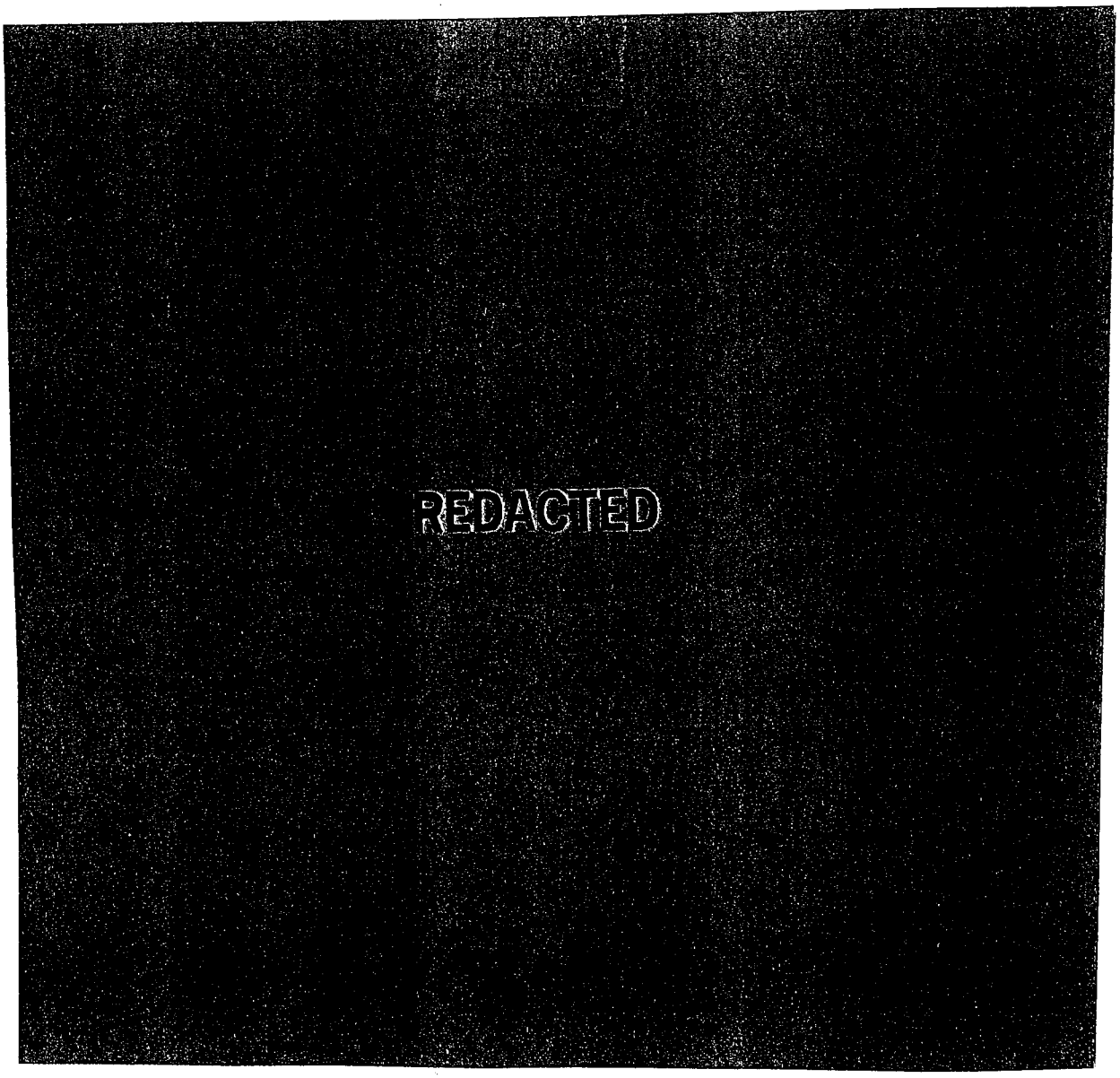
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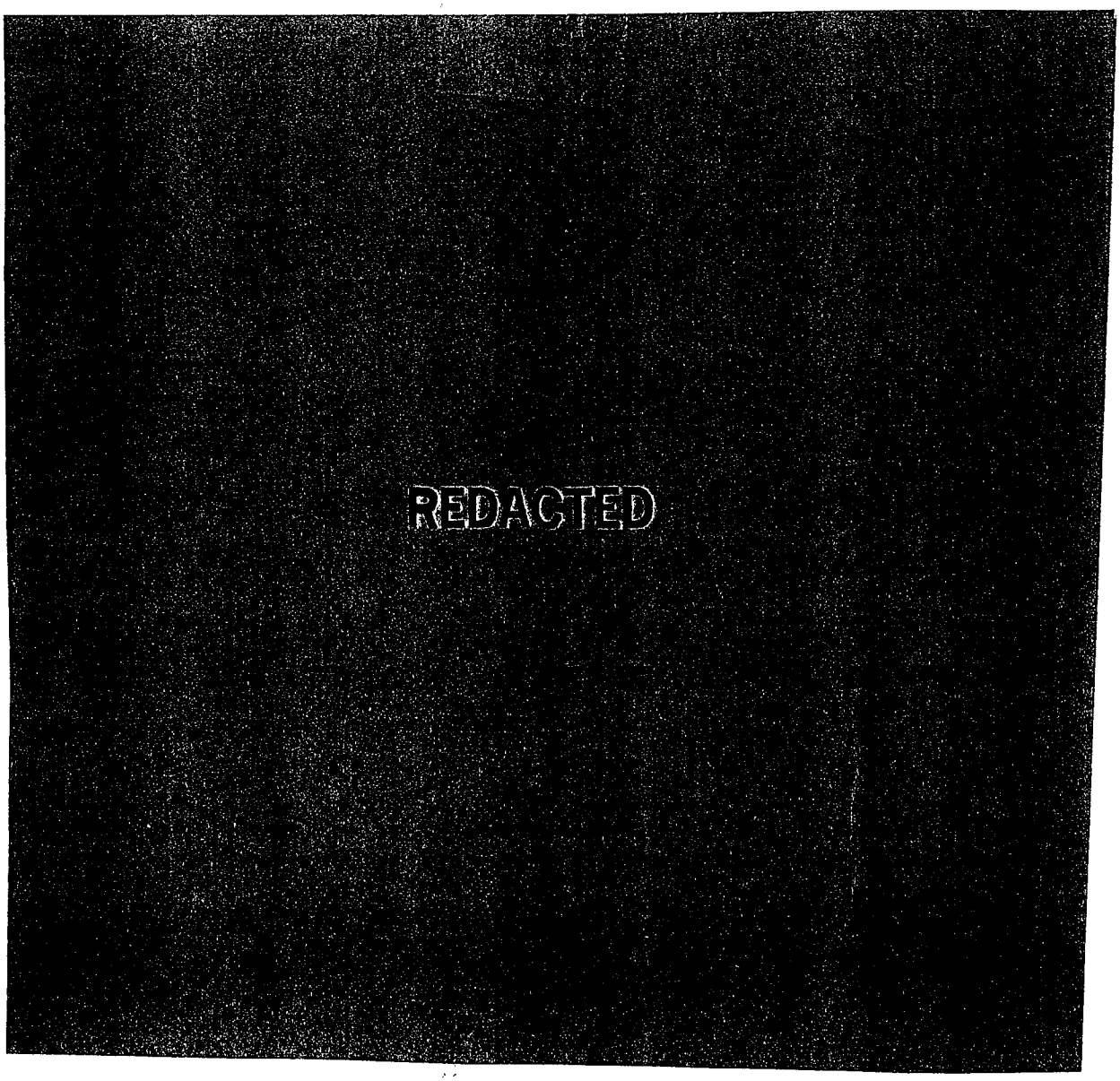
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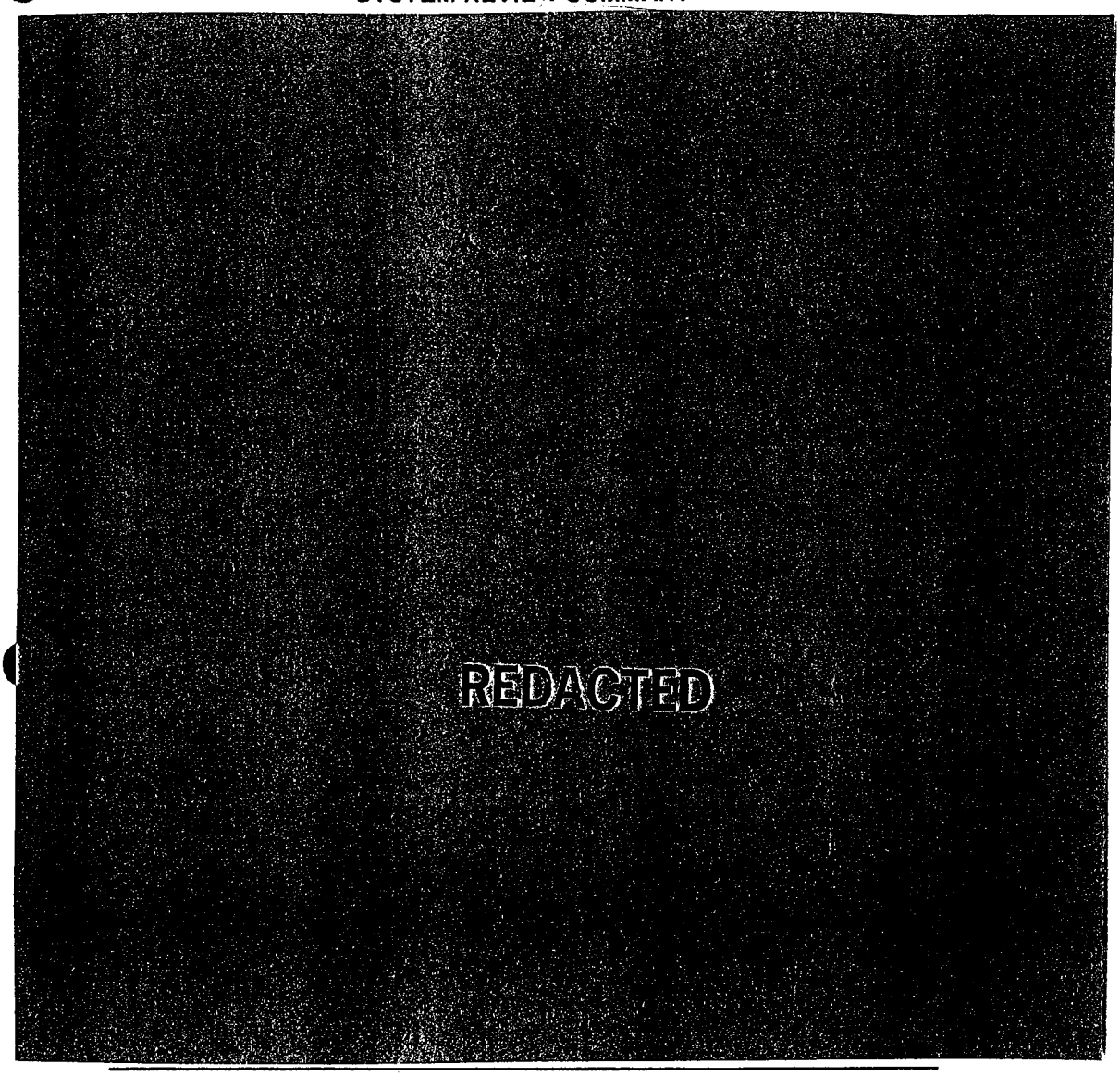


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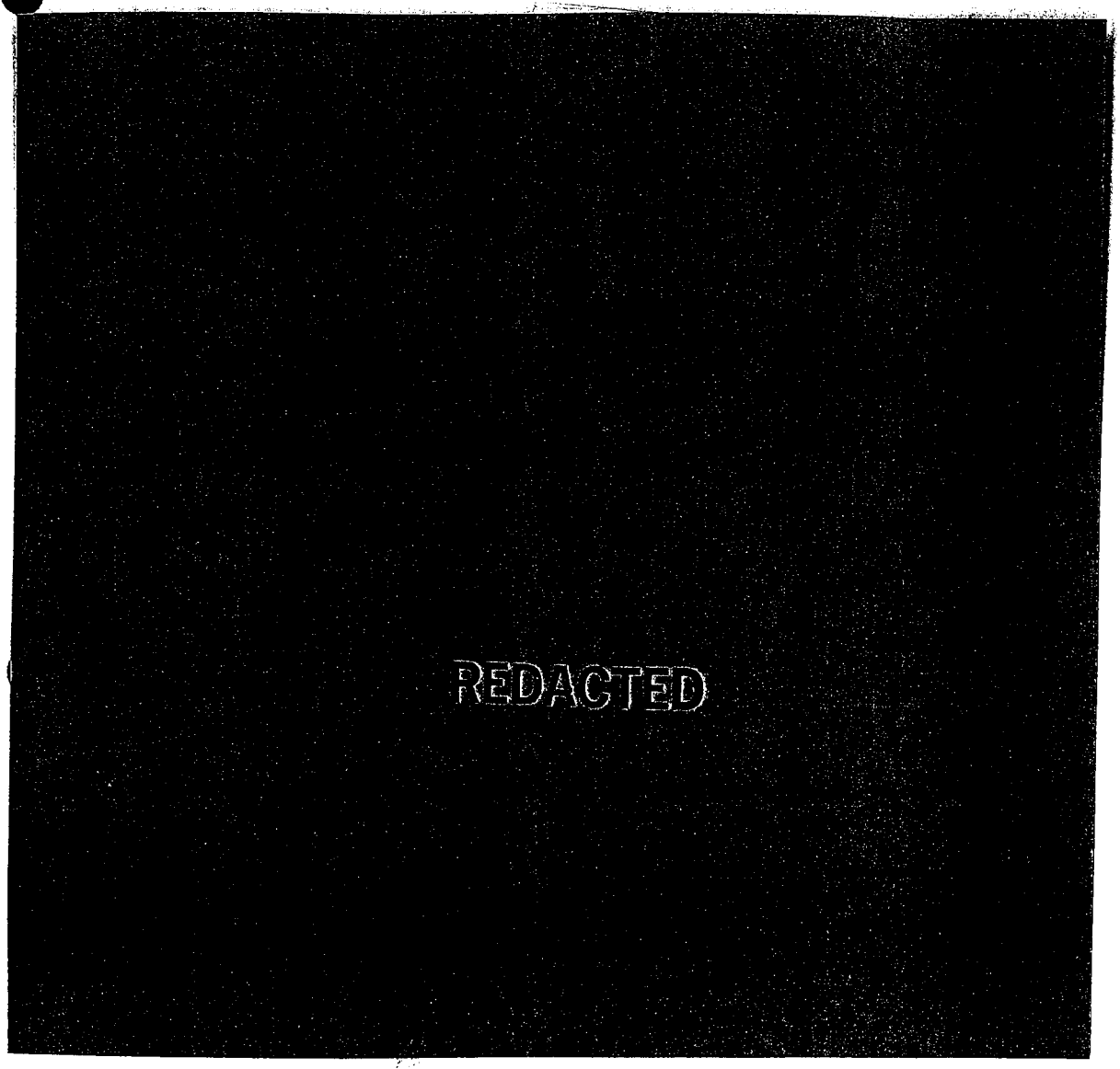
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SYSTEM REVIEW SUMMARY



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2.1.4 Licensing Report Preparation



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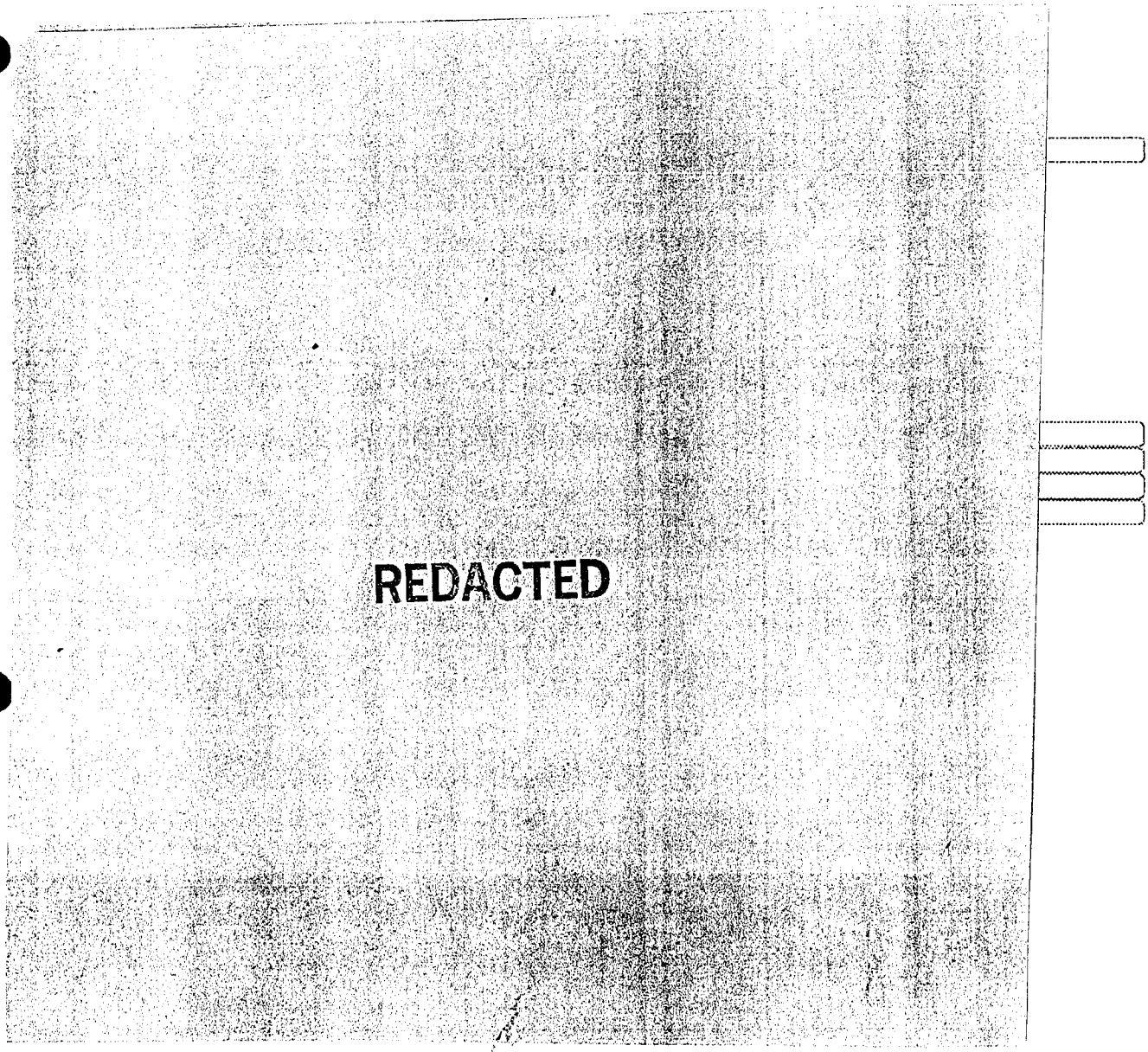
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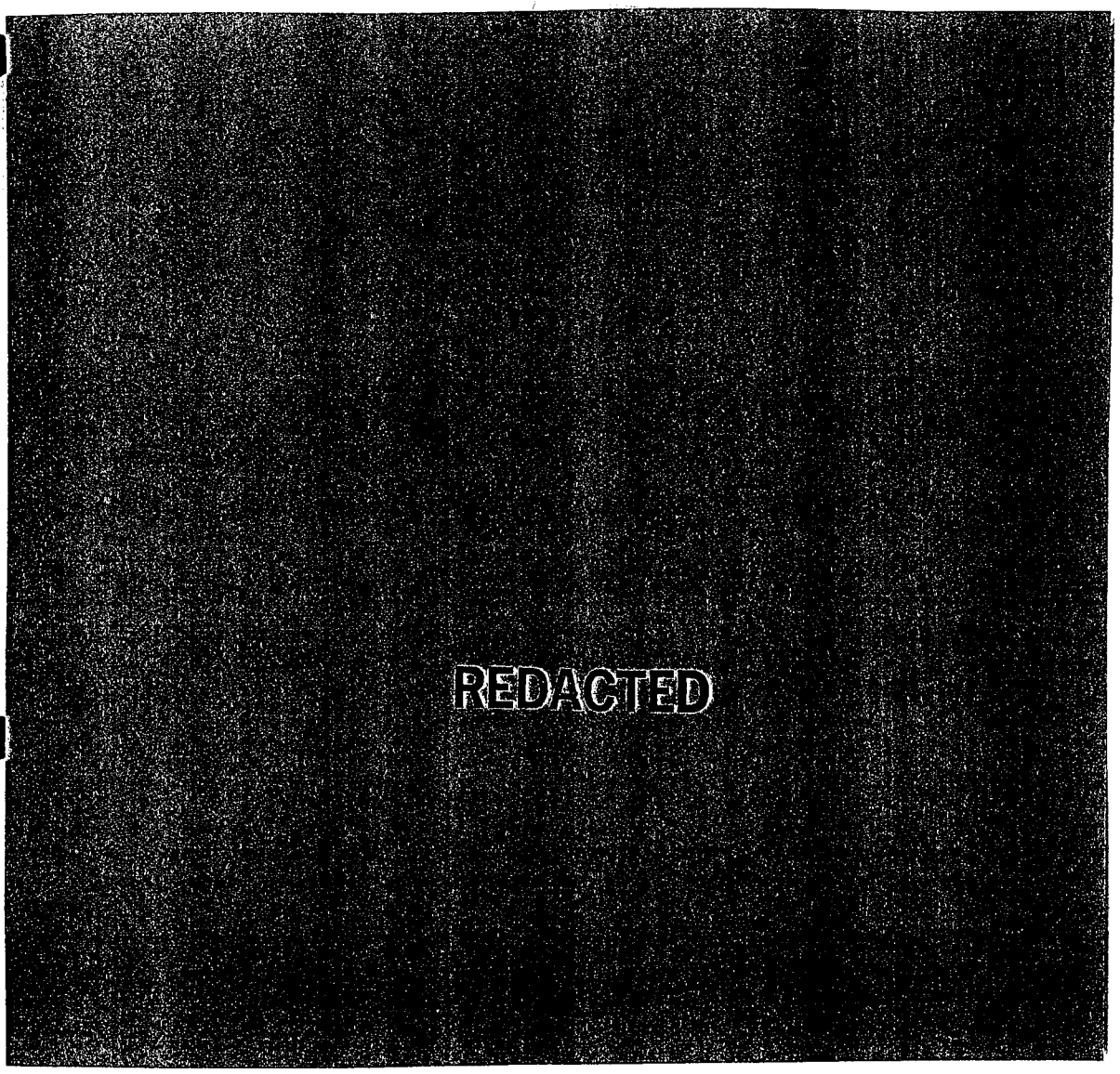
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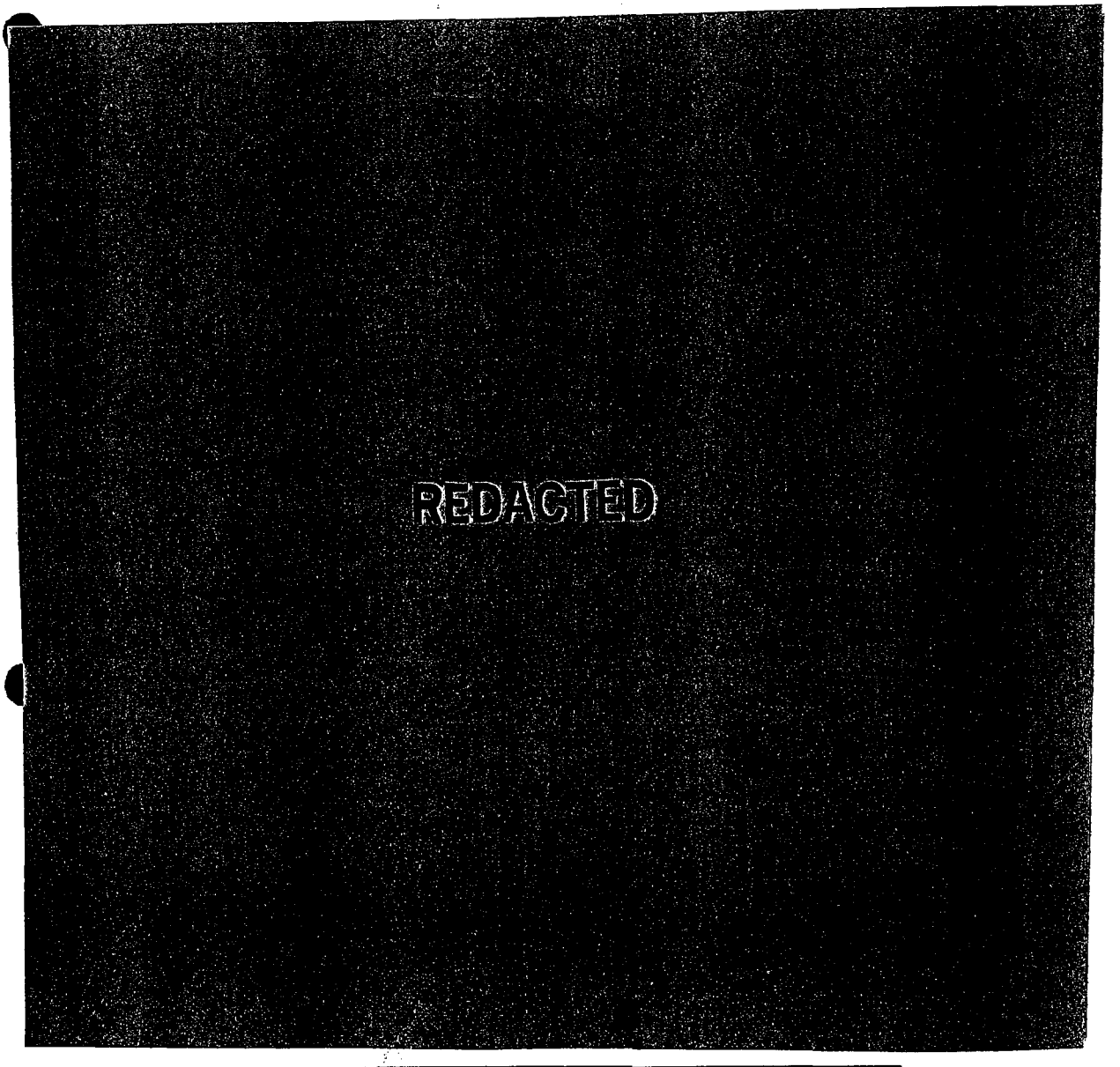
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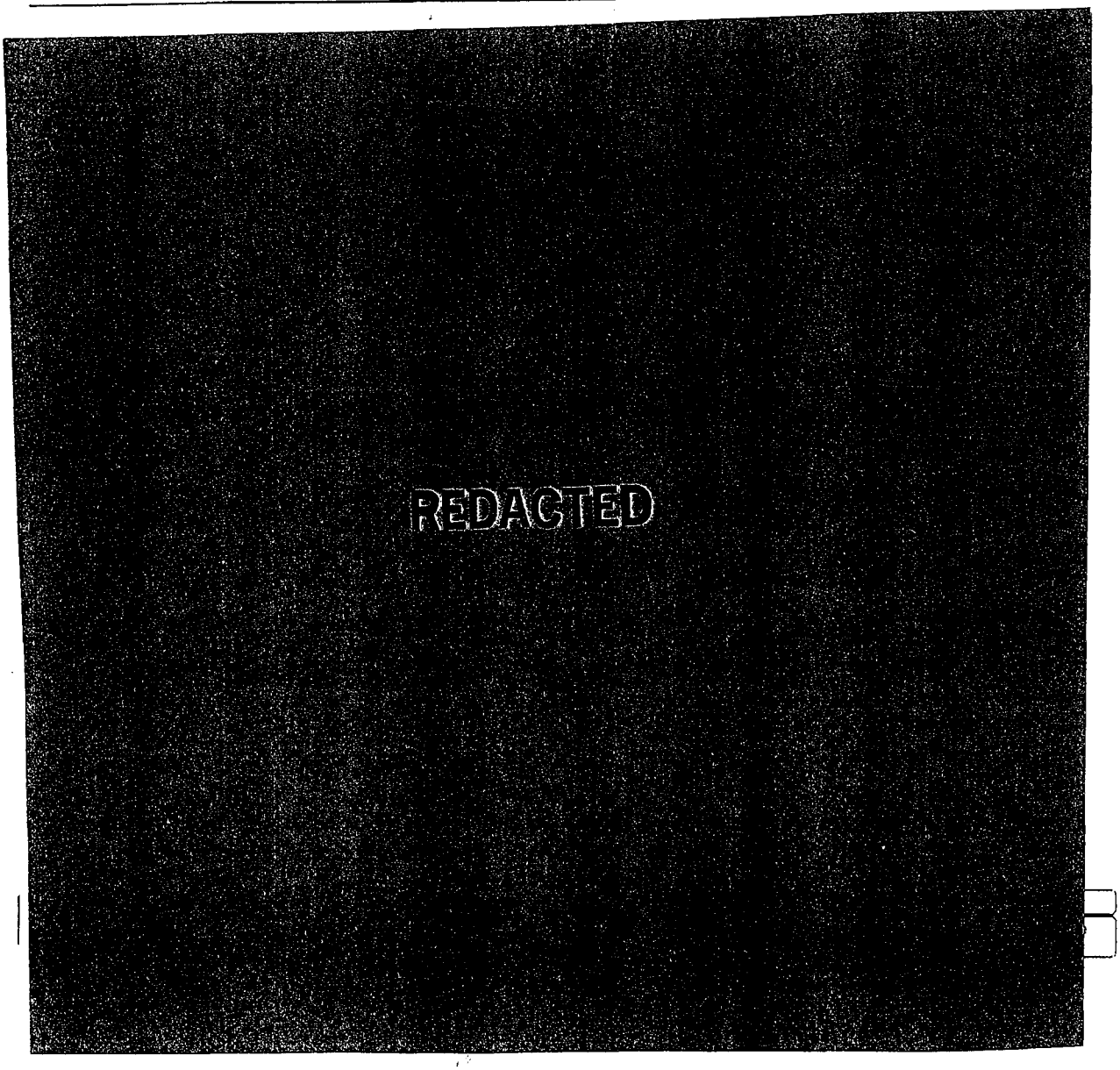
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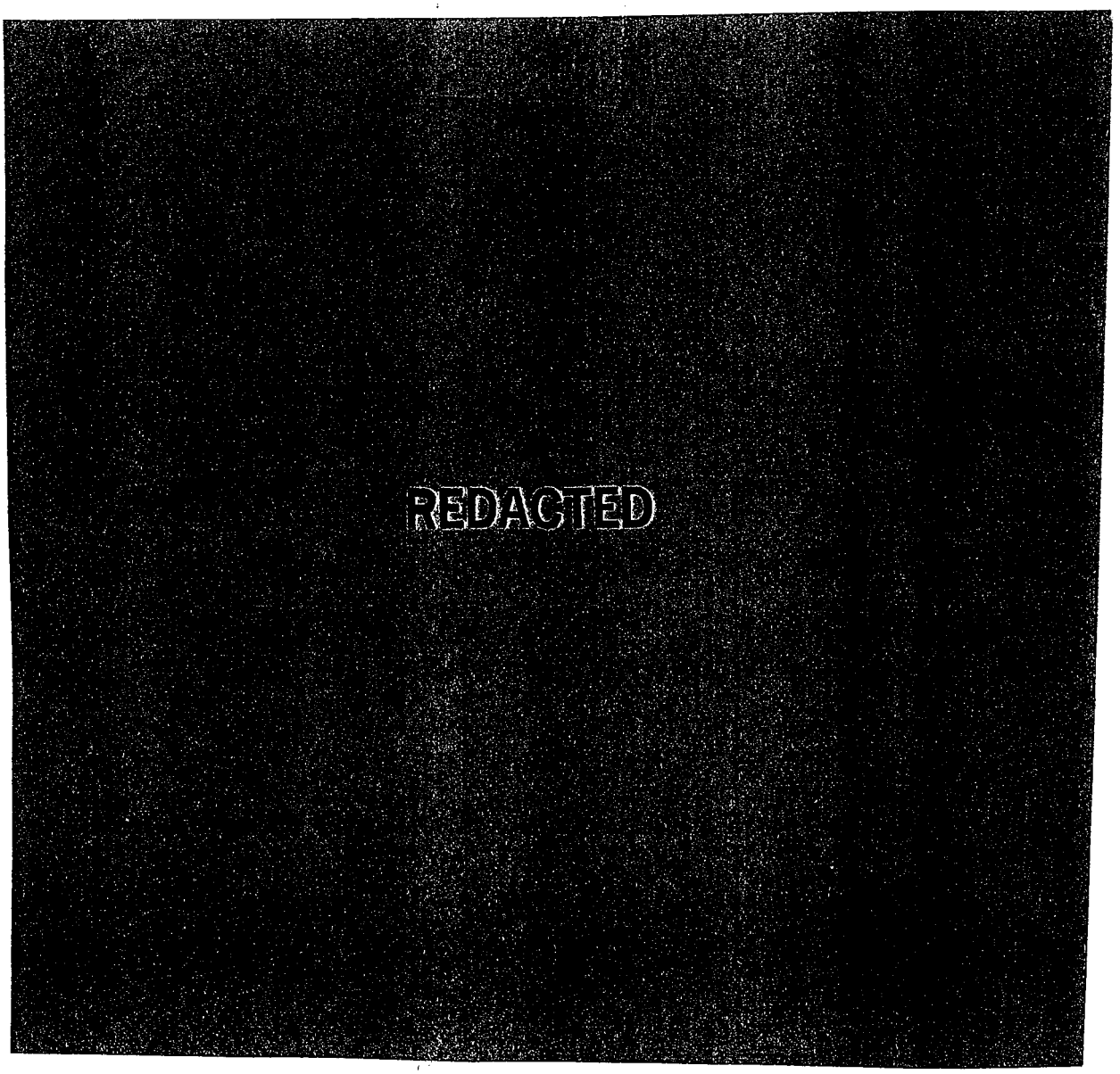
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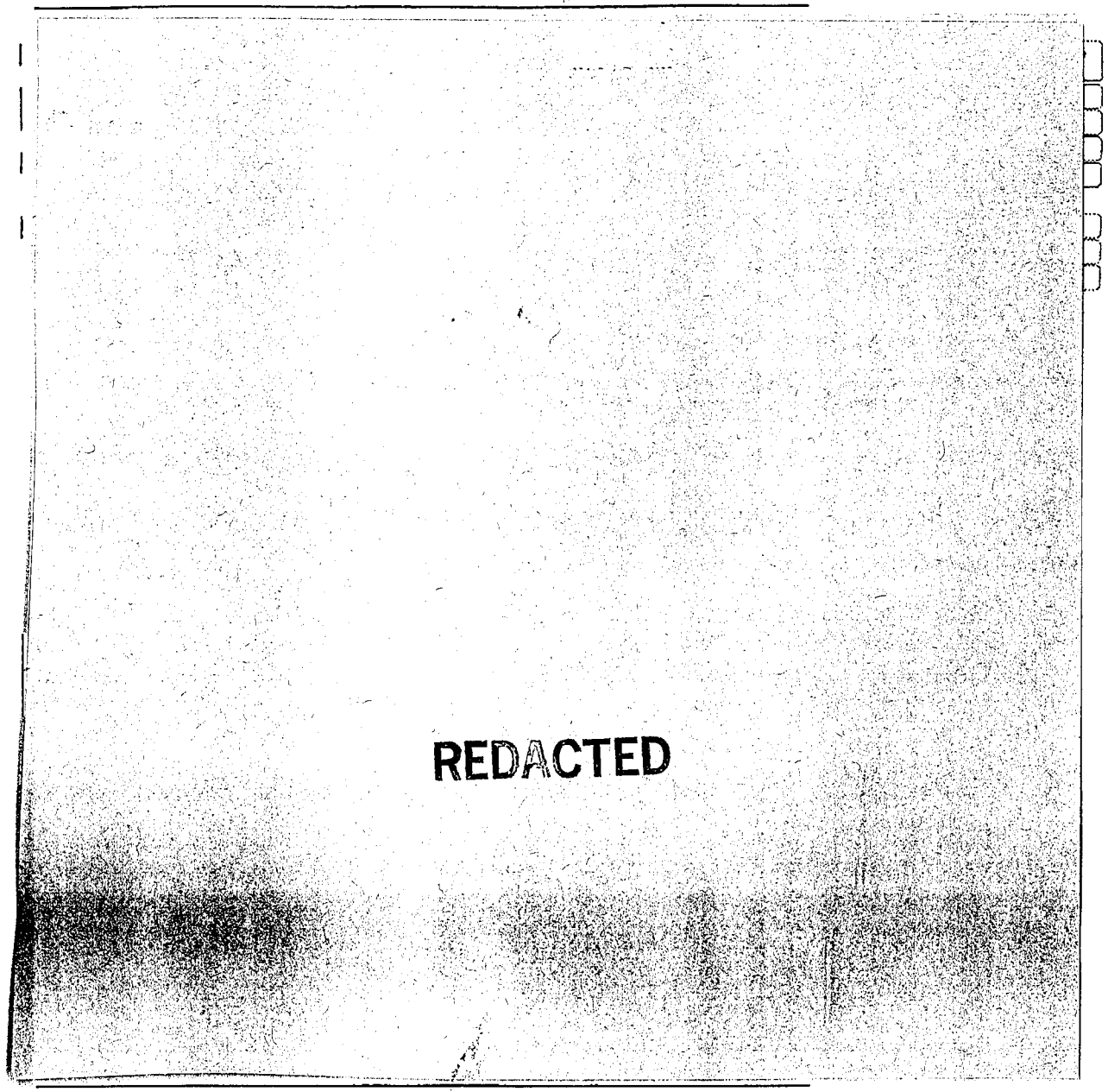
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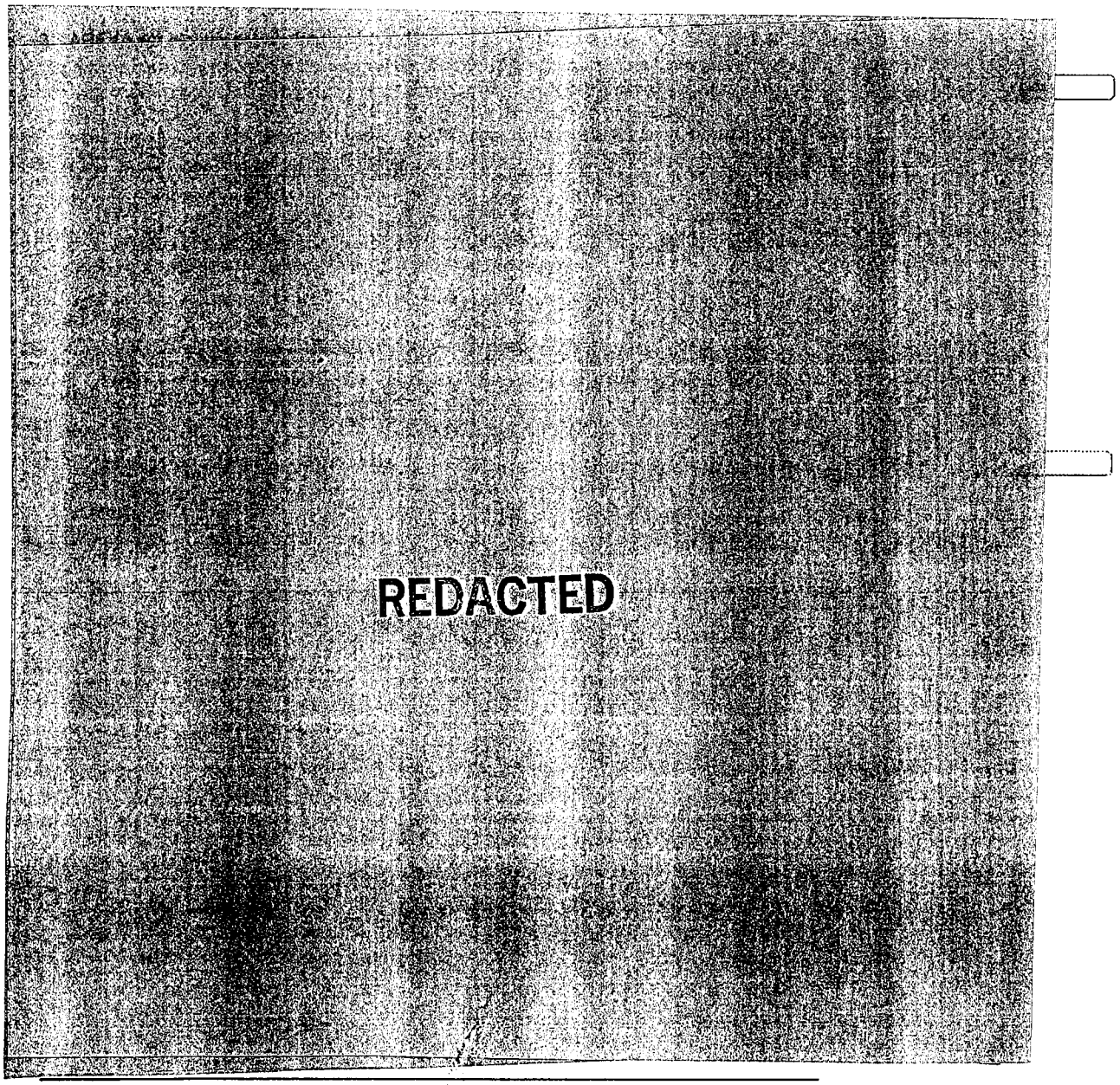
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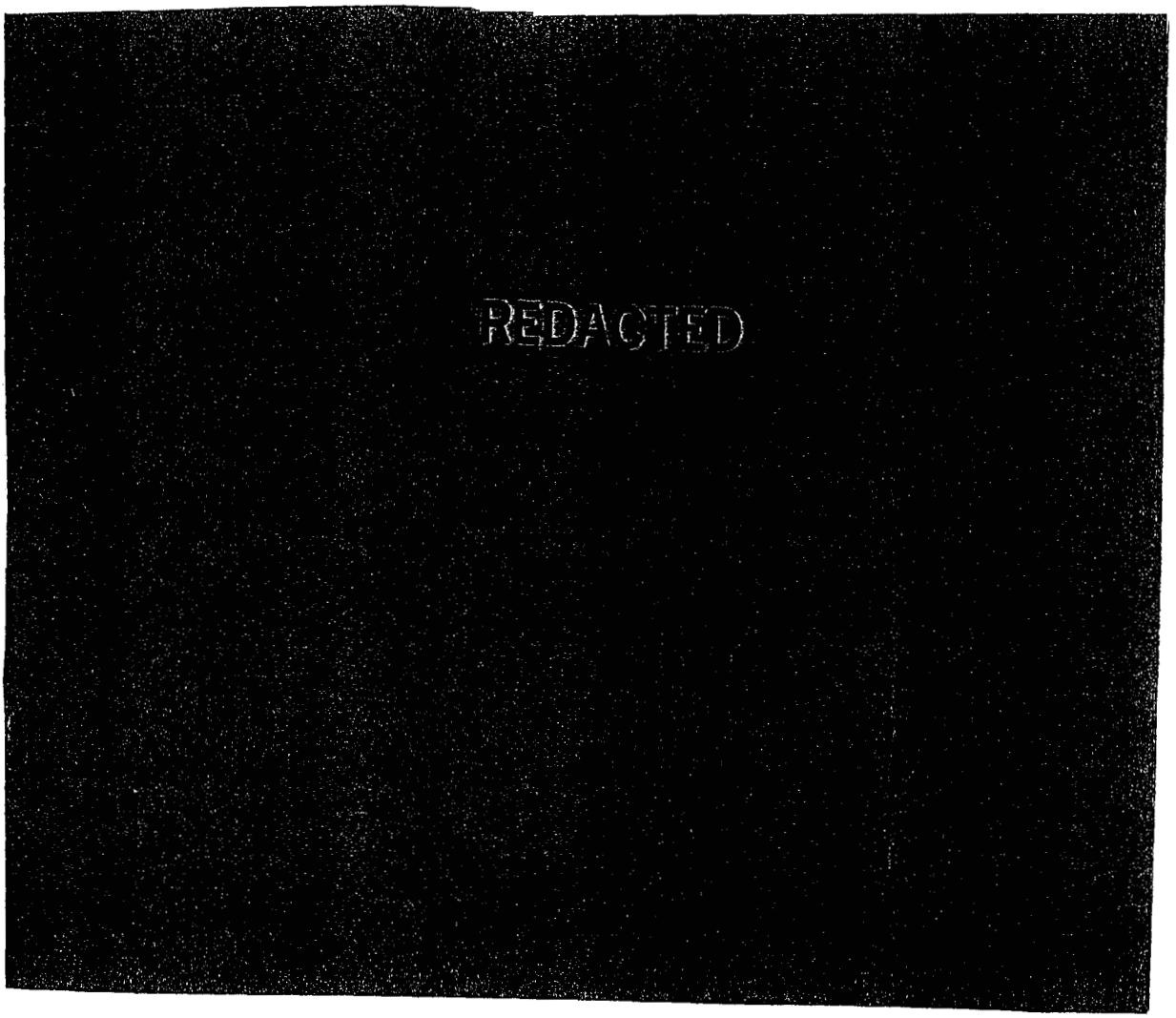
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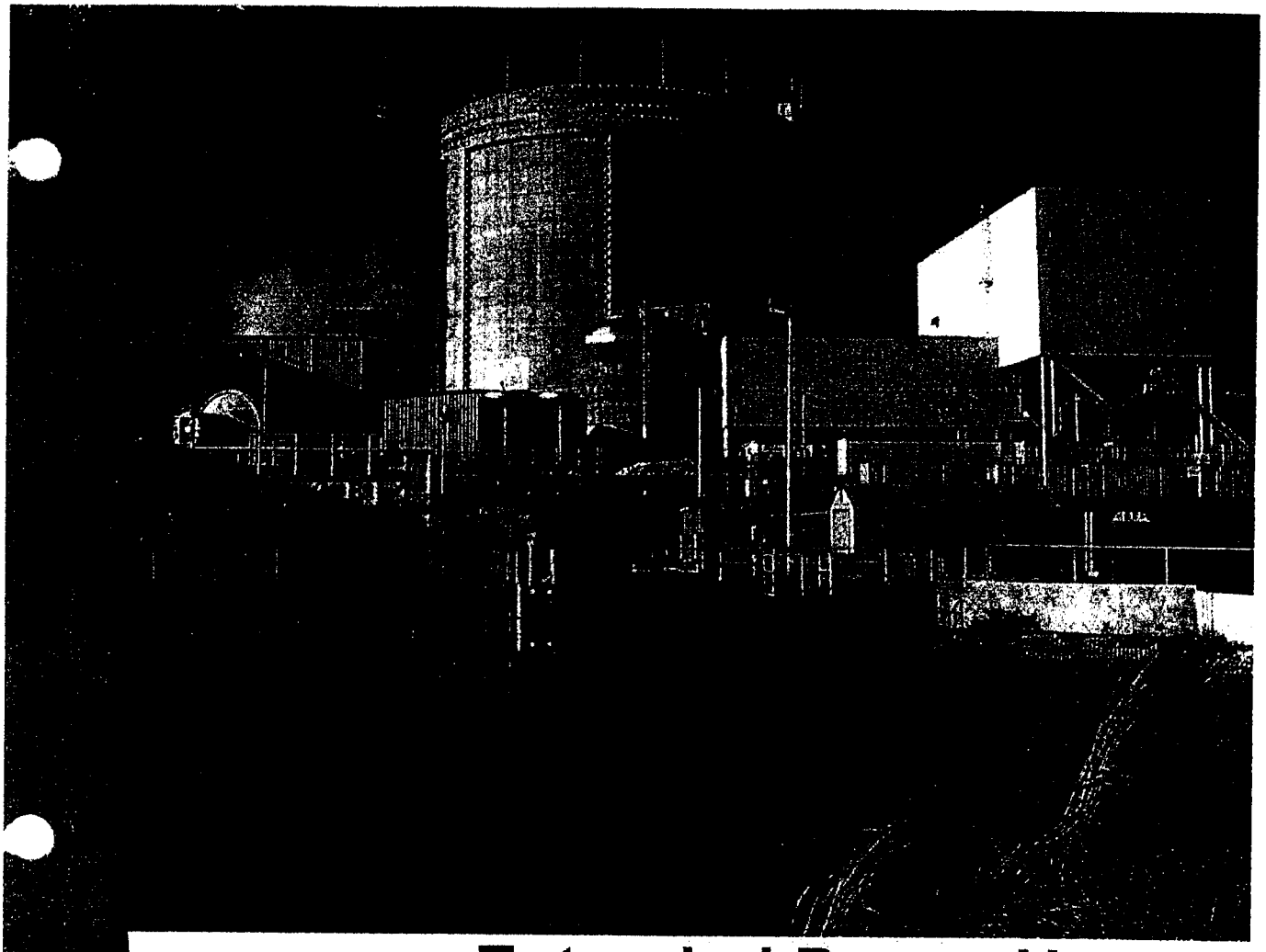
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2.8 Schedule



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Extended Power Uprate Balance of Plant Activities

Progress Energy/Crystal River 3

August 6, 2007

RFQ # KS12007

Including Addenda # 113343

AREVA NP Proposal # PENG07-1370.0

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AREVA

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PROPRIETARY

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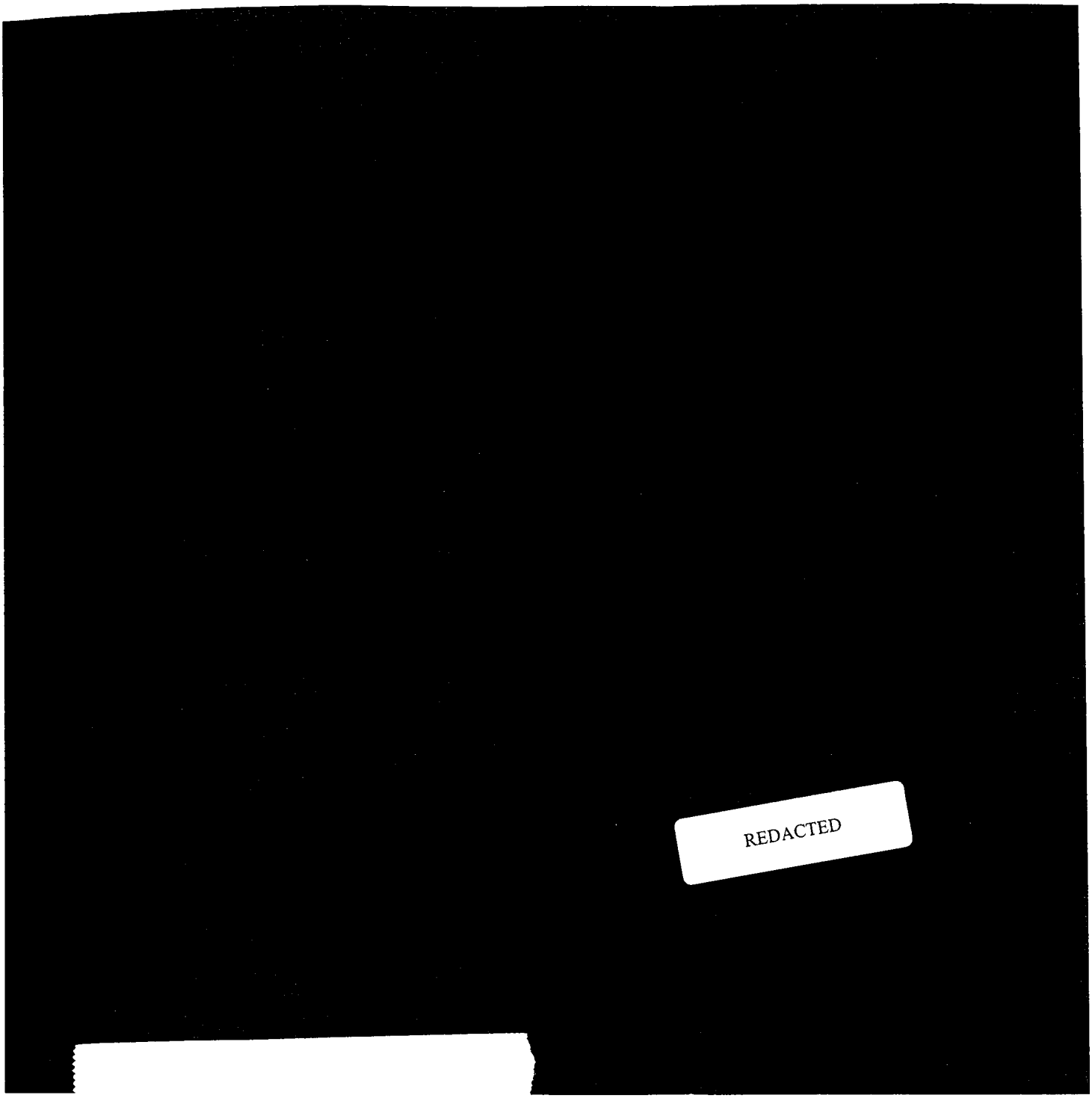
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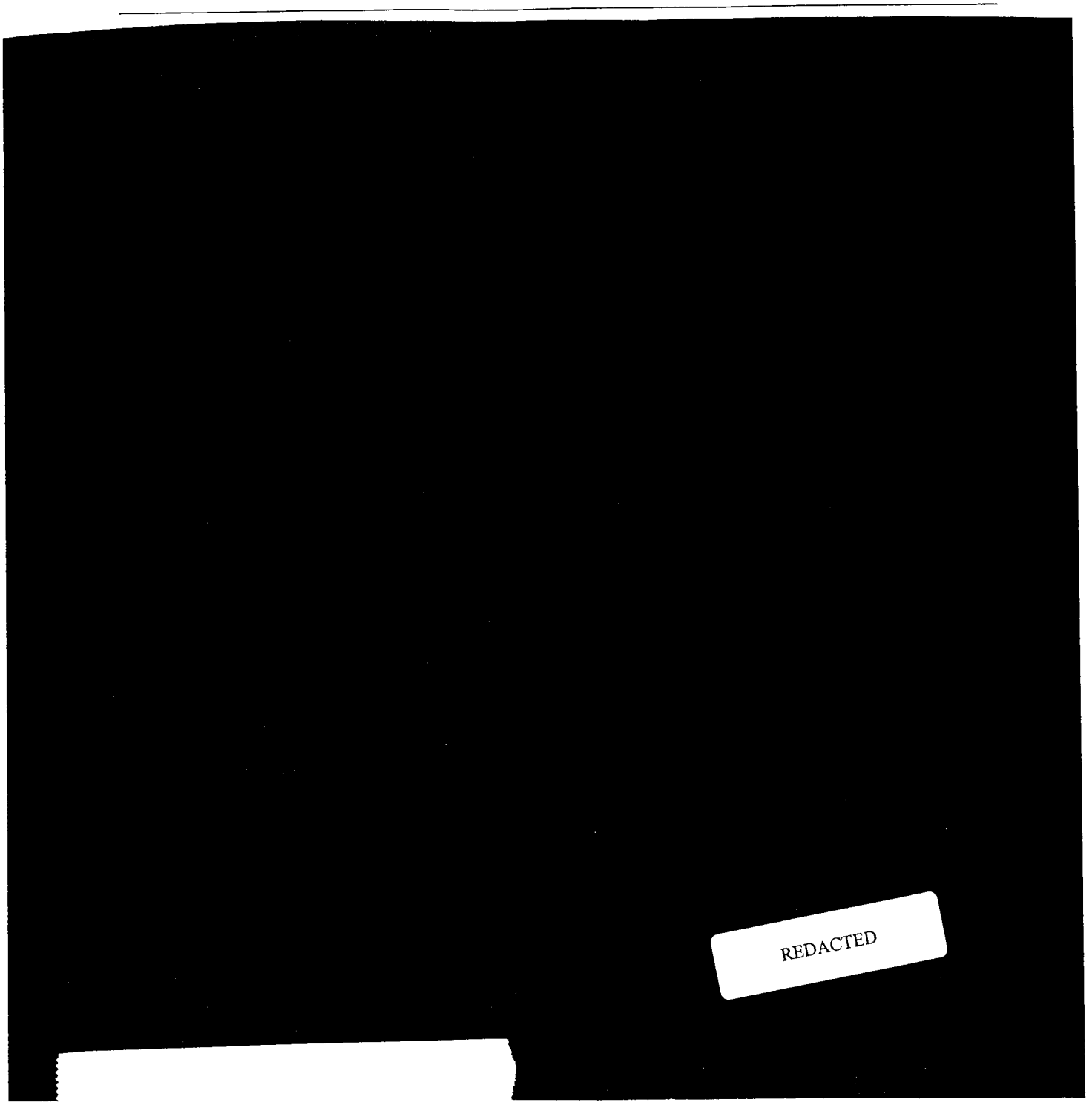
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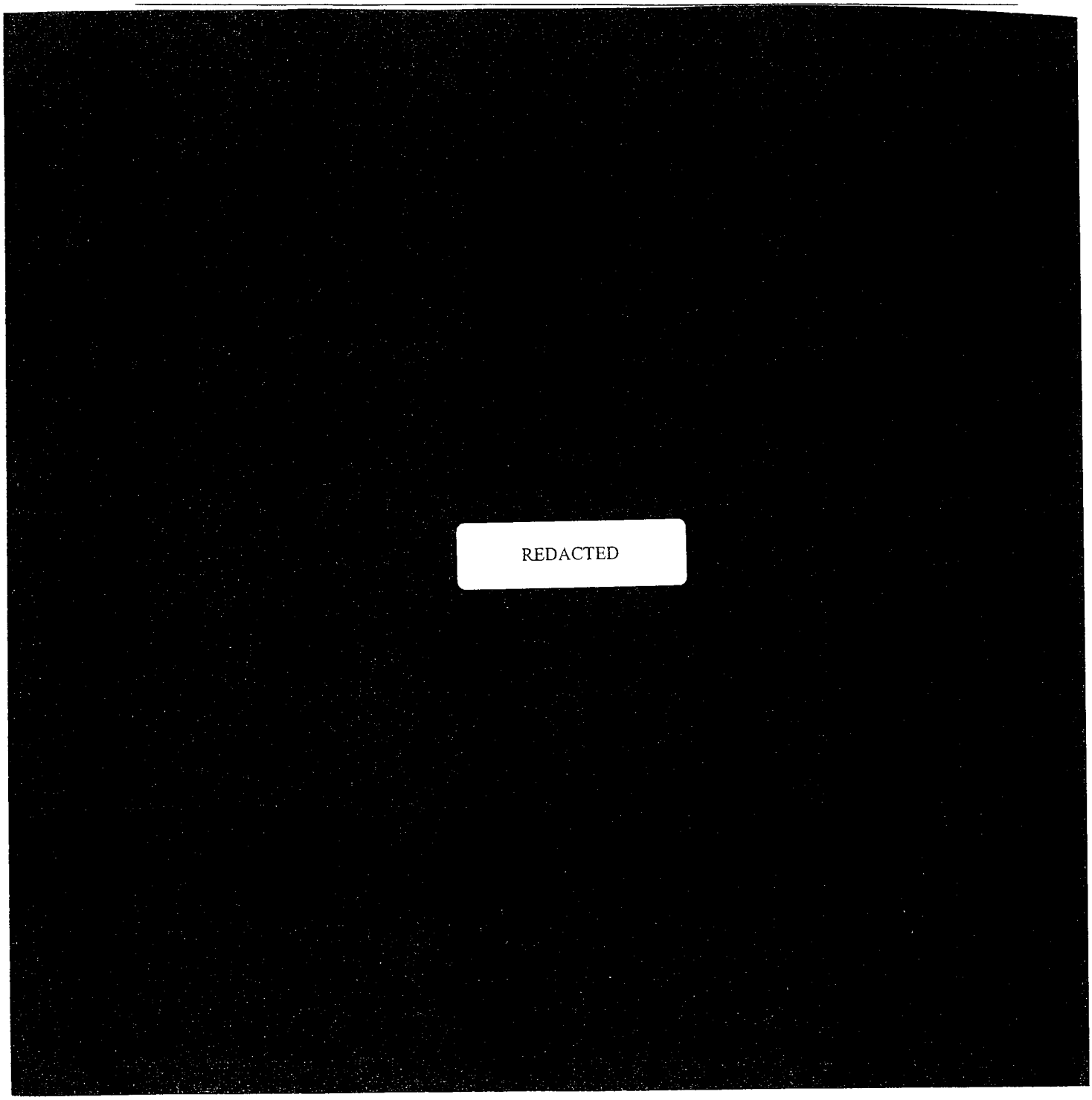
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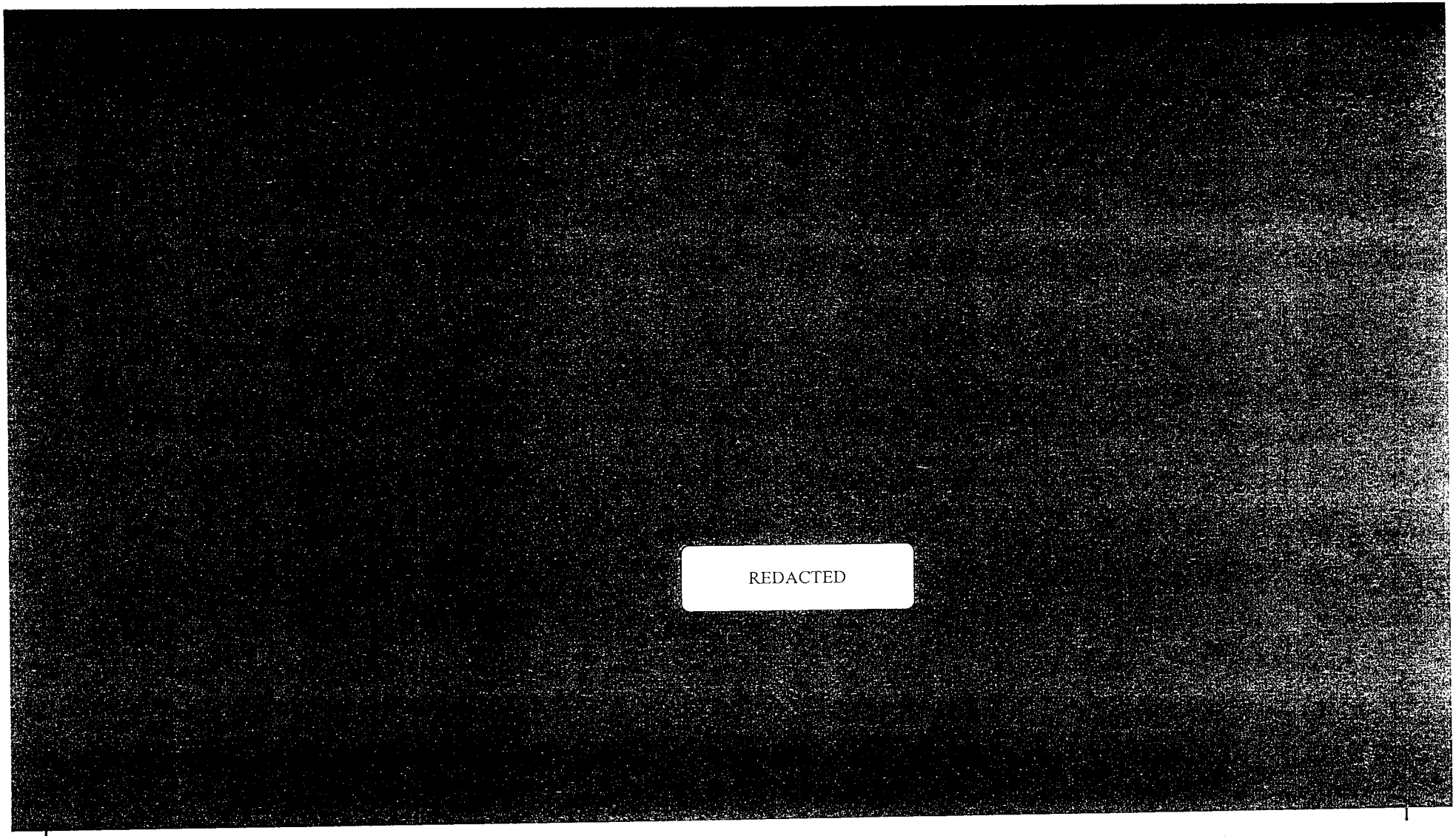
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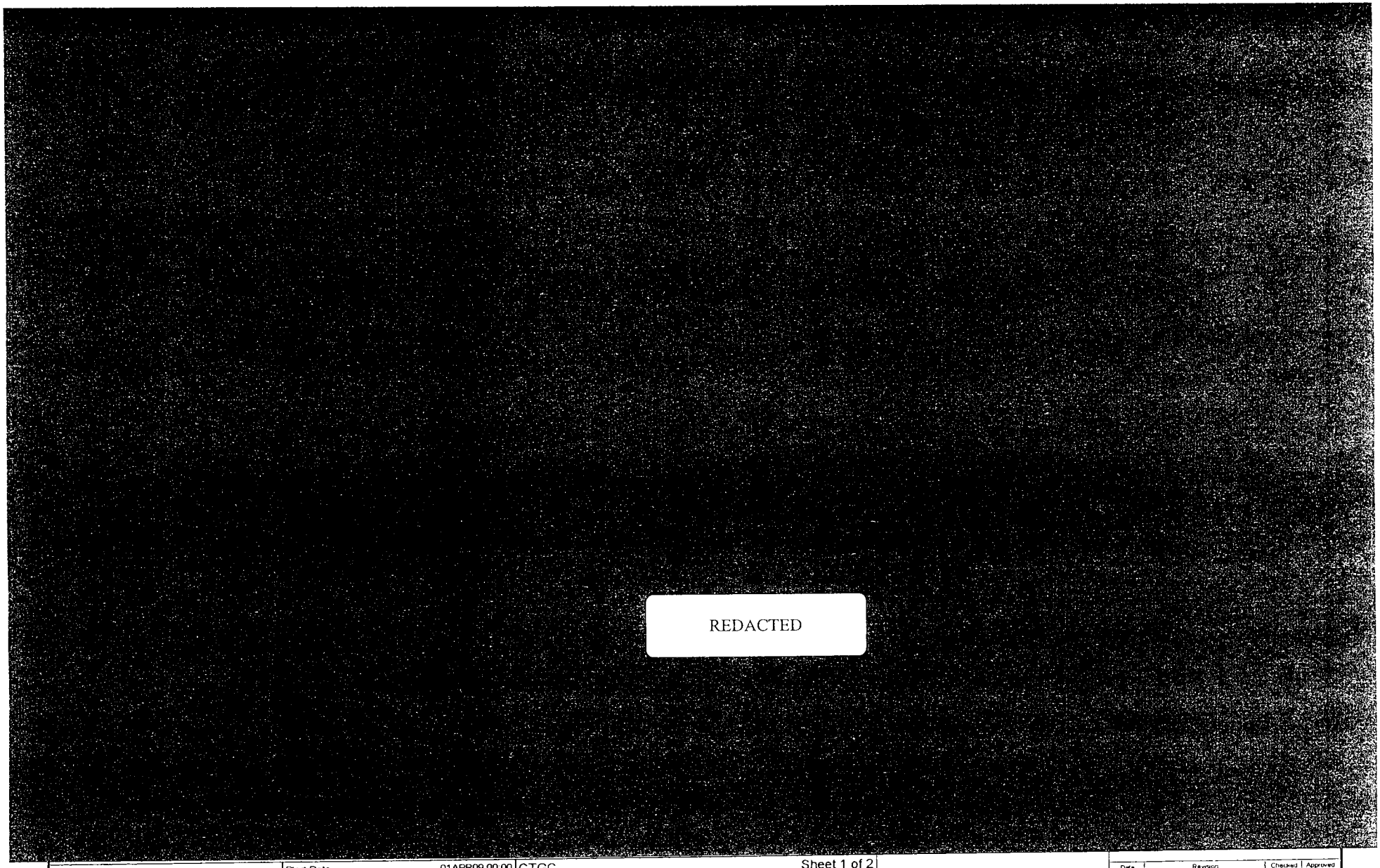
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PROGRESS ENERGY
CRYSTAL RIVER UNIT 3
HPTURBINE UPRATE

SUMMARY SCHEDULE
PRELIMINARY VERSION
[FALL 2011]

Date	Revison	Checked	Approved
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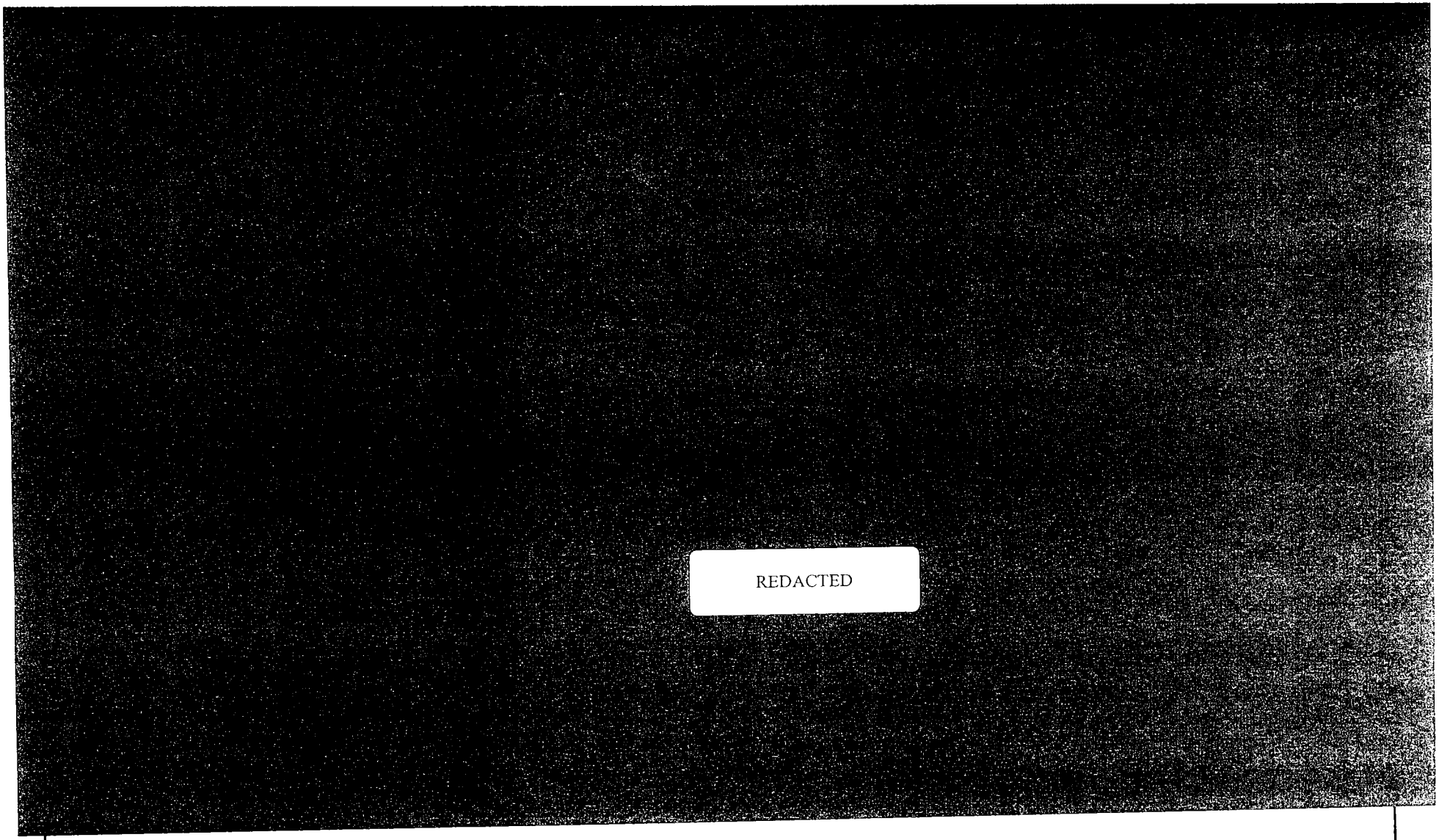
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CRYSTAL RIVER UNIT 3
LP TURBINE UPRATE and GENERATOR
RECORE & REWIND

SUMMARY SCHEDULE
PRELIMINARY VERSION
[FALL 2009]

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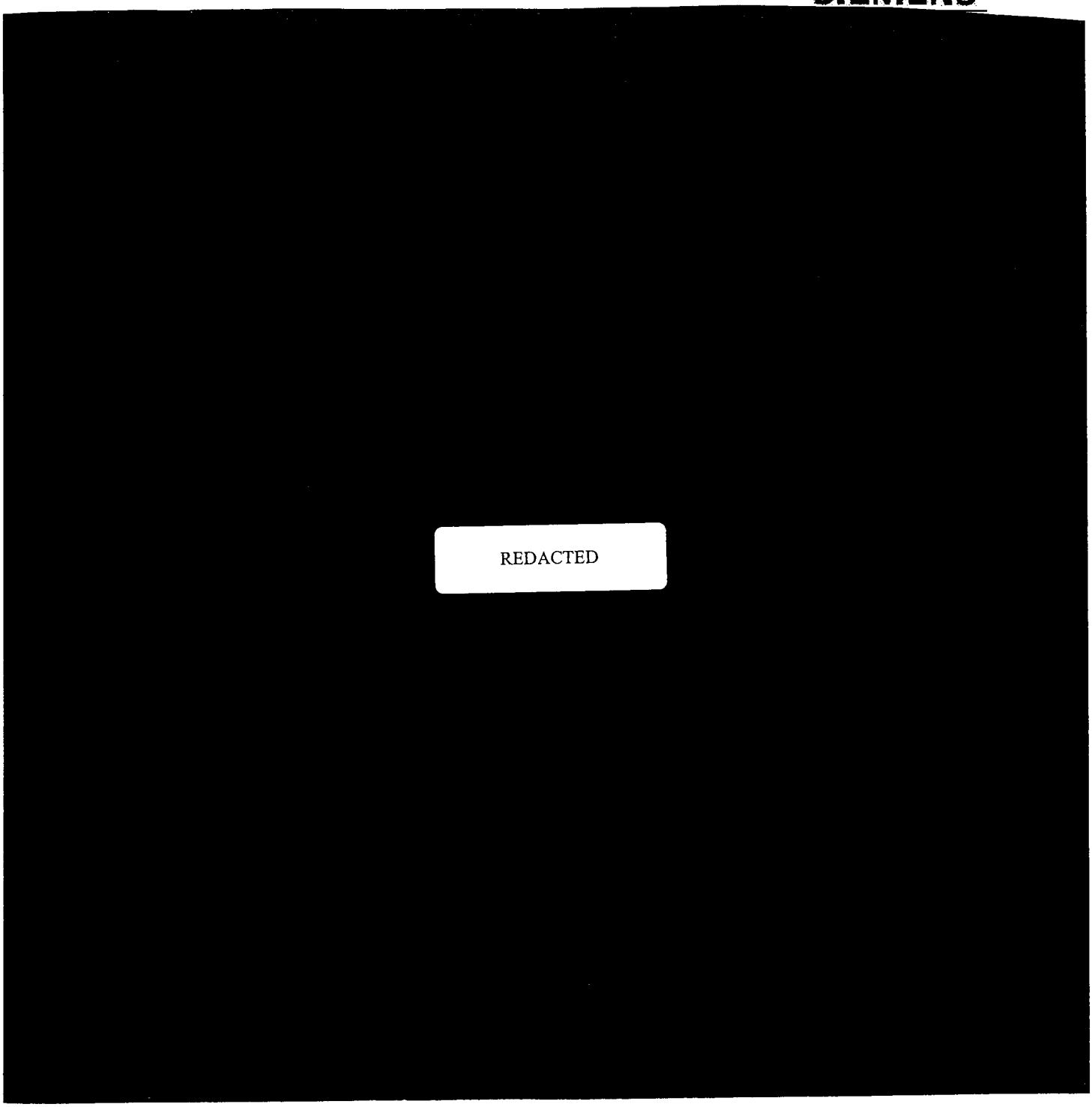
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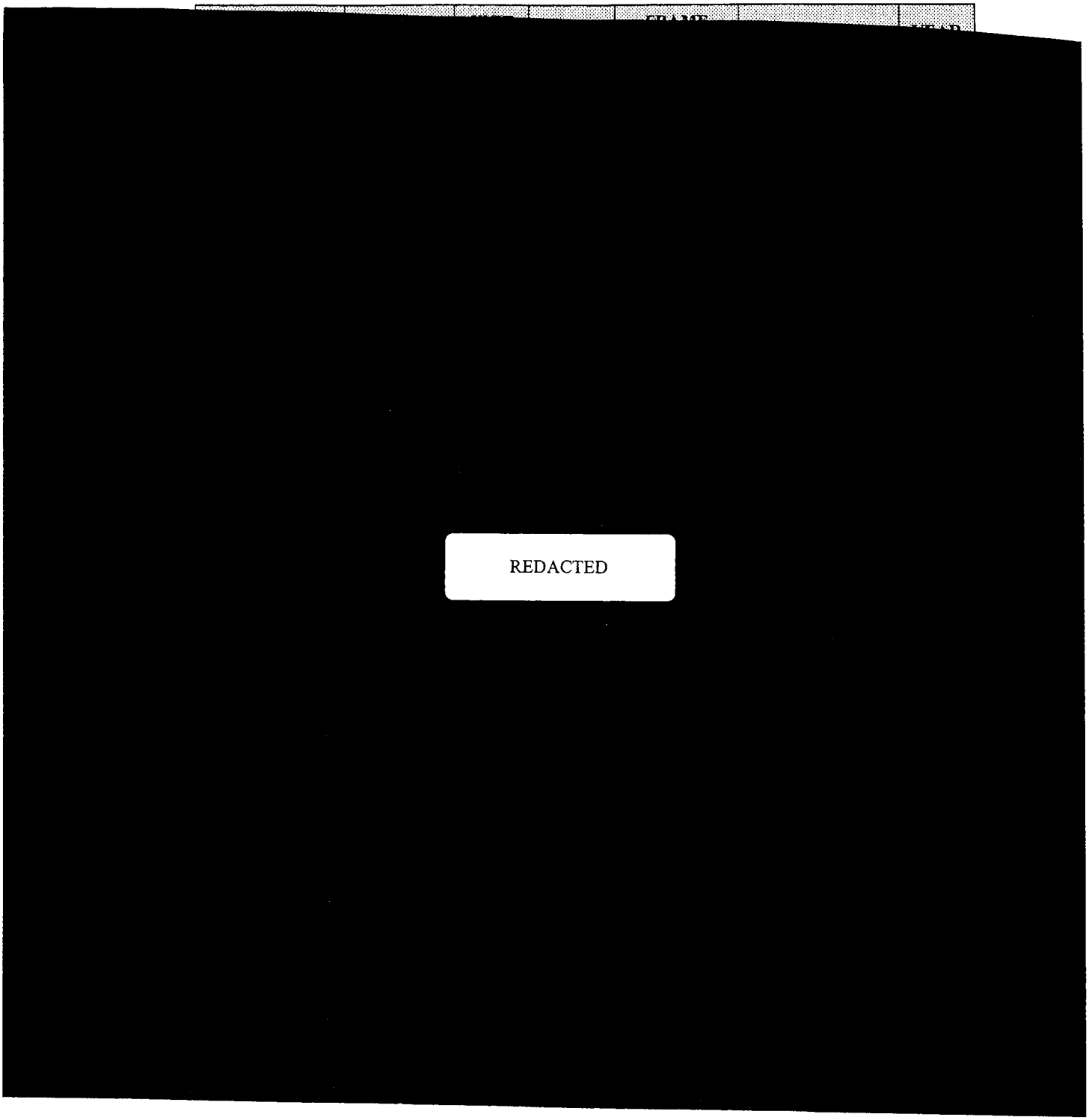
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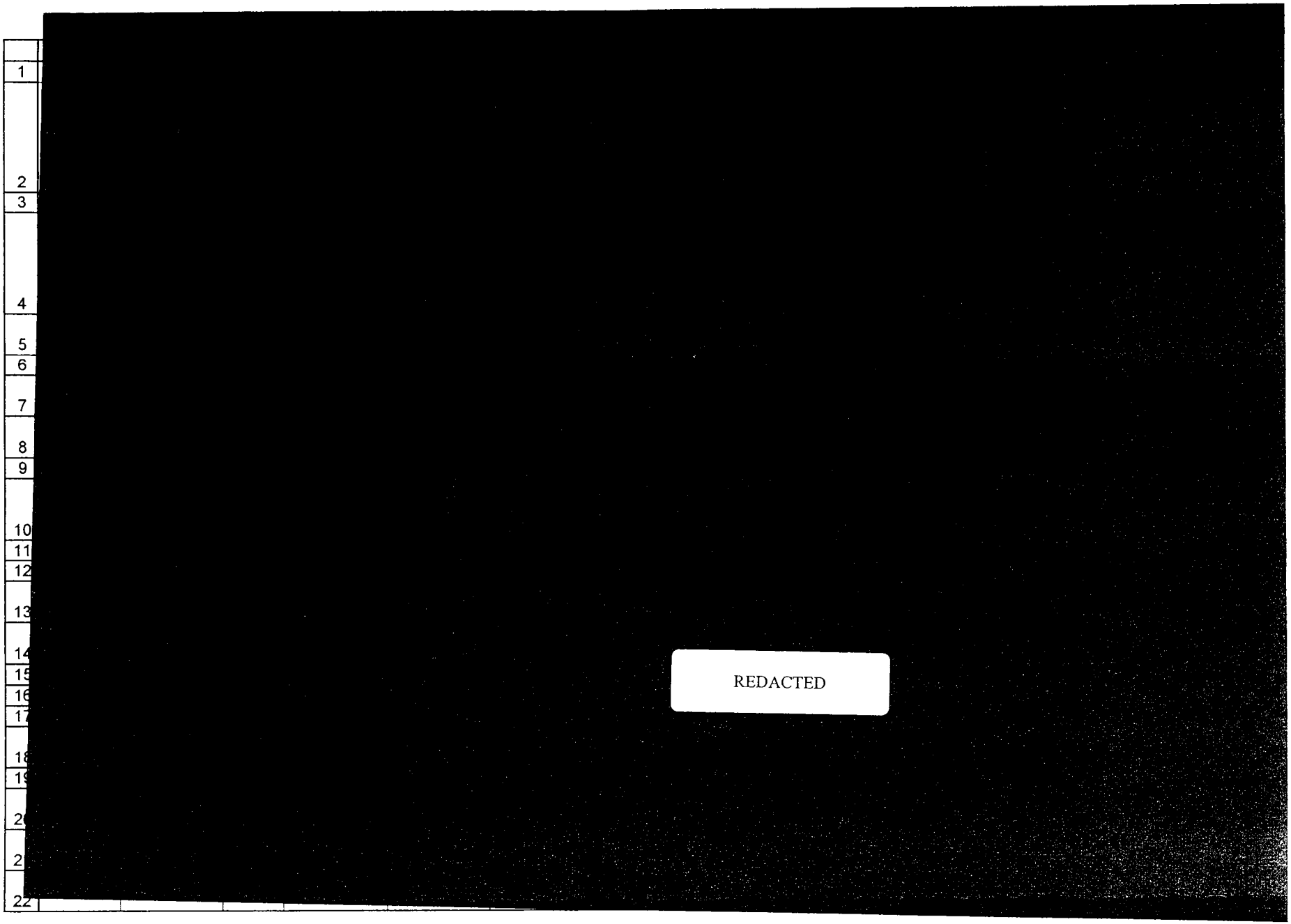
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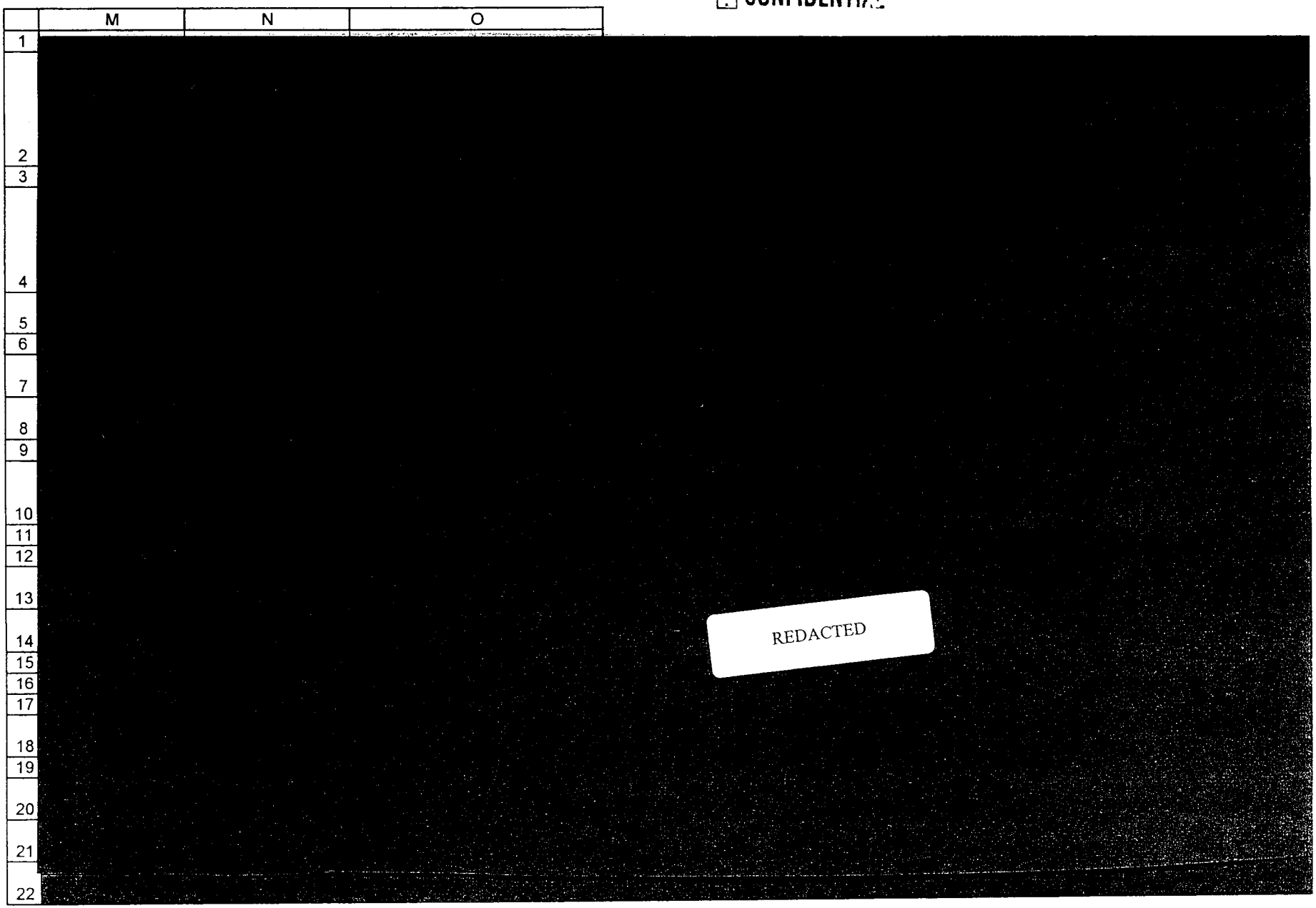
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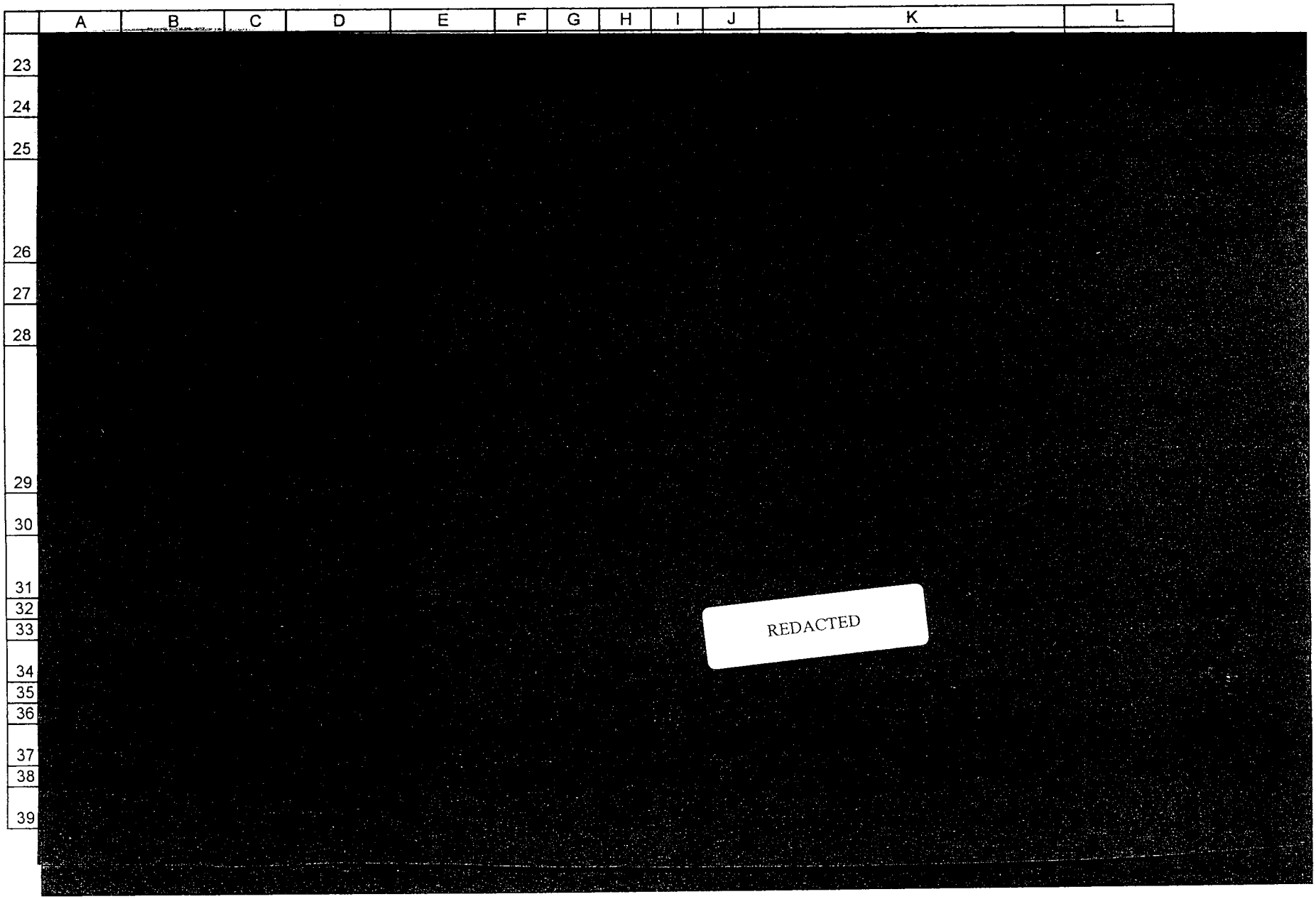
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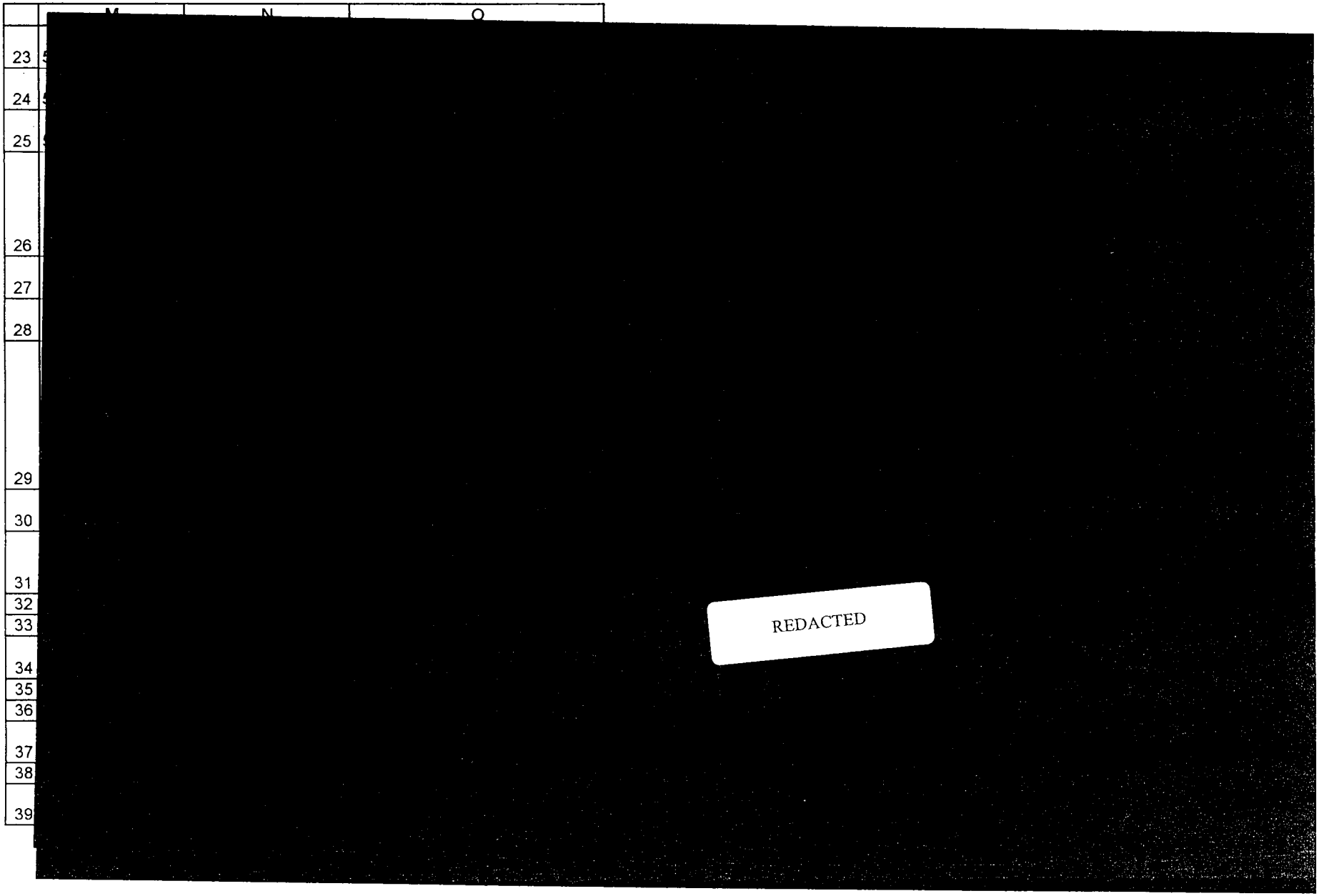

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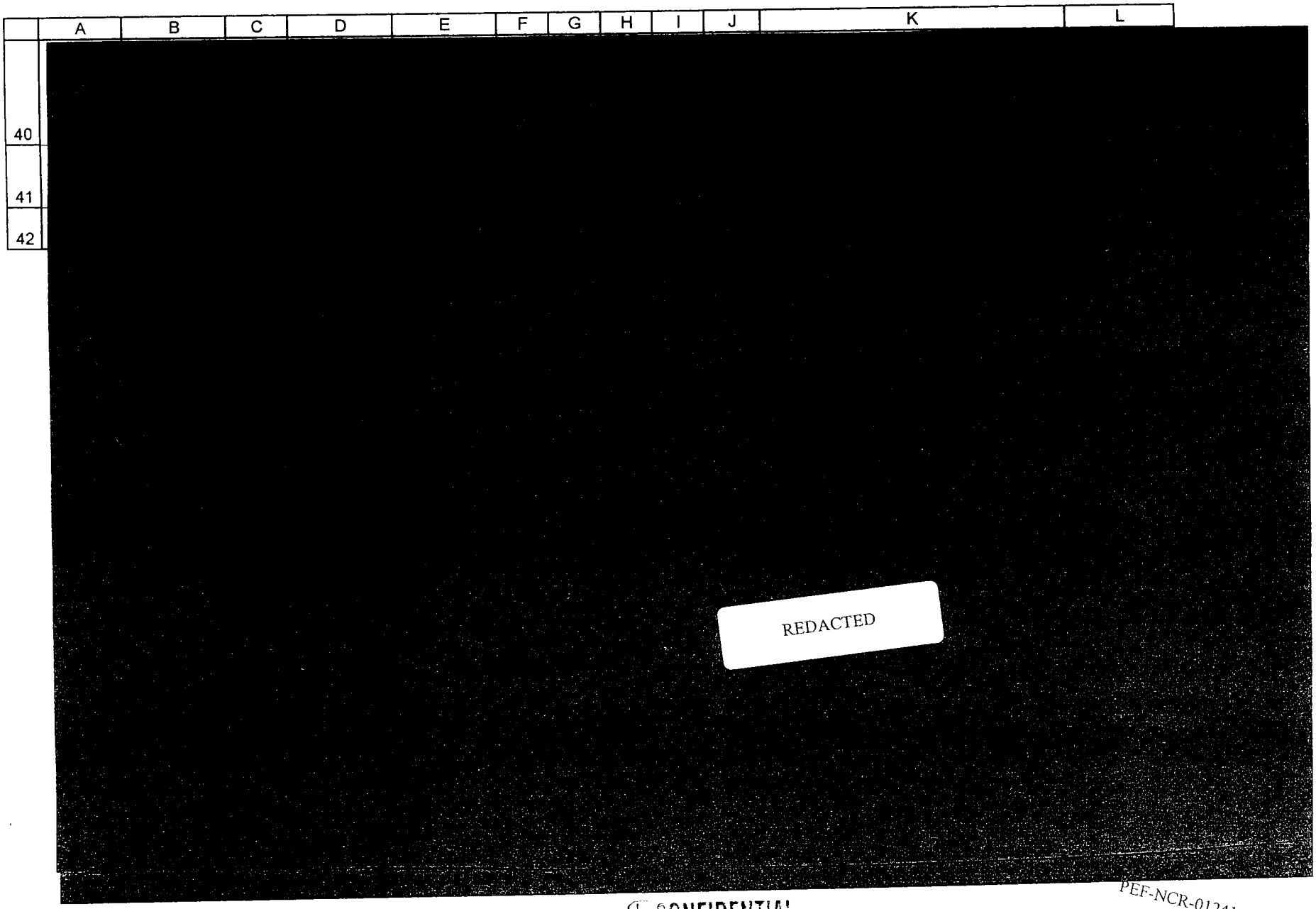


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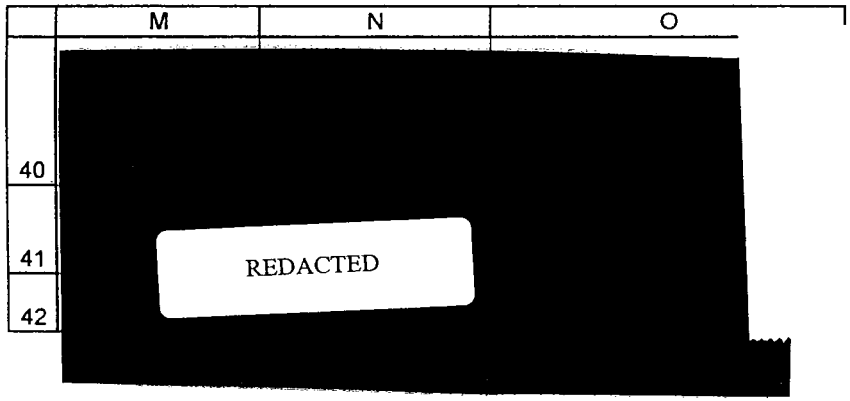
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PEF-NCR-01240



CONFIDENTIAL

PEF-NCR-01241



CONFIDENTIAL

February 16, 2007

_____
_____
_____
_____

Attention:

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
TURBINE GENERATOR REPLACEMENT & RETROFIT
REQUEST NO. SD22007

Dear Bidder:

You are invited to submit a proposal for Replacement of the Turbine Generator and the performance of related work (see the Scope attached for additional details) for Progress Energy's Crystal River Nuclear Power Station, Unit 3 site located at 15760 West Powerline Street in Crystal River, Florida 34428. Two (2), signed copies of the proposal (one priced and one unpriced) shall be sealed and marked "CONFIDENTIAL" and submitted to Tony Owen, Progress Energy Service Company, LLC, P. O. Box 1551 (PEB 2C1), Raleigh, NC 27602. Overnight delivery should be sent to 410 S. Wilmington Street (PEB 2C3), Raleigh, NC 27601. The proposal must be sealed and marked as noted above in a separate envelope inside the overnight envelope. No copies of the proposal shall be distributed to any other Progress Energy personnel by the bidder. Your proposal must be received no later than 12:00 noon, March 30, 2007. If your proposal is received after that day or time, it will not be considered for the described work. Telephoned or faxed proposals or proposal information is unacceptable and will not be considered. No modifications to the bidder's proposal will be accepted after the bid due date and time specified above unless specifically requested by Progress Energy in writing.

Bidder is requested to complete, sign, and return the General Information form attached in its entirety and to furnish all information requested by this form. Bids will not be considered when submitted on forms other than those provided.

It is intended that a Contract in the form of the attached specimen Contract will be awarded for this Work and quotations shall be made accordingly, unless the successful bidder has an existing Master Contract with Progress Energy, in which case a Work Authorization will be released against that Master Contract incorporating the details of this Inquiry.

Progress Energy does not obligate itself to accept the lowest or any other bid and specifically reserves the right to reject any and all bids. Bidders are advised that all bids will be opened and evaluated solely by Progress Energy. All information contained in the bids submitted to Progress Energy and Progress Energy's evaluation, including any bidder's relative position to the successful bidder, is considered exclusive information of Progress Energy and will not be made available to any of the bidders. All unsuccessful bidders will be notified by Progress Energy in writing of the award of the work to another firm.

03238 APR 22 08
FPSC-COMMISSION CLERK

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the commercial aspect of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Tony Owen, Tony.owen@pgnmail.com (919) 546-2933 by the bidder only.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the technical aspect of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Scott T. Deahna at the Crystal River Nuclear Plant (CNP) at (352) 563-2943, extension 4234, or email address Scott.deahna@pgnmail.com by the bidder only.

It is the bidder's responsibility to advise his potential subcontractors, suppliers, and other subvendors that information will be available only through the bidder and that no direct contacts with Progress Energy by subtier firms shall be initiated. Information exchange shall be between Progress Energy and bidder, and bidder and his potential subcontractors. No work shall be subcontracted without the approval of Progress Energy. Subcontract work and proposed subcontractors must be identified in bidder's proposal.

As a prerequisite for consideration of a bidder's proposal, bidder must contact the site of the proposed work, discuss job conditions with Progress Energy's designated representative, become acquainted with the technical requirements of the work and all available information and local conditions which may possibly occur in the course of the work, and make his choice of methods and equipment accordingly. Contact appointments must be made with Scott Deahna at the Crystal River Nuclear Plant. No site visits will be allowed without prior appointment with the above named person.

Please acknowledge receipt of this proposal and your bidding intentions by completing the attached Acknowledgement and faxing to Tony Owen at (919) 546-6750 by two business days.

PROGRESS ENERGY SERVICE COMPANY, LLC

By: _____
Tony Owen
Supply Chain Management

Attachments to this RFP:

Acknowledgement
General Information
Scope and Other Requirements
Sample Contract
Bid Specification
Table of Conformance
Safety Evaluation Form
Attachments to Bid Specifications
- 10.1 CR3 Turbine Generator Operating Data (Electronic Only)
- 10.2 MUR Power Uprate PEPSE Analysis (Electronic Only)
- 10.3 CR3 P&ID's (Electronic Only)
- 10.4 CR3 Turbine Generator Layout Drawings (Electronic Only)

ACKNOWLEDGEMENT

Mr. Tony Owen
Progress Energy Service Company, LLC
P. O. Box 1551 (PEB 2C3)
Raleigh, NC 27602
Fax: 919-546-6750

PROGRESS ENERGY SERVICE COMPANY, LLC
CRYSTAL RIVER NUCLEAR PLANT, UNIT #3
REQUEST NO. SD22007

I acknowledge receipt of the subject proposal package and have indicated my bidding intentions as follows:

_____ I have reviewed the proposal documents and will not be submitting a bid for this work. Proposal documents are being returned under separate cover.

__X__ I have reviewed the proposal documents and intend to submit a bid for this work and will make arrangements to contact or visit the site as requested.

(Signature)

Dan J. Smith
(Name)

Key Account Manager
(Title)

Siemens Power Generation, Inc.
(Company)

February 19, 2007
(Date)

GENERAL INFORMATION

PROGRESS ENERGY SERVICE COMPANY, LLC
CRYSTAL RIVER NUCLEAR PLANT, UNIT #3
REQUEST NO. SD22007

Contractor visited the site [X] and/or contacted [X] the site on **March 13, 2007** and discussed job conditions with **Scott Deahna** to acquaint himself with the technical requirements of the work and all available information and local conditions which may impact pricing of the subject Inquiry **No.SD22007.**

In the event that your Proposal is accepted and a Contract is awarded to the firm whose full legal company name appears herein below, **Siemens Power Generation, Inc. Mr.. Craig Weeks**, whose title is **President Global Service Division** , will be executing the Contract on behalf of the firm. Should this person's title not indicate that he/she is a corporate officer (president, vice president, or corporate secretary), an affidavit signed by a corporate officer shall be provided along with the bid, stating that the person whose name appears above is duly authorized to execute contracts on behalf of the firm.

The Contractor is: (select appropriate line and complete information)

An Individual: _____

A Corporation of the State of **Delaware**

A Partnership consisting of _____

A Joint Venture comprised of _____

Full Legal Company Name **Siemens Power Generation, Inc.**
Business Address **4400 Alafaya Trail**
Orlando, Florida 32826

Mailing Address _____
(if different) _____

Contact Name **Dan Smith Key Account Manager**

Contact Phone **813-931-5004**

Contact E-Mail **dan.j.smith@siemens.com**

Company Website **Siemens.com**

Federal Tax ID Number **13-3987280**

Contractor's License Number (if applicable) CGC059151 State of Issuance FL.

In accordance with the Federal Acquisition Regulation section 52.219, please check all that apply to your company. Please provide supporting documentation or certification to confirm the status for any categories checked under Small/Diverse Vendors.

[ ] Certified small business*
[ ] Veteran-owned business*
[ ] Service-disabled veteran-owned business*
[X] Not a Small Business
[ ] HUBZone, 8(a) or disadvantaged business*
[ ] Minority-owned business * *
[ ] Women-owned small business * *

* As defined by the Small Business Administration (SBA): www.sba.gov
* * Certified by Progress Energy and as defined by SBA.

Register online at www.progress-energy.com/supplierdiversity

BY: _____

NAME (printed): **Bill Comklin**

TITLE: **Manager-Contract Management**
DATE: **April 13, 2007**

SCOPE AND OTHER REQUIREMENTS

PROGRESS ENERGY SERVICE COMPANY, LLC
CRYSTAL RIVER NUCLEAR PLANT, UNIT #3
REQUEST NO. SD22007

SCOPE: (See Section 1 of the Sample Contract)

The Crystal River Unit 3 Nuclear Power Station (CR3), located near Crystal River, FL presently generates 903 MWe at 100% reactor power (2568 MWt).

CR3 is planning to implement an extended reactor power uprate of 17% during the fall 2011 refueling outage. The CR3 steam generators will be replaced during the fall 2009 refueling outage. CR3 is also planning an "appendix K" feedwater flow measurement uncertainty recovery (MUR) uprate of approximately 1.6% reactor power during the fall 2007 refueling outage.

The intent of the CR3 extended power uprate (EPU) project is to retrofit the low pressure turbines, moisture separator reheaters, feedwater heat exchangers, generator and the exciter during the fall 2009 refueling outage. The high pressure turbine will be designed and retrofit during the fall 2011 refueling outage to support the reactor thermal uprated conditions.

SCHEDULE:

The replacement of the turbine generator at the Crystal River Unit 3 site is scheduled for completion during the fall 2009 refueling outage. Implementation of an extended reactor power uprate of 17% is scheduled to be completed during the fall 2011 refueling outage.

TERMS AND CONDITIONS

Terms and Conditions will be in accordance with the Sample Contract.

EXECUTION OF PROPOSAL:

The full corporate firm or individual name and exact address shall appear on your proposal form. The signature must be that of a corporate officer or authorized person followed by their title. The signature(s) of all authorized persons signing the Proposal shall be in ink and in longhand.

BIDDERS PROPOSAL:

Bidder is required to submit two (2) signed copies (one priced and one unpriced) and one (1) electronic copy of the entire proposal giving complete descriptive information covering Bidder's solution, including engineering, construction, procurement, testing, and related work proposed to be furnished which meets or exceeds all functional requirements of PE's RFP. Also, acknowledge that PE shall have permission to make additional copies of Bidder's proposal, attachments, and any other submitted materials. The proposal form and any other requested attachment that contains prices must be submitted in a sealed envelope separate from the other submittals requested herein. Bidder's proposal as appropriate shall include the following:

a. A cover letter with an inventory of the contents of the complete proposal.

b. A clear description of your company's solution proposed to meet all functional requirements of the Requirements Documents and the methods used to perform those functions.

c. The Bidder shall complete the Table of Conformance for the Scope(s) of Work contained herein, and by responding to each section, heading and subheading in the order they appear. The Bidder shall indicate for each whether your proposed solution will conform or deviate. The heading or subheading includes all paragraphs up to the next heading or subheading. Bidder may respond to individual paragraphs under such headings or subheading. Sections, headings, and subheadings are those numbered, in bold print and/or underlined. In preparing the Table of Conformance, Bidder may use either Microsoft Word or Microsoft Excel; bidder is encouraged to utilize the redlining technique in Microsoft Word appropriate (i.e., sample contract document).

Further, the Bidder shall provide details of nonconformance, such as an exception, alternate or enhancement (see below) on the Tables of Conformance. If the Bidder fails to supply the Tables of Conformance, PE will assume the Bidder's proposed system is in conformance with the Scope(s) of Work and all other documents furnished with this RFP, and if the Bidder is the successful Bidder, the Bidder shall be required to meet all requirements without exception. The only acceptable classifications in the Tables of Conformance (to be indicated by letter) are:

C (Conform) - The Bidder meets the requirement in the manner indicated.

X (Exception) - An approach which does not meet the requirements or a requirement the Bidder declines to meet.

A (Alternate) - An approach which is substantially different from the suggested approach but which meets the stated requirements.

E (Enhancement) - An element not required by the Requirements Documents but offered for consideration.

The technical response as expressed in the Tables of Conformance shall be such as to enable PE's personnel to make a thorough and complete evaluation and arrive at a sound determination as to whether or not the solution proposed and described will satisfy the requirements of PE. The proposal should be specific, detailed, and complete to clarify and fully demonstrate that the Bidder has a thorough understanding of the requirements for and technical problems inherent in the performance for the described Work. It should also demonstrate that the Bidder has a valid and practical solution for such problems.

Statements that the Bidder understands the Scope(s) of Work or that Bidder can or will comply with all requirements and statements paraphrasing the requirements or parts thereof are considered insufficient. Phrases such as "Standard procedures will be employed," "Well-known techniques will be used," etc., will be considered insufficient. The proposal must be sufficient to indicate how the Bidder proposes to comply

with all requirements and procedures to be exercised. Clarity and completeness of the technical approach will be given much attention. Only written data submitted with the proposal and subsequent clarifications will be considered. Orally submitted data will not be considered.

All information pertinent to a particular requirement item of the Scope(s) of Work must be given in each place in the proposal at the expense of some (but not excessive) redundancy if necessary.

d. Answer all questions proposed by PE. The response to each question shall be cross-referenced to the Bidder's proposal where applicable.

e. Bidder shall acknowledge that discounts provided by hardware suppliers to Bidder, at the time of submitting Bidder's proposal, shall also apply to the actual hardware that will ultimately be furnished PE, regardless of

size or quantity. Further, in the event any greater discounts are received by Bidder at the time of delivery, Bidder shall proportionally pass such discounts on to PE.

f. Provide a preliminary milestone schedule for accomplishing this work.

SPECIAL REQUIREMENTS:

Familiarity with Laws:

The bidder is assumed to be familiar with all federal, state, and local laws, ordinances, and regulations which may in any manner affect those engaged or employed in the work, the materials or equipment in the work or the conduct of the work. PE should be immediately contacted for clarification if a Bidder should discover provisions in any drawings, specifications or contractual documents contrary to or inconsistent with any such law, ordinance or regulation.

Confidentiality:

All drawings, specifications, and contractual documents will remain the property of Progress Energy and are to be returned in good condition within ten (10) days after the date set for receiving bids. These documents shall not be reproduced or used for any purpose other than for the preparation of a proposal in accordance with this request. The information contained in these documents is proprietary and confidential and shall be maintained in strict confidence.

Interpretation:

An interpretation request shall be made to Progress Energy if a bidder is in doubt as to the true meaning of any part of the drawings, specifications, or contractual documents. Modification of the documents will be made only by written addendum issued to each bidder as described below.

Exceptions:

If a bidder's proposal contains any deviations or exceptions, those deviations or exceptions must be specifically identified on a single separate attachment to the proposal in order to be considered in the evaluation. If not so identified, the deviations or exceptions will not be considered part of the proposal. Conditional proposals based on bidder-generated clarifications may not be accepted. If a bidder takes any exceptions in addition to those submitted in accordance with this section, that bidder's proposal may be rejected by Progress Energy.

Sample contract documents are not included for bidders possessing a Master Contract with Progress Energy. All other bidders, if successful, will review and redline the enclosed SAMPLE contract format. Any exceptions to the contract documents must accompany the proposal as detailed above and the exceptions will be considered in the bid evaluation process.

Approved Equal Evaluation:

Submittals by bidder for evaluation of products as "approved equal" shall be made to the appropriate designated individual listed in the Request for Proposal at least ten (10) days prior to the proposal due date. Results of evaluations will be provided no later than seven (7) days prior to the proposal due date. Submittals made later than ten (10) days prior to the proposal due date will not be considered.

Addenda:

Progress Energy reserves the right to amend or clarify requirements herein by Addenda. These may be issued at any time prior to the date for receipt of proposals and may be mailed or otherwise delivered to all bidders who

have been invited to bid. Request by a bidder for extension of the proposal due date shall be received by Progress Energy at least one week prior to the then scheduled date. If revisions or clarifications are of magnitude to warrant, in the opinion of Progress Energy, the extension of the date set for receipt of proposals, an addendum will be issued announcing the new date. Failure of a bidder to acknowledge receipt of any addendum in the space provided on the proposal form may result in rejection of that proposal.

Safety:

Progress Energy is committed to using safety conscious contractors. To this end, Progress Energy collects safety-related data voluntarily provided by all persons performing or desiring to perform Progress Energy work. This data is compiled and made available to Progress Energy employees via Progress Energy's intranet. This intranet system is accessible by non-Progress Energy employees, and thus, so will be any safety-related information you provide. In providing the safety-related information requested herein, to Progress Energy or to any other person doing business, directly or indirectly, with Progress Energy, the undersigned contractor explicitly authorizes Progress Energy to disclose said information to non-Progress Energy persons and hereby releases Progress Energy and its agents and employees from any cause of action or claim for damages related to said disclosures.

Progress Energy subscribes to the "BROWZ" system and will expect the successful bidder to track safety and insurance certificates in the "BROWZ" system.

Nuclear Requirements:

This work is classified as NON-SAFETY RELATED.

All site assigned personnel of the successful bidder who are to be granted unescorted access to the plant site are required to attend a prerequisite security/radiation training class prior to entering radiation controlled areas.

When Contractor's employees must apply for unescorted access, the screening of Contractor employees will be performed by Owner in accordance with the latest revision of the document titled "Nuclear Worker Screening Requirements for Unescorted Access," the current revision of which is attached to this Contract. The document contains instructions to the Contractor with respect to providing employees for screening by Owner. Owner will send Contractor revisions to the document, and Contractor shall acknowledge receipt of the revision in writing. In the event Contractor performs screening at Owner's request, Contractor grants to Owner the right to audit all documentation resulting from Contractor's employee screening process on its own behalf or in conjunction with the U.S. Nuclear Regulatory Commission.

Bidder's attention is specifically directed to the stringent security, fitness-for-duty, health physics, ALARA, and quality check provisions which apply to this work. These criteria are defined in the attached specimen Contract.

Award of Contract / Right to Reject Proposals:

PE will award the contract to the Bidder submitting the best evaluated proposal which complies with the requirements herein. PE will utilize Bidder's Tables of Conformance, all requested attachments, references, and other information provided in its process of evaluating Bidder's proposal. PE may, in its sole discretion, reject any or all proposals received or waive minor defects, irregularities or informalities therein.

a. Upon reaching the award decision, PE may elect to issue a Letter of Intent to the successful Bidder. Bidder shall include a statement within its proposal as to its commitment to start work immediately and continue performance of such work upon receipt of such letter.

b. The successful Bidder may be required to furnish corporate guaranties from each of its corporate ownerships up to and including the parent corporation. Such documents will be due upon execution of the contractual document. Bidder shall include a statement within its proposal acknowledging Bidder's understanding and

agreement to furnish such corporate guaranties in the form furnished with this RFP.

Schedule Risk:

Timely completion of the replacement turbine generator at the Crystal River Unit 3 Site by the fall 2009 refueling outage and implementation of an extended reactor power uprate of 17% during the fall 2011 refueling outage is critical to the success of this project. Therefore, the selected bidder will be asked to place profit at risk to demonstrate understanding and ownership of the schedule.

Irrevocable Standby Letter of Credit:

Bidder shall affirm on the proposal form its ability and willingness to furnish, in PE's favor, an irrevocable standby Letter of Credit per the Contract. The Letter of Credit shall remain in full force and effect during the term of the contract and may be engaged by PE in the event of Bidder's default under any such contract.

Insurance:

Furnish proof of valid insurance per contractual requirements.

Alternate Bid Formats:

A bid based on the requirements noted herein is required; however, PE encourages Bidder to propose an alternative bid process.

PEF-NCR-01252

PROPOSAL INCLUSIONS:

1. Classifications of each type person you intend to bill for.
2. Hourly billing rates for each personnel classification (may be straight time/overtime or all-hours rate).
3. Billable travel and living expenses.
4. Estimated man-hours for each personnel classification.
5. Provide a maximum not-to-exceed contract dollar amount to accomplish the work.
6. Resumes of people you intend to use on this project.
7. Provide the earliest date that you could start work on this project.
8. Provide a preliminary milestone schedule for accomplishing this work.
9. Redlined copy of Sample Contract.
10. Completed Table of Conformance.
11. Complete Contractor Safety Information/Checklist Form.

Progress Energy Contractor's Safety Information/Checklist Form

PURPOSE: Please supply the following safety information for your company. Safety is important to Progress Energy and will be used as criteria in selecting contractors. **NOTE:** ***INCOMPLETE FORMS CANNOT BE PROCESSED.***

SECTION 1: TO BE COMPLETED BY THE CONTRACTOR

Contractor Name:	Siemens Power Generation, Inc.
Address:	4400 Alafaya Trail, Orlando, FL 386
E-Mail Address:	
Telephone:	407-736-2000
NAICS Code:	333611
Scope of Work:	Crystal River Nuclear Plant, Unit 3 Turbine Generator Replacement & Retrofit
Name of Subcontractor(s) if applicable:	Subcontractors selected will be reviewed with Progress Energy.
Progress Energy Contact:	Scott Deahna

	Yes	No	NA
Safety Program			
Please provide your current written safety manual (diskette or CD-ROM, if possible). **(Note:** Unless there are changes to the manual, resubmission is not necessary for annual reviews).	X		
Does your company have a high level corporate officer responsible for safety compliance? Title: Director, Environmental Health and Safety	X		
Does your company have a formal safety program to assure compliance with safety regulations?	X		
Does program include:			
• Job hazard analysis and control	X		
• Medical management of work related injuries and illnesses	X		
• On-site supervision to ensure compliance with safety regulations and Progress Energy Safety policies	X		
• Pre-qualification and management of subcontractors to ensure compliance with safety regulations and Progress Energy Safety policies	X		
Does your company hold periodic crew/team safety meetings?	X		
• How Often? Site Safety Meetings are held weekly.			
Does your company provide and document required initial and refresher training to prepare employees to perform duties in compliance with safety regulations? **NOTE:** If a contract is awarded, the DR will need this documentation prior to commencement of work for Progress Energy.	X		
Compliance History			
Has a serious, willful or repeat OSHA citation been issued to your company within the last three years? (Please check the OSHA web site at http://www.osha.gov/pls/imis/establishment.html). **If yes, please provide a copy of the citation and a certification of abatement.**		X	
Has your company and/or any of its officers been convicted of any violation of any federal or state occupational health and safety laws? If yes, please attach a description of this case, including its resolution.		X	
Line & Service Contractors: Is your Federal Motor Carrier Safety Rating Satisfactory? (Can be found at http://www.safersys.org) If not, state what the rating is (Unsatisfactory or Conditional).			X

AUTHORIZED COPY

Using your company's OSHA log for the last 3 years:	Yr: 2004	Yr: 2005	Yr: 2006
• Total number of OSHA Recordable injuries and illnesses	117	91	68
• Total number of cases involving Days Away, Restricted or Transferred	55	41	21
• Total number of fatalities	0	0	0
Employee hours worked each year for last three years	5,502,677	4,457,798	4,846,770
OSHA Incident Rate last three years (01 Rate)*	4.25	4.08	2.80
Days Away, Restricted or Transferred Rate last three years (DART Rate)*	1.99	1.83	.87
Your company's EMR for the last three years	.88	.77	.77

Rates are calculated as follows: 01 Rate= $\frac{\text{\# OSHA Recordable injuries X 200,000}}{\text{\# employee hours}}$ DART Rate= $\frac{\text{\# cases involving DART X 200,000}}{\text{\# employee hours}}$

Please have an authorized representative of the company who is responsible for your company's safety program sign on the line below certifying that the information provided above is current and accurate. Providing false information may result in termination of the contract.

Name: Dan Cunnard Title: Manager, Safety, Industrial Hygiene & Environmental

Signature: _____ Date: April 13, 2007

SECTION 2: TO BE COMPLETED BY THE PROGRESS ENERGY DR OR CONTRACT SERVICES

Print Name, Location and Phone of Designated Rep: _____

Progress Energy Experience with Contractor	Yes	No	NA	Number (if appl)
Are you aware of any safety-related incidents on Progress Energy jobs last three years?				
If yes, was contractor safety program found to be deficient?				
If yes, has program been corrected?				
Have any negative comments been reported by Progress Energy employees about contractor's safety performance?				
If yes, has situation been satisfactorily resolved?				

Contractor OSHA Rates (Last Year)	Industry Average(Latest from OSHA)	Comments
01 Rate		
DART Rate		

Recommended Rating (DR/Contract Services): RED ☐ YELLOW ☐ GREEN ☐

Signature: _____ Date: _____

SECTION 3: TO BE COMPLETED BY THE HEALTH AND SAFETY SUPPORT

Final Rating (Health & Safety Support): RED ☐ YELLOW* ☐ GREEN ☐

Signature: _____ Date: _____

Comments:

*Necessary improvements to upgrade contractor from Yellow to Green:

AUTHORIZED COPY

OPC

1ST POD

#1

080009

BATES NOS. PEF-NCR-01256 THROUGH PEF-NCR-01283

NON-RESPONSIVE

DOCUMENT NUMBER-DATE
03238 APR 22 08
FPSC-COMMISSION CLERK

Hello Bob and Greg;

I have scheduled the Crystal River Site Admin Building Conf Rm. 1 for our next meeting the afternoon of Monday July 31, 2006. Mr. Dan Roderic (Director – CR3 Nuclear Plant Operations) will be available from 1PM to 3PM. We have the room all afternoon.

The previous site visitor access forms were only good for 2 weeks. Please have everyone who plans to attend sign the attached form and return scanned copy or fax to me at (352) 563-4450

Background:
The Crystal River 3 Nuclear Power Station (CR3) is considering a 17% reactor thermal (20% electrical) power uprate in 2011. The unit steam generators will be replaced during an 85 day outage during 2009. The CR3 electric generator is H2 inner cooled (60 psig), 989 MVA, 0.9 PF. CR3 presently generates 900 MW at 100% reactor power. The generator rotor weight is 365,000 Lbs.

Issue 1, Electric Generator

- Is it possible to uprate a 989 MVA H2 inner cooled generator to 1100MVA by increasing the H2 pressure, etc? What are the uprate limitations for H2 inner cooled machines? What are the largest Alstom H2 inner cooled generators?
- Discuss level of generator disassembly required for Alstom to obtain field measurements to bid a generator retrofit design.

Issue 2, Plant Integrated Solution
Turbine retrofit solutions integration and SIGMA Energy Solutions proposal PEC-06-001, dated April 28, 2006.

- Discuss SIGMA Energy Solutions capability and experience.
- Discuss Alstom "retrofit solutions integration" information presented at Chicago conference.
- Discuss Alstom "one stop shop" capabilities.
- Discuss Chicago conference paper – case study "Oskarshamn 3". What Alstom group performed this plant integration study? How are they associated with SIGMA?

Issue 3, High Pressure Turbine
If the HP turbine is retrofit in 2009, it will operate significantly throttled until 2011. The increased throttling losses may be greater than the technology efficiency gains. It may be cost effective to retrofit the HP turbine in 2011.

- Discuss above.
- Discuss nuclear HP turbine retrofit design technology and estimated performance improvement.
- Discuss HP turbine retrofit schedule duration requirements.
- Discuss level of HP turbine disassembly required for Alstom to obtain field measurements to bid a HP turbine retrofit design.

Issue 4, Low Pressure Turbines

- Discuss nuclear LP turbine retrofit design technology and estimated performance improvement above existing ABB DS 492 design.

Spec Page #	Section Reference				C - Conform	X-Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Replacement Turbine Generator Table of Conformance - Technical	Comments
4	1.0								**GENERAL DESIGN REQUIREMENTS**	
4		1.1							An "appendix K" feedwaater flow measurement uncertainty recovery (MUR) uprate of 1.6% reactor power is planned during the fall 2007 refueling outage.	
			P2						Retrofit the low pressure turbines, moisture separator reheaters, generator and exciter during the fall 2009 refueling outage which will begin in September and will have a duration of approximately 80 days.	
									Design and retrofit the high pressure turbine during the fall 2011 refueling outage to support the reactor thermal uprated conditions.	
									An extended reactor power uprate an additional 15.4% reactor power during the fall 2011 refueling outage.	
									Total extended power uprae from present will be 17%.	
									Design life - 40 years.	
4			P4						Provide a proposal for replacement of high pressure and low pressure turbines.	
									Objective: To obtain a replacement steam path that produces maximum power from the steam supplied by steam generators after implementation of a 17 percent power uprate.	
									A new steam path shall be defined as including both the fully assembled rotating parts as well as the adjacent stationary parts, as required.	
									Replacement Steam Path should:	
									• Maintain or improve existing unit's availability.	
									• Address stress corrosion cracking in blade attachments.	
									• Address stress corrosion cracking in disk and keyway areas.	
									• Reduce erosion of turbine stationary parts.	
									• Increase time between maintenance intervals.	
									• Minimize need to replace or modify existing support systems, structures and components.	
									Replacement of the High Pressure Turbine shall:	
									• Consider the capability to the plant integrated control system to control main steam header pressure based on estimated governor control valve positions following retrofit.	
4			P5						Provide a proposal for replacement of the CR3 Moisture Separator Reheaters (MSR's) to:	
									• Optimize the uprated turbine steam cycle conditions.	
									• Maintain the existing plant piping configuration.	
									• Maintain turbine cross under piping.	
									• Maintain turbine cross over piping.	
4			P6						Provide a proposal for Generator / Exciter Capability Uprate. The CR3 plant step up transformers will be rated at 1200 MVA.	
									• The uprated generator / exciter capability should closely match the step up transformer capability.	

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									• Submit various generator stator uprate options including:	
									- Rewinding with hydrogen inner cooled winding,	
									- Rewinding with water cooled winding, or	
									- A complete midsection replacement.	
									• The generator rotor forging is expected to be reused and rewound in the shop.	
									• An excited rotor spin balance is required.	
									• The exciter and voltage regulator shall be evaluated for modification or replacement to support the generator uprated capability.	
5			P7						Provide details of all field measurements required.	
									Identify required field measurements as required to support final design or final machining.	
									Provide schedule for performing required field measures.	
									Identify long lead time materials.	
5		**1.2**							**OBJECTIVES**	
									The following objectives will apply to the design of the new Steam Path and Generator Capability:	
5			1.2.1						Provide a state-of-the-art turbine generator design that will maximize the electrical (MW_e) output and reliability.	
5			1.2.2						Contribute to a maximum overall availability and efficiency for the NSSS-turbine-generator combination.	
5			1.2.3						Provide ease of maintenance and increase outage inspection intervals to a minimum of 10 years over a 40 year design life.	
5			1.2.4						Provide minimum ISI intervals of 10 years.	
5			1.2.5						Eliminate Stress Corrosion Cracking (SCC) as a maintenance issue, including all areas subject to SCC such as rotor bore, disk/wheel bore, blade root radii, blade attachment, etc.	
			1.2.6						Eliminate or severly reduce wear due to moisture erosion.	
5			1.2.7						Provide a rated generator MVA capability that will have a minimum performance capability of 1080 MW_e real power output while concurrently providing 430 MVAR reactive overexcited reactivepower.	
5			1.2.8						Refurbish or replace the generator exciter and automatic voltage regulator to reliably support the uprated generator capability.	
5			1.2.9						Provide moisture separator reheaters that maximize the performance of the uprated steam cycle.	
5		**1.3**							**PROPOSAL PRICING**	
									Purchaser has milestone to purchase rotor forgings and other long lead time materials during 2007 to support 2009 installation schedule	
									Evaluate and present Bid Proposal Pricing in the following formats:	
5			1.3.1						Bid the following Work Scope separately:	

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									• High pressure turbine retrofit.	
									• Low pressure turbine retrofit.	
									• Generator stator and rotor rewind.	
									- Generator stator hydrogen (H2) inner cooled winding, and	
									water (H2O) cooled winding options should be provided	
									• Generator stator midsection replacement (optional scope).	
									• Exciter / voltage regulator modification / replacement.	
									• MSR vessel replacement.	
									• Turnkey Installation and commissioning service for proposed solution.	
									- Installation shall be performed in accordance with NRC 72 hour work week rule for nuclear power plant workers.	
5			1.3.2						Combine the total Work Scope (proposed solution) in one bid.	
5		1.4							**QA CONDITION**	
									The Replacement Turbine Steam Paths to be provided are classified as NON-SAFETY RELATED.	
									Evaluation of any design basis requirements of rotating machinery will be required during the design phase.	
6		1.5							**EXISTING CONFIGURATION**	
6			1.5.1						Current Heat Balance Data: Please refer to page 6 of the Specifications.	
6			1.5.2						Thermal Power: Please refer to page 6 of the Specifications.	
6			1.5.3						HP Turbine Model: Please refer to page 6 of the Specifications.	
6			1.5.4						HP Turbine Steam Chests: Please refer to page 6 of the Specifications.	
6			1.5.5						LP Turbine Model: Please refer to page 6 of the Specifications.	
6			1.5.6						Moisture Separator Reheater's (MSR's): Please refer to page 6 of the specifications.	
7			1.5.7						Generator Model: Please refer to page 7 of the Specifications.	
7			1.5.8						Exciter Model: Please refer to page 7 of the Specifications.	
7			1.5.9						Voltage Regulator Model: Please refer to page 7 of the Specifications.	
									If there are issues or questions regarding the above, please note an exception (X) and provide an explanation on the attached sheet.	
8		1.6							**OPERATING CONDITIONS**	
									The 1.6% Measurement Uncertainty Recovery Uprate (MUR) will be implemented in the R15 refueling outage scheduled to begin in November 2007.	
									Installation of Phase 1 is scheduled for the R16 refueling outage beginning in September 2009.	
									Phase 1 will include installation of:	
									• New Low Pressure Turpines (LPT's)	

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						• Moisture Separator Reheaters (MSR's)	
						• Generator Rewind	
						• Feedwater Heaters	
						Installation of Phase 2 is scheduled for the R17 refueling outage beginning in October 2011.	
						Phase 2 will include installation of:	
						• A new HPT	
						• Remaining balance of plant modifications (main feedwater condensate and booster pumps, turbine bypass valves, etc.)	
8							

		Phase 1	Phase 2
Parameter	Present Value	MUR Uprate	Extended Power Uprate (EPU)
OTSG Thermal Power	2584 MW_{th}	2625 MW_{th}	3030 MW_{th}
OTSG Intlet Pressure	989.0 psia	1015.7 psia	1015 psia
OTSG Inlet Temperature	457.7 °F	458.41 °F	460 °F
OTSG Inlet Enthalpy	439.2 btu/lbm	440.0 btu/lbm	441.7 btu/lbm
OTSG Outlet Pressure	923.4 psia	923.4 psia	964 psia
OTSG Outlet Temperature	591.00 °F	594.5 °F	582 °F
OTSG Outlet Enthalpy	1250.4 btu/lbm	1250.0 btu/lbm	1237.4 btu/lbm
Main Feed Pump Discharge Pressure	1010 psia	1044.1 psia	1083 psia
Final Feedwater Flow	10.854 Mlb/hr	11.012 Mlb/hr	13.00 Mlb/hr
Turbine Throttle Pressure	902.72 psia	902.04 psia	930 psia
Turbine Throttle Flow	10.365 Mlb/hr	10.530 Mlb/hr	
Turbine Control Valve Positions:		TBD	TBD
GV-1	45% (6.5")		
GV-2	100% (14")		
GV-3	100% (14"		
GV-4	15% (2.25")		

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									Turbine Backpressure (Ref. HES condenser analysis report) | Design Point – 2.0 in hg abs. (seasonal range 1.5 – 3.5) | Design Point - 2.7 in hg abs. (seasonal range 1.5 – 3.5) | Design Point – 2.7 in hg abs. (seasonal range 2.0 – 4.0)	
									If there are issues or questions regarding the above, please note an exception (X) and provide an explanation on the attached sheet.	
									Refer to Attachment 10.1 for CR3 Turbine Generator Plant Operating Data from 01/31/2007	
									Refer to Attachment 10.2 for CR-3 MUR Power Uprate PEPSE Analysis. The CR3 PEPSI model can be electronically transmitted upon request.	
9									CR3 Condenser Performance Analysis: The EPU turbine back pressure design point should correspond with 75F circulating water inlet temperature. 75F circulating water inlet temperature is the CR3 seasonal average temperature. Refer to Section 1.6, page 9 of Specifications.	
10		**1.7**							**SCOPE OF SUPPLY**	
									The scope of supply shall include, as determined by the Seller, the following:	
10			1.7.1						**TURBINE**	
									For the replacement of the high pressure and low pressure turbine steam path and associated equipment, the following shall be furnished:	
									• The Design	
									• Engineering	
									• Equipment	
									• Fabrication and Assembly	
									Specify all necessary material and any other components requiring replacement for compatibility with the replacement steam path.	
									Evaluate the feasibility of reusing existing:	
									• Equipment	
									• Controls	
									• Turbine supervisory instrumentation bearings	
									• Hood sprays	
									Provide written evaluations for reused components justifying the reuse of these components, **OR**	
									Provide new replacement components that are compatible with the new design.	
10									**HP Turbine and Steam Chests:**	
									Assumptions: Turbine valves, steam chests and HP turbine outer cylinder will be reused.	

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						Scope:	
						• One double flow HP rotor and rotating blades. Contractor may propose impulse or reaction type steam path with partial arc or full arc control mode with 3% flow margin. See evaluation requirements below.	
						• Inner casings, blade rings and stationary blades.	
						• Nozzles and flow guides.	
						• Inner Gland seals with stainless steel housings.	
						• Outer Gland seals and housings.	
						• Couplings and hydraulic coupling bolts.	
						• The turbine rotor shall include a center bore if required by Seller's design. If a center bore is required, it shall be included in the base scope of supply.	
						• If a center bore is required, it shall be included in the base scope of supply.	
						• Any other components requiring replacement for compatibility with the replacement steam path.	
						Evaluations Required:	
						• Estimate final governor valve position and impact to steam flow control.	
						• The CR3 plant integrated control system (ICS) controls main steam header pressure constant setpoint at all loads by adjusting steam flow to HP turbine.	
						• Bearing loading.	
						• Governor pedestal HP turbine stub shaft and control components.	
						• Outer cylinder bolting.	
10						**LP Turbines:**	
						Assumptions: Intercept valves, crossunder and crossover piping, outer cylinder and thrust bearing will be reused.	
						Scope:	
						• Two double flow LP rotors and rotating blades.	
						• Inner casings, exhaust diffusers, blade rings and stationary blades.	
						• Gland seals and housings.	
						• Couplings and hydraulic coupling bolts.	
						• Bull Gear.	
						• Makeup to extraction steam pipes.	
						• Any other components requiring replacement for compatibility with the replacement steam path.	
						Evaluations Required:	
						• Bearing loading.	
						• Extraction steam pipe nozzles.	
						• Re-use of existing inner casing.	
11		1.7.2				**GENERATOR**	
						Assumptions:	

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									• CR3 minimum generator capability shall be 1080 MW_e real power concurrent with 430 Mvar overexcited reactive power capability.	
									• Stator core iron can be reused and rewound with either a hydrogen (H2) inner cooled winding **or** a water (H_2O) cooled winding.	
									• Generator rotor forging and 18-18 retaining rings can be reused.	
									• Generator rotor winding has three known shorts and shall be replaced.	
									Scope:	
									• Stator rewind	
									• Rotor rewind	
									• Coupling and the hydraulic coupling bolts.	
									• Lead bushings.	
									• Main lead current transformers.	
									• Generator monitoring systems (TBD).	
									Evaluations Required:	
									• Evaluate an optional scope for generator mid-section replacement.	
									• Capability curve.	
									• Maintaining a hydrogen (H_2) inner cooled stator winding **OR**	
									• Upgrading to a water (H_2O) cooled stator winding.	
									• Additional cooling requirements for uprated generator.	
									• Rotor coupling.	
									• H_2 gland sealing design and upgrade	
									• Neutral ground transformer and support systems.	
11			1.7.3						**EXCITATION**	
									Assumptions:	
									• Exciter must be:	
									- Refurbished, **or**	
									- Replaced	
									• WTA automatic voltage regulator should be replaced with digital voltage regulator including a Delta-P Omega power system stabilizer.	
									Scope:	
									• Brushless or static exciter.	
									• Digital automatic voltage regulator with a Delta-P Omega power system stabilizer.	
									Evaluations Required:	
									• Uprated generator excitation requirements.	
									• Exciter shaft requirements.	
12			1.7.4						**MOISTURE SEPARATOR REHEATERS**	

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									Four complete replacement moisture separator reheater vessels with two stages of reheat and four pass tube bundles shall be included in the Seller's scope of supply.	
									MSR moisture separation and tube bundles should be designed to optimize the turbine steam cycle to achieve the best performance within the existing shell envelope.	
									Existing nozzle configuration and piping should be reused to the extent possible.	
									The MSR shall be designed in accordance with Electric Power Research Institute (EPRI) NP-3692 "Procurement and Operation Considerations for Moisture Separator Reheaters."	
									439 SS tube material shall be specified.	
									MSR instrumentation package shall be included.	
12			1.7.5						**INSTRUMENTATION AND CONTROLS**	
12				P1					The turbine AEH control system is expected to be reused. Refer to Section 1.7.5 of the Bid Specification for more information.	
12				P2					The turbine supervisory instrument system is a Bently Nevada 3300 system and is expected to be reused. Refer to the Bid Specification for more information.	
									Pickup mounting details will be provided by the Owner to support retrofit design. Refer to the Bid Specification, page 12 for more information.	
12				P3					Generator rotor flux probes will be reused or replaced. Refer to page 12 of the Bid Specification for more information.	
12				P4					Recommend new generator monitoring systems (rotor flux monitor, stator end turn vibration monitor, stator partial discharge monitor, etc.) as appropriate.	
12				P5					Furnish all electrical components and associated auxiliary equipment required to support:	
									• the turbine replacement	
									• the MSR replacement, and	
									• generator modifications.	
				P6					Furnish a MSR instrumentation package, **and**	
									Furnish a generator instrumentation package.	
12				P7					Evaluate existing electrical and control systems and interfaces to verify existing capabilities and compatibility, specifically:	
									• Turbine speed control system (AEH Electro-Hydraulic Control System).	
									• Auxiliary instrumentation and controls.	
									Design equipment to ensure that all of the interfacing systems, structures, and components shall be reused, if possible, and shall operate with minimal modification of the systems.	

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12				P8					Furnish all electrical components and associated auxiliary equipment required to support the following if the existing electrical and instrumentation/control systems are not usable:	
									• the turbine replacement	
									• the MSR replacement, and	
									• generator modifications.	
									Generator/Rotor monitoring instruments may require replacement or rescaling. Provide evaluation for Buyer approval.	
13				P9					Furnish all instrumentation including instrument piping/tubing, root valves, thermowells, and accessories required for:	
									• the turbine generator and	
									• the MSR replacement and/or modification.	
									Recommend any instrumentation upgrades considered appropriate.	
13				P10					If Seller chooses to supply alternate control systems, the alternate systems shall be modern digital systems that fully meet U.S. nuclear industry requirements for:	
									• scope of supply,	
									• redundancy, and	
									• EPRI recommendations	
									Completely describe any such offering.	
13				P11					All instrumentation provided shall be wired to terminal blocks in dust-tight and drip-proof terminal boxes (NEMA 4) accessible from outside the turbine-generator housing.	
									• Provide all wiring, raceway, terminal blocks, and junction boxes for these items.	
13				P12					All electrical conduit furnished shall be rigid galvanized steel conduit supplied in ANSI standard sizes in nominal English units (inch sizes) at all Buyer/Seller terminal points.	
									Rigid galvanized steel conduit furnished in accordance with IEC standards is acceptable for conduit within Seller's terminal points.	
13				P13					Provide each instrument connection to the main process lines with an isolation (root) valve.	
									Provide Instrument vent/drain connections with an isolation valve. A valve or drain plug is not acceptable.	
13				P14					All instrumentation tubing and accessories supplied shall be stainless steel.	
13				P15					All thermocouples furnished shall be iron-constantan.	
									All RTD's furnished shall be 100 ohm platinum.	
									Any transmitters to be provided shall use a 4-20 ma signal range.	

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13				P16					Wiring shall be connected to 600 volt barrier type molded terminal blocks for extension during installation at the plant site where termination of Buyer's wiring is required	
									Seller-to-Seller terminations shall be Seller's standard.	
									Buyer's connections made on terminal blocks and on internal devices shall be by means of flanged spade or ring type insulation-gripping insulated terminals.	
									Dedicated termination points shall be provided for connection of all cable shield drain wires.	
									All thermocouple wiring shall be terminated on appropriate thermocouple type terminal blocks.	
									Internal wiring shall have no splices in any circumstance, nor shall more than two wires be terminated on one terminal point.	
									All terminal blocks shall be properly marked and identified for all internal and external wiring.	
									All cables shall be fire retardant.	
13				P17					Contacts for switches to be connected to Buyer's equipment (i.e., plant annunciator, plant computer system, plant supplied control room indicators, etc.) shall be double pole-double throw or equal, and rated for 125 VDC, 0.3 amperes inductive load minimum.	
13			1.76						**EVALUATION OF EXISTING COMPONENTS**	
									Evaluate existing mechanical and electrical systems and interfaces to verify existing capabilities and compatibility.	
									Design the equipment to ensure that all of the interfacing systems, structures, and components shall be reused, if possible, and shall operate with minimal modification of the systems, structures, and components.	
									The evaluation shall include, but not limited to, the following:	
									Turbine foundation.	
									Physical interface with steam chest and governor valves.	
									Steam systems - location, size and compatibility.	
									• HPT cross under piping to MSR.	
									• MSR cross over piping to LPT.	
									• Extraction steam nozzle sizes and locations.	
									• Gland seal steam.	
									• Gland steam exhaust.	
14									Support systems	
									• Turbine lube oil system.	
									• EHC - electro-hydraulic control system.	
									• Hood sprays.	
									• Generator seal oil system	
									Main shaft and bearings.	

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									• Couplings	
									• Spool pieces	
									• Bearing pedestals	
									• Bearings	
									• Turning gear	
									• Thrust bearing	
									• HP turbine stub shaft and mechanical overspeed trip.	
									Turbine supervisory instrumentation bearings	
									Turbine controller and plant integrated control system response	
									Generator capability	
									Generator cooling requirements	
									Excitation system requirements	
									MSR and turbine steam cycle performance	
14			1.7.7						**ENGINEERING**	
									The following engineering and supporting calculations are expected after award of contract:	
									Analysis supporting 40-year design life.	
									Design calculations.	
									Overspeed trip and other set point changes.	
									Design requirements for modifications to existing systems, structures, and components.	
									Torsional response analysis.	
									Critical speed calculations.	
									Calculations supporting recalibration of all instrumentation and controls.	
									Natural frequency calculations.	
									Rotor lateral and torsional frequency response and loading transients.	
									Missile probability analysis.	
									Turbine deck laydown plan and floor loading analysis	
14			1.7.8						**MISCELLANEOUS**	
									Furnish all tools required for:	
									• removal of existing equipment	
									• installation of new and reused equipment	
									• modification of retained systems, structures and components.	
									This shall include, but not be limited to special customer tools as required for:	
									• erection and maintenance of supplied equipment,	
									• lifting beams,	
									• hydraulic tools for assembly of inner casing flange bolts and couplings,	
									• tools for installation of balancing weights,	
									• tools required for maintenance (e.g., guiding elements, lifting slings, rigging equipment, etc.), and	
									• a set of power roller rotor stands for each rotor supplied.	

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									Furnish and deliver all spare parts required during construction.	
									Shipment to the job site shall be the responsibility of the Seller.	
15		**1.8**							**SCOPE OF SUPPLY BY OTHERS**	
15			1.8.1						Access to Systems Design Information: Identification of the required information is the Seller's responsibility.	
									Purchaser shall receive or duplicate necessary documents such as drawings, procedures, specifications, etc.	
15			1.8.2						Modifications to existing mechanical systems, components, including piping and hangers as required for the new installation.	
15			1.8.3						Modifications to existing turbine control systems, instrumentation and electrical systems as required for compatibility with replacement equipment. Owner shall describe any such modifications as described in Section 1.7.5.	
15			1.8.4						Modifications to existing generator interface systems and equipment such as generator cooling water supplies, generator busses, generator breakers, main transformers and protective relaying as required for compatibility with replacement equipment.	
15			1.8.5						Any existing parts that require replacement as a result of disassembly of the existing components for final installation will be supplied by the Owner.	
15			1.8.6						Disposal of removed components that shall not be reused.	
15			1.8.7						Operation personnel to perform shutdown, startup, draining, filling, isolation, and other normal system operating functions.	
15			1.8.8						Safety clearance and tagging of all equipment.	
15			1.8.9						Removal, inspection, and installation of instrumentation.	
15			1.8.10						Electric power, lighting, water, compressed air, and overhead crane facilities.	
15			1.8.11						Removal and installation of insulation.	
15			1.8.12						All electrical disconnects and terminations required to perform work.	
15			1.8.13						Construction and removal of scaffolding.	
15			1.8.14						Radiation protection technicians if required.	
15			1.8.15						Unescorted access training for Contractor's personnel.	
15			1.8.16						Preparation of post installation test procedures.	
									Supply of test instrumentation.	
									Performance of post installation tests and preparation of associated test reports.	
15		**1.9**							**SCOPE OF SERVICES**	
15			1.9.1						Design, fabrication, shipping, inspection and factory testing of equipment, including implementation of Quality Control procedures to ensure completed equipment satisfied the specification and design requirements.	
15			1.9.2						Factory assembly of stationary components to validate dimensional and configuration interface with retained systems, structures and components.	

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15			1.9.3						Engineering and design for any required modification of interfacing or retained systems, structures and components.	
			1.9.4						Start-up testing and tuning of excitation system.	
15			1.9.5						Drawings and manuals.	
15			1.9.6						Calculation of heat balances and revision of the Thermal Kit.	
15			1.9.7						Quality Assurance and Quality Control documentation.	
15			1.9.8						Shipping and handling.	
15			1.9.9						Review of post installation test procedures.	
									Field support for post-installation tests and review of associated test reports.	
15		**1.10**							**SCHEDULE**	
									Provide expected equipment delivery schedules (lead times) and anticipated installation schedule durations.	
16		**1.11**							**REQUIRED BID DOCUMENTATION**	
									Submit a complete proposal fully describing all of the proposed equipment and all services to be furnished.	
									All documents shall be in English and in U.S. measurement units.	
									To include the following:	
16			1.11.1						Technical product description including but not limited to rotor design, rotor design life, steam path design, susceptibility to street corrosion cracking, erosion-corrosion resistance, materials of construction, inter-stage sealing, codes and standards.	
16			1.11.2						Requirements for Seller inspection of existing equipment including owner support required.	
16			1.11.3						Provide separate Heat Balance Diagrams for the Phase 1 installation and the Phase 2 installation.	
16									Include a new guarantee diagram with the new MSR's, HP and LP turbine components.	
16			1.11.4						Performance guarantee estimate.	
16			1.11.5						Generator capability curve.	
									Generator cooling requirements.	
									Generator excitation requirements	
16			1.11.6						Furnish a list of all equipment and materials including special tools and spare parts required for construction.	
16			1.11.7						Outline drawings of the turbine-generator unit giving approximate weights, principal dimensions, and showing main piping connections.	
16			1.11.8						Equipment warrantee information.	
16			1.11.9						A project level milestone schedule including forging milestones and long lead time material requirements.	
16			1.11.10						Proposed installation schedule that starts with the time when the turbine is taken off turning gear and ends with the time that it goes back on turning gear (i.e., days to install the equipment).	

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16			1.11.11						Additional optional scope of supply as defined by Contractor.	
16			1.11.12						Identification and interfaces with remaining components.	
16			1.11.13						The evaluation of retained interface components.	
16			1.11.14						Specify any modifications required to existing equipment including but not limited to exhaust hoods/diffusers, packing casings, vacuum alarm, bearings, turbine lube oil system, and turbine supervisory instrumentation to allow installation of new equipment.	
16			1.11.15						Recommended inspection interval for each major part (Rotor and Cylinder) including scope of inspection.	
16			1.11.16						Provide details of the new component construction. The contractor shall describe the materials proposed to be used for the major parts of the equipment, such as rotors, blades (all stationary and rotating rows), and casings, to be supplied using either an ASTM designation or the closes ASTM designation.	
									#NAME?	
16			1.11.17						Factory and field balancing of rotors and vibration standards used.	
16			1.11.18						Steam chemistry/purity requirements.	
16			1.11.19						Organizational structure of labor for turnkey installation including craft labor, supervision, technical direction and project management.	
16			1.11.20						Provide recommended test methodologies including acceptance testing based on the alternative test as defined in the latest edition of ASME Performance Test Code PTC-6.	
16			1.11.21						Absolute backpressure limitations including alarm values.	
16			1.11.22						Performance effect of annual variation in condenser absolute backpressure.	
									LSB exhaust loss curve and total exhaust loss curve.	
16			1.11.23						Summary of retrofit experience with similar equipment and technology..	
									Identify "first of a kind" scope.	
16			1.11.24						Seller's service facilities that are applicable to the equipment covered in these specifications and their locations.	
			1.11.25						Recommended test procedure/tuning procedure for exciter.	
									Recommended test procedure/tuning procedure for voltage regulator.	
17		1.12							**REQUIRED DOCUMENTATION AFTER AWARD**	
									Refer to Section 1.12 of the Specifications, Items No. 1 through 40, for a complete listing of required documentation after award.	
									Note any exception (X) and provide an explanation on the attached sheet.	
19	2.0								**DEFINITIONS**	
									The following definitions shall apply to this specification:	
									Owner - Progress Energy	
									Purchaser - Owner Representative	
									Buyer - Owner Representative	

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									Seller - Firm proposing to supply the subject equipment	
									Contract - Equipment and Service Supply Contract	
									OSTG - Once Through Steam Generator	
									VWO - Valves Wide Open	
									STG - Steam Turbine Generator	
									TBD - To Be Determined	
									PWR - Pressurized Water Reactor	
19	**3.0**								**REFERENCES**	
		3.1							**CODES AND STANDARDS**	
				P1					Note that only recognized U.S. standards and equivalent International standards will be accepted.	
									• Submit a list of applicable International codes and standards in English for Engineer's acceptance prior to use.	
				P2					The design, fabrication, materials, workmanship, and testing of all equipment shall be in accordance with the Buyer's standards and applicable codes.	
									In the Bid Proposal, identify all applicable codes and standards (with revision) to be utilized.	
19 thru 23				P3					In the event of an apparent conflict among standards, codes and this Specification, the Seller shall identify such conflict and note Exceptions (X) and Alternates (A) to the codes listed in Section 3.1.1 through 3.1.24, including Sections 3.2 and 3.3.	
23		**3.2**							**REGULATORY REQUIREMENTS**	
									Regulatory Guide 1.115, Protection against low-trajectory turbine missiles.	
23		**3.3**							**DOCUMENTS**	
									CR-3 MUR Power Uprate PEPSE Analysis attached.	
24	**4.0**								**DESIGN REQUIREMENTS**	
									Note: See Section 1.11 for bid-proposal documentation requirements.	
24		**4.1**							**SITE CONDITIONS**	
									The CR3 turbine generator is enclosed in a turbine building.	
									The turbine operating deck is at elevation 145 feet.	
									The turbine building is not seismically qualified.	
									The turbine building is equipped with a ventilation system.	
									The turbine building ambient temperature does not exceed 120F.	
									The turbine building is equipped with one overhead crane rated at 185 ton.	
24		**4.2**							**SERVICE CONDITIONS**	
24			4.2.1						**Normal Operations:**	

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									The replacement turbines shall not impose any restrictions on the normal operation of the unit that are more restrictive than the standard operating recommendations when the unit is in good condition.	
									The LP turbine shall be designed with a normal operating backpressure of at least 5.5 inches of Hg (absolute).	
24			4.2.2						**Maintenance:**	
									The recommended intervals between turbine overhauls shall be at least 10 years.	
									Specific operating surveillances are required to achieve this extended interval.	
									The Seller shall provide operating surveillance requirements and the scope of work typically required for:	
									• inspections,	
									• minor overhauls, and	
									• major overhauls.	
24		4.3							**TECHNICAL REQUIREMENTS**	
24			4.3.1						**Turbine Performance Requirements:**	
									Phase 1 Installation: LPT, MSR, Generator Rewind Guarantee	
									• Guarantee the turbine-generator gross electrical output (Mw_e) uplift after installation of the turbine and MSR steam paths at 2625 MWt backpressure, and makeup in accordance with the contract guarantee heat balance.	
									• This performance improvement results directly and exclusively from the scope of supply defined in this specification.	
									• Performance of remaining cycle components external to and not impacted by this scope of supply, such as stop valves, glad steam system, etc., shall remain materially unchanged from the pre- to the post- and as described in the guarantee heat balances is assumed.	
									• Provide a revised thermal kit for the revised turbine designs that includes the following but is not limited to:	
									- Heat Balance Diagrams with the new turbine and MSR components at VWO, 100% MWth (guarantee point, 75%, 50% and 25%. The baseline and guarantee HBD's will provide the basis for the thermal performance warranty.	
									- Net Heat Rate	
									- Turbine Expansion Line for each Heat Balance	
									- LP Turbine Base Expansion Line End Points	
									- Extraction Stage Pressure vs. Flow	
									- Gland Leakages and Mechanical Losses	
									- Heat Rate and Load Correction Curves for:	
									o Exhaust Pressure,	
									o Throttle Pressure,	
									o Throttle Temperature,	

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						o Reheater TTD	
						- Turbine Stage Moisture Removal Effectiveness	
						- LP Turbine Exhaust Loss Curve	
						- Generator Loss	
						Phase 2 Installation: HPT, Balance of Plant Modifications Guarantee	
						• Guarantee the turbine-generator gross electrical output (MW_e) uplift after installation of the HPT steam paths at 3030 MWt backpressure, and makeup in accordance with the contract guarantee heat balance.	
						• This performance improvement results directly and exclusively from the scope of supply defined in this specification.	
						• Provide a revised thermal kit for the revised turbine designs that includes the following but not limited to:	
						- Heat Balance Diagrams with the new HPT and balance of plant components at VWO, 100% MWth (guarantee point), 75%, 50% and 25%. The baseline and guarantee HBD's will provide the basis for the thermal performance warranty.	
						- Net Heat Rate	
						- Turbine Expansion Line for each Heat Balance	
						- HP Turbine expansion line end points	
						- First Stage Pressure vs. Flow	
						- Extraction Stage Pressure vs. Flow	
						- Gland Leakages and Mechanical Losses	
						- Heat Rate and Load Correction Curves for:	
						o Exhaust Pressure,	
						o Throttle Pressure,	
						o Throttle Temperature,	
						o Reheater TTD	
						- Turbine Stage Moisture Removal Effectiveness	
25						Turbine Performance	
						• The Seller's heat balance shall be based on the operating parameters specified on the Buyers heat balance for nominal full load conditions.	
						• Specific requirements for the design include:	
						- HP turbine throttle pressure and temperature,	
						- HP turbine throttle enthalpy,	
						- HP turbine throttle flow, and	
						- Final feedwater temperature.	
						• Values for feedwater heater performance at uprated conditions as well as extraction line pressure losses can be obtained from the Buyers heat balance.	
						• Values for MSR performance shall be provided based on the proposed new design.	

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									• The turbine shall be designed with a mass flow margin of 2% above the steam flow required to achieve the guaranteed output at the throttle pressure specified in the Buyer's heat balance diagram for nominal 100% load to account for *manufacturer's tolerances*.	
									• The design shall allow for an additional 1% flow margin for a **total of 3% flow margin**.	
									• The turbine shall be capable of stable operation at 100% of rated steam flows and rated conditions with one or more low pressure turbines operating at choked flow conditions.	
									• The turbine governor valves shall be capable of controlling stable main steam header pressure.	
26			4.3.2						**Generator Performance Requirements:**	
26				P1					The generator shall be designed to produce a minimum of 1080 MW real power concurrent with 430 MVAR overexcited reactive power at 100% reactor thermal output power.	
26				P2					The generator shall be suitable for operation at rated MVA, power factor, and frequency at ±5% of rated voltage in accordance with the standards of performance established for operation at normal rating.	
26									• Permissible variation at the generator terminal voltage shall be in accordance with IEEE C50.13.	
26				P3					The maximum temperature rise for any generator component shall be in accordance with IEEE C50.13 for Class B.	
									• The total temperatures as determined by any of the methods given in ANSI/IEEE applicable standards shall not exceed 110° C for the stator coils and for the field when operating at full loads, and over the full range of power factors.	
26				P4					The generator open circuit terminal voltage wave deviation factor shall not exceed 10% as defined by ANSI/IEEE standard.	
26				P5					Starting from stabilized temperature at rated conditions, the generator field windings shall be capable of operating at 130% of rated armature current for one minute in accordance with IEEE C50.13 standard requirements.	
26				P6					Starting from stabilized temperature and rated conditions, the generator field windings shall be capable of operating at 125% of rated load field voltage for one minute in accordance with IEEE C50.13 standard requirements.	
26				P7					The stator windings shall satisfactorily withstand normal maintenance high potential tests without damage.	
26				P8					The generator shall be capable of continuous operation at any load up to its rated maximum out put and shall withstand all expected operating transients resulting from rapid load changes and transmission line fault conditions.	

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26				P9					In accordance with IEEE C50.13, the generator shall be capable of withstanding (without mechanical damage) any type of short circuit at its terminals for times not exceeding the short time thermal capabilities, when operating at rated voltage and power factor as well as 5% over voltage, provided the maximum phase current is limited by external means to a value which does not exceed the maximum phase current obtained from the three phase fault.	
26									• Generator Operating Frequency Requirements;	
									- Must be able to withstand frequency excursions between 59.5 Hz and 60.5 Hz indefinitely.	
									- Must be able to withstand frequency excursions between 58.5 Hz and 59.5 Hz for 60 seconds.	
									- Must be able to withstand frequency excursion between 60.5 Hz and 61.8 Hz for 10 seconds.	
									- Must be able to withstand frequency excursions between 58.0 Hz and 58.5 Hz for 10 seconds.	
									- Must be able to withstand frequency excursions between 57.5 Hz and 58.0 Hz for 1 second.	
26				P10					Generator Operating Voltage Requirements:	
									• Must be able to withstand terminal voltages within +/- 5% of rated nominal voltage indefinitely.	
									• Must be able to withstand terminal voltage deviations between 5% and 10% (+/-) for 10 seconds.	
27				P11					Generator Operating Overexcitation Requiements:	
									• Must be able to withstand Volts per hertz conditions less than 116% (of generator nominal voltage and frequency) for 1.5 seconds.	
									• Generator overexcited stator currents less than 150% of nameplate rating for at least 5 seconds.	
27			4.3.3						**MSR Performance Requirements:**	
									Four complete replacement moisture separator reheater vessels with two stages of reheat and four pass tube bundles.	
									MSR moisture separation and tube bundles should be designed to optimize the turbine steam cycle to achiecve the best performance within the existing envelope.	
									Existing vessel supports, nozzle configuration and piping should be reused to the extent possible.	
27			4.3.4						**Turbine Design Requirements:**	
27				P1					Identify every interface between the new steam flow path and the existing *equipment where mating to existing parts is a consideration.*	

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									Identify components that cannot be utilized with the replacement design and which therefore must be replaced	
									Consider options and other components recommended for replacement based on optimization of performance, component life, reduced maintenance and other operational measures as defined elsewhere in this Specification, as well as cost considerations.	
27				P2					Design all equipment for a minimum of 40 years of service with a 10-year minimum inspection interval.	
				P3					Consider inspection ports for bore scope inspection technique.	
27				P4					Cite experience and analytic bases that demonstrate satisfactory performance and long-term reliability for 40 plus years of trouble-free service.	
27				P5					Erosion resistant materials shall be used in all areas susceptible to erosion, including turbine blading and nozzles.	
									Moisture removal provisions and/or protective shields shall also be utilized where appropriate.	
									Any blade coatings utilized in the wet steam of the LP turbine shall have demonstrated proven experience under conditions similar to those encountered in the CR3 turbine.	
									Provisions shall be incorporated into the turbine design to minimize erosion of the HP turbine nozzle and the LP turbine inner casing.	
									Specific features addressing this requirement shall be identified by seller.	
27				P6					Provide a missile analysis report. Turbine missiles shall be considered in the design of the turbine and turbine control system to limit the overall probability that a turbine missile event will occur and cause unacceptable damage.	
27				P7					Provide adequate damping in the overall turbine generator design to minimize peaking at critical speeds.	
27									Provide the following information to the Buyer to address site specific characteristics:	
									• Minimum separation of the lateral natural frequencies (critical speeds) of the complete turbine-generator assembly from operating and test speeds (above and below).	
									• Separation between torsional natural frequencies of the complete turbine-generator shaft and anticipated exciting line frequencies under normal operating conditions or under upsets (e.g., loss of load or loss of generation on the system).	
28				P8					Verify by testing blade frequencies of tuned modes in accordance with Seller's standard practice. Calculation of blade frequencies should include:	
									• The effect of centrifugal forces,	
									• Metal temperatures,	

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									• Root fixity factors, and	
									• Blade grouping devices (i.e., covers, lashing lugs, etc.)	
									Provide Campbell diagrams for each stage.	
28				P9					Rotor couplings shall be integral with the shaft and shall be compatible with existing components.	
									The couplings shall withstand shocks during operation, including generator short circuit and synchronizing out of phase without exceeding the minimum yield stress of the coupling or bolting.	
									The rotor design shall minimize stress concentrations.	
28				P10					Describe the method of rotor fabrication including:	
									• Whether a center bore is included, and	
									• The reasons for including or not including the center bore.	
28				P11					Turbine rotor and blade materials and fabrication techniques shall have proven high resistance to Stress Corrosion Cracking (SCC). Consider:	
									• Effects of material strength,	
									• Heat treatment,	
									• Temper embrittlement of low alloy steels, and	
									• Sensitization of stainless steels.	
28				P12					At time of manufacture, rotors shall be dynamically balanced at rotational speeds from 0 to 120 percent of rated speed on the manufacturer's test stand.	
									Shaft vibration during final field operational runs shall not exceed ISO Standard 7919 Part 2 limits and ISO Standard 10816 Part 2 for non-rotating parts.	
28				P13					Provide to Owner the total loading imposed on the foundations by the components supplied.	
28				P14					Design replacement rotors to maximize practical compatibility with existing journal and thrust bearings.	
									New bearings, if required, should be designed with adequate lubrication from the existing turbine lubricating oil system.	
									If the existing lubricating oil system is inadequate, propose modifications to the existing system.	
28				P15					The design shall maintain the current frequency of	
									• Overspeed Protection system testing,	
									• The quarterly Main Turbine Valve testing, and	
									• The Main Turbine Valve disassembly/inspection frequency.	
28				P16					Provide all connections required to perform an ASME Performance Test Code (PTC) 6, alternative test, on all Seller's furnished equipment and piping. Seller is not responsible for PTC 6 connections in the Owner's supplied piping.	
29			4.3.5						**Generator Design Requirements:**	
29				P1					Generator design is an alternate synchronous speed rated according with the requirements of this specification and driven by the turbine described herein.	

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29				P2					The upgraded generator shall be of nonsalient pole design, with the existing cylindrical rotor and revolving field.	
29				P3					Identify every interface between the new rewind generator and the existing system/equipment.	
									Components that cannot be utilized with the new design and which must be replaced are to be identified for Buyer approval.	
29				P4					A design evaluation of the existing generator design is required to determine if the proposed generator uprate can be accomplished with the existing hydrogen inner cooled cooling system or optional stator water cooled system will be required.	
29				P5					Identify all interface between the new generator winding and rotor upgrade and the existing equipment such as hydrogen cooling system, exciter, voltage regulator where these subsystems can be utilized.	
									Options shall consider components recommended for replacement based on optimization of performances, component life cycle status, reduced maintenance, as well as cost effectiveness.	
29				P6					The stator and rotor insulation shall be of Class F per IEEE C50.13 with Class B temperature rise in accordance with this Specification.	
29				P7					Evaluation shall be required to determine if the following replacement or refurbishment are warranted:	
									• Generator retaining ring,	
									• Generator main leads and high voltage bushings,	
									• Hydrogen coolers with its control and supply system (required design pressure)	
									• Rotor collector rings,	
									• Rotor field windings,	
									• Current transformers,	
									• Rotating exciter and exciter field control (including cooling system),	
									• Rotor coils end turns,	
									• Rotor retaining leads,	
									• Generator surge protection and RF monitoring.	
29				P8					All temperature sensors shall be wired to the existing terminal blocks according to the existing layout, with similar number of sensors.	
									Any recommendation for upgrading temperature sensors design/layout requires Buyer approval.	
29				P9					Generator rewinding evaluation shall include an analysis of the existing grounding system.	
									If the existing design and grounding condition can not be utilized, a new grounding system shall be recommended for Buyer approval.	
29				P10					If new generator retaining rings are recommended, the non-magnetic material shall be 18Mn-18Cr type material.	

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30				P11					An optional stator cooling system shall be considered if additional generator output power could be gained and analysis could show improvements in the generator performance.	
30				P12					In the Bid Proposal, cite experience and analytic bases that demonstrate satisfactory performance and long-term reliability for 40 plus years of trouble-free services for the generator/subsystems.	
				P13					Any components that do not meet the 40 years expected design life shall be explicitly detailed in the bid proposal.	
30				P14					On site torsional vibration testing for the new upgraded turbine generator should be included if analysis deems necessary.	
30			4.3.6						**MSR Design Requirements:**	
30				P1					The MSRs shall be designed, fabricated, inspected and tested in accordance with HEI Standards for Power Plant Heat Exchangers and ASME Section VIII Division 1.	
									MSRs and drain tanks shall be certified to ASME Section VIII and shall be Code symbol stamped.	
									The MSR shall be designed in accordance with Electric Power Research Institute (EPRI) NP-3692 "Procurement and Operation Considerations for Moisture Separator Reheaters."	
30				P2					Moisture separator reheater tube material shall be type 439 stainless steel.	
									Tube-to-tubesheet joint shall be rolled and welded.	
30				P3					Specify MSR overpressure protection requirements in accordance with the requirements of ASME Section VIII.	
									Relief valves shall be specified for overpressure protection on the Seller's piping or equipment in accordance with ASME Code requirements.	
30				P4					Minimum plate thickness for baffles and support plates shall be in accordance with HEI Standards for Power Plant Heat Exchangers.	
									Describe the minimum plate thickness for baffles and support plates in the Proposal and provide evidence of acceptable experience thereof.	
31	**5.0**								**MATERIAL REQUIREMENTS**	
31		**5.1**							**MATERIALS**	
31			5.1.1						Specify materials selected for manufacture of the Equipment.	
									Justify these materials for their respective applications as part of the Bid Proposal.	
									Utilize materials that are resistant to stress corrosion cracking and erosion for use in the manufacture of the equipment.	
31			5.1.2						Provide the proposed materials list, which shall designate:	
									• The equipment material selection (i.e., ASTM designation, any supplements or equivalents),	
									• Chemical composition, and	

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									• Physical properties.	
									Materials and equipment as determined by the Seller and subject to the approval of Buyer.	
31			5.1.3						Materials used in the manufacture of the stationary parts, and the rotor and blades shall be consistent with current technology so as to provide the maximum amount of service under the specified service conditions.	
31			5.1.4						The use of asbestos materials or materials containing asbestos shall not be permitted.	
									All nonmetallic materials in Supplier furnished piping systems shall be noted to the Engineer for review and comment.	
31			5.1.5						Steam path components shall not be made of copper or copper based alloys such as bronze or brass.	
									Steam path components shall not contain lead.	
31			5.1.6						Identify, as a part of this Bid, any parts with cobalt.	
31			5.1.7						Turbine steam path structural materials shall have satisfactory proven experience with the main steam chemistry requirements specified herein.	
31		**5.2**							**MOISTURE EROSION PROTECTION**	
31			5.2.1						Moisture erosion protection is required in all areas subject to erosion.	
									The location and type of moisture erosion protection shall be identified and described.	
									Where cladding is used, the type and extent of such cladding and its purpose shall be described.	
									Where shot peening is used, the extent of such shot peening and its purpose shall be described.	
									Where hard surfacing, such as flame hardening, induction hardening or material inserts are used, the extent of such hard surfacing and its purpose shall be described.	
31			5.2.2						This moisture protection could include but not be limited to:	
									• The leading edge of the high moisture stages free standing rotating blade rows.	
									• The water removal provisions at every steam extraction location.	
									• The horizontal and vertical joints and sealing surfaces of every stationary part where steam leakage can occur.	
									• Other areas subject to moisture erosion such as casing surfaces, extraction nozzle connections and rotor sealing surfaces.	
31		**5.3**							**PIPING**	
31			5.3.1						All piping furnished shall be provided in ASME standard sizes in nominal English units (inch sizes) at all Buyer/Seller terminal points.	
									All weld end preparations, socket weld couplings, threaded connections (mechanical and electrical), flange sizes and ratings, at Buyer/Supplier terminal points shall comply with ASME standards in English units.	

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32			5.3.2						Seller's field erected piping shall be designed, fabricated, tested and inspected to ASME B31.1.	
									Materials shall resist erosion/corrosion.	
									A minimum corrosion allowance of 1/116" shall be provided for all carbon steel piping.	
									The routing of the piping shall minimize the effects of erosion/corrosion.	
33	6.0								INSPECTION AND TESTING	
33		6.1							GENERAL	
33			6.1.1						All of the castings and forgings used in the construction of this unit shall be of high quality and have the necessary casting processing, radiographic testing, magnetic particle inspections, and sonic testing performed that are outlined in the currently applicable ASTM specifications, or their equivalent.	
33			6.1.2						All piping furnished by the Seller shall be tested in accordance with ASME B31.1.	
33			6.1.3						Safety relief valves shall be tested in accordance with ASME Code Section VIII.	
33			6.1.4						All heat exchangers, tanks and pressure vessels, except the turbine casings, main steam piping and valves, reheat piping and valves, and the generator coolers, shall be hydrostatically tested in accordance with ASME Section VIII, shall be Code stamped and registered with the National Board.	
									ASME Code Data Forms shall be submitted.	
33			6.1.5						Shaft vibration during the final field operational runs shall not exceed ISO Standard 7919 Part 2 limits and ISO Standard 10816 Part 2 for non-rotating parts.	
33			6.1.6						Certified material test reports (CMTR) shall be provided in accordance with the referenced codes and standards:	
									• for large cast steel components;	
									• for shafts for equipment over 100 HP;	
									• for heat exchanger heads, shell, tubesheets and tubes;	
									• for tank shells;	
									• for steam piping, valves and piping components;	
									• and for stainless steel piping, valves and components.	
33			6.1.7						As a minimum for hardware, all materials, components, and welds shall be 100% visually inspected.	
									The inspections shall be documented, performed by qualified inspectors, and performed before painting of the item.	
									Acceptance shall be based upon the workmanship and inspection requirements in the codes and standards, such as ASTM, to which the item is made.	
33			6.1.8						The contract price shall include all tests and inspections normally conducted by manufacturers, subcontractors, and material suppliers and all other tests and inspections which may be so specified herein.	
33			6.1.9						Weld testing procedures shall be defined in the Quality Procedures and shall satisfy applicable codes and standards.	

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									The weld testing program shall be administered by a welding inspector certified in compliance with the American Welding Society (AWS) or Engineer approved equal.	
33			6.1.10						Conduct shop tests of the work as required to comply with applicable codes, to determine acceptability of workmanship and as specified including, but not limited to, the following:	
									• Pressure testing or NDE of piping systems, pressure vessels and related equipment.	
									• Testing of welded joints in accordance with applicable requirements.	
34		**6.2**							**SHOP AND FIELD TESTS**	
34			6.2.1						Major rotating parts shall have chemical and physical analysis.	
									Charpy impact tests and fracture appearance transition temperature (FATT) tests are required for turbine wheels and rotor materials.	
34			6.2.2.						Mechanical inspection for rotor shaft and body including:	
									• Material, chemical and physical properties tests,	
									• UT tests,	
									• Magnetic particle and UT of bore (if applicable),	
									• Surface finish tests of slots	
34			6.2.3						The rotor and buckets shall be magnafluxed in accordance with Supplier's inspection and test plan.	
34			6.2.4						The high pressure turbine casing shall be either hydrostatically tested or equivalent non-destructive examination (NDE).	
34			6.2.5						**Turbine Performance Acceptance Test**	
34				P1					Turbine acceptance tests will be performed in accordance with the requirements of the latest edition of ASME Performance Test Code PTC-6 alternative test to determine the performance of the replacement turbine generator.	
									Tests will be performed for Phase 1 and Phase 2 of the extended power uprate project.	
									The performance test will be prepared and conducted by the Buyer.	
									The Seller shall provide technical direction, assistance and witnessing of the acceptance test.	
34				P2					The Buyer and Seller will jointly determine the technical aspects of the acceptance tests with mutually agreed test methodology, procedures, and plans.	
									The Seller shall provide technical direction, assistance and witnessing of the acceptance tests.	
									The Owner prefers acceptance testing based on the alternative test as defined in PTC-6.	
									The Seller shall submit with the bid documentation, acceptable test methodologies for Owner review including a recommendation based on the alternative test.	

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34				P3					Primary flow will be measured using the Owner's installed Caldon Check Plus LEFM installed in the final feedwater section.	
34				P4					The unit will be considered accepted when the unit meets the guaranteed heat rate and output in accordance with the Contract.	
34			6.2.6						Turbine and Generator rotor bore shall have UT bore inspection, if applicable.	
34			6.2.7						Rotors shall be balanced and overspeed tested at not less than 120% of rated speed.	
									Generator rotor shall be excited at rated speed to verify no winding shorts.	
34			6.2.8						Measurement of cold resistance of stator and rotor windings.	
34			6.2.9						Insulation resistance measurements.	
34			6.2.10						Stator and Rotor dielectric test.	
34			6.2.11						Generator rotor leakage test.	
34			6.2.12						Exciter measurement of output voltage and output voltage adjustable range.	
35	7.0								FABRICATION REQUIREMENTS	
35		7.1							Provide for approval at the Owner's discretion procedures, plans, and sequences of operation that will be utilized in manufacturing the equipment.	
									The areas of manufacturing and fabrication that may be reviewed and require the Owner's approval are:	
									• Forging,	
									• Casting,	
									• Machining,	
									• Mechanical assembly,	
									• Welding,	
									• Weld repair,	
									• Heat treatment,	
									• Induction hardening,	
									• Cleaning,	
									• Nondestructive examination,	
									• Testing,	
									• Preparation for shipping (packaging), and	
									• Shipping.	
									Owner shall retain the right to include additional manufacturing and fabrication operation procedural review and approval after the initial review has been completed.	
35		7.2							The Buyer shall review and approve subcontractors to be used by the Seller.	
35	8.0								INSTALLATION REQUIREMENTS	
35		8.1							Provide support of plant modification and planning packages that shall include, but not be limited to, installation drawings, installation instructions, welding information, bill of materials, etc.	
35		8.2							Provide instructions for balancing the equipment following the installation.	

Spec Page #	Section Reference				C - Conform	X-Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Replacement Turbine Generator Table of Conformance - Technical	Comments
35		8.3							Seller shall identify all lubricants and chemicals required for installation.	
									Buyer shall supply lubricants approved for use.	
35	**9.0**								**SHIPMENT**	
35		**9.1**							**PREPARATION AND PACKAGING FOR SHIPMENT**	
35			9.1.1						Preparation and packaging for shipment shall be the responsibility of the Seller.	
35			9.1.2						All equipment shall be prepared for shipment in such a manner that quality and cleanliness will be maintained during shipment and prolonged storage prior to erection.	
									Equipment and all components shall be adequately protected against damage during shipment.	
35			9.1.3						All items subject to corrosion shall be suitably protected.	
35			9.1.4						Identify all desiccants and inhibitors used for preservation during shipment and storage and their required replacement frequency.	
35			9.1.5						Shipping expendable materials in contact with austenitic stainless steel or nickel alloys shall not contribute to corrosion during packaging, shipping or storage.	
									Objectionable chemicals within the expendable materials are lead, mercury, chloride, fluoride, sulfur, copper and zinc.	
									Submit a MSDS for each preservative chemical or material used to the Purchaser.	
35			9.1.6						The center of gravity and/or lifting points for large and heavy equipment shall be identified.	
35		**9.2**							**SHIPPING REQUIREMENTS**	
35			9.2.1						Shipping to the job site shall be the responsibility of the Seller.	
									Any special storage requirements shall be included with each shipment to which they are applicable.	
35			9.2.2						Notify and/or indicate when component requires special considerations during shipment.	
									Take appropriate measures necessary during shipping and/or storage to prevent damage and/or deterioration of equipment and components.	

Spec Page #	Section Reference	C - Conform	X-Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Replacement Turbine Generator Table of Conformance - Technical	Comments

Spec Page #	Section Reference	C - Conform	X-Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Replacement Turbine Generator Table of Conformance - Technical	Comments

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Spec Page #	Section Reference	C - Conform	X-Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Replacement Turbine Generator Table of Conformance - Technical	Comments

ALSTOM

Power Systems

May 30, 2007

DOCUMENT NUMBER-DATE
03238 MAY 22 08
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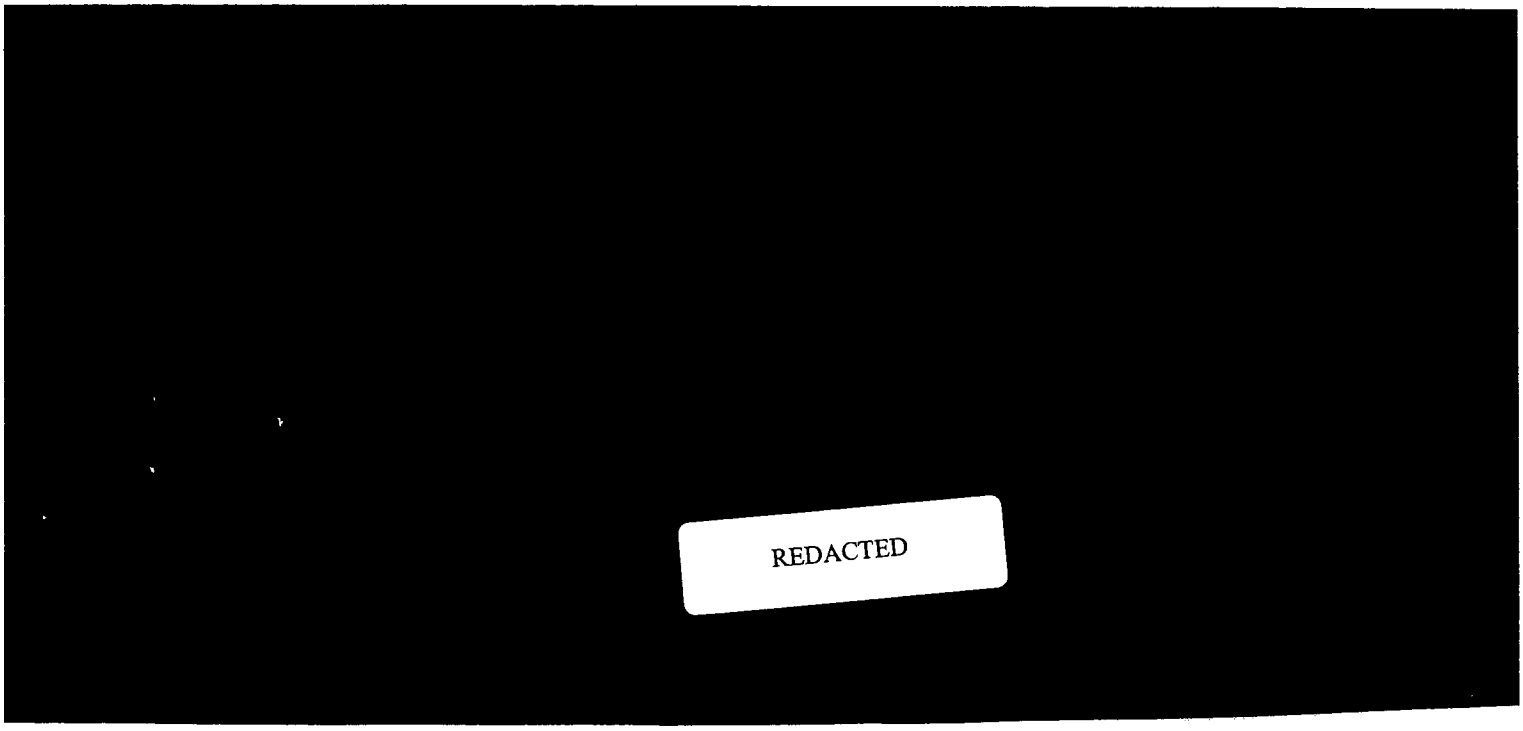
Progress Energy Service Company, LLC
P.O. Box 1551 (PEB 2C3)
Raleigh, NC 27602

ATTN: Mr. Tony Owen

RE: Crystal River Nuclear Plant Unit #3 – Request No. SD22007
Amendments to Alstom Proposal No. 844T0467

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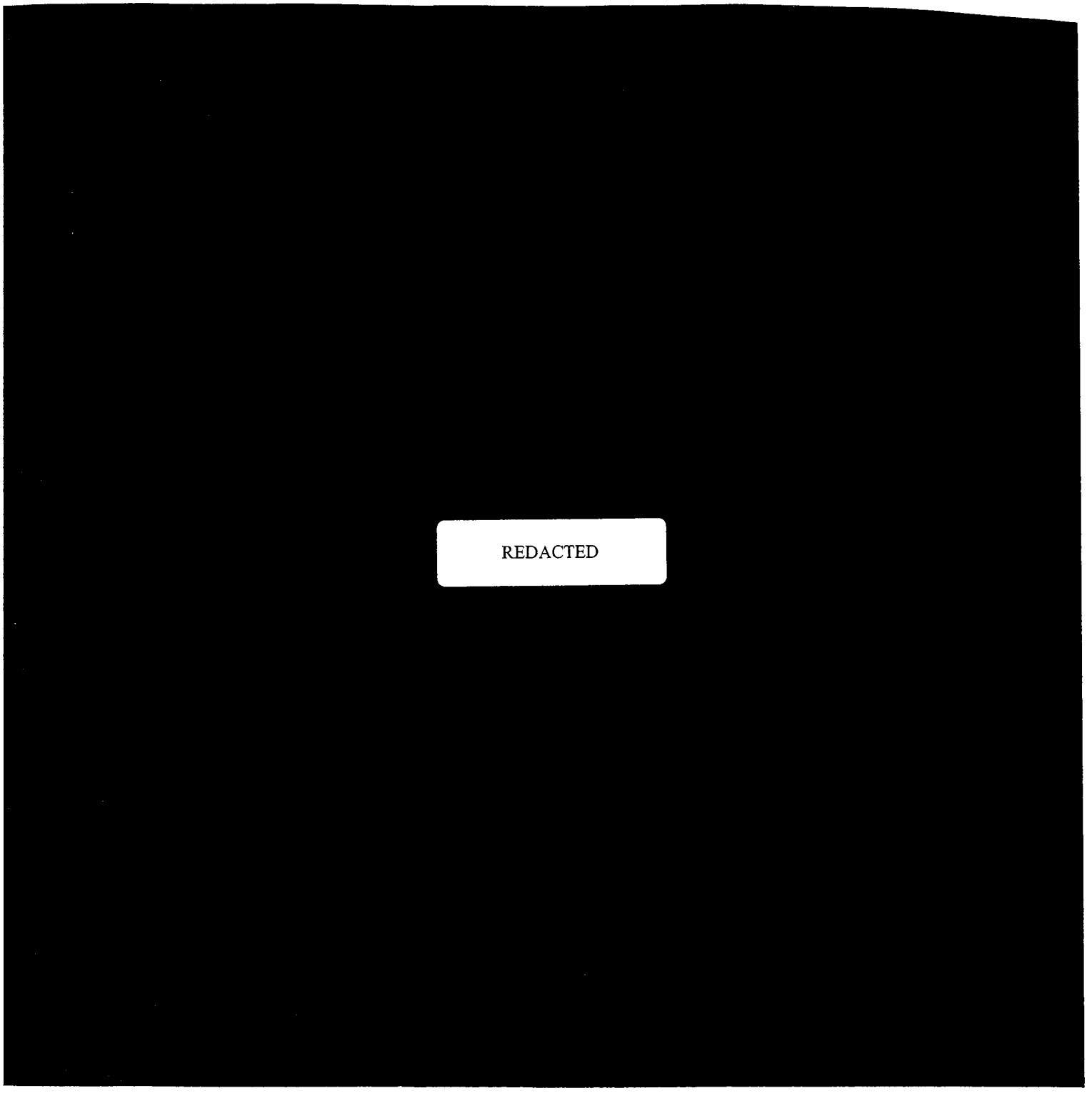
Dear Mr. Owen:



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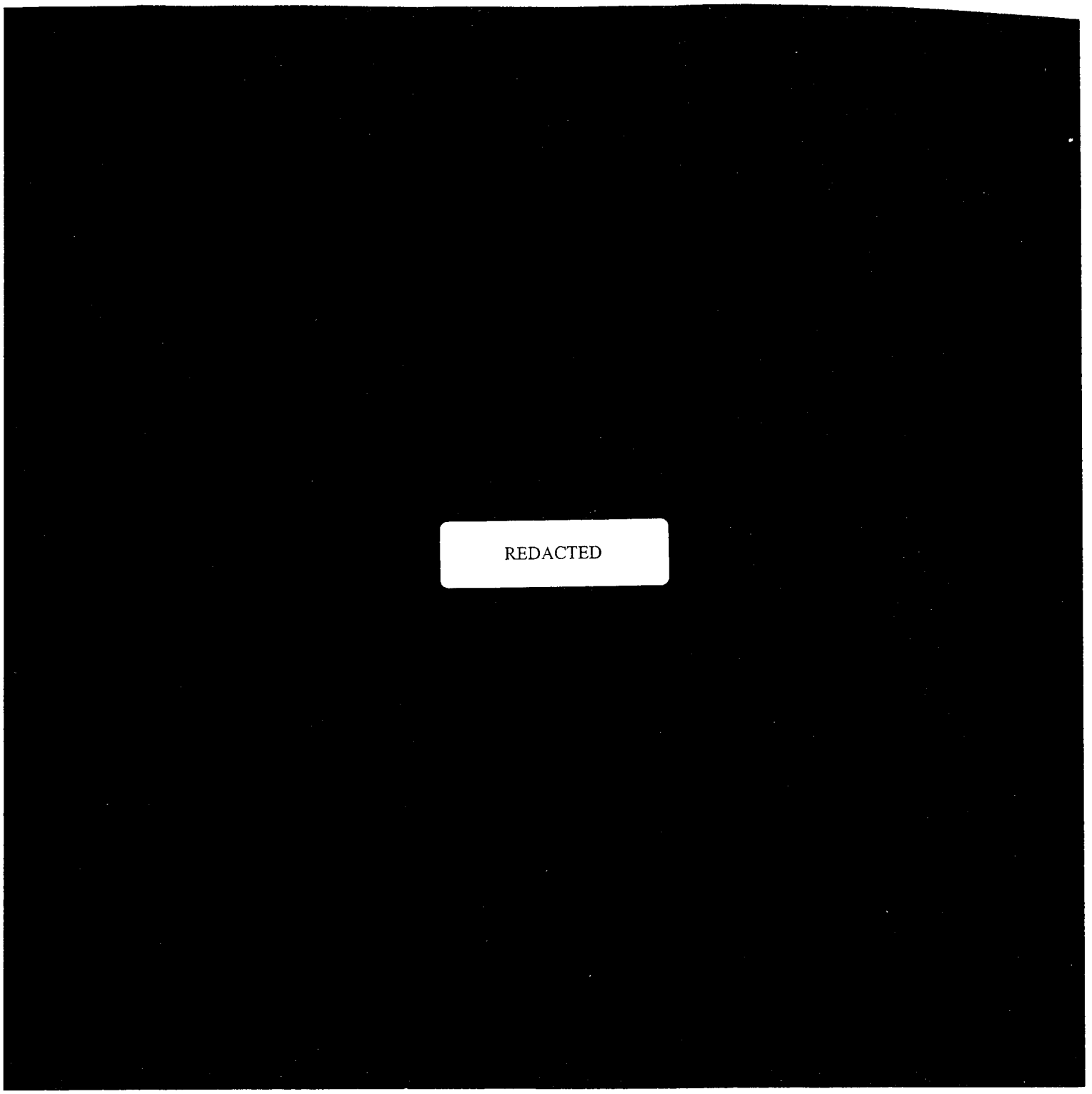
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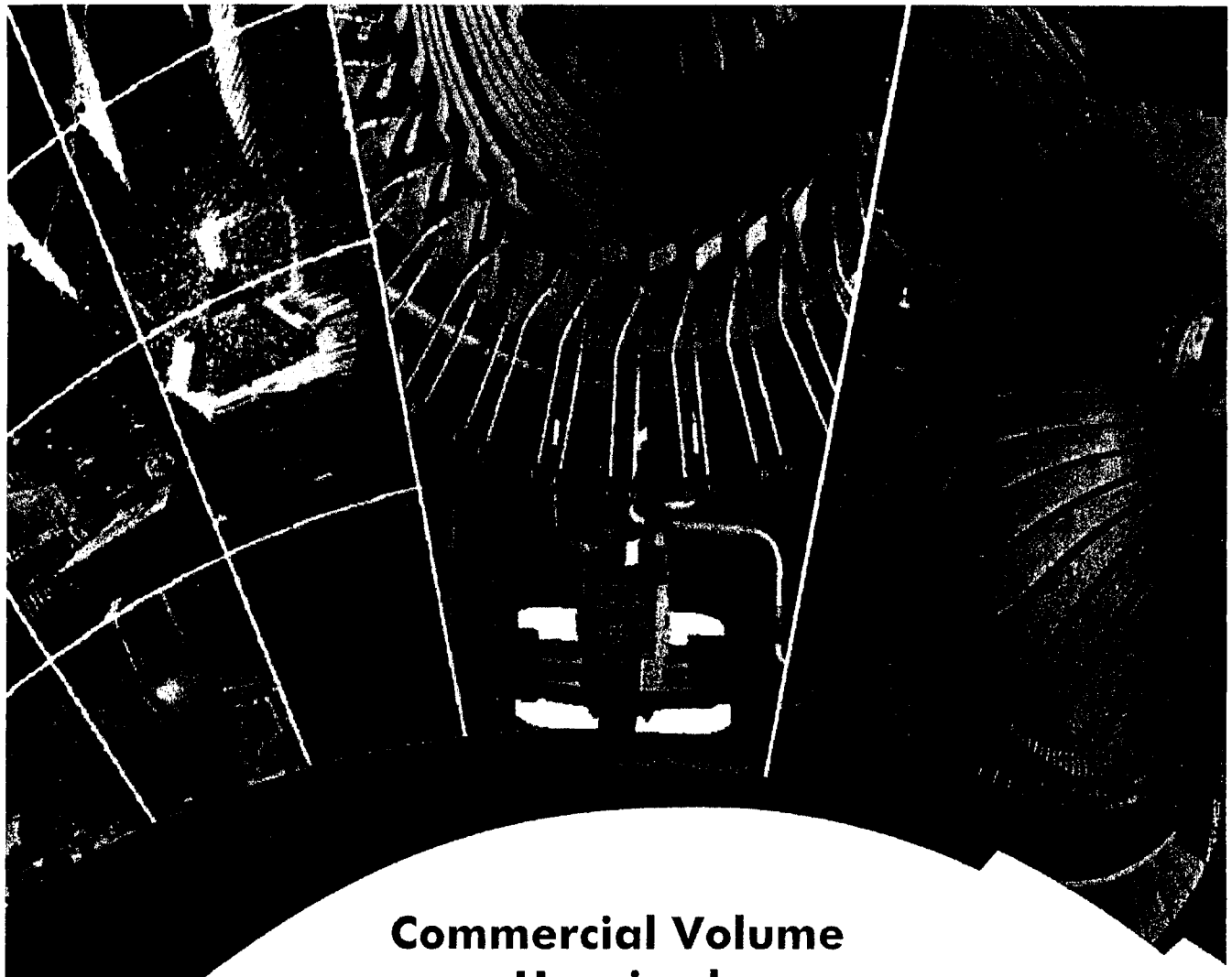


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Commercial Volume
Unpriced

Progress Energy
Crystal River Nuclear Plant, Unit 3
Turbine Generator Replacement and Retrofit Project
Request No. SD22007
ALSTOM Power Ref: 844T0467

PROPRIETARY STATEMENT
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Commercial Volume(Unpriced)

Document last updated 16-04-2007 11:35 EDT

Commercial Volume(Unpriced)

1 Executive Summary 1

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6 Price Schedule 15
7 Retrofit Experience 17
8 Further Opportunities 19

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PEF-NCR-01342

REDACTED

Alstom Proposal # SD22007, CR3 EPU Turbine Generator Retrofit Meeting Notes, 05/15/07:

Proposal Summary:

REDACTED

Cost: Total estimated cost for above scope is REDACTED Installation cost is estimated for T&M billing.

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Performance Guarantee: REDACTED

Outage Schedule: 2009 outage schedule is 75 days for HP and LP turbine replacement, generator mid-section replacement and MSR replacement. Schedule driver is shop rewind of generator rotor (60 days, 45 days in shop).

Optional Scope: Generator Stator field rewind with H2O cooled winding. Stator core iron is not replaced.
Cost: total estimated cost reduced to REDACTED. Generator Rating: stator rating reduced to 1162.5 MVA.
Schedule: 2009 outage schedule will not decrease due to off site rotor rewind.

Meeting Summary Highlights:

- Alstom proposal amendment letter requested by June 1, 2007.
- Generator rotor replacement is required to improve the 75 day schedule and to increase MVA rating to 1200MVA. Generator rotor replacement will be 2011. Requested Alstom to price new rotor vs. rewind rotor.
- Requested Alstom to consider 2007 open and close of HP turbine and generator to be R&D cost by them.
- Requested Alstom to quote 57"LSB LP turbine option.
- Support systems for water cooled stator skid and static excitation system are additional cost. Alstom requested to provide support system requirements.
- Control Room impacts for water cooled stator skid and static excitation system (voltage regulator) are additional cost. Alstom requested to provide control room impact details.
- Include laser alignment of entire train, including generator alignment and generator frame foot loading (pg.110).
- Include Re-striping all bearing pedestal oil seals.
- Include HP and LP turbine bearing be rebabbitted in base scope due to new rotor journals.
- Include machining of all HP Turbine cylinder interface locations as needed to install new parts.
- Need to provide Installation "Division of Responsibilities".

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General Notes:

- HP Turbine and Generator must be opened in 2007 for field measurements. Is open and close cost included?

Re: Requested Alstom to consider this R&D cost to them.

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- Evaluate performance of larger 16.8M2 (57"LSB) LP Turbine.

Re: Alstom presented performance curve for 47" and 57" LSB. 57" performs better below 2.7 In. Hg. Both perform the same above 2.7 In. Hg. Average benefit of 57" LSB is approximately 3MW/year. Cost is approximately REDACTED more. Note: the 57"LSB was installed at Diablo Canyon and performance was much better than expected.

- Heat balance indicates low feed water temperature between 2009 and 2011 (pg. 201, 207, 208). What is plant impact?

Re: Ted say's reactor is not affected. Lower feedwater temperature is in Alstom heat balance and would not be corrected for in a plant performance test. Areva would have to evaluate / model the Alstom heat balance for EPU.

- PE must verify generator frame 75 psi H2 pressure rating for generator stator rewind.

Re: This is responsibility of PE. Will need Siemens support to document.

- Support systems for water cooled stator skid and static excitation system are additional cost.

Re: Alstom requested to provide requirements. See engineering issues.

- Evaluate control room impact for new systems.

Re: Alstom requested to provide requirements. Pump controls and annunciator inputs.

Scope of Supply Comments:

HP Turbine: 7 stage, full impulse design

- New nozzle plates are fitted into existing nozzle box. Existing nozzle plates may need destructive removal. Is machining or repairs to the existing nozzle box included?

Re: Contingency repairs will be extra scope.

- New inner and outer glands are provided. New gland seals machined for rotor clearance. Are both inner and outer glands type 405 ss (pg. 19)?

Re: Alstom stated the HP turbine outer glands are **not** included. Proposal was in error. Inner glands are stainless steel.

Scope of Supply Comments:

- Governor pedestal stub shaft will be reused. Eccentricity run out will be corrected. Will a spacer be provided to correct axial position if needed?

Re: Yes, if needed based on field measurement.

LP Turbine: 10 stage, reaction design

- Inner cylinder is reused. Blade carriers are replaced. Discuss interface between new blade carriers and existing inner cylinder (pg. 37).

Re: Spring back seals. Pg. 50

- Blade carriers are ductile cast iron with 12% CR ring inlays. How is the ring inlays installed in the blade carriers (pg. 51)?

Re: keeper bolt at horizontal joint.

- L-0 blades have snubbers. Why not free standing?

Re: Improves vibration response characteristics.

Generator Mid-Section: 1173 MVA, Capability Curve pg. 77

- Verify main leads between stator and bushings are replaced. Not shown on pg. 75.

Re: Yes. Drawing in error.

- Discuss phase dropper and bushing connection installation (pg. 98 / 99).

Re: Interface between H2O cooled portion and H2 cooled portion of main lead.

Stator Water Skid:

- What are the plant requirements to support installation?

Re: Alstom to provide support system requirements. Cooling water 154 M3/hr (2500 KW), Demineralized water supply, Power supplies, Instrument and controls cabling, control room impacts include pump controls and annunciators. The support systems are not Alstom scope.

Generator Stator Rewind: 1162 MVA, Capability Curve pg. 121

- Scope includes core iron loop test (pg.117). What are the power supply requirements? Core loop test is not identified in testing section 2.4.3.29 (pg. 143).

Re: Core loop test is in scope. PE provides power 4160V, 1 phase, ???? Amps.
Alstom has core iron repair capability by insulation material injection up to 5 inches deep. Siemens el cid test data glitches are near surface issues.

Scope of Supply Comments:

Generator Rotor Rewind:

- Any repairs to rotor winding are included (pg. 156)

Re: Yes

- Siemens technical advisory TA 2005-001, Modification of rotor baffle assembly, must be included. May need to get parts from Siemens.

Re: Included. Alstom has parts.

- A bearing charge will not apply for shop balancing (pg. 154)

Re: Agreed.

- Asbestos abatement in the shop will not be extra cost (pg. 156)

Re: Agreed.

Static Excitation System:

- Generator bus supply through transformer rated at 7,500 amps @ 500volts.

Re: Yes

- Installation of new transformer (44,200 lbs), electrical cabinets and all electrical connections are included.

Re: Yes. Transformer foundation (if needed) is not included.

- What is the auxiliary power supply requirement for field flashing and is installation included?

Re: 480V, 3 phase, approx. amps (standard bus bkr) for field flashing. 2 x 480V, 3 phase for cabinet air conditioners, 2 x 125VDC control power.

- P400AVR digital voltage regulator. What is the control room impact of this system? Are control room modifications included?

Re: Control Room impact needs to be provided and is not included in scope.

- Pg. 171 states the collector is rated for 3,500 amps. Explain this rating compared to the generator excitation requirements.

Re: Typo error. Should be 7,500 amps.

- Pg. 172 and 177 states new collector assembly housing or modification of existing exciter housing. Is either of these options included?

Re: New housing is included in scope of supply.

- Pg. 178 and 179 indicate the collector assembly is cooled by ambient air and the ambient air limit is 45C (113F). Are air coolers an option?

Re: Possibly. Recommendation not made.

- Can the existing exciter air coolers be reused with the new collector assembly fan?

Re: Alstom can evaluate.

Include the following scope of supply at no additional cost:

- Include laser alignment of entire train, generator alignment and generator frame foot loading (pg.110).
- Include Re-striping all bearing pedestal oil seals.

Engineering Comments:

- Provide estimated megawatt output vs. condenser pressure curve for the 57" LSB (16.8M2) LP turbine. Include on curve provided for the 47" LSB (12.9M2) LP turbine provided in proposal (pg. 209).

Re: See pg. 2. Paul will email curve.

- 47" LSB LP turbine appears to choke at 2.2 In Hg. 47" LSB appears marginal for 1100 MWe output with 4 exhaust flows.

Re: Correct.

- Has a 57"LSB LP turbine been retrofitted into a Westinghouse turbine frame? References are on pg. 43.

Re: Diablo Canyon. Actual performance was much greater than predicted. Guaranteed 35 MW. Obtained 46 at unit 1 and 50 at unit 2.

- Why was a full impulse HP turbine design selected? Is design constrained due to reuse of existing inlet nozzle box?

Re: Standard design in Europe.

- Should HP and LP turbine bearing be rebabbitted due to new rotor journals?

Re: Request to include in proposal.

- Why is bearing 5 loaded greater than bearing 4 following retrofit (pg. 196)?

Re: Unknown at meeting.

- Pg. 538 discusses bearing pedestal modification for reinforcing brackets. What is expected? Are modifications required?

Re: Bearing strongback to withstand L-0 blade failure by using stronger bolts and heavier strongback if needed.

- Generator rotor rewind will reuse the existing rotor copper winding with new insulation. What is the rewound rotor current capacity rating?

Re: 7,720 Amps @ 75 psi H2 gas pressure.

- Generator mid-section replacement is rated at 1173 MVA. What is the rating limiting component? What is the excitation current required?

Re: Rotor is limiting above 1173 MVA. Excitation requirement is 6,770 amps @ max PF.

- Generator stator rewind is rated at 1162.5 MVA. Excitation current required is 6,845A (pg. 120). What is the rating limiting component? Pg. 119 states field measurement confirmation is required. What is the risk? The capability curve is shown on pg. 121. Why isn't the maximum power output at unity power factor on the curve?

Re: Stator core is limiting for 1162.5 MVA stator rewind.

- The generator stator rewind reuses the existing core iron as is. What engineering evaluations were performed to qualify reuse of the existing core iron?

Re: Engineering models were evaluated.

- Is a generator startup ventilation test requires for either generator options?

Re: A ventilation test is not required based on experience.

- What are the customer installation requirements for the stator cooling water skid and the static excitation system? Pg. 73 states the water skid and water tank control system is not included? What does this mean?

Re: The proposal statement in not applicable.

- What load rating will the lifting beam have?

Re: Design rating should be for generator rotor 360,000 lbs. Lifting slings are included.

Installation Comments:

- Installation schedule is estimated at 75 days (pg. 548). Generator scope is for mid-section replacement. Schedule driver is rotor rewind in shop (60 days, 45 days in shop). Any potential schedule improvement for rotor rewind?

Re: 45 days in shop for generator rotor rewind is best effort. Schedule improvement can only be gained by procuring a new rotor. A new rotor can not be fabricated in time for the 2009 outage. Generator rotor replacement would be 2011. The stator field rewind schedule is 35-42 days.

- Is machining of all HP Turbine cylinder interface locations included (pg. 8)?

Re: Need to include in scope.

- HP turbine exhaust bowl erosion repair is contingency extra cost item.

Re: Contingency repair item.

- Complete rotor train laser alignment is included.

Re: Need to include.

- Destructive removal of bolts is extra work (pg. 544).

Re: Alstom agreed to eliminate this as extra work item.

- New MSR insulation is included (pg. 539).

Re: Yes.

- Generator manways and cleaning of stator winding oil will not be extra work (pg. 544).

Re: Alstom agreed to eliminate this as extra work item.

- Heavy hauling is included (pg. 545).

Re: Yes.

- Pg. 545, discuss items relating to H2 coolers and turbine end bearing bracket.

Re: Alstom agreed to eliminate this as extra work item.

- Pg. 546, review personnel numbers identified on table.

Re: Asked Alstom to evaluate and explain the personnel numbers on the table.

- Discuss support resources required to be provided by PE.

Re: Alstom stated their installation cost estimate included all support resources. Need to provide "Division of Responsibilities".

Commercial Comments:

- Master Service agreement # 139805 open issue discussion.

Re: Alstom needs to provide name of person in Alstom who is responsible to negotiate contract.

- MSR material cost is REDACTED This appears excessive. Explain basis of cost.

Re: Alstom agrees it is high but can not cut the cost in half. Alstom can work with other MSR vendors.

- HP / LP Turbine material cost is REDACTED This appears high for LP turbine "blade carrier" solution and reuse of HP turbine nozzle box. Explain basis of cost.

Re: material cost / Euro / shop utilization. Larger LP turbine with inner cylinder was stated to be approximately REDACTED more.

- Would Alstom accept total project management responsibility if PE assigned required support labor to Alstom?

Re: alstom stated the estimated installation included all support resources.

- Proposal states installation is T&M billing. PE prefers fixed cost for total project scope.

Re: Can be fixed cost after a defined scope of work is established. PE can provide support resources.

Progress Energy Questions:

- EH tubing will be impacted by MSR replacement.
- Engineering Change and Work Order Package development.
- Radiological support and material decontamination contingency.
- O&M replacement of extraction pipe expansion joints?
- Any other turbine plant major equipment replacements must be integrated into turbine generator schedule for crane usage and logistics coordination.

Enercon Services, Inc.

An Employee Owned Company

August 6th, 2007

JC07-017

Project Energy Service Company, LLC
410 South Wilmington Street (PEB 2C1)
Raleigh, NC 27601

Attention: Tony Owen
Manager, NGG Major Projects

Reference: Engineering Services Proposal for Secondary Systems Upgrade
Request for Proposal No. KS12007
Enercon Proposal Number: PECR-A07-3007

Thank you for the opportunity to provide you and Progress Energy with this proposal. We understand the importance of this project and have assembled a focused, cost effective approach to support its requirements.

We have attached one (1) priced version and one (1) un-priced version in hardcopy attached to this letter along with a CDROM disk which contains electronic copies of both. As called for in your Request for Proposal ("RFP"), this disk also contains an electronic copy of the "Table of Conformance". ENERCON holds a current General Services Agreement with Progress Energy, thus additional contract negotiations are unnecessary. All work will be performed using these existing terms and conditions.

The proposal contains all requisite information and is conformance with your RFP.

- Cover Letter with Inventory of Proposal
- Executive Summary
- Conformance Acknowledgements
- Separate Proposal for each Major Scoped Task
  - Introduction
  - Scope of Work Description
  - Deliverables
  - Schedule
  - Capabilities and Experience
  - Quality Assurance
  - Commercial and Resource Proposal
  - Assumptions
- Combined Scopes of Work Proposal
- Organizational Support Structure
- Appendices
  - Key Personnel Resumes
  - Consolidated Project Schedules
  - Technical Conformance Checklist
  - Organization Charts
  - Completed Safety Information Checklist

500 Town Park Lane, Suite 275, Kennesaw, GA 30144 - (770) 919-1930

Our proposal offers a strong team of professionals to support this effort, most with recent Crystal River experience. ENERCON is uniquely qualified with an excellent understanding of both the technical and operational impacts of Extended Power Uprate as it affects CR3 and able to provide unmatched service and quality through the breadth and depth of our organization as needed.

ENERCON and Progress Energy both enjoy a strong working relationship built on mutual benefit and trust. We are confident that our proposal extends that same result and offers the best value and quality.

If you should have any questions or require any additional information, please do not hesitate to contact me at (678) 354-8343 or jcurreri@enercon.com.

Best Regards,

(Signature on Hardcopies)

Jerry Curreri
Manager of Projects

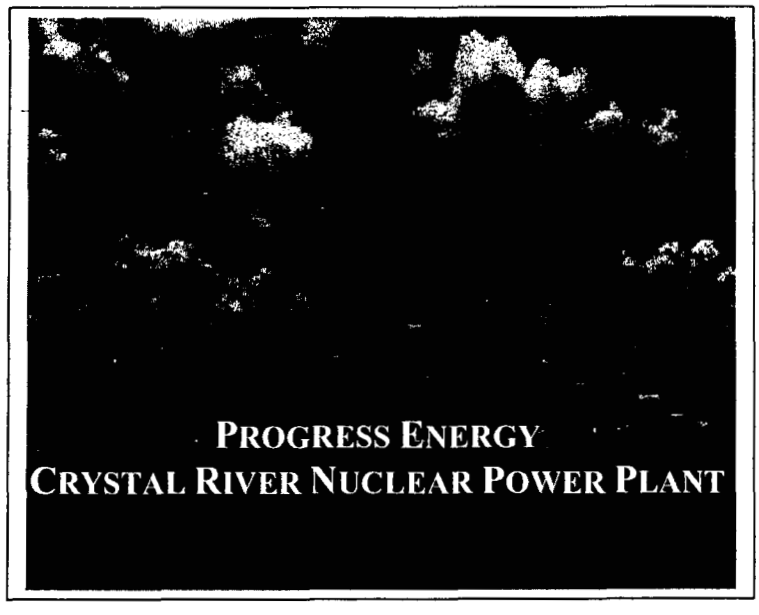
Attachment

Cc: Jim Gannon, Client Services Manager
PECR-A07-3007

ENERCON SERVICES, INC.
An Employee Owned Company

ENGINEERING SERVICES PROPOSAL FOR SECONDARY SYSTEMS UPGRADE TO SUPPORT EXTENDED POWER UPRATE

Request for Proposal (RFP) – KS12007



Submitted to:

Tony Owen

Manager, NGG Major Projects

Progress Energy Service Company, LLC

410 Wilmington Street (PEB2C1)

Raleigh, NC 27601

Submitted on:

AUGUST 6TH, 2007

ENERCON SERVICES, INC.
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Proprietary Statement

[redacted]

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ENERCON SERVICES, INC.
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BATES NOS. PEF-NCR
01357 THROUGH
PEF-NCR-01603

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Meeting Date: 8/28/2007

The RFP bid specification identified fifteen (15) major tasks. The RFP requested each major task be bid separately and include estimated manhours. Combined total work scope pricing and maximum not to exceed pricing was to be identified. A request for proposal # KS12007 addendum letter was issued on August 14, 2007. The addendum letter added two (2) additional work scopes (item 16 & 17).
The major task areas included:

1) Computer models.
2) MSR replacement and MSR belly drain heat exchanger addition.
3) Turbine generator modifications.
4) Deaerator bypass line addition.
5) Isophase bus duct cooling system.
6) Feedwater heater and heater drain system modifications.
7) Secondary service closed cycle cooling system modifications.
8) Circulating water system modifications.
9) Condensate pumps and motors.
10) Feedwater booster pumps and motors.
11) Feedwater control valves and control system stability analysis.
12) Condenser evaluations.
13) Electrical distribution calculations.
14) Mechanical ultimate heat sink calculations.
15) Turbine building structural evaluation.
16) Internal flooding analysis due to increased circulating water flow.
17) Plant operating license amendment support.

Areva / Worley Parsons Proposal Review Notes:

- Proposal includes total work scope and is teaming effort by both companies.

- Proposal does not include estimated man hours or cost per task. Proposal includes one fixed cost price for total work scope.

- Pg.2, background, states "BOP phase 2 evaluations and implementation will be defined later and are not part of this proposal scope". Verify this is not an accurate statement. All EPU BOP identified work is to be in scope of proposal. BOP Piping Analysis Scope does not appear to be included. Areva scoping study report # 51-9043794-000 Section 3.4.1.3 "pipe support / water hammer" identifies 16 piping calculations (ref. App. J) and the main steam pipe hammer calculation M73-1002 need developed or revised.

- Pg.4, Table 1.4-1; add "Iso-Phase Bus Duct Electrical Evaluation" to engineering evaluation list.

- Pg. 4, Table 1.4-1; add "Condense Steam Impingement Plate Mods" to EC list. This is an expected output of the HES condenser tube vibration analysis. This modification should be scheduled during the 2009 LP turbine modification.

- Pg.5, Table 1.4-1; add "Feedwater Heater CDHE-3A/B" to equipment specification list.

- Pg.19, EPU PEPSI Model; add MSR belly drain, add deaerator bypass mod, add YUBA estimated feedwater heater TTD's and DCA's for retained heaters.

- Pg.19, PEPSI Model; validate MUR PEPSI model against plant data following MUR implementation. PEPSI model will be used as equipment design input.

- Pg.19, PEPSI Model; Siemens will provide preliminary turbine PEPSI model input in September 2007 as requested. PEPSI model to be updated with final turbine PEPSI model input after final turbine design is established.

- Pg.20, FATHOM model; add Secondary Cooling System (SC) to list of systems. Need to verify uprated SC system will provide sufficient cooling water to specific locations in the system (i.e. Generator H2 coolers). System flow control valves should be evaluated. The LO Cooler temperature control valve may need to be enlarged. The SC system header pressure control setpoint can be increased 10-15 psi due to increasing the generator H2 gas pressure from 60 psig to 75 psig. Ref.Pg.43, SC Pump EC section.

- Pg.22, Condenser Evaluation; Required output of the HES flow induced vibration analysis is to identify tube bundle locations where steam impingement plates should be installed. Impingement plate additions were recommended by HES during the CR3 previous condenser tube failure analysis.

- Pg.23, Feedwater Heater Evaluation, add "feedwater heater relief valve setpoints and relieving capacity evaluation" to scope of work.

- Pg.24, Secondary Cooling Maximum; add logistical evaluation for removing existing SC coolers and installing larger heat exchangers into turbine building.

- Pg.28, Turbine Building Structural Evaluation; Turbine Pedestal Foundation Evaluation will NOT be performed by the turbine manufacturer. The turbine manufacturer will provide the increased loading data. The Turbine Generator Pedestal Structural Analysis, S95-0021, must be revised under this scope of work. Analysis S95-0021, dated June 20, 1995, was performed by Gilbert Commonwealth. Same comment Pg.35, Pg. 37, Pg.55, Pg.60 and Pg.61.

- Pg. 30, Engineering Change Packages; Areva shall perform all work in accordance with current revision to EGR-NGGC-0005, Engineering Change. Same comment Pg.51.

- Pg. 30, Engineering Change Packages; include "mark-up" of FSAR for each EC to support consolidated EPU FSAR revision.

- Pg. 30, Engineering Change Packages; Separate EC packages will be issued for equipment procurement specifications.

- Pg.35, LP Turbine Replacement; Turbine Generator Instrument calibration or range changes, including AEH controller scaling, provided by the turbine generator OEM shall be included in the EC package. Same comment Pg. 37. Anticipated instrument changes are identified on Pg.60 and 61.

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- Pg.38, MSR Replacement, add "MSR relief valve evaluation" to scope of work.

- Pg.39, MSR Belly Drains, Evaluate 2 new heat exchangers (2 MSR drain inlets each) rather than 4 new heat exchangers. If feasible, this may be less expensive and tie into condensate system better (less piping required).

- Pg.42, Isolated Phase Bus Duct, include evaluation of bus duct electrical capacity (bus duct rating) in conjunction with the bus duct cooling EC.

- Pg.47, Circulating Water Pump EC, include C/D water box flow straighteners and expansion joints. (Larry Sexton working on adding to 2007 outage scope).

- Pg.49, Equipment Specifications, reliance on original equipment specifications should not be assumed. There should be no additional scope to develop the equipment specifications identified. Same comment Pg.60.

- Pg.53, Condenser Evaluation, HES shall provide the condenser evaluation CFD analysis. HES stated the HES CFD analysis is an input to the condenser tube bundle tube vibration analysis which is subcontracted by HES. The condenser tube bundle tube vibration analysis should be identified as an additional deliverable and should include recommended locations where tube bundle steam impingement plates should be installed.

- Pg.53, SC Maximization, final report should include verification of system flow balance and heat loads satisfied. SC system flow control valves shall be evaluated.

- Pg.57, PEPSI model, Siemens to provide initial turbine inputs in September, 2007. Siemens to provide final turbine inputs following turbine design and submittal of turbine thermal kit. PEPSI model to be verified with plant operating data following MUR power uprate. YUBA estimated EPU condition feedwater heater TTD's and DCA's to be included in EPU model. Should the EPU model be validated and corrected following EPU implementation?

- Pg.57, Electrical Calculations, impact assessment of 54 electrical calculations is included. Revision of these calculations is not included. Review optional workscope for ETAP electrical system modeling consolidation.

- Pg.58, Updates. Design Basis Documents and applicable FSAR sections should be "marked up" and included in each EC package.

- Pg.61 / 62, MSR assumptions, New MSR vessels will be longer. Modifications to piping supports may be required and will not be extra work. MSR vendor is to provide revised piping drawings.

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- Pg.67, Mechanical Inputs, A "preliminary" turbine thermal kit should be provided by Siemens in September, 2007. Turbine Generator and MSR structural load inputs may not be available in September, 2007. This should not impact schedule.

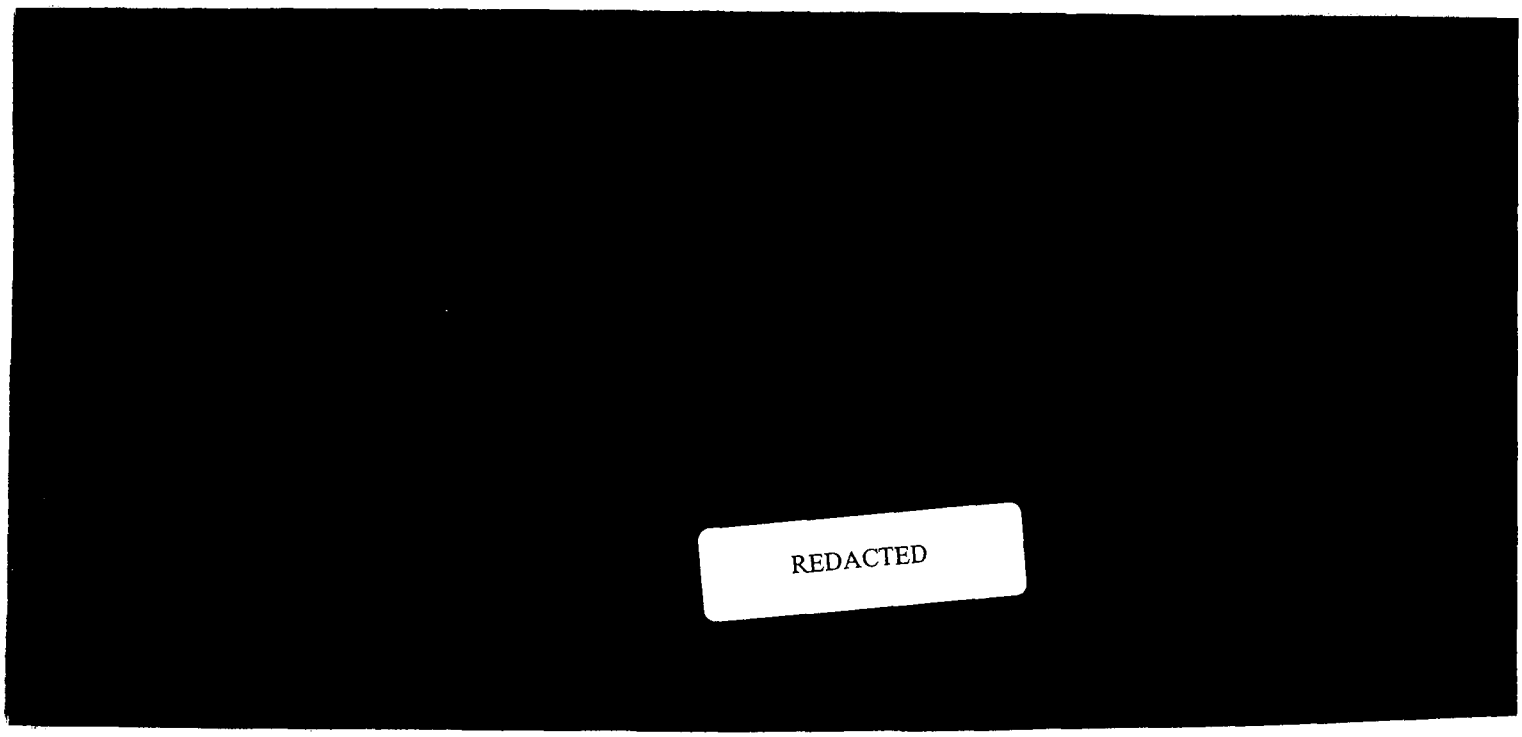
- Schedule Attachment, review for equipment specifications / procurement EC's needed by end of October, 2007. Too much equipment is identified to be specified by October, 2007. The feedwater heaters (CDHE-3A/B) and the SC heat exchangers Impellers and Motors are priority components.

AREVA

September 4, 2007
PENG07-1370.1
AREVA NP07-02511

Mr. Tony Owen
Progress Energy Services Company, LLC
410 S. Wilmington Street (PEB2C1)
Raleigh, NC 27601

Subject: AREVA NP Proposal PENG07-1370.1 Addendum for Progress Energy Crystal River Unit 3, Extended Power Uprate for Balance of Plant Activities



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03238 APR 22 08
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PEF-NCR-01609

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Rev. Date: 08/29/2007

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CR3 EPU Project Organization

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CR-3 EPU BOP PHASE I IMPLEMENTION
LEVEL 2 ROLLUP

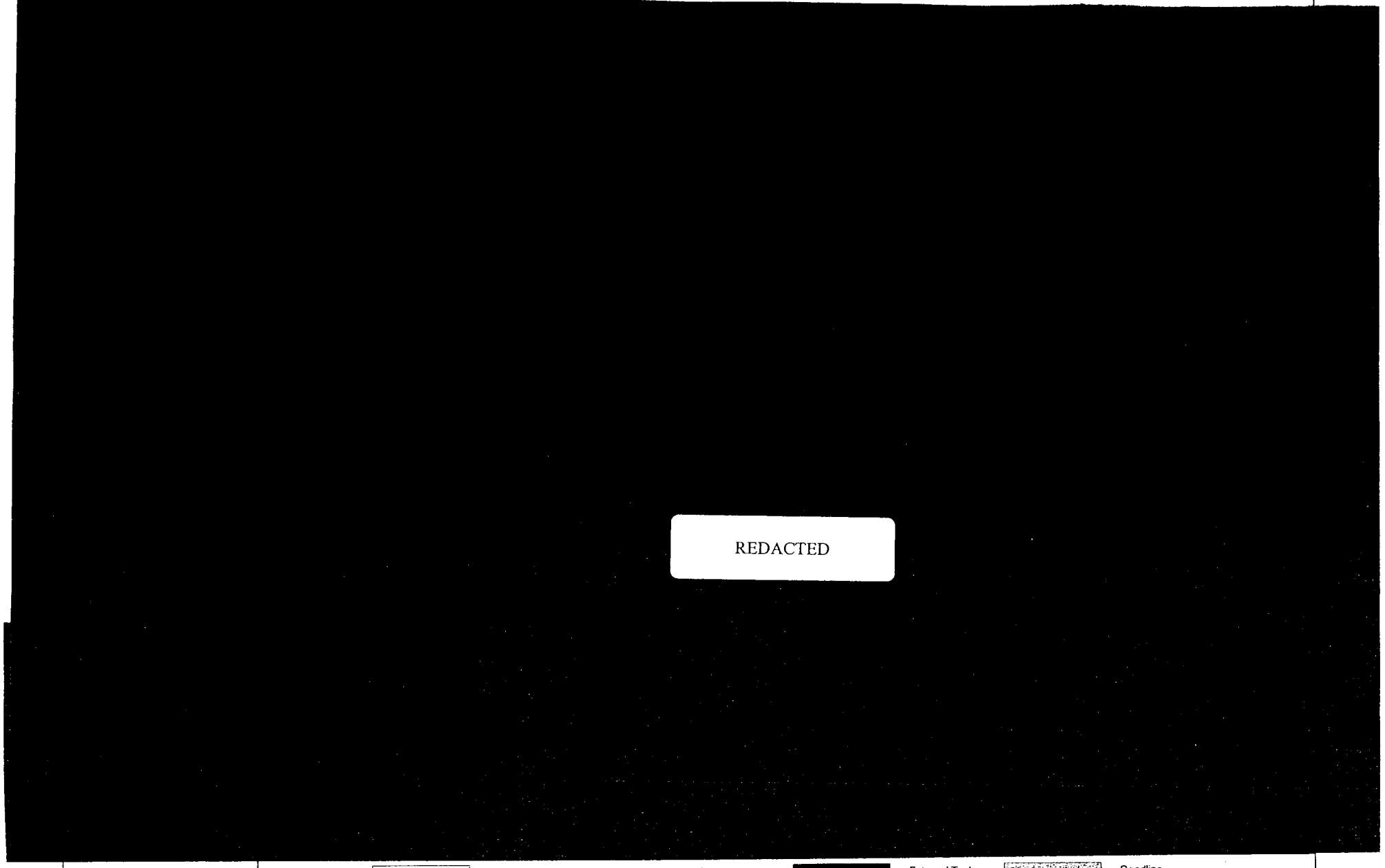
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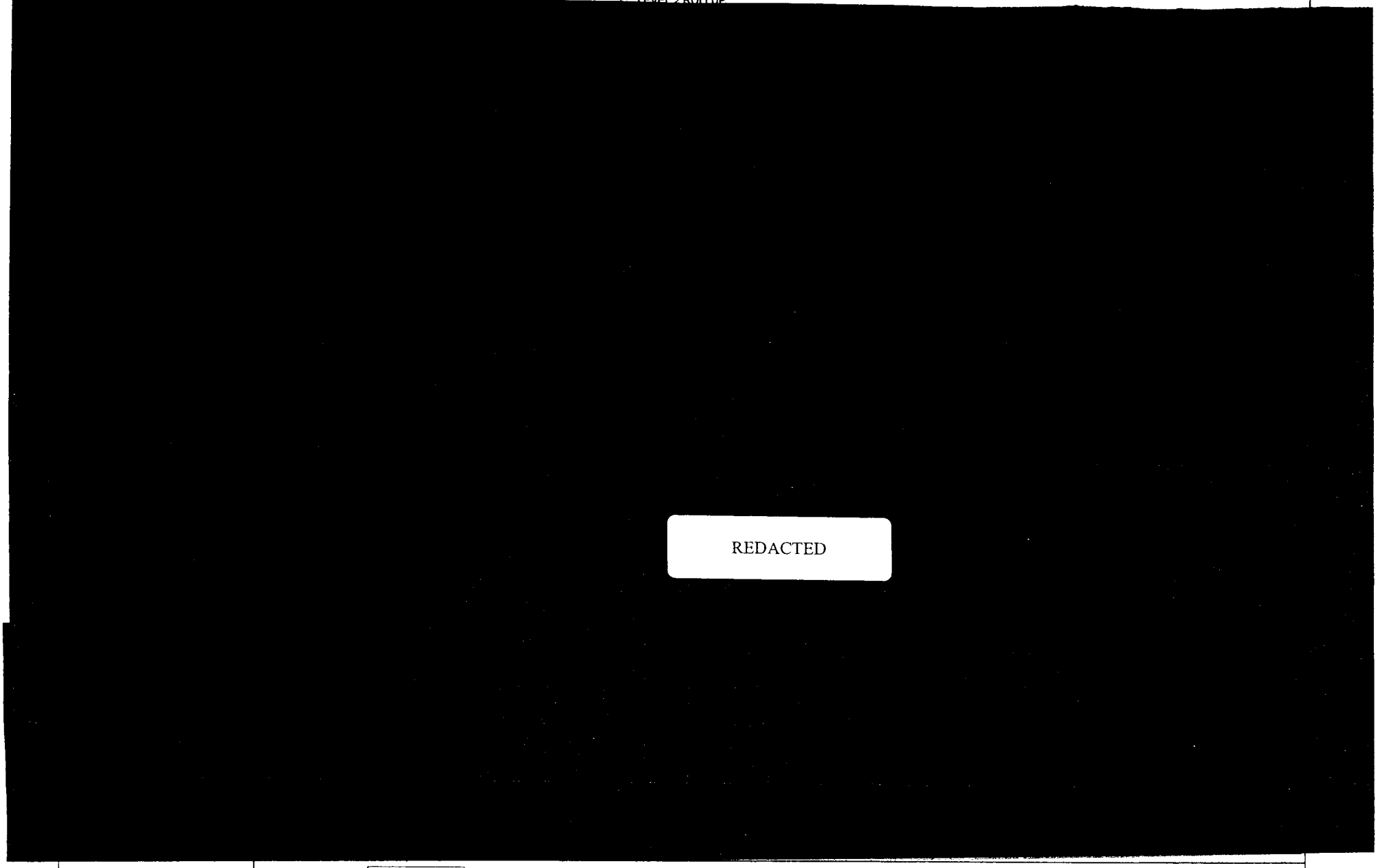
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Date: Tue 9/4/07

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

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Project: EPU BOP Phase I schedule 9
Date: Tue 9/4/07

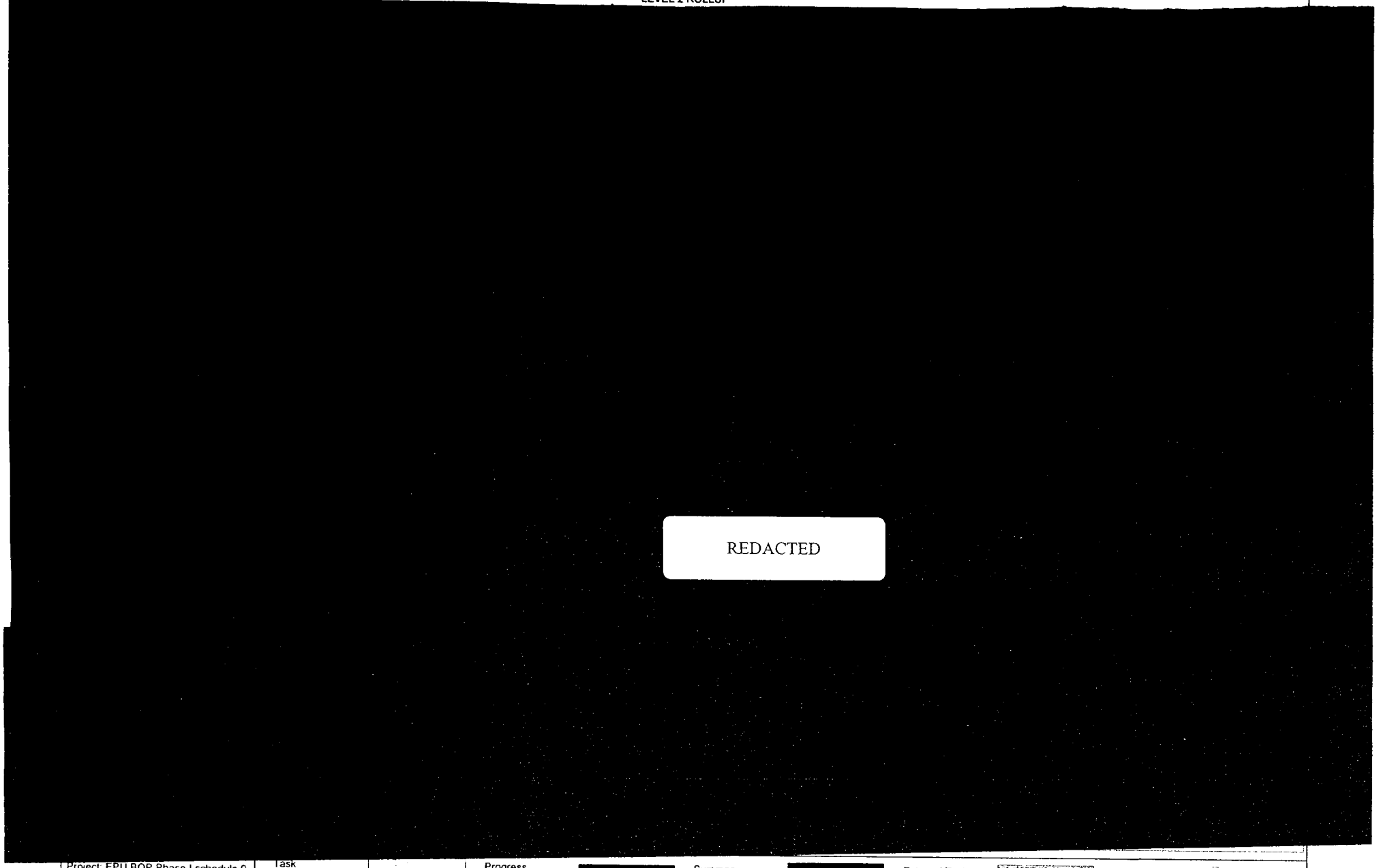
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Split | Milestone | Project Summary | External Milestone

PEF-NCR-01630

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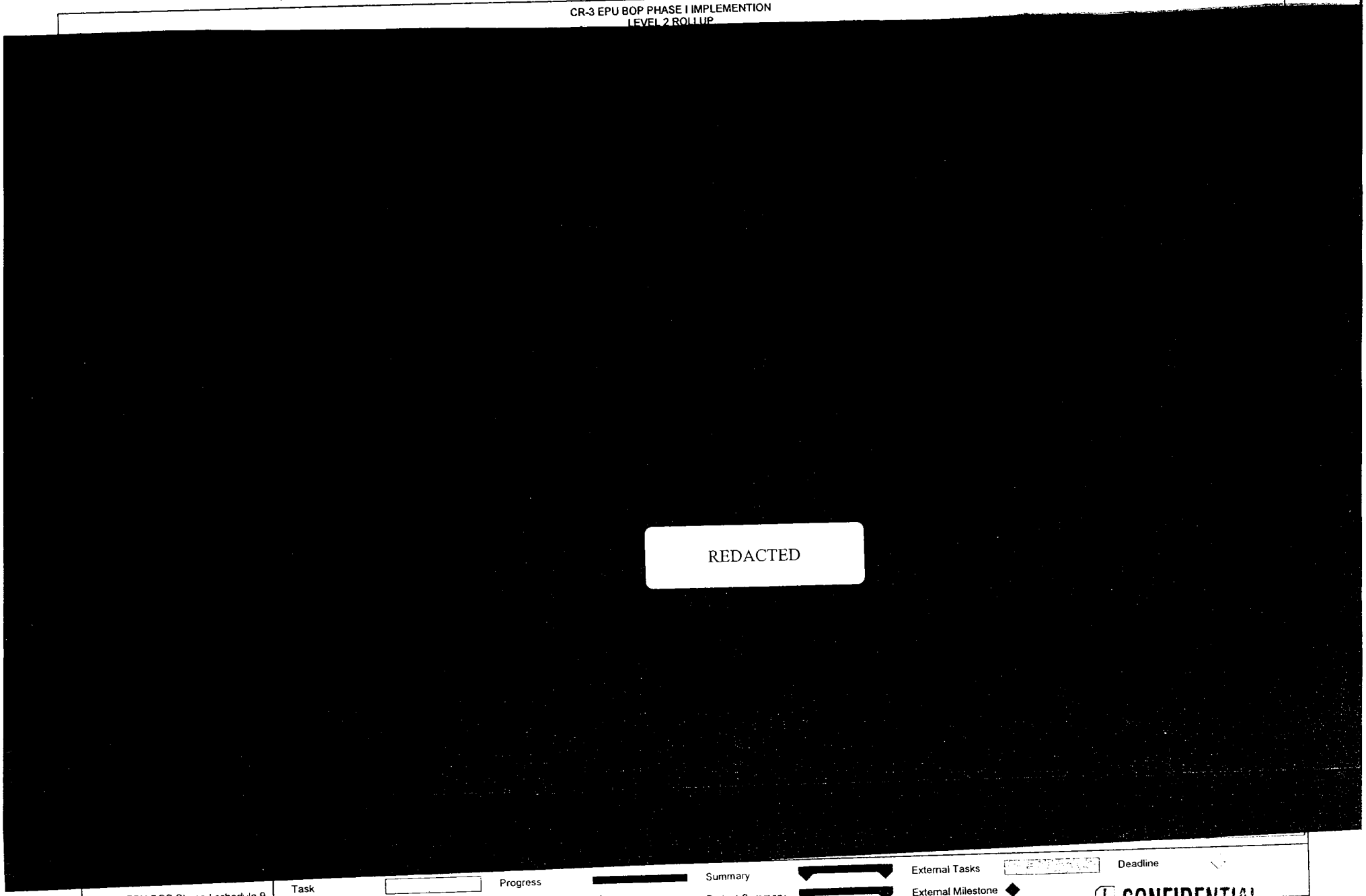
CR-3 EPU BOP PHASE I IMPLEMENTION
LEVEL 2 ROLLUP

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Project: EPU BOP Phase I schedule 9
Date: Tue 9/4/07

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

CR-3 EPU BOP PHASE I IMPLEMENTION
LEVEL 2 ROLLUP



Project: EPU BOP Phase I schedule 9
Date: Tue 9/4/07

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

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PEF-NCR-01634

Crystal River #3
Electric Power Uprate – BOP Engineering

Executive Summary
AREVA Contract # 101659 - 091
October 16, 2007

DOCUMENT NUMBER-DATE
03238 APR 22 08
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Progress Energy

BOP Contract Summary: Contents

- Scope
- Contract Bidders
- Technical Evaluation
- Bid Price Comparison
- AREVA Negotiations and Royalty Agreement
- Negotiated Price
- Bidder Selection Basis
- Payment Milestones
- Limits of Liability
- Project review Team

BOP Contract Summary: Scope (Slide a)

- Computer Model Updates
  - ◇ PEPSE- heat rate modeling
  - ◇ FATHOM- hydraulic modeling
  - ◇ CHECWORKS- FAC modeling
- MSR Replacement and Belly Drain Heat Exchangers
- Turbine Generator Upgrade impacts
  - ◇ Low Pressure Turbine
  - ◇ High Pressure Turbine
  - ◇ Main Generator and Exciter
- Dearator Bypass Line Addition
- Isophase Bus Duct Cooling System Upgrade

BOP Contract Summary: Scope (Slide b)

- Feedwater Heater and Drain Mods
  - Replace heaters CDHE3A and 3B
  - Evaluate Existing balance of Heaters
  - Replacement of Valves HDV 101, 102, 103, 104
  - Replace Piping upstream of HDV 247, 248, 249, and 250
- Secondary Closed Cycle Cooling
  - Replacement of Heat Exchangers
  - Replacement of SC Pumps and Motors
  - Maximization of the system
- Circulating Water Pumps and Motors
- Condensate Pumps and Motors

BOP Contract Summary: Scope (Slide c)

- Feedwater Booster Pumps and Motors
- Feedwater Control Valves
- Condenser Performance and FIV calculations and Condenser Baffle Plate Installation EC
- Electrical Distribution System calculations
- Mechanical Ultimate Heat Sink Calculations
- Turbine Building Structural Evaluation
- LAR Support

BOP Contract Summary: Contract Bidders

- AREVA
  - Completed CR3 MUR
  - Performing CR3 NSSS
  - Team very capable of completing BOP and integrating complete study
  - Areva partnered with Worley Parsons, the Original A/E for CR3 BOP
- ENERCON
  - Conducted Waterford BOP
  - NSSS Set points only in conjunction with Westinghouse
- TCI
  - No real experience in the conduct of a similar study, helped to develop the Specification
  - Did not bid all Tasks

BOP Contract Summary: Technical Evaluation of Bid

Summary of Technical Evaluation

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- Concern for Enercon

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BOP Contract Summary: Technical Evaluation of Bid

Quality

- Concern for Enercon [redacted]

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- AREVA has full time employees with strong history of the B&W design plants.
  - ◇ Proven performance on MUR and NSSS
  - ◇ Stronger interfaces with vendors
  - ◇ Teamed with original A/E for BOP at CR3

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BOP Contract Summary: Bid Price Comparison ($000's)

	AREVA	Enercon
Initial Bid		
Bid Clarification - 1*	REDACTED	
Bid Clarification – 2**		

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*Bidders were asked to review organization, set scope, convert T&M work to Fixed Price electrical calculations, Condensate Speed Control Drives equipment, etc.

**Bidders were asked to review hours for Tasks 3 (T/G Mods) and 9 (Condensate Speed Drives) to determine their alignment with the Toshiba design reviews for the equipment.

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BOP Contract Summary: AREVA Negotiations

Price Reduction

D
D
D
D

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Risk Reduction*

D
D
D

REDACTED

Royalties

D
D
D

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BOP Contract Summary: AREVA Negotiated Price ($000's)

Final Fixed Price

Potential Contingency (Max.)

Maximum Royalty

REDACTED

Evaluated Prices (full Royalty/no contingency)

Evaluated Price (no Royalty/full contingency)

Evaluated Price (1/2 Royalty/1/2contingency)

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BOP Contract Summary: Bidder Selection Basis

Technical

AREVA has a proven track record with Progress for this work

[redacted] REDACTED [redacted]

[redacted] CONFIDENTIAL

Commercial

[redacted] REDACTED [redacted]

Conclusion

AREVA is best from a Technical perspective and on average equal cost with opportunity [redacted] REDACTED

Progress Energy

BOP Contract Summary: Payment Milestones/Dis-incentive

Payment Milestones are designed to provide an incentive to complete scheduled work on time and a dis-incentive for failure to meet schedule.

BOP Contract Summary: Limit of Liability

Per the Master Agreement #101659, the LOL will be [redacted] or the final amount of the contract.

BOP Contract Summary: Project Review Team

Project Manager	Ted Williams
Project Technical Lead	Scott Deahna
Legal	Dave Conley
Audit	Loyd Graves
Contracts Lead	Tony Owen
Executive Sponsor	Danny Roderick

CR3 Extended Power Uprate, Secondary Systems Upgrade Bid Proposal Technical Evaluation

08/21/07

The following proposal technical comments were developed by reviewing unpriced copies of each proposal. The RFP bid specification identified fifteen (15) major tasks. The RFP requested each major task be bid separately and include estimated manhours. Combined total work scope pricing and maximum not to exceed pricing was to be identified.

The major task areas included:

1) Computer models.
2) MSR replacement and MSR belly drain heat exchanger addition.
3) Turbine generator modifications.
4) Deaerator bypass line addition.
5) Isophase bus duct cooling system.
6) Feedwater heater and heater drain system modifications.
7) Secondary service closed cycle cooling system modifications.
8) Circulating water system modifications.
9) Condensate pumps and motors.
10) Feedwater booster pumps and motors.
11) Feedwater control valves and control system stability analysis.
12) Condenser evaluations.
13) Electrical distribution calculations.
14) Mechanical ultimate heat sink calculations.
15) Turbine building structural evaluation.

A request for proposal # KS12007 addendum letter was issued on August 14, 2007. The addendum letter added two (2) additional work scopes and responded to questions by the bidders.
The additional work scope items included:

1) Internal flooding analysis due to increased circulating water flow.
2) Plant operating license amendment support.

Areva / Worley Parsons Proposal Review Notes:

- Proposal includes total work scope and is teaming effort by both companies.
- Proposal does not include estimated man hours or cost per task. Proposal includes one fixed cost price for total work scope.
- Pg.2, background, states "BOP phase 2 evaluations and implementation will be defined later and are not part of this proposal scope". Verify this is not an accurate statement. All EPU BOP identified work is to be in scope of proposal. BOP Piping Analysis Scope does not appear to be included. Areva scoping study report # 51-9043794-000 Section 3.4.1.3 "pipe support / water hammer" identifies 16 piping calculations (ref. App. J) and the main steam pipe hammer calculation M73-1002 need developed or revised.
- Pg.4, Table 1.4-1; add "Iso-Phase Bus Duct Electrical Evaluation" to engineering evaluation list.
- Pg. 4, Table 1.4-1; add "Condense Steam Impingement Plate Mods" to EC list. This is an expected output of the HES condenser tube vibration analysis. This modification should be scheduled during the 2009 LP turbine modification.
- Pg.5, Table 1.4-1; add "Feedwater Heater CDHE-3A/B" to equipment specification list.
- Pg.19, EPU PEPSI Model; add MSR belly drain, add deaerator bypass mod, add YUBA estimated feedwater heater TTD's and DCA's for retained heaters.

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- Pg.19, PEPSI Model: validate MUR PEPSI model against plant data following MUR implementation. PEPSI model will be used as equipment design input.
- Pg.19, PEPSI Model: Siemens will provide preliminary turbine PEPSI model input in September 2007 as requested. PEPSI model to be updated with final turbine PEPSI model input after final turbine design is established.
- Pg.20, FATHOM model: add Secondary Cooling System (SC) to list of systems. Need to verify uprated SC system will provide sufficient cooling water to specific locations in the system (i.e. Generator H2 coolers). System flow control valves should be evaluated. The LO Cooler temperature control valve may need to be enlarged. The SC system header pressure control setpoint can be increased 10-15 psi due to increasing the generator H2 gas pressure from 60 psig to 75 psig. Ref.Pg.43, SC Pump EC section.
- Pg.22, Condenser Evaluation; Required output of the HES flow induced vibration analysis is to identify tube bundle locations where steam impingement plates should be installed. Impingement plate additions were recommended by HES during the CR3 previous condenser tube failure analysis.
- Pg.23, Feedwater Heater Evaluation, add "feedwater heater relief valve setpoints and relieving capacity evaluation" to scope of work.
- Pg.24, Secondary Cooling Maximum; add logistical evaluation for removing existing SC coolers and installing larger heat exchangers into turbine building.
- Pg.28, Turbine Building Structural Evaluation; Turbine Pedestal Foundation Evaluation will NOT be performed by the turbine manufacturer. The turbine manufacturer will provide the increased loading data. The Turbine Generator Pedestal Structural Analysis, S95-0021, must be revised under this scope of work. Analysis S95-0021, dated June 20, 1995, was performed by Gilbert Commonwealth.
- Pg. 30, Engineering Change Packages; Areva shall perform all work in accordance with current revision to EGR-NGGC-0005, Engineering Change. Same comment Pg.51.
- Pg. 30, Engineering Change Packages; include "mark-up" of FSAR for each EC to support consolidated EPU FSAR revision.
- Pg. 30, Engineering Change Packages; Separate EC packages will be issued for equipment procurement specifications.
- Pg.35, LP Turbine Replacement; The turbine vendor will not perform turbine foundation calculations or revise design basis foundation calculations. Calculation S95-0021 shall be revised under this workscope. Same comment Pg. 37, Pg.55, Pg.60 and Pg.61.
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- Schedule Attachment, review for equipment specifications / procurement EC's needed by end of October, 2007. Too much equipment is identified to be specified by October, 2007. The feedwater heaters (CDHE-3A/B) and the SC heat exchangers Impellers and Motors are priority components.

CR3 Extended Power Uprate, Secondary Systems Upgrade Bid Proposal Technical Evaluation

08/23/07

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2) MSR replacement and MSR belly drain heat exchanger addition.
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4) Deaerator bypass line addition.
5) Isophase bus duct cooling system.
6) Feedwater heater and heater drain system modifications.
7) Secondary service closed cycle cooling system modifications.
8) Circulating water system modifications.
9) Condensate pumps and motors.
10) Feedwater booster pumps and motors.
11) Feedwater control valves and control system stability analysis.
12) Condenser evaluations.
13) Electrical distribution calculations.
14) Mechanical ultimate heat sink calculations.
15) Turbine building structural evaluation.

A request for proposal # KS12007 addendum letter was issued on August 14, 2007. The addendum letter added two (2) additional work scopes and responded to questions by the bidders.
The additional work scope items included:

1) Internal flooding analysis due to increased circulating water flow.
2) Plant operating license amendment support.

Enercon Proposal Review Notes:

- Proposal includes total work scope.
- Proposal includes estimated man hours per major task. Proposal includes cost per major task as well as total not to exceed cost for full work scope.
- Enercon appears qualified to perform work scope based on work references and personnel resumes included in proposal. Recommend to review Enercon project management team for power uprate project experience.
- BOP Piping Analysis Scope does not appear to be included. Areva scoping study report # 51-9043794-000 Section 3.4.1.3 "pipe support / water hammer" identifies 16 piping calculations (ref. App. J) and the main steam pipe hammer calculation M73-1002 need developed or revised.
- Schedule Comment: Prioritize the 2007 procurement of the 2 feedwater heaters (CDHE-3A/B), the 2 SC heat exchangers and the SC pumps / motors. All other equipment procurement EC can be postponed to 2008.
- Verify existing design basis documents and affected FSAR sections will be "marked up" for each EC.

- Pg.5, PEPSE Model, add YUBA estimated feedwater heater TTD's and DCA's for retained heaters; validate MUR PEPSE model against plant data following MUR implementation. Siemens will provide preliminary turbine PEPSE model input in September 2007. PEPSE model to be updated with final turbine PEPSE model input after final turbine design is established.
- Pg.5, FATHOM model; add Secondary Cooling System (SC) to list of systems. Need to verify uprated SC system will provide sufficient cooling water to specific locations in the system (i.e. Generator H2 coolers). System flow control valves should be evaluated. The LO Cooler temperature control valve may need to be enlarged. The SC system header pressure control setpoint can be increased 10-15 psi due to increasing the generator H2 gas pressure from 60 psig to 75 psig.
- Pg.9, Commercial and Resource Proposal; review "billing in accordance with master service agreement for T&M" vs. the not to exceed prices stated in the proposal.
- Pg.10, Item 7; CHECWORKS program at CR3 will be utilized.
- Pg.10, Item 8; Final PEPSE model after all new equipment is specified is not in scope.
- Pg.10, Item 9; Enercon site liaison is expected to obtain design basis information. Reliance on site engineering to provide design basis information is not desired.
- Pg.11, Item 12; The proposal does not include a PEPSE model for the 2009 plant condition. The 2009 plant configuration heat balance model will be performed by Siemens to support turbine performance guarantee and performance testing. Add, "Enercon shall support this effort as needed to accurately model the plant configuration". Evaluate having Enercon perform an independent 2009 model to compare with Siemens model.
- Pg.20, Assumption item 3 and 4; all valves on piping associated with the new MSR belly drain heat exchangers shall be evaluated. New valves shall be specified for procurement however a procurement EC should not be required.
- Proposal requires CR3 plant cable databases will be updated by plant engineering.
- Pg.24, Turbine Vendor Information; will not be as extensive as described in the proposal. The turbine vendor will provide new complete turbine generator instruction manuals and the turbine generator installation instructions. The existing turbine generator vendor drawing file will have to be reviewed for impact. A turbine performance test procedure shall be developed and shall be in accordance with ASME PTC 6 – 2004, Alternate test for nuclear plant.
- Pg.28, Turbine Generator Assumptions; The SC piping to the generator H2 coolers may be impacted; Turbine Generator instrument and control setting changes will be provided by Siemens and shall be included in the turbine EC; Generator Instruments will be impacted and shall be evaluated; Turbine Generator support systems will be evaluated by Siemens. Any impacts identified by Siemens shall be included in the turbine EC.
- Pg.29, Turbine Generator Assumptions 17; Calculation S95-0021, Turbine Generator Pedestal Structural Analysis, shall be "updated" using the methodology contained in the analysis. A three dimensional analysis model of the turbine pedestal structure is included.
- Pg.39, Bus Duct Deliverables; Verify evaluation of bus duct electrical capacity (bus duct rating) will be performed in conjunction with the bus duct cooling EC.
- Pg.59, SC System Workscope Item 10; Verify hydraulic evaluation includes system flow balance, system heat loads are satisfied and system flow control valves are evaluated. Note the SC system pressure setpoint can be increased due to increasing generator H2 pressure.
- Pg.59, SC System Workscope Item 11; The turbine lube oil temperature control valve should be replaced with a larger valve.

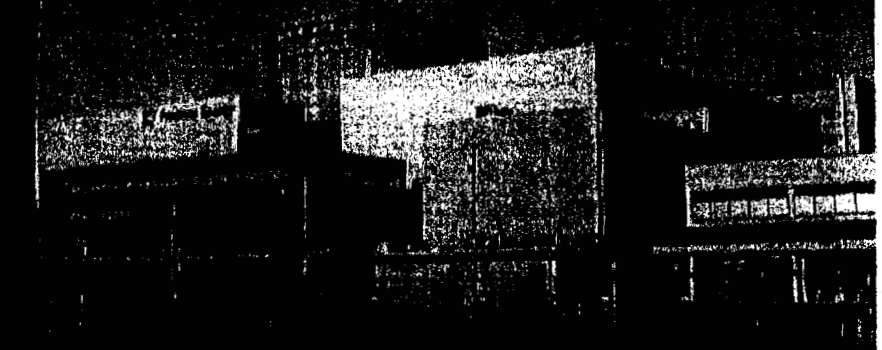
- Pg.60, SC System Work Performed by Others; Enercon should interface with equipment vendors to obtain design input information and not rely on PE to perform this function. This comment applies to all equipment and all "work by others" sections of the proposal.
- Pg.64, SC system Assumptions; defined work scope does not address interferences to replace the major SC components. EC installation instructions must address these issues.
- Pg.94, FW Booster Pump Assumption 15; A larger pump / motor will be specified. Impacts to the support pedestal and piping can be expected.
- Pg.99, Condenser Evaluation, HES shall provide the Condenser Evaluation CFD Analysis. The HES CFD analysis is an input to the condenser tube bundle tube vibration analysis which is subcontracted by HES. The Condenser Tube Bundle Tube Vibration Analysis should be identified as a deliverable and shall identify tube bundle locations where steam impingement plates should be installed. Impingement plate additions were recommended by HES during the CR3 previous condenser tube failure analysis. Steam impingement plates should be installed during the 2009 LP turbine replacement.
- Pg.115, Electrical Distribution Calculations; Review proposal to consolidate existing electrical calculations into new ETAP. Evaluate cost of converting vs. updating existing electrical calculations.

Appendix B, Consolidated Project Schedule Comments:

- October 07 PEPSE model is "initial" EPU model. Final PEPSE model shall be submitted after all plant design changes have been specified and inputted into the model.
- MSR drain mod procurement EC can be postponed to 2008.
- All turbine generator and MSR schedules shall be compared to and coordinated with the equipment vendor's engineering deliverable schedules. The schedule for issuing the installation EC packages shall be determined by the owner.
- The turbine pedestal calculation schedule shall be accelerated and will support final calculation expeditiously upon receiving final input data from Siemens.
- Deaerator procurement EC can be postponed to 2008.
- Isophase Bus Duct procurement EC can be postponed to 2008.
- Isophase Electrical Capacity Calculation shall be performed in conjunction with designing the bus duct cooling system.
- Turbine Building Structural Evaluation is scheduled to complete by 12/12/07. This does not appear feasible.

More Power to the People of Florida

Crystal River 3



AREVA NP and WorleyParsons's Team

Committed to Cost Minimization, Schedule Optimization and Preserving Operational Margins

Executive Summary

August 2007

AREVA

This Executive Summary, including any drawings submitted or pertaining thereto, is the property of AREVA NP Inc. It contains confidential information and is loaned to Progress Energy on the condition that Progress Energy, or Progress Energy's representatives, by accepting the Executive Summary, agrees not to furnish information from it to others without permission, or to make use of the Executive Summary other than for evaluation. Pricing is for estimating purposes only and is not contractually bound. Progress Energy agrees to return this Executive Summary if requested.

DOCUMENT NUMBER-DATE

03238 APR 22 8

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This document contains 278 pages including Appendices A through T.

DOCUMENT NUMBER-DATE
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CONFIDENTIAL

DOCUMENT NUMBER-DATE
03238 APR 28
FPSC-COMMISSION CLERK

Proposed Invoice Milestone	Date	Invoice Amount	Year Totals
Upon Contract Award (10% of contract value)	Friday, September 14, 2007	[redacted]	
PEPSE Model - Uprate Case	Thursday, October 11, 2007		
Feedwater Heater Purchasing Specification EC	Wednesday, November 07, 2007		
SCHE Purchasing Specification EC	Friday, November 23, 2007		
SC Pump / Motor Purchasing Specification EC	Friday, November 23, 2007		
FATHOM Analysis Complete	Friday, December 07, 2007		[redacted]
Isophase Bus Duct Purchasing Specification EC	**Monday, January 28, 2008**		
MSR Belly Drain HX Purchasing Specification EC	**Monday, January 28, 2008**		
Deareator Bypass Purchasing Specification EC	Wednesday, February 06, 2008		
Heater Drain Valve Purchasing Specification EC	Friday, February 08, 2008		
MSR Belly Drain 30% EC Package Review Complete	Monday, March 10, 2008		
Condenser Evaluation and FIV Analysis	**Tuesday, April 15, 2008**		
LP Turbine 30% EC Package Review Complete	Tuesday, April 29, 2008		
SC Heat Exchanger 30% EC Package Review Complete	Tuesday, May 27, 2008		
MSR Replacement 30% EC Package Review Complete	Tuesday, May 27, 2008		
Dearator Bypass, 70% EC Package Review Complete	Wednesday, June 25, 2008		
Isophase Bus Duct 70% EC Package Review Complete	Tuesday, July 08, 2008		
Main Generator 30% EC Package Review Complete	Friday, July 25, 2008		
FWH Replacement 70% EC Review Package Complete	Friday, August 01, 2008		
HP Turbine 30% EC Package Review	Friday, August 15, 2008		
MSR Belly Drain EC, Final DRB Comments Incorporated	Friday, August 22, 2008		
SC Heat Exchanger 70% EC Package Review Complete	Tuesday, September 02, 2008		
LP Turbine EC, Final DRB Comments Incorporated	Monday, September 08, 2008		
Dearator Bypass EC, Final DRB Comments Incorporated	Thursday, September 25, 2008		
SC Heat Exchanger EC, Final DRB Comments Incorporated	Tuesday, October 14, 2008		
MSR Replacement, Final DRB Comments Incorporated	Monday, October 27, 2008		
SC Pump and Motor EC, Final DRB Comments Incorporated	Tuesday, November 18, 2008		
FAC Report	Friday, December 12, 2008		
Main Generator EC, Final DRB Comments Incorporated	Friday, December 12, 2008		[redacted]
HP Turbine EC, Final DRB Comments Incorporated	Monday, January 19, 2009		
Condensate Pump and Motor Purchasing Specification EC	Tuesday, February 10, 2009		
Feedwater Booster Pump 30% EC Package Review	Friday, February 27, 2009		
CW Pump / Motor Purchasing Specification EC	Tuesday, March 24, 2009		
Condensate VSD Purchasing Specification EC	Wednesday, April 29, 2009		
Condensate Pump / Motor EC Design Specification	Tuesday, May 26, 2009		
Feedwater Booster Pump 70% EC Package Review	Friday, June 05, 2009		
Feedwater Booster Pump EC, Final DRB Comments Incorporated	Friday, July 17, 2009		
Circulating Water Pump / Motor EC Design Specification	Tuesday, July 28, 2009		
Condensate Pump / Motor 30% EC Package Review	**Monday, August 03, 2009**		
Circulating Water Pump / Motor 30% EC Package Review	Tuesday, September 29, 2009		
Feedwater Booster Pump Purchasing Specification EC	**Friday, October 02, 2009**		
Condensate Pump / Motor 70% EC Package Review	Tuesday, November 03, 2009		
Condensate Pump / Motor EC, Final DRB Comments Incorporated	Tuesday, December 15, 2009		[redacted]
Circulating Water Pump / Motor 70% EC Package Review	Tuesday, January 05, 2010		
Circulating Water Pump / Motor EC, Final DRB Comments Incorporated	Tuesday, February 16, 2010		
Condensate VSD EC Design Specification	Thursday, May 27, 2010		
Condensate VSD 30% EC Package Review	Thursday, July 29, 2010		
Condensate VSD 70% EC Package Review	Thursday, November 04, 2010		
Condensate VSD EC, Final DRB Comments Incorporated	Thursday, December 16, 2010		[redacted]
	Total Fixed Price:		

REDACTED

Note: Bold dates indicate minor schedule changes.

July 27, 2007

PROGRESS ENERGY SERVICE COMPANY, LLC
CR3 NUCLEAR PLANT
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADE
REQUEST NO. KS12007

Dear Bidder:

This addendum adds requirements to the above-referenced Request for Proposal and provides answers to several questions raised by bidders. The questions and respective answers are attached. In addition, the following two new requirements are added to the RFP:

- Bidder shall include an analysis of Internal flooding due to the increased "Circulation Water" flow rate of approximately 22%.

- Bidder shall include provisions in their bid for License Amendment input.

All other terms and conditions remain unchanged. Questions pertaining to this addendum should be directed to the appropriate individual listed in the original Request for Proposal.

DOCUMENT NUMBER-DATE
03238 APR 22 08
FPSC-COMMISSION CLERK

Your acknowledgement of receipt of this addendum should be noted on your proposal. Failure to do so may constitute grounds for rejection of your bid.

PROGRESS ENERGY SERVICE COMPANY, LLC

_____

Tony Owen

Manager NGG Major Projects

__/__

Attachment

Attachment A to Request No. KS12007

Certain bidders have asked the following questions in regards to RFP No. KS12007, so this addendum is in answer to those questions and available to all bidders. A question and answer format has been used.

Turbine building structural evaluation comments/clarifications:

Question: Sections 1.2.13 and 1.9.15 discuss "Conduct an evaluation of the Turbine Building structure considering the expected additional loads resulting from installation of new and larger equipment" and "Perform an evaluation of the Turbine Building structure and supports to identify if any significant changes are required to accommodate the expected increases in loads resulting from new and larger equipment such as turbine motors, main generator, etc.". Both statements imply there is an evaluation for the existing building loads. What calculations cover the existing TB evaluations, and will these be made available?

Answer: Original calculations are Gilbert Commonwealth structural calculations and will be made available. Estimate 200 hours to review and revise calculations as necessary.

Question: The statements in sections 1.2.13 and 1.9.15 ask for an evaluation to see if significant changes are required. Please define the term "significant" changes versus others?

Answer: "Significant changes" in design loads would be those that would not meet current acceptance criteria and would require modifications to the existing floor or support columns.

Question: There is no mention of what to do when changes are required. When changes are required, are they included with this scope or handled separately outside of this scope?

Answer: The modifications would be scope addition and would be priced separately as T&M, if required.

Question: Section 1.12 discusses the schedule for the Turbine Building evaluation (Item 15) and is scheduled to be completed 12/13/07. It is noted that a PO will not be submitted to anyone before late August. Before the TB evaluation can be done, inputs for the weights and footprints of all equipment must be known. This includes major components such as the turbine and MSRs. When will the detailed vendor information be available and the locations within the TB be defined? The schedule indicates that equipment information will not be known until after the deadline for the TB evaluation, which would invalidate the TB evaluation schedule. It appears the schedule needs to be reworked to define predecessor activities for all tasks.

Answer: The weights of the replacement components are readily available and will be provided as part of the Owners deliverables within the schedule.

Electrical comments/clarifications:

Question: Section 1.9.5 asks for the complete replacement of the existing system with the 2 X 100% new system each with 100% motor/fan and cooling coils, while Section 1.2.1 discusses upgrade cooling unit to have redundant fan/motor and cooling coils. The existing unit can not be upgraded to have redundant fans. Therefore two 100% new units would be required.
Is the plant replacing the existing cooling unit with two new 100% redundant units or upgrading the existing unit with redundant motors to meet the design requirements?

Answer: Iso phase bus duct coolers should be replaced with 2 X 100% redundant coolers and fans.

Attachment A to Request No. KS12007

Question: Booster Feed Water pump motors are up-rated to 4000 HP. The 4 KV Aux and startup transformers may become overloaded and 4KV switchgear will not likely handle all of EPU load requirements. It is recommended that before writing the spec proposal for the FW Booster Pump, an evaluation on the power distribution system be performed to determine what voltage class motors are required. This should be performed prior to preparing the pump/motor specification. Should the Bid Specification identify the need to prepare a preliminary electrical system design review prior to preparing the FW Booster Pump motor spec (4KV level)?

Answer: The Feed Water Booster pump motor replacement and modification should include rerouting the load center from the 4160V to the 6900V switch gear.

Question: The draft bid specification identifies the need to revise the Non-Safety 125 VDC calculation using the ETAP model. If this calculation will not be affected by the EPU, what is the basis for upgrading the 125 VDC calculation using the ETAP program?

Answer: If 125VDC calculations are not affected then state as such within your exception conformance tables for the proposal.

Question: The bid specification recommends performing the voltage drop and short circuit calculation using the SKM software tool. Can CR3 provide the overall plant model in the SKM software environment?

Answer: CR3 will provide modeling as currently exists for electrical load centers.

Question: The specification limited this scope to a revision of calculation E90-0044. Is it Progress Energy's intention to limit the scope of the ETAP proposal to only one calculation? The ability to comprehensively update all the individual calculations using multiple software programs, spreadsheets, etc. is limited (especially those calculations performed by other third parties). Would Progress Energy support developing an overall plant electrical distribution model using the Progress Energy ETAP program to incorporate all design changes from the EPU?

Answer: Provide a comparison of costs for updating the entire electrical system to ETAP instead of revising all current software programs and calculations. Prudence will dictate decision. If costs, resource, and schedule are better by modeling the whole system in ETAP then CR3 can support this approach.

Clarification/Comments to Condensate Pump/VFD/Motor Request:

Question: Suggest separating the pump and motor ECs from the VFDs. These are actually 2 different product offerings and if the equipment is combined, it may limit the options available for separating pumps from VFD vendors.

Answer: Condensate Pump and Motor and Control system may be separated and designed as separate ECs.

Attachment A to Request No. KS12007

Clarification on the ICS system:

Question: Is it the intent that the Integrated Control System modifications be performed in-house by PEF or other contracted entities?

Answer: PEF will perform ICS modifications.

Clarification/Comment to Equipment Specification and Design Specification definition:

Question: The terms Equipment Specification and Design Specification appear to be interchangeable. Are these reference terms the same in the PEF system? Please clarify if they are not the same.

Answer: Design Specifications are the requirements for the component or system parameters provided in an engineering document. Equipment Specifications are the PEF Engineering Documents that are used to order equipment in accordance with EGR-NGGC-0020. Note 4 has the issuance of Equipment Specifications developed per NGGC-EGR-0020 also requires generation of an EC per EGR-NGGC -0005

Clarification/Comment on the Reference to Affected Calculations:

Question: Section 1.9.14 references more than 5 calculation documents out of the ~1500 calculations that will need to be revised or evaluated. Are these other affected documents to be included in the respective EC package preparation, or are the critical documents determined to be the 5 identified in the RFP with any other documents to the scope to be defined later?

Answer: Additional calculations not identified within the RFP should be identified and may be bid as part of a fixed price proposal or identified that they will be addressed separately as T&M.

Clarification/Comments on the schedule:

Question: A brief review of the schedule noted that there are a number of instances where items are to be completed prior to a predecessor task being completed, or, not enough time has been allotted for the task based on a projected authorization date. A couple of examples include: the reference to the PEPSE model being completed by 9-20-07 when a typical PEPSE analysis and documentation takes 8 weeks to complete after the receipt of the turbine thermal kit. As mentioned previously, the turbine building structural evaluation is scheduled to be completed prior to the completion of the ordering and ECs for turbine items, MSRs, etc. Please clarify.

Answer: A completed PEPSE Analysis was requested by the TG Vendor in order to perform the Thermal Kit Analysis. Subsequent conversations have identified that a completed PEPSE run is not required. However, the data sheet in the RFP shows what data will be required by the end of Sept to support the LP and HP turbine rotor designs. The weights of replacement components are readily available and can be provided for the Structural evaluation in order to meet desired schedule.

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADE
REQUEST FOR PROPOSAL NO. KS12007

LIST OF BIDDERS:

1. AREVA NP, Inc.
   7207 IBM Drive
   Charlotte, NC 28262
   Attention: Tom Doering

   (704) 805-2357
   thomas.doering@areva.com

2. Enercon Services, Inc.
   500 Town Park Lane
   Suite 275
   Kennesaw, GA 30144
   Attention: Jim Gannon

   (770) 919-1930
   jgannon@enercon.com

3. Sargent & Lundy, LLC
   55 East Monroe St.
   Chicago, IL 60603-5780
   Attention: Chris Sward

   (312) 269-7426
   chris.a.sward@sargentlundy.com

4. TechCom International Corporation
   440 Goddard
   Irvine, CA 92618
   Attention: Bob Katebian

   (949) 453-0660 ext. 222
   katebian@tci-corp.com

5. WorleyParsons
   2675 Morgantown Road
   Reading, PA 19607-9676
   Attention: John Ioannidi

   (610) 855-2000 ext. 2493
   john.ioannidi@worleyparsons.com

June 6, 2007

_____
_____
_____

Attention:

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADE
REQUEST FOR PROPOSAL NO. KS12007

Dear Bidder:

You are invited to submit a proposal for providing engineering services on secondary system components, including preparation of design specifications, equipment specifications, Engineering Change Packages and calculations for work necessary to increase the electrical generation by 20% (EPUR). Three per cent of the increase in generating capacity is to be achieved by improvements to the secondary plant performance (see the Scope attached for additional details). This EPUR will occur at Progress Energy's Crystal River Nuclear Power Station, Unit 3 located at 15760 West Powerline Street, Crystal River, Florida 34428.

You are requested to provide two (2), signed copies of the proposal (one priced and one unpriced) plus one electronic copy of each shall be sealed and marked "CONFIDENTIAL" and submitted to Tony Owen, Progress Energy Service Company, LLC, P. O. Box 1551 (PEB 2C1), Raleigh, NC 27602. Overnight delivery should be sent to 410 S. Wilmington Street (PEB 2C1), Raleigh, NC 27601. The proposal must be sealed and marked as noted above in a separate envelope inside the overnight envelope. No copies of the proposal shall be distributed to any other Progress Energy personnel by the bidder. Your proposal must be received no later than **12:00 noon, August 6, 2007**. If your proposal is received after that day or time, it will not be considered for the described work. Telephoned or faxed proposals or proposal information are unacceptable and will not be considered. No modifications to the bidder's proposal will be accepted after the bid due date and time specified above unless specifically requested by Progress Energy in writing.

Bidder is requested to complete, sign, and return the General Information form attached in its entirety and to furnish all information requested on this form. Bids will not be considered when submitted on forms other than those provided.

It is intended that a contract in the form of the attached specimen contract will be awarded for this work and quotations shall be made accordingly, unless the successful bidder has an existing Master Contract with Progress Energy, in which case a Work Authorization will be released against that Master Contract incorporating the details of this Inquiry.

257906

Progress Energy does not obligate itself to accept the lowest or any other bid and specifically reserves the right to reject any and all bids. Bidders are advised that all bids will be opened and evaluated solely by Progress Energy. All information contained in the bids submitted to Progress Energy and Progress Energy's evaluation, including any bidder's relative position to the successful bidder, is considered exclusive information of Progress Energy and will not be made available to any of the bidders. All unsuccessful bidders will be notified by Progress Energy in writing of the award of the work to another firm.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the commercial aspect of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Tony Owen via e-mail at tony.owen@pgnmail.com or by phone at (919) 546-2933 by the bidder only.

All requests for clarifications, interpretations or decisions on discrepancies pertaining to the technical aspect of the proposal documents or related project data furnished as part of the proposal documents shall be made directly to Ted E. Williams at the Crystal River Nuclear Plant (CNP) at (352) 563-2943, extension 4356, or email address ted.williams@pgnmail.com by the bidder only.

It is the bidder's responsibility to advise his potential subcontractors, suppliers, and other subvendors that information will be available only through the bidder and that no direct contacts with Progress Energy by subtier firms shall be initiated. Information exchange shall be between Progress Energy and bidder, and bidder and his potential subcontractors. No work shall be subcontracted without the approval of Progress Energy. Subcontract work and proposed subcontractors must be identified in bidder's proposal.

As a prerequisite for consideration of a bidder's proposal, bidder must contact the site of the proposed work, discuss job conditions with Progress Energy's designated representative, become acquainted with the technical requirements of the work and all available information and local conditions which may possibly occur in the course of the work, and make his choice of methods and equipment accordingly. Contact appointments must be made with Ted Williams at the Crystal River Nuclear Plant. No site visits will be allowed without prior appointment with the above named person.

Please acknowledge receipt of this proposal and your bidding intentions by completing the attached Acknowledgement Form and faxing it to Tony Owen at (919) 546-6750 within two business days.

PROGRESS ENERGY SERVICE COMPANY, LLC

By: _____

Tony Owen
Manager, NGG Major Projects

Attachments to this RFP:

Acknowledgement
General Information
Scope and Other Requirements
Sample Contract (if applicable)
Bid Specification
Table of Conformance
Contractor Safety Checklist

ACKNOWLEDGEMENT

Mr. Tony Owen
Progress Energy Service Company, LLC
P. O. Box 1551 (PEB 2C3)
Raleigh, NC 27602
Fax: 919-546-6750

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADE
REQUEST FOR PROPOSAL NO. KS12007

I acknowledge receipt of the subject proposal package and have indicated my bidding intentions as follows:

_____ I have reviewed the proposal documents and will not be submitting a bid for this work. Proposal documents are being returned under separate cover.

_____ I have reviewed the proposal documents and intend to submit a bid for this work and will make arrangements to contact or visit the site as requested.

_____
(Signature)

_____
(Name)

_____
(Title)

_____
(Company)

_____
(Date)

GENERAL INFORMATION

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADE
REQUEST FOR PROPOSAL NO. KS12007

Contractor visited the site [ ] and/or contacted [ ] the site on _____ and discussed job conditions with _____ to acquaint himself with the technical requirements of the work and all available information and local conditions which may impact pricing of the subject Inquiry No. _____.

In the event that your Proposal is accepted and a Contract is awarded to the firm whose full legal company name appears herein below, Mr./Ms. _____ whose title is _____, will be executing the Contract on behalf of the firm. Should this person's title not indicate that he/she is a corporate officer (president, vice president, or corporate secretary), an affidavit signed by a corporate officer shall be provided along with the bid, stating that the person whose name appears above is duly authorized to execute contracts on behalf of the firm.

The Contractor is: (select appropriate line and complete information)

An Individual: _____

A Corporation of the State of _____

A Partnership consisting of _____

A Joint Venture comprised of _____

Full Legal Company Name _____

Business Address _____
_____

Mailing Address _____
(if different) _____

Contact Name _____

Contact Phone _____

Contact E-Mail _____

Company Website _____

Federal Tax ID Number _____

Contractor's License Number (if applicable) _____ State of Issuance _____

In accordance with the Federal Acquisition Regulation section 52.219, please check all that apply to your company. Please provide supporting documentation or certification to confirm the status for any categories checked under Small/Diverse Vendors.

[ ] Certified small business*
[ ] Veteran-owned business*
[ ] Service-disabled veteran-owned business*
[ ] Not a Small Business
[ ] HUBZone, 8(a) or disadvantaged business*
[ ] Minority-owned business * *
[ ] Women-owned small business * *

* As defined by the Small Business Administration (SBA): www.sba.gov
* * Certified by Progress Energy and as defined by SBA.

Register online at www.progress-energy.com/supplierdiversity

BY: _____

NAME (printed): _____

TITLE: _____

DATE: _____

PROGRESS ENERGY FLORIDA, INC.
CRYSTAL RIVER NUCLEAR PLANT, UNIT 3
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADI
REQUEST FOR PROPOSAL NO. KS12007

LIST OF BIDDERS:

1. AREVA NP, Inc.
   7207 IBM Drive
   Charlotte, NC 28262
   Attention: Tom Doering

2. Enercon Services, Inc.
   500 Town Park Lane
   Suite 275
   Kennesaw, GA 30144
   Attention: Jim Gannon

   (770) 919-1930
   jgannon@enercon.com

3. Sargent & Lundy, LLC
   55 East Monroe St.
   Chicago, IL 60603-5780
   Attention: Chris Sward

4. TechCom International Corporation
   11 Redondo
   Laguna Niguel. CA 92677
   Attention: Bob Katebian

   (949) 453-0660 ext 222
   katebian@tci-corp.com

5. WorleyParsons
   2675 Morgantown Road
   Reading, PA 19607-9676
   Attention: John Ioannidi

SCOPE AND OTHER REQUIREMENTS

PROGRESS ENERGY SERVICE COMPANY, LLC
CRYSTAL RIVER NUCLEAR PLANT, UNIT #3
REQUEST NO. KS12007

SCOPE:

The scope of this request for proposal (RFP) is to supply engineering services to prepare design specifications, equipment specifications, Engineering Change packages and calculations for work necessary to increase the electrical generation at Progress Energy's Crystal River Unit 3 (CR3) by approximately 20% by achieving a 17% increase in reactor power and a 3% increase due to improvements in secondary plant efficiencies. This work includes preparation or revision to specifications for heat exchangers, pumps and valves, and conducting engineering design and analysis and is limited to secondary system components. The scope is further detailed in the bid specification.

The Crystal River Unit 3 Nuclear Power Station (CR3), located near Crystal River, FL presently generates 903 MWe at 100% reactor power (2568 MWt).

SCHEDULE:

Proposals shall be submitted within 28 days following receipt of the proposal request.

Specific work for this proposal as noted in Section 1.12 must be completed in accordance with the submittal due dates as noted in Section 1.12.

Turbine/generator retrofit for Crystal River Unit 3 is scheduled for completion during the fall 2009 refueling outage. Implementation of an extended reactor power uprate of 17% is scheduled to be completed during the fall 2011 refueling outage.

TERMS AND CONDITIONS

Terms and Conditions will be in accordance with your Master Contract (or in certain cases the attached sample contract). Certain specific terms may be renegotiated for this specific proposal and those agreements will take precedent over the Master Contract.

EXECUTION OF PROPOSAL:

The full corporate firm or individual name and exact address shall appear on your proposal form. The signature must be that of a corporate officer or authorized person followed by their title. The signature(s) of all authorized persons signing the Proposal shall be in ink and in longhand.

BIDDER'S PROPOSAL:

Bidder is required to submit two (2) signed copies (one priced and one unpriced) and one (1) electronic copy of the entire proposal giving complete descriptive information covering Bidder's solution, including engineering, construction, procurement, testing, and related work proposed to be furnished which meets or exceeds all functional requirements of Progress Energy's (PE's) RFP. Also, acknowledge that PE shall have permission to

make additional copies of Bidder's proposal, attachments, and any other submitted materials. The proposal form and any other requested attachment that contains prices must be submitted in a sealed envelope separate from the other submittals requested herein. Bidder's proposal as appropriate shall include the following:

a. A cover letter with an inventory of the contents of the complete proposal.

b. A clear description of your company's solution proposed to meet all functional requirements of the Requirements Documents and the methods used to perform those functions.

c. The Bidder shall complete the Table of Conformance for the Scope(s) of Work contained herein, and by responding to each section, heading and subheading in the order they appear. The Bidder shall indicate for each whether your proposed solution will conform or deviate. The heading or subheading includes all paragraphs up to the next heading or subheading. Bidder may respond to individual paragraphs under such headings or subheading. Sections, headings, and subheadings are those numbered, in bold print and/or underlined. In preparing the Table of Conformance, Bidder must use Microsoft Excel; Bidder is encouraged to utilize the redlining technique in Microsoft Excel appropriately (i.e., sample contract document). The completed Table of Conformance shall be submitted electronically with the proposal with an active Excel spreadsheet.

Further, the Bidder shall provide details of nonconformance, such as an exception, alternate or enhancement (see below) on the Tables of Conformance in the comments section. If additional space is needed use numerical notation to reference your comments and provide as an attachment. If the Bidder fails to supply the Tables of Conformance, PE will assume the Bidder's proposed system is in conformance with the Scope(s) of Work and all other documents furnished with this RFP, and if the Bidder is the successful Bidder, the Bidder shall be required to meet all requirements without exception. The only acceptable classifications in the Tables of Conformance (to be indicated by letter) are:

C (Conform) - The Bidder meets the requirement in the manner indicated.

X (Exception) - An approach which does not meet the requirements or a requirement the Bidder declines to meet.

A (Alternate) - An approach which is substantially different from the suggested approach but which meets the stated requirements.

E (Enhancement) - An element not required by the Requirements Documents but offered for consideration.

The technical response as expressed in the Tables of Conformance shall be such as to enable PE's personnel to make a thorough and complete evaluation and arrive at a sound determination as to whether or not the solution proposed and described will satisfy the requirements of PE. The proposal should be specific, detailed, and complete to clarify and fully demonstrate that the Bidder has a thorough understanding of the requirements for and technical problems inherent in the performance for the described Work. It should also demonstrate that the Bidder has a valid and practical solution for such problems.

Statements that the Bidder understands the Scope(s) of Work or that Bidder can or will comply with all requirements and statements paraphrasing the requirements or parts thereof are considered insufficient. Phrases such as "Standard procedures will be employed," "Well-known techniques will be used," etc., will be considered insufficient. The proposal must be sufficient to indicate how the Bidder proposes to comply with all requirements and procedures to be exercised. Clarity and completeness of the technical approach will be given much attention. Only written data submitted with the proposal and subsequent clarifications will be considered. Orally submitted data will not be considered.

All information pertinent to a particular requirement item of the Scope(s) of Work must be given in each

place in the proposal at the expense of some (but not excessive) redundancy if necessary.

d. Answer all questions proposed by PE. The response to each question shall be cross-referenced to the Bidder's proposal where applicable.

e. Bidder shall acknowledge that discounts provided by hardware suppliers to Bidder, at the time of submitting Bidder's proposal, shall also apply to the actual hardware that will ultimately be furnished PE, regardless of size or quantity. Further, in the event any greater discounts are received by Bidder at the time of delivery, Bidder shall proportionally pass such discounts on to PE.

f. Provide a preliminary milestone schedule for accomplishing this work.

SPECIAL REQUIREMENTS:

Familiarity with Laws:

The Bidder is assumed to be familiar with all federal, state, and local laws, ordinances, and regulations which may in any manner affect those engaged or employed in the work, the materials or equipment in the work or the conduct of the work. PE should be immediately contacted for clarification if a bidder should discover provisions in any drawings, specifications or contractual documents contrary to or inconsistent with any such law, ordinance or regulation.

Confidentiality:

All drawings, specifications, and contractual documents will remain the property of Progress Energy and are to be returned in good condition within ten (10) days after the date set for receiving bids. These documents shall not be reproduced or used for any purpose other than for the preparation of a proposal in accordance with this request. The information contained in these documents is proprietary and confidential and shall be maintained in strict confidence.

Interpretation:

An interpretation request shall be made to Progress Energy if a bidder is in doubt as to the true meaning of any part of the drawings, specifications, or contractual documents. Modification of the documents will be made only by written addendum issued to each bidder as described below.

Exceptions:

If a bidder's proposal contains any deviations or exceptions, those deviations or exceptions must be specifically identified either in the Table of Conformance or on a single separate attachment to the proposal in order to be considered in the evaluation. If not so identified, the deviations or exceptions will not be considered part of the proposal. Conditional proposals based on bidder-generated clarifications may not be accepted. If a bidder takes any exceptions in addition to those submitted in accordance with this section, that bidder's proposal may be rejected by Progress Energy.

Sample contract documents are not included for bidders possessing a Master Contract with Progress Energy. All other bidders, if successful, will review and redline the enclosed SAMPLE contract format. Any exceptions to the contract documents must accompany the proposal as detailed above and the exceptions will be considered in the bid evaluation process.

Approved Equal Evaluation:

Submittals by bidders for evaluation of products as "approved equal" shall be made to the appropriate

designated individual listed in the Request for Proposal at least ten (10) days prior to the proposal due date. Results of evaluations will be provided no later than seven (7) days prior to the proposal due date. Submittals made later than ten (10) days prior to the proposal due date will not be considered.

Addenda:

Progress Energy reserves the right to amend or clarify requirements herein by Addenda. These may be issued at any time prior to the date for receipt of proposals and may be mailed or otherwise delivered to all bidders who have been invited to bid. Request by a bidder for extension of the proposal due date shall be received by Progress Energy at least one week prior to the then scheduled date. If revisions or clarifications are of magnitude to warrant, in the opinion of Progress Energy, the extension of the date set for receipt of proposals, an addendum will be issued announcing the new date. Failure of a bidder to acknowledge receipt of any addendum in the space provided on the proposal form may result in rejection of that proposal.

Safety:

Progress Energy is committed to using safety conscious contractors. To this end, Progress Energy collects safety-related data voluntarily provided by all persons performing or desiring to perform Progress Energy work. This data is compiled and made available to Progress Energy employees via Progress Energy's intranet. This intranet system is accessible by non-Progress Energy employees, and thus, so will be any safety-related information you provide. In providing the safety-related information requested herein, to Progress Energy or to any other person doing business, directly or indirectly, with Progress Energy, the undersigned contractor explicitly authorizes Progress Energy to disclose said information to non-Progress Energy persons and hereby releases Progress Energy and its agents and employees from any cause of action or claim for damages related to said disclosures.

PE also requires that Contractor complete the attached Safety Checklist form and contractor must score appropriately (green) in order to be awarded contract.

Nuclear Requirements:

This work is classified as NON-SAFETY RELATED.

All site assigned personnel of the successful bidder who are to be granted unescorted access to the plant site are required to attend a prerequisite security/radiation training class prior to entering radiation controlled areas.

When Contractor's employees must apply for unescorted access, the screening of Contractor employees will be performed by Owner in accordance with the latest revision of the document titled "Nuclear Worker Screening Requirements for Unescorted Access," the current revision of which is attached to this Contract. The document contains instructions to the Contractor with respect to providing employees for screening by Owner. Owner will send Contractor revisions to the document, and Contractor shall acknowledge receipt of the revision in writing. In the event Contractor performs screening at Owner's request, Contractor grants to Owner the right to audit all documentation resulting from Contractor's employee screening process on its own behalf or in conjunction with the U.S. Nuclear Regulatory Commission.

Bidder's attention is specifically directed to the stringent security, fitness-for-duty, health physics, ALARA, and quality check provisions which apply to this work. These criteria are defined in the attached specimen Contract.

Award of Contract / Right to Reject Proposals:

PE will award the contract to the Bidder submitting the best evaluated proposal which complies with the requirements herein. PE will utilize Bidder's Tables of Conformance, all requested attachments, references, and

other information provided in its process of evaluating Bidder's proposal. PE may, in its sole discretion, reject any or all proposals received or waive minor defects, irregularities or informalities therein.

a. Upon reaching the award decision, PE may elect to issue a Letter of Intent to the successful Bidder. Bidder shall include a statement within its proposal as to its commitment to start work immediately and continue performance of such work upon receipt of such letter.

b. The successful Bidder may be required to furnish corporate guaranties from each of its corporate ownerships up to and including the parent corporation. Such documents will be due upon execution of the contractual document. Bidder shall include a statement within its proposal acknowledging Bidder's understanding and agreement to furnish such corporate guaranties in the form furnished with this RFP.

Schedule Risk:

Timely completion of the design work for secondary systems for Crystal River Unit 3 must be completed in accordance with the submittal due dates in Section 1.12 of the Bid Specification to support the fall 2009 refueling outage and implementation of an extended reactor power uprate of 17% during the fall 2011 refueling outage is critical to the success of this project. Therefore, the selected bidder will be asked to place profit at risk to demonstrate understanding and ownership of the schedule.

Irrevocable Standby Letter of Credit:

Bidder shall affirm on the proposal form its ability and willingness to furnish, in PE's favor, an irrevocable standby Letter of Credit per the Contract. The Letter of Credit shall remain in full force and effect during the term of the contract and may be engaged by PE in the event of Bidder's default under any such contract.

Insurance:

Furnish proof of valid insurance per contractual requirements.

Alternate Bid Formats:

A bid based on the requirements noted herein is required; however, PE encourages Bidder to propose an alternative response.

PROPOSAL INCLUSIONS:

1. Classifications of each type person you intend to bill for.
2. Hourly billing rates for each personnel classification (may be straight time/overtime or all-hours rate)
3. Billable travel and living expenses.
4. Estimated man-hours for each personnel classification.
5. Provide a maximum not-to-exceed contract dollar amount to accomplish the work.
6. Resumes of people you intend to use on this project.
7. Provide the earliest date that you could start work on this project.
8. Provide a preliminary milestone schedule for accomplishing this work.
9. Redlined copy of Sample Contract if applicable.
10. Completed Table of Conformance provided electronically as an active Excel spreadsheet.
11. Complete Contractor Safety Information/Checklist Form.

Progress Energy Contractor's Safety Information/Checklist Form

PURPOSE: Please supply the following safety information for your company. Safety is important to Progress Energy and will be used as criteria in selecting contractors. **NOTE:** ***INCOMPLETE FORMS CANNOT BE PROCESSED.***

SECTION 1: TO BE COMPLETED BY THE CONTRACTOR

Contractor Name:	
Address: **Web Site Address** (optional):	
Telephone:	
NAICS Code:	
Scope of Work:	
Name of Subcontractor(s) if applicable:	
Progress Energy Contact:	

	Yes	No	NA
Safety Program			
Please provide your current written safety manual (diskette or CD-ROM, if possible). (**Note:** Unless there are changes to the manual, resubmission is not necessary for annual reviews).			
Does your company have a high level corporate officer responsible for safety compliance? Title:			
Does your company have a formal safety program to assure compliance with safety regulations?			
Does program include:			
• Job hazard analysis and control			
• Medical management of work related injuries and illnesses			
• On-site supervision to ensure compliance with safety regulations and Progress Energy Safety policies			
• Pre-qualification and management of subcontractors to ensure compliance with safety regulations and Progress Energy Safety policies			
Does your company hold periodic crew/team safety meetings?			
• How Often?			
Does your company provide and document required initial and refresher training to prepare employees to perform duties in compliance with safety regulations? **NOTE:** If a contract is awarded, the DR will need this documentation prior to commencement of work for Progress Energy.			
Compliance History			
Has a serious, willful or repeat OSHA citation been issued to your company within the last three years? (Please check the OSHA web site at www.osha.gov/oshstats and click on Establishment Search). This site also provides SIC numbers. **If yes, please provide a copy of the citation and a certification of abatement.**			
Has your company and/or any of its officers been convicted of any violation of any federal or state occupational health and safety laws? If yes, please attach a description of this case, including its resolution.			
Line & Service Contractors: Is your Federal Motor Carrier Safety Rating Satisfactory? (Can be found at http://www.safersys.org) If not, state what the rating is (Unsatisfactory or Conditional).			

Using your company's OSHA log for the last 3 years:	Yr: 2002	Yr: 2003	Yr: 2004
• Total number of OSHA Recordable injuries and illnesses			
• Total number of cases involving Days Away, Restricted or Transferred			
• Total number of fatalities			
Employee hours worked each year for last three years			
OSHA Incident Rate last three years (OI Rate)*			
Days Away, Restricted or Transferred Rate last three years (DART Rate)*			
Your company's EMR for the last three years			

* Rates are calculated as follows: OI Rate= $\frac{\text{\# OSHA Recordable injuries X 200,000}}{\text{\# employee hours}}$ DART Rate= $\frac{\text{\# cases involving DART X 200,000}}{\text{\# employee hours}}$

Please have an authorized representative of the company who is responsible for your company's safety program sign on the line below certifying that the information provided above is current and accurate. Providing false information may result in termination of the contract.

Name: _____ Title: _____

Signature: _____ Date: _____

SECTION 2: TO BE COMPLETED BY THE PROGRESS ENERGY DR OR CONTRACT SERVICES

Print Name, Location and Phone of Designated Rep: _____

Progress Energy Experience with Contractor	Yes	No	NA	Number (if appl)
Are you aware of any safety-related incidents on Progress Energy jobs last three years?				
If yes, was contractor safety program found to be deficient?				
If yes, has program been corrected?				
Have any negative comments been reported by Progress Energy employees about contractor's safety performance?				
If yes, has situation been satisfactorily resolved?				

Contractor OSHA Rates (Last Year)	Industry Average(Latest from OSHA)	Comments
OI Rate		
DART Rate		

Recommended Rating (DR/Contract Services):	RED ☐	YELLOW ☐	GREEN ☐
Signature: _____ Date: _____			

SECTION 3: TO BE COMPLETED BY THE HEALTH AND SAFETY SUPPORT

Final Rating (Health & Safety Support):	RED ☐	YELLOW* ☐	GREEN ☐
Signature: _____ Date: _____			
Comments:			
*Necessary improvements to upgrade contractor from Yellow to Green:			

Crystal River Unit 3 Nuclear Power Station
Extended Power Uprate Bid Specification Table of Conformance - Technical

Spec Page #	Section Reference	C - Conform	X - Exception	A - Alternate	E - Enhance		Comments
10	1.9					SCOPE OF SERVICES	
	1.9.1					**Update the following computer models for EPU conditions**	
						• PEPSE	
						• FATHOM	
						• CHECWORKS	
	1.9.2					**MSR Replacement and MSR Belly Drain Heat Exchanger Addition**	
						• Prepare an EC to install 4 new Moisture Separator Reheaters including an evaluation of the MSR Relief Valves	
						• Provide the following for the four new MSR Belly Drain Heat Exchangers	
						• Design specification	
						• Prepare an MSR Belly Drain Heat Exchanger specification	
						• Prepare an EC to purchase four new MSR Belly Drain Heat Exchangers	
						• Prepare an EC to install four new MSR Belly Drain Heat Exchangers	
	1.9.3					**Turbine Generator Modifications**	
						• Prepare an EC to install two new low pressure turbine rotors and inner casings	
						• Prepare an EC to install a new high pressure turbine rotor and inner casing	
						• Prepare an EC to install a new Main Generator and Exciter	
	1.9.4					**Deaerator Bypass Line Addition**	
						• Prepare a Design specification for Deaerator Bypass Line Addition	
						• Prepare a specification for a new control valve	
						• Prepare an EC to purchase new control valve	
						• Prepare an EC to install new valves, piping, and controls	
	1.9.5					**Upgrade of the Isophase Bus Duct Cooling System**	
						• Determine the adequacy of the existing isophase bus ampacity	
						• Prepare a design specification	
						• Prepare a specification for new Isophase Bus Duct Cooling System including fans, motors and controls	
						• Prepare an EC to purchase new equipment	
						• Prepare an EC to install new Isophase Bus Duct Cooling System	
11	1.9.6					**Feedwater Heater and Feedwater Heater Drain Modifications**	
						• Replacement of Feedwater Heaters CDHE-3A and -3B	
						• Prepare a Feedwater Heater specification	
						• Prepare an EC to purchase two new third point feedwater heaters	
						• Prepare an EC to install 2 new third point feedwater heaters	
						• Evaluation of the existing feedwater heaters	
						• Characterize the condition of the existing feedwater heaters that will remain in service	
						• Establish a monitoring program following EPU implementation for these feedwater heaters	
						• Heater Drain Valves HDV-101, -102, -103, and -104	
						• Prepare a Valve specification for the first point heater drain valves	
						• Prepare an EC to purchase four new first point feedwater heater drain valves	
						• Prepare an EC to install four new first point feedwater heater drain valves	
						• Heater Drain Valves HDV-247, -248, -249, and -250	

Spec Page #	Section Reference	C - Conform	X - Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Extended Power Uprate Bid Specification Table of Conformance - Technical	Comments
						• Prepare an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and -250 with piping with a higher pressure and temperature rating	
	1.9.7					**Secondary Services Closed Cycle Cooling System Modifications**	
						• Perform an evaluation to determine the maximum capacity and cooling flow of the Secondary Cooling Heat Exchangers based on existing space limitations. Perform an evaluation to determine the maximum flow by replacing the SC pump impellers and motors	
						• Prepare a new specification for the Secondary Cooling Heat Exchangers 1A and 1B	
						• Prepare an EC to purchase two new SC heat exchangers	
						• Prepare an EC to install two new SC heat exchangers	
						• Revise Secondary Cooling pumps and motors, SCP-1A and -1B specification	
						• Prepare an EC to purchase two new SC pump impellers and motors	
						• Prepare an EC to install two new SC pump impellers and motors	
12	1.9.8					**Circulating Water System Modifications**	
						• Revise specification for Circulating Water pumps and motors CWP-1A, -1B, -1C, and -1D to achieve a nominal flow of 207,400 gpm	
						• Prepare an EC to purchase four new CW pump impellers and motors	
						• Prepare an EC to install four new CW pump impellers and motors and upgrade the circulating water system expansion joints at the condenser as required	
	1.9.9					**Condensate pumps and motors**	
						• Revise specification for the Condensate pumps and motors, CDP-1A and -1B to achieve the required flow for EPU conditions including incorporation of variable speed drives and compatible condensate flow control	
						• Prepare an EC to purchase two new CD pump impellers and motors equipped with variable speed drives	
						• Prepare an EC to install two new CD pump impellers, motors and the associated variable speed drives	
	1.9.10					**Feedwater Booster pumps and motors**	
						• Revise specification for the Feedwater Booster pumps and motors, FWP-1A and -1B to achieve the required flow for EPU conditions including increasing the flow margin to 10%	
						• Prepare an EC to purchase two new feedwater booster pumps and motors	
						• Prepare an EC to install two new feedwater booster pumps and motors	
	1.9.11					**Feedwater Control Valves and Feedwater Control System Stability**	
						• Perform an evaluation to determine if the feedwater control valves and feedwater control system are stable under EPU conditions	
	1.9.12					**Condenser**	
						• Conduct an update to existing condenser performance and flow-induced vibration calculations. This shall also include an evaluation of waterbox temperature limits and shielding designs for internal components. The update is to be subcontracted to Heat Exchanger Services	
	1.9.13					**Electrical Distribution Calculations**	

Spec Page #	Section Reference			C - Conform	X - Exception	A - Alternate	E - Enhance	Crystal River Unit 3 Nuclear Power Station Extended Power Uprate Bid Specification Table of Conformance - Technical	Comments
								• Perform an evalution of the station auxiliary transformer, startup transformer, and the 4KV buses, switchgear, circuit breakers and cabling to support the expected increase in the electrical load	
								• Update the following electrical distribution calculations to evaluate the adequacy of existing power system equipment ratings (auxiliary transformers, load centers, motor control centers, switchgear, cables, etc) to support the higher system load and identify required upgrades of the electrical distribution system	
13								• Voltage Drop/Short Circuit for AC Electrical System - SKM Software	
								• Non Safety 125 VDC - ETAP Software	
		1.9.14						**Mechanical Ultimate Heat Sink Calculations**	
								• Update the following Mechanical Ultimate Heat Sink Calculations to reflect EPU conditions	
								• Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11	
								• Calculation M95-0020, "DCHE Performance Evaluation," Rev 1	
								• Calculation M95-044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1	
								• Calculation M95-0035, "SW System Inventory Transient Analysis," Rev 2	
		1.9.15						**Turbine Building Structural Evaluation**	
								• Perform an evaluation of the turbine building structure and supports for major equipment to identify if any significant changes are required to accommodate the expected increases in loads resulting from new and larger equipment such as turbine rotors, main generator, etc.	
6	1.3							PROPOSAL PRICING	
		1.3.1						Each of the major tasks described in section 1.9 should be bid separately	
		1.3.2						Each of the computer model updates described in section 1.9 should be bid separately	
		1.3.3						Combine the total work scope	
13	1.10							SCHEDULE	
								Proposals shall be submitted within 28 days of receipt of the proposal request	
15	1.12							Tasks must be completed in accordance with the schedule detailed in section 1.12	
18	3.0							REFERENCES	
								All work will be done in accordance with the:	
18	3.0	3.1						• Codes and Standards detailed in section 3.1	
19		3.2						• Regulatory Requirements detailed in section 3.2	
		3.3						• Owner Procedures detailed in section 3.3	
43	10.2							• Specifications detailed in section 10.2	
	10.3							• P&ID's detailed in section 10.3	
	10.4							• Calculations detailed in section 10.0	

Progress Energy
Crystal River Unit 3
Nuclear Power Station

Extended Power Uprate Bid Specification

Secondary Systems

June 25, 2007

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1.0 SCOPE

1.1 General

The purpose of this document is to provide information to prospective bidders to supply engineering services to prepare design specifications, equipment specifications, Engineering Change packages and calculations for work necessary to increase the electrical generation at Progress Energy's Crystal River Unit 3 (CR3) station by approximately 20% by achieving a 17% increase in reactor power and a 3% increase due to improvements in secondary plant efficiencies. This work includes preparation or revision to specifications for heat exchangers, pumps and valves, and conducting engineering design and analysis and is limited to secondary system components.

The Crystal River Unit 3 Nuclear Power Station, located near Crystal River, Florida presently generates 903 MWe at 100% reactor power (2568 MWt). CR3 is planning an "Appendix K" feedwater flow measurement uncertainty recovery (MUR) uprate of 1.6 % reactor power (to 2609 MWt, 914 MWe) during the fall 2007 refueling outage. The CR3 steam generators, low pressure turbines, main generator and other significant equipment will be replaced during the fall 2009 refueling outage. The fall 2009 refueling outage is expected to begin in September 2009 and will have a duration of approximately 80 days. During the fall 2011 refueling outage, CR3 is planning to implement an extended reactor power uprate to achieve an additional 15.4% reactor power (3030 MWt including pump heat, 1080 MWe) and additional secondary plant upgrades including replacement of the high pressure turbines. The total extended power uprate from present will be approximately 20% including the MUR uprate and improvement in thermal efficiency.

The Extended Power Uprate (EPU) at CR3 requires some design changes, procurement of new equipment and substantial changes to some existing equipment such as the main generator and exciter, LP and HP turbines, condensate pumps, feedwater booster feed pumps, circulating water pumps, secondary cooling pumps, moisture separator reheaters, low pressure feedwater heaters, as well as new and revised calculations and evaluations. A proposal to prepare design specifications and installation modifications for these design changes is requested. In addition, new systems are required to achieve the desired electrical output. These design changes are the addition of four Moisture Separator Reheater (MSR) Belly Drain Heat Exchangers; valves, piping, and controls for a Deaerator bypass line; and an upgrade of the Isophase Bus Duct Cooling System to make the motors and fans redundant. In addition to the design specification, equipment specifications are required for the MSR Belly Drain Heat Exchangers, the Deaerator bypass line control valve, and the new Isophase Bus Duct Cooling System.

Equipment that is being substantially changed and requires new or revised specifications follows. Specifications shall be prepared as outlined in

procedure EGR-NGGC-0020. This equipment is being replaced with like components that have higher capacities.

Feedwater Heaters CDHE-3A and -3B (2)
Heater Drain Valves HDV-101, -102, -103, and –104 (4 valves)
Secondary Cooling Heat Exchangers 1A and 1B (2)
Secondary Cooling pumps and motors, SCP-1A and –1B (2)
Circulating Water pumps and motors 1A, 1B, 1C and 1D (4)
Condensate pumps and motors CDP-1A and –1B
Feedwater Booster pumps and motors FWP-1A and –1B

In addition to preparation of procurement documents for equipment, engineering support is required to perform a number of analyses and evaluations. Update of the existing computer models and calculations for an NSSS output of 3030 MWt (3014 MWt + 16 MWt RCP heat) are required. Calculations and analyses shall be prepared as outlined in procedure EGR-NGGC-0017.

PEPSE (thermal performance)
FATHOM (hydraulic)
CHECWORKS (flow accelerated corrosion)
Electrical Distribution System calculations (ETAP and SKM)
Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11
Calculation M95-0020, "DCHE Performance Evaluation," Rev 1
Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1
Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2

Coordination of an update to existing condenser performance and flow-induced vibration by Heat Exchanger Services (HES) is required. New analyses/evaluations are required for the feedwater heaters, secondary cooling heat exchanger sizing, feedwater control valve stability, and a structural evaluation of the turbine building considering the new equipment to be installed.

The third segment of this work scope is to prepare Engineering Change (EC) packages for purchase of equipment. The EC's shall be prepared as outlined in Procedure EGR-NGGC-0005, "Engineering Change". The following Engineering Change packages are required. The requirements of NGGM-PM-0020, "Vendor Quality Program for Critical Non-Safety Equipment" apply to these components also.

Feedwater Heaters CDHE-3A/B (2)
Heater Drain Valves HDV-101, -102, -103, and –104 (4 valves)
Secondary Cooling Heat Exchangers 1A and 1B (2)
Circulating Water pumps and motors 1A, 1B, 1C and 1D (4)
Secondary Cooling pumps and motors, SCP-1A and –1B (2)
Condensate pumps and motors CDP-1A and –1B
Feedwater Booster pumps and motors FWP-1A and –1B

The final part of this task is to prepare EC's (EGR-NGGC-0005) to install the following upgrades.

Feedwater Heaters CDHE-3A and -3B (2)

Heater Drain Valves HDV-101, -102, -103, and –104 (4 valves)
Secondary Cooling Heat Exchangers 1A and 1B (2)
Circulating Water pumps and motors 1A, 1B, 1C and 1D (4)
Secondary Cooling pumps and motors, SCP-1A and –1B (2)
Condensate pumps and motors CDP-1A and –1B
Feedwater Booster pumps and motors FWP-1A and –1B
Moisture Separator Reheater (MSR) Belly Drain Heat Exchangers (4),
Deaerator bypass line
Redundant Isophase Bus Duct Cooling System
New Low Pressure Turbine rotors and inner casings (2)
New High Pressure Turbine rotor and inner casing
New Main Generator and Exciter
New Moisture Separator Reheaters (4)

In addition to these upgrades, an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and –250 with piping with a higher pressure and temperature rating is required.

1.2 Objectives

The objective of this proposal request is to obtain bids on engineering services for work associated with upgrading the secondary systems at Crystal River Unit 3 necessary to support the Extended Power Uprate.

1.2.1. Prepare design specifications for the addition of MSR belly drain heat exchangers, addition of a deaerator bypass line, replacement of the condensate pumps, motors and controls with a variable speed design, and an upgrade of the Isophase Bus Duct Cooling System to make the motors and fans redundant.
1.2.2. Prepare new equipment specifications for MSR belly drain heat exchangers, a deaerator bypass line control valve, and the Isophase Bus Duct Cooling System motors and fans.
1.2.3. Revise existing specifications for Feedwater Heaters CDHE-3A and -3B, Heater Drain Valves HDV-101, -102, -103, and –104, Secondary Cooling Heat Exchangers 1A and 1B, Circulating Water pumps and motors 1A, 1B, 1C and 1D, Secondary Cooling pumps and motors, SCP-1A and –1B, Condensate pumps, motors and variable speed drives, CDP-1A and 1B, and Feedwater Booster pumps and motors, FWP-2A and 2B.
1.2.4. Update the existing PEPSE, FATHOM, CHECWORKS computer models.
1.2.5. Update existing calculations for the Electrical Distribution System (Calculation E90-0044), Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11, Calculation M95-0020, "DCHE Performance Evaluation," Rev 1, Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1, and Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2
1.2.6. Conduct an update to existing condenser performance and flow-induced vibration calculations. The update is to be performed by Heat Exchanger Services.

1.2.7. Perform an evaluation to determine the maximum capacity and cooling flow of the secondary cooling heat exchangers and secondary cooling motor, pump, and impellers based on existing space limitations.
1.2.8. Determine if the feedwater control valves and main feedwater pump control system are stable under EPU conditions.
1.2.9. Perform an evaluation of the existing feedwater heaters to characterize the existing condition and establish a monitoring program following EPU implementation.
1.2.10. Prepare Engineering Change packages and other associated procurement documentation for purchasing new Feedwater Heaters CDHE-3A/B, Heater Drain Valves HDV-101, -102, -103, and –104, Secondary Cooling Heat Exchangers 3A and 3B, Circulating Water pumps and motors 1A, 1B, 1C and 1D, Secondary Cooling pumps and motors, SCP-1A and –, Condensate pumps, motors and variable speed drives, CDP-1A and 1B, and Feedwater Booster pumps and motors, FWP-2A and 2B.
1.2.11 Prepare EC's (EGR-NGGC-005) to install the new Feedwater Heaters CDHE-3A and -3B, Heater Drain Valves HDV-101, -102, -103, and –104, Secondary Cooling Heat Exchangers 1A and 1B, Circulating Water pumps and motors 1A, 1B, 1C and 1D, Secondary Cooling pumps and motors, SCP-1A and –1B, Condensate pumps, motors and variable speed drives, CDP-1A and 1B, Feedwater Booster pumps and motors, FWP-2A and 2B, , MSRs and MSR Belly Drain Heat Exchangers, Deaerator bypass line, redundant Isophase Bus Duct Cooling System, and High and Low Pressure Turbine rotors and inner casings and turbine generator and exciter.
1.2.12. Prepare an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and –250 with piping with a higher pressure and temperature rating.
1.2.13 Conduct an evaluation of the turbine building structure considering the expected additional loads resulting from installation of new and larger equipment.

1.3 Proposal Pricing

Seller shall evaluate and present bid proposal pricing in the following formats:

1.3.1 Each of the major tasks described in Section 1.9 should be bid separately.
1.3.2 Each of the computer model updates described in Section 1.9 should be bid separately.
1.3.3 Combine the total work scope.

1.4 QA Condition

The equipment identified in this proposal request is classified as non-nuclear safety related. The analysis work described in this proposal request is classified as non-nuclear safety related except for the revision of the existing mechanical calculations and the evaluation of the feedwater block valves.

1.5 Existing Configuration

The existing configuration is described in existing drawings, specifications and calculations.

1.6 Operating Conditions

The existing operating conditions are described in existing drawings, specifications and calculations. The following are the operating conditions used to determine the scope of work included in this proposal request.

Preliminary Operating Conditions

Parameter	Current Conditions	Uprate Conditions
Core Thermal Power (MWt)	2568	3014
Pump Heat (MWt)	16	16
Steam Generator Thermal Output (MWt)	2584	3030
Core Safety Analysis Limit (MWt)	2619.4	3026.06
RCS High Temperature Trip Limit (°F)	618	618
RCS High Temperature Trip Setpoint	615.8	615.8
RCS Average Temperature (°F)	579	582
RCS Hot Leg Temperature (°F)	601.9	608.5
RCS Cold Leg Temperature (°F)	556.2	555.6
RCS Pressurizer Pressure (psig)	2155	2155
RCS Flow (E6 lbm/hr) *	144.05	144.4
RCS Pressurizer Level (in)	220	220 (Goal)
Feedwater Flow (E6 lbm/hr)	10.86	13.04
Feedwater Temperature to SG Inlet (°F)	460	461
Turbine Header Pressure (psia)	900	930
MS ΔP SG Outlet to Header (psid)	23.4	34
Estimated SG ΔP (psid)	35	60
SG Inlet Pressure (psia)	958.4	1024
ΔP MFWP Discharge to SG Inlet (psid)	54.8	68
MFWP Discharge Pressure (psia)	1013	1092
Steam Temperature (°F)	584	582
Condenser Design Back Pressure (in Hg)	2.5 ± 1.0	2.7 ± 1.0

1.7 Scope of Supply

This proposal request is limited to engineering services. Supply of equipment is not within the scope of this proposal request.

1.8 Scope of Supply by Owner

1.8.1 Access to system design information. Identification of the required information is the seller's responsibility. The purchaser shall provide VPN access to necessary documents such as drawings, procedures, specifications, etc.

1.8.2 Access to any electrical equipment panels, cubicles, etc. is only permitted with approval of responsible owner personnel in accordance with approved procedures.

Deleted: .

1.8.3 Operations personnel to perform shutdown, startup, draining, filling, isolation, and other normal system operating functions.

1.8.4 Safety clearance and tagging of all equipment.

1.8.5 Removal and installation of insulation.

1.8.6 All electrical disconnects and terminations required to perform work.

1.8.7 Construction and removal of scaffolding.

1.8.8 Radiation protection technicians if required.

1.8.9 Unescorted access training for seller's personnel.

1.8.10 Preparation of post installation test procedures. Supply of test instrumentation. Performance of post installation tests and preparation of associated test reports, unless specified within separate contracts.

1.9 Scope of Services

This section provides an outline of the scope of supply of engineering services for this proposal request. Additional detail can be found in Attachment 10.1.

1.9.1 Computer Models

Update the following computer models for EPU conditions

- PEPSE
- FATHOM
- CHECWORKS

1.9.2 MSR Replacement and MSR Belly Drain Heat Exchanger Addition

- Prepare an EC to install four new moisture separator reheaters including an evaluation of the MSR relief valves. The supplier of the new turbine rotors is providing the new MSRs.
- Add four new MSR belly drain heat exchangers
  - Design specification
  - Prepare an MSR belly drain heat exchanger specification
  - Prepare an EC to purchase four new MSR belly drain heat exchangers
  - Prepare an EC to install 4 new MSR belly drain heat exchangers, valves, piping, and controls

1.9.3 Turbine Generator Modifications

- Prepare an EC to install two new low pressure turbine rotors and inner casings
- Prepare an EC to install a new high pressure turbine rotor and inner casing
- Prepare an EC to install a new Main Generator and Exciter

1.9.4 Deaerator Bypass Line Addition

- Prepare a design specification
- Prepare a specification for a new control valve
- Prepare an EC to purchase new control valve
- Prepare an EC to install new valves, piping, and controls

1.9.5 Upgrade of the Isophase Bus Duct Cooling System

- Determine the adequacy of the existing isophase bus ampacity
- Prepare a design specification
- Prepare a specification for new Isophase Bus Duct Cooling System including fans, motors, and controls
- Prepare an EC to purchase new equipment
- Prepare an EC to install new Isophase Bus Duct Cooling System

1.9.6 Feedwater Heater and Feedwater Heater Drain Modifications

- Replacement of Feedwater Heaters CDHE-3A and -3B
  - Prepare a feedwater heater specification
  - Prepare an EC to purchase two new third point feedwater heaters
  - Prepare an EC to install 2 new third point feedwater heaters
- Evaluation of the existing feedwater heaters
  - Characterize the condition of the existing feedwater heaters that will remain in service
  - Establish a monitoring program following EPU implementation for these feedwater heaters
- Heater Drain Valves HDV-101, -102, -103, and –104,
  - Prepare a valve specification for the first point heater drain valves
  - Prepare an EC to purchase four new first point feedwater heater drain valves
  - Prepare an EC to install four new first point feedwater heater drain valves
- Heater Drain Valves HDV-247, -248, -249, and –250
  - Prepare an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and –250 with piping with a higher pressure and temperature rating.

1.9.7 Secondary Services Closed Cycle Cooling System Modifications

- Perform an evaluation to determine the maximum capacity and cooling flow of the secondary cooling heat exchangers based on existing space limitations. Perform an evaluation to determine the maximum flow by replacing the SC pump impellers and motors.
- Prepare a new specification for the Secondary Cooling Heat Exchangers 1A and 1B
- Prepare an EC to purchase two new SC heat exchangers
- Prepare an EC to install two new SC heat exchangers
- Revise Secondary Cooling pumps and motors, SCP-1A and –1B specification
- Prepare an EC to purchase two new SC pump impellers and motors
- Prepare an EC to install two new SC pump impellers and motors

1.9.8 Circulating Water System Modifications

- Revise specification for Circulating Water pumps and motors CWP-1A, 1B, 1C and 1D to achieve a nominal flow of 207,400 gpm
- Prepare an EC to purchase four new CW pump impellers and motors
- Prepare an EC to install four new CW pump impellers and motors and upgrade the circulating water system expansion joints at the condenser as required.

1.9.9 Condensate pumps and motors

- Revise specification for the Condensate pumps and motors, CDP-1A and 1B to achieve the required flow for EPU conditions including incorporation of variable speed drives and compatible condensate flow control.
- Prepare an EC to purchase two new CD pump impellers and motors equipped with variable speed drives
- Prepare an EC to install two new CD pump impellers, motors and the associated variable speed drives

1.9.10 Feedwater Booster pumps and motors

- Revise specification for the Feedwater Booster pumps and motors, FWP-1A and 1B to achieve the required flow for EPU conditions including increasing the flow margin to 10%.
- Prepare an EC to purchase two new feedwater booster pumps and motors
- Prepare an EC to install two new feedwater booster pumps and motors

1.9.11 Feedwater Control Valves and Feedwater Control System Stability

- Perform an evaluation to determine if the feedwater control valves and feedwater control system are stable under EPU conditions.

1.9.12 Condenser

- Conduct of an update to existing condenser performance and flow-induced vibration calculations. This shall also include an evaluation of waterbox temperature limits and shielding designs for internal components. The update is to be subcontracted to Heat Exchanger Services.

1.9.13 Electrical Distribution Calculations

- Perform an evaluation of the station auxiliary transformer, startup transformer, and the 4KV buses, switchgear, circuit breakers and cabling to support the expected increase in the electrical load.
- Update the following electrical distribution calculations to evaluate the adequacy of existing power system equipment ratings (auxiliary transformers, load centers, motor control centers, switchgear, cables, etc) to support the higher system

load and identify required upgrades of the electrical distribution system.
- o Voltage Drop/Short Circuit for AC Electrical System - SKM Software
- o Non Safety 125 VDC - ETAP Software

1.9.14 Mechanical Ultimate Heat Sink Calculations
- Update the following calculations to reflect EPU conditions.
- Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11
- Calculation M95-0020, "DCHE Performance Evaluation," Rev 1
- Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1
- Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2

1.9.15 Turbine Building Structural Evaluation
- Perform an evaluation of the turbine building structure and supports for major equipment to identify if any significant changes are required to accommodate the expected increases in loads resulting from new and larger equipment such as turbine rotors, main generator, etc.

1.10 Schedule

Proposals shall be submitted within 28 days following receipt of the proposal request.

1.11 Required Bid Documentation

1.11.1 Seller shall submit a complete proposal fully describing all of the services to be furnished. All documents shall be in English and in U.S. measurement units.

1.11.2 Exceptions to the proposal request must be clearly identified.

1.11.3 A project level milestone schedule identifying the start date of each task and sub task, completion date of the tasks, subtasks, and the overall completion date. Need dates for information not being developed by the seller should be included in this schedule.

1.11.4 The seller may offer additional optional scope of supply as defined by seller.

1.11.5 The seller must provide the organizational structure of labor for engineering services described in this proposal request including supervision, technical direction and project management. The staffing levels should be provided for each task identified in the proposal request.

1.11.6 The seller should describe the project management measures to be implemented to control the cost schedule and risks associated with this scope of work.

1.11.7 Any of the work in this proposal that the seller intends to subcontract must be clearly identified. The buyer must approve all subcontractors.

1.11.8 The seller must provide a summary of experience providing similar engineering services and identify any "first of a kind" scope. For those "first of a kind" services, the seller should describe the steps to be taken to assure a quality and timely product.

1.11.9 The seller must identify the location where this work will be conducted including a discussion of how the seller will interface with the CR3 site.

1.12 Required Documentation After Award

The following table summarizes the documentation required by this proposal request.

No.	TASK	SUBTASK	PRIORITY	SUBMITTAL DUE DATE
1	Computer Models	PEPSE	1	9-20-07
		FATHOM	1	12-06-07
		CHECWORKS	3	12-13-07
2	MSR	Install EC package	3	12-12-08
	MSR Drain Heat Exchanger	Design Specification	1	10-03-07
		Equipment Specification	1	10-17-07
		Purchase EC package	1	10-31-07
		Install EC package	3	12-12-08
3	Low Pressure Turbine	Install EC package	3	12-12-08
	High Pressure Turbine	Install EC package	6	12-16-10
	Main Generator and Exciter	Install EC package	3	12-12-08
4	Deaerator Bypass Line	Design Specification	1	10-03-07
		Equipment Specification	1	10-17-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
5	Isophase Bus	Evaluate electrical capacity	4	6-18-09
	Isophase Bus Duct Cooling System	Design Specification	1	10-03-07
		Equipment Specification	1	10-17-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
6	CDHE-3A and -3B Feedwater Heaters	Equipment Specification	1	10-17-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
	FW Heater Evaluation	Evaluation	1	12-13-07
		Monitoring Plan	1	12-13-07
	Heater Drain Valves	Equipment Specification	2	4-10-08
		Purchase Order (NGGM-PM-0020)	3	6-19-08
		Install EC package	3	12-12-08
	Heater Drain Piping	Purchase Order (NGGM-PM-0020)	3	6-19-08
		Install EC package	3	12-12-08

No.	TASK	SUBTASK	PRIORITY	SUBMITTAL DUE DATE
7	SC Modifications	Maximization Report	1	9-20-07
	SC Heat Exchangers	Equipment Specification	1	10-03-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
	SC Pump Impellers and Motors	Equipment Specification	1	10-03-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
8	CW Pump Impellers and Motors	Equipment Specification	4	6-18-09
		Purchase EC package	5	7-2-09
		Install EC package	6	12-16-10
9	Condensate Pump Impellers, Motors, and Variable Speed Drives	Design Specification	4	3-18-09
		Equipment Specification	4	6-18-09
		Purchase EC package	5	7-2-09
		Install EC package	6	12-16-10
10	FW Booster Pump Impellers and Motors	Equipment Specification	4	6-18-09
		Purchase EC package	5	7-2-09
		Install EC package	6	12-16-10
11	FW Control System	Evaluation	4	4-8-10
		Stability Analysis	4	6-11-10
12	Main Condenser	Evaluation	4	6-25-09
		FIV Analysis	4	6-25-09
13	Electrical Distribution	Evaluate Station Auxiliary and Startup Transformers, and 4KV System	4	12-12-08
		Calculation E90-0044	6	1-08-09
	Non Safety 125 VDC	Calculation	6	6-19-08
	Emergency Diesel Generators	Calculation	6	1-08-09
	Vital 120 VAC	Calculation	6	1-08-09
	Safety 125 VDC	Calculation	6	1-08-09
	TSC Security Diesel	Calculation	6	1-08-09
14	Calculation M97-0133	Calculation	4	6-19-08
	Calculation M95-0020	Calculation	4	6-19-08
	Calculation M95-0044	Calculation	4	6-19-08
	Calculation M95-0035	Calculation	4	6-19-08
15	Turbine Building Structural Evaluation	Evaluation	1	12-13-07

Priority Codes:

1 Required for specifying equipment for the 2009 refueling outage
2 Required for ordering equipment for the 2009 refueling outage
3 Required for installation of equipment for the 2009 refueling outage
4 Required for specifying equipment for the 2011 refueling outage
5 Required for ordering equipment for the 2011 refueling outage
6 Required for installation of equipment for the 2011 refueling outage

The work products that are required by tasks included in this proposal request are computer model updates, design specifications, Engineering Change packages for purchase, Engineering Change packages for installation, evaluations and plans, specifications, calculations, and purchase orders.

Computer model updates should be completed and the results provided in either a calculation or a report. The individual computer model task description provides direction on how the results are to be documented.

The requirements for design specifications are identified in Procedure EGR-NGGC-0005, Engineering Change. One component of a design specification is the design inputs. Attachment 2 of EGR-NGGC-0005 provides a comprehensive list of design inputs to be considered.

Procedure EGR-NGGC-0005 provides the requirements for preparing an Engineering Change for the installation of a design change in the plant. In addition to EGR-NGGC-0005, the requirements of MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections, and NGGM-PM-0020, Vendor Quality Program for Critical Non-Safety Equipment apply to the preparation of ECs for purchase of major equipment.

The results of evaluations and plans are to be documented in reports. There are no specific procedures that define the content or format. The reports should be prepared and documented consistent with professional engineering standards.

Specifications are prepared and documented in accordance with the requirements of EGR-NGGC-0020, Preparation and Control of Specifications.

Calculations are prepared and documented in accordance with the requirements of EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations.

In some cases, a purchase order may be prepared without completing an EC. The information should be prepared and documented as defined in NGGM-

PM-0020, Vendor Quality Program for Critical Non-Safety Equipment. The tasks where this requirement applies are indentified in the individual task descriptions.

2.0 DEFINITIONS

The following definitions shall apply to this specification:

Owner - Progress Energy
Purchaser - Owner Representative
Buyer - Owner Representative
Seller - Firm proposing to supply the subject equipment
Supplier - Firm awarded the order for the subject equipment
Contract - Equipment and Service Supply Contract

3.0 REFERENCES

3.1 Codes and Standards

The following codes and standards should be used in developing design and equipment specifications. Note that only recognized U.S. standards and equivalent International standards will be accepted. A list of applicable International codes and standards shall be submitted, in English, for Engineer's acceptance prior to use. The design, fabrication, materials, workmanship, and testing of all equipment shall be in accordance with the buyer's standards and applicable codes. In the event of an apparent conflict among standards, codes and this specification, the seller shall identify such conflict. The Seller shall obtain written resolution of such conflict from the purchaser prior to proceeding with work involving the conflict. When standards are referenced in this specification without current or effective dates, the latest revision of the standard specification in effect as of the date of the Contract shall be considered applicable. Any modifications to the standard specifications included herein shall be with the express written approval of the purchaser.

3.1.1 Heat Exchange Institute (HEI)
- a. Standards for Power Plant Heat Exchangers
- b. Standards for Steam Surface Condensers

3.1.2 Electrical equipment shall be designed, constructed and tested in accordance with the following standards:
- a. Institute of Electrical and Electronics Engineers (IEEE):
  - i. Standard General Principles for Temperature Limits in the Rating of Electrical Equipment and for Evaluation of Electrical Insulation, IEEE 1.
  - ii. Neutral Grounding Devices, IEEE 32.
  - iii. Recommended Practice for Testing Insulation Resistance of Rotating Machinery, IEEE 43
  - iv. Test Procedures for Polyphase Induction Motors and Generators, IEEE 112A.
- b. American National Standards Institute (ANSI):
  - i. National Electric Safety Code, ANSI C2.
  - ii. Switchgear, ANSI C37.

iii. Transformers, ANSI C57.

c. National Electrical Manufacturers Association (NEMA):
   i. Enclosures, NEMA 250.
   ii. Motors and Generators, NEMA MG1, MG2.
   iii. Power Circuit Breakers, NEMA SG4.

d. National Fire Protection Association (NFPA) Standard 70 – "National Electrical Code".
e. All electrical hardware shall be listed in the Factory Mutual Approval Guide or, if not listed in this guide, shall be Underwriters Laboratories listed.

3.1.3 Instrumentation, Systems, and Automation Society (ISA), Standards and Practices for Instrumentation.

3.1.4 All work performed and materials provided by the Supplier shall be in accordance with Federal, State, County, and Municipal codes, laws, and ordinances of the place of installation.

3.2 Regulatory Requirements

3.2.1 Crystal River Unit 3 Updated Final Safety Analysis Report
3.2.2 Crystal River Unit 3 Technical Specifications

3.3 Owner Procedures

3.3.1 EGR-NGGC-0003, Design Review Requirements
3.3.2 EGR-NGGC-0005, Engineering Change
3.3.3 EGR-NGGC-0007, Maintenance of Design Documents
3.3.4 EGR-NGGC-0011, Engineering Product Quality
3.3.5 EGR-NGGC-0012, Equipment Data Base
3.3.6 EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations
3.3.7 EGR-NGGC-0020, Preparation and Control of Specifications
3.3.8 EGR-NGGC-0155, Specifying Electrical/I&C Modification Related Tests
3.3.9 MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping)
3.3.10 NUA-NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections
3.3.11 REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Reviews
3.3.12 ADM-NGGC-0107, Equipment Reliability Process Guideline
3.3.13 NGGM-PM-0018, Project Management Program Manual
3.3.14 NGGM-PM-0020, Vendor Quality Program for Critical Non-Safety Equipment
3.3.15 AI-550, Infrequently Performed Tests or Evolutions
3.3.16 EGR-NGGC-0157, Engineering of Plant Digital Systems and Components

PEF-NCR-01985

4.0 DESIGN REQUIREMENTS

This proposal request is limited to engineering services to prepare design documents. Specific design requirements for equipment have not yet been established for components within the scope of this proposal request. Requirements for design-related work within the scope of this proposal request are identified in Section 3.

5.0 MATERIAL REQUIREMENTS

No material is requested for supply under this request for proposal. The scope of this proposal request is for engineering services only.

6.0 INSPECTION AND TESTING

This proposal request is limited to engineering services. No inspection or testing requirements apply to this work.

7.0 FABRICATION REQUIREMENTS

This proposal request is limited to engineering services. No fabrication requirements apply to this work.

8.0 INSTALLATION REQUIREMENTS

This proposal request is limited to engineering services. Since physical installation of equipment is not within the scope of this proposal request, installation requirements do not apply to this work.

9.0 SHIPMENT

This proposal request is limited to engineering services. Since supply of equipment is not within the scope of this proposal request, shipping instructions do not apply to this work.

10.0 ATTACHMENTS

10.1 Scope of Services Detail

Scope of Services Detail

This attachment provides a detailed discussion of specific elements of the engineering service so that a proposal can be provided. Numbering is consistent with the line item number from section 1.9.

1.9.1 Computer Models

PEPSE Computer Model Update

The CR3 PEPSE thermal heat balance model will require revision for the new operating conditions based on the final thermal kit from the selected turbine/generator supplier, proposed deaerator bypass flow and Circulating Water System flow of 207,400 per pump. The 3030 MWt PEPSE model will include the following cases.

- Baseline without the MSR belly drain heat exchangers and deaerator bypass line modifications
- EPU configuration with the MSR belly drain heat exchangers and the deaerator bypass line
- One case with each set of the feedwater heaters removed from service (five cases total) and the MSR belly drain heat exchangers and the deaerator bypass line installed

Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

FATHOM Computer Model Update

The condensate, feedwater, and main steam systems will require hydraulic analysis (FATHOM or equal) based on the new operating conditions at 3030 MWt including pump performance data, system configurations, and component pressure drops. The following will be included as part of this evaluation.

- Condensate Pump Sizing
- Booster Feedwater Pump Sizing
- Verification of feedwater block (isolation) valve differential pressure

Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

CHECWORKS Computer Model Update

The CR3 CHECWORKS model will require updating based on final PESPE results for 3030 MWt. A preliminary FAC analysis indicates increased wear rates for several critical components. Detailed review and impact on the CR3 erosion corrosion program will be required once the final 3030 MWt PEPSE model is complete. It is recommended that

Advanced Run Definitions (ARDs) be developed and input for each relevant component or system section breakdown.

Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, does not apply to this task.

1.9.2 MSR Replacement and MSR Belly Drain Heat Exchanger Addition

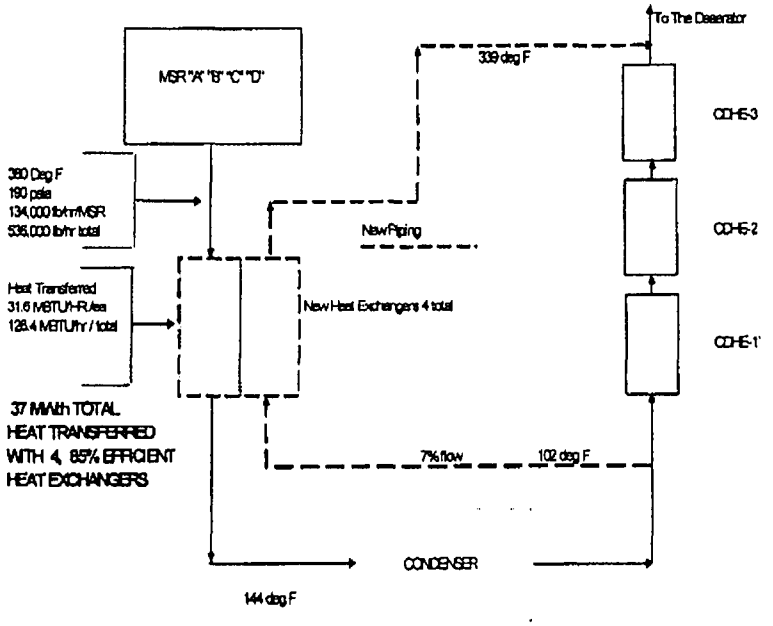
MSR Replacement

The turbine rotor supplier is providing new moisture separator reheaters. An engineering change package is required to be prepared to support installation of the new MSRs. As part of the task of preparing the EC package, evaluation of the MSR relief valves is required. Procedure EGR-NGGC-0005, Engineering Change applies is this task.

MSR Belly Drain Heat Exchanger Addition

Current CR3 plant configuration dumps the MSR belly drains directly to the condenser. This design negatively impacts plant efficiency because a significant amount of energy is dumped to the condenser. The BOP efficiency can be improved and energy recaptured by installing heat exchangers in the MSR drains. It is expected that approximately 4 MWe will be gained in generator output. The figure below illustrates the concept of recapturing the energy in the MSR belly drains before dumping to the condenser.

MSR Belly Drain Flow Diagram



The existing MSRs are not adequate for 3030 MWt and are being replaced. The preliminary PEPSE model for 3030 MWt indicates that the MSR shell drain flow is expected to increase from 11% to 13% with a temperature increase to 392 °F from 377

°F with the EPU power uprate. Velocity in the 4-in drain line will increase to 9 ft/sec from 7.8 ft/sec.

Instrumentation & Controls

These heat exchangers would be transferring heat from liquid to liquid, and will require temperature control valves to regulate condensate flow to the new heat exchangers. Local indications for the process variables that are necessary for the heat exchangers would include differential pressure across the heat exchangers (both MSR drain fluid side and condensate side), which would be used to determine fouling or tube plugging, and temperatures at the inlet and outlet (both MSR drain fluid side and condensate side), to determine efficiencies and heat transfer for the heat exchangers.

Procedure EGR-NGGC-0005, Engineering Change, Section 9.3.1, provides the list of information necessary for a design specification. This information includes the following.

- Scope Description
- References
- Design Input
- Assumptions
- Evaluation
- Interfaces
- Quality Class Determination

The design specification should also address the operation of the system under upset conditions such as a turbine trip, control valve failures, pump trips, etc.

As part of this task, a new specification for the MSR belly drain heat exchangers is required. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections apply to the preparation of specifications.

Two EC packages are required, one to procure the four new heat exchangers and a separate EC package to install the entire design change in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.3 Turbine Generator Modifications

Low Pressure Turbine Replacement

The new low pressure turbine rotors and inner casings are being procured to increase the CR3 electrical output. An engineering change package is required to be prepared to support installation of the new low pressure turbine rotors. Procedure EGR-NGGC-0005, Engineering Change applies is this task.

High Pressure Turbine Replacement

A new high pressure turbine rotor and inner casing are being procured to increase the CR3 electrical output. An engineering change package is required to be prepared to support installation of the new high pressure turbine rotors. Procedure EGR-NGGC-0005, Engineering Change applies is this task.

Generator and Exciter Replacement

A new main generator and exciter is being procured to increase output to 1200 MVA, 430 MVAR, 0.93 power factor, and 1080 MWe with a condenser vacuum of 2.7 inches of mercury and a circulating water inlet temperature of 75 °F. An engineering change package is required to be prepared to support installation of the new main generator and exciter. Procedure EGR-NGGC-0005, Engineering Change applies is this task.

1.9.4 Design Specification, Deaerator Bypass Line

The Deaerator (FWHE-1) is designed to break up the entering condensate and allow entrained gases to escape and be vented off and to provide heat input to the fluid as it is passed through the elements. The Deaerator Storage Tank, FWT-1, capacity is 73,000 gallons to the normal water line. The capacity of this open, deaerating feedwater heater assures adequate inventory for the FW Booster Pumps (NPSH) following a large step load decrease in condensate pump flow. At EPU conditions, the expected condensate inlet temperature is 277 °F; extraction steam inlet temperature is 344 °F; and outlet feedwater temperature is 308 °F. The stated maximum feedwater outlet capacity of the deaerator is 11,200,000 lbs/hr. The expected condensate flow at EPU conditions is 13,010,639 lbs/hr.

Preliminary evaluation by the OEM, Crane-Cochrane, indicates that the existing deaerator heater is not adequate based on its ability to remove non-condensables and physical flow limitations. The EPU flow rate of 13,010,639 lbs/hr cannot be handled by existing internal components (nozzles, trays, piping). To resolve this issue, a portion of the condensate flow to the deaerator is to be bypassed around FWHE-1 and fed directly into the deaerator storage tank, FWT-1. A flow control valve with manual isolation and bypass will be used to divert any flow above the maximum deaerator design limit of 11,200,000 lbs/hr. Based on the preliminary 3030 MWt PEPSE model, the total flow into the deaerator will be 13,010,639 lbs/hr that is approximately 16% higher than the current 11,200,000 lbs/hr design limit.

Instrumentation & Controls

This line will normally carry approximately 1.8×10^6 lbs/hr and the control valve should be sized accordingly. The deaerator bypass valve should be closed when condensate flow to the deaerator is less than 11.2×10^6 lbs/hr and open to maintain condensate flow to the deaerator within the design limit. Deaerator bypass flow should be measured and displayed locally.

To implement this design change, a design specification, a specification for the control valve, an EC package to purchase the control valve, and an EC package to install the design change into the plant are required. Procedure EGR-NGGC-0005, Engineering Change, Section 9.3.1, provides the list of information necessary for a design specification. This information includes the following.

Scope Description
References
Design Input
Assumptions
Evaluation
Interfaces
Quality Class Determination

The flow, temperature, pressure, and injection path of the condensate flow directly into the deaerator storage tank will require evaluation to maintain desired deaerator performance. An evaluation of the expected concentration of dissolved oxygen content and hydrazine injection will be required. Preparation of this design specification must be coordinated with the MSR belly drains Heat Exchanger modifications to the deaerator drain tank.

As part of this task, a new specification for the deaerator bypass control valve is required. *Procedures EGR-NGGC-0020, Preparation and Control of Specifications*, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections apply to the preparation of specifications.

Two EC packages are required, one to procure the new control valve and a separate EC package to install the entire design change in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.5 Upgrade of the Isophase Bus Duct Cooling System

The Isolated Phase Bus Duct system includes a forced-air cooler to remove excess heat from the bus duct. The heat sink for the cooler is the Secondary Cooling (SC) system. The present cooler, furnished by Westinghouse, is a closed air loop design. The existing cooler (fan and coils) has no backup capability, nor the ability to shift to once-through cooling mode on a loss of cooling. As a result, in the event of loss of cooling, the generator load has to be reduced to the bus duct self-cool rating of 18600A in a very short period of time. The latest approach for large generation plant bus cooling system provides for redundant fans and coolers for optimum reliability. The existing CR3 design did not include a solar radiation load factor that is estimated to be a maximum heat input in summer month of 66 KW. The net heat input to the force-air cooling system from solar radiation is estimated to be 33 KW. Cooler design load should include the solar radiation factor.

At EPU design conditions, the bus duct load will be 33.1 KA. At this load and the peak operating conditions, the design heat generation rate in the bus duct will increase to 566 KW, and the heat removal rate required from the SC system will increase to 466 KW. Cooling demand with the solar input is estimated at 500 KW. Instruments on the existing cooler are basic. The design does not provide operating flexibility or to initiate corrective actions, in timely manner. To support EPU operating requirements, the entire existing cooler is to be replaced with a new cooler that contains redundant fans and cooling coils. The new cooler should have following features:

- 2-100% cooling capacity fans, motors and cooling coils
- Full access to stand by unit including redundant fans
- Upgraded instruments and control
- Heating elements to dry bus duct during start up

Instrumentation & Controls

The instrumentation and control equipment for the new coolers should include local differential pressure and cooler inlet and outlet temperatures for both air and water. Controls should include automatic start of the standby unit. The status of each cooler should be displayed on a local panel (run, stop, stand by).

To implement this design change, a design specification, a specification for the control valve, an EC package to purchase the fans, motors and controls, and an EC package to install the design change into the plant are required. This design specification must identify any changes required to the electrical distribution, including load centers and/or MCCs, to accommodate this change. Procedure EGR-NGGC-0005, Engineering Change, Section 9.3.1, provides the list of information necessary for a design specification. This information includes the following.

Scope Description
References
Design Input
Assumptions
Evaluation
Interfaces
Quality Class Determination

As part of this task, a new specification for the fans, motors and controls is required. This specification should include a requirement for an evaluation of the effects of increased airflow on vibration of the system components. The specification should include a requirement for high efficiency motors to offset the impact on the electrical distribution system. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections apply to the preparation of specifications.

An evaluation of electrical capability of the existing isophase bus should be completed considering the new Isophase Bus cooling capacity.

Two EC packages are required, one to procure the new isophase bus duct cooling unit and a separate EC package to install the entire design change in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.6 Feedwater Heater and Feedwater Heater Drain Modifications

Performance of all of the feedwater heaters was reviewed by Yuba Heat Transfer to determine the acceptability of the current feedwater heaters to operate at EPU conditions. All heaters exceed either the Heat Exchanger Institute (HEI) recommended limits or the Yuba standards in one or more areas. The primary area of concern is the high velocity through the extraction steam side nozzles. Although these high velocities do not pose an immediate danger of damage to the heaters, they could lead to increased flow accelerated corrosion. In addition to the YUBA evaluation, plant FAC data indicates accelerated wear on the CDHE-3A/B feedwater heaters. It has been decided to replace the third point feedwater heaters, CDHE-3A and -3B and implement an upgraded monitoring plan for the remaining feedwater heaters.

EPU increases the flow rates through all of the feedwater heaters. The flow capacities of the existing low pressure heater drain valves were examined to determine if sufficient capacity exits for these valves. All of the low pressure heater drain valves are capable of the EPU flow rates except for the valves associated with the first point heaters, HDV-101, -102, -103, and –104. Therefore, these four valves require replacement.

A new PEPSE heat balance will be performed to determine the first point heater drain valve flow rates at EPU conditions.

There are four sections of secondary system piping that will likely exceed design allowable pressures and temperatures. These sections of piping are the 2-in lines upstream of valves HDV-247, HDV-248, HDV-249, and HDV-250. These piping segments are on CR3 FD-302-111 Sheet 3 Rev 47, Locations G-6 and C-1. The line specification for this piping is 600-4 and has an allowable pressure of 670 psig at 500 °F. The EPU operating conditions are expected to be 877.06 psig at 530.87 °F. Therefore, this piping will be replaced with piping that is rated for the EPU conditions at these locations.

To implement this strategy, four subtasks are to be accomplished; all related to the feedwater heaters and the feedwater heater drains.

Replacement of Feedwater Heaters CDHE-3A and -3B

A revision to the specification for the third point feedwater heaters is required. A new PEPSE heat balance at EPU conditions will be performed to support preparation of this revised specification. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections apply to the preparation of specifications.

Two EC packages are required, one to procure the new third point feedwater heaters and a separate EC package to install the new third point feedwater heaters in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

Evaluation of the Existing Feedwater Heaters

A proposal is required to evaluate the current condition of the existing eight feedwater heaters that will remain in service and create an upgraded monitoring program for all of the feedwater heaters.

The evaluation of the existing heaters that will remain in service should include an assessment of the feedwater heater performance based on the final 3030 MWt PESPE model and the feedwater heater relief valve setpoints and relieving capacity. Also, the design of the piping between CDHE-3A/B feedwater heaters and the associated heater drain valves should be reviewed based on 3030 MWt PEPSE model.

The monitoring program should include base lining the current conditions and an inspection after the first cycle following EPU. An outline of the conceptual program follows.

- Obtain any current CR3 FAC data for feedwater heaters.
- Establish nozzle inspections for feedwater heaters based on the new FAC analysis at EPU conditions.
- Obtain and evaluate original design specifications for stainless steel components.
- Obtain industry benchmark data
- Identify additional inspections required for online/outage in 2007 to support decision
- Establish acceptance criteria including mitigation options
- Review the relief valve sizes to determine if they are adequate at EPU conditions
- Prepare table of issues and risk potential

Replacement of Heater Drain Valves HDV-101, -102, -103, and –104,

Revision of the existing valve specification for the first point heater drain valves is required to reflect the conditions predicted by the PEPSE model at EPU conditions. These valves will also be required to operate for two fuel cycles at the Measurement Uncertainty Recovery (MUR) power level (2625 MWt). Procedures NGGM-PM-0020, Vendor Quality Program for Critical Non-Safety Equipment, EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections are applicable to this task.

Two EC packages are required, one to procure the four new first point feedwater heater drain valves and a separate EC package to install these new valves in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

Replacement of Piping Upstream Heater Drain Valves HDV-247, -248, -249, and –250

An EC package is required to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and –250 with piping the appropriate pressure and temperature rating for EPU and MUR conditions. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.7 Secondary Services Closed Cycle Cooling System Modifications

The Secondary Services Closed Cycle Cooling System (SC) provides cooling water flow to various secondary plant loads including the Turbine Generator, Condensate Pumps, Lube Oil Coolers, Air Removal System, Instrument Air System and Station Air System. It also provides backup cooling to the Control Complex Chillers upon loss of SW. The SC system consists of two main heat exchangers (SCHE-1A, 1B) and two main pumps (SCP-1A, 1B).

Currently the SC system is rated for 54 Mbtu/hr and the flow rate is 10,000 gpm. The new generator heat loads (which account for the majority SC system heat load) are expected to produce about 56.9 Mbtu/hr based on 1200 MVA and 430 MVAR (0.933 pf). Based on the generator heat load increase, the total SC heat for EPU conditions is projected to be between 75 Mbtu/hr and 80 Mbtu/hr. The SC system will need to increase its heat removal capacity to handle the increased heat load due to planned power uprate and to restore margin.

By relocating piping and small obstructions, sufficient space is available to install new SC heat exchangers with over all dimensions of 66 inches outside diameter and 54 feet in length. The actual heat exchanger sizing shall maximize the heat transfer capacity of the heat exchangers based on the existing space limitations. Likewise, the size SC pump impeller and motor will be increased to maximize SC flow so the new heat exchanger specifications must be coordinated with the new SC pump maximum flow rate.

Maximization of the Secondary Services Closed Cycle Cooling System

Due to the increased heat loads on this system, it is required to maximize the heat removal capability of the system. This evaluation must determine the maximum capacity and cooling flow of the secondary cooling heat exchangers based on existing space limitations. This evaluation must also determine the maximum SC system flow by replacing the SC pump impellers and motors.

Replacement of the SC Heat Exchangers

Revision of the SC heat exchanger specification is required. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections are applicable to this task.

Two EC packages are required, one to procure the two new SC heat exchangers and a separate EC package to install these new heat exchangers in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

Replacement of the SC Pumps and Motors

Revision of the SC pump and motor specification is required. The specification should include a requirement to maximize the motor efficiency to offset the impact on the electrical distribution system. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving,

Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections are applicable to this task.

Two EC packages are required, one to procure the two new SC pumps and motors and a separate EC package to install these new pumps and motors in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.8 Circulating Water System Modifications

The current circulating water system Pumps 1A & 1D are 30-pole motors running at 233 rpm with a stated flow of 167,000 gpm each. Pumps 1C & 1D are 28-pole motors running at 250 rpm with a stated flow of 179,000 gpm each. This provides a total system flow of approximately 692,000 gpm for the condenser water boxes and the SC system heat exchangers. At these flow rates the condenser water box flow rates are between 8.4 and 9.0 ft/sec. The limiting design conditions are the water box inlet filters that have a design flow limit of 10.5 ft/sec.

Based on the information supplied by HES for the condenser backpressures, and the information supplied by Siemens for the turbine/generator performance, higher CW flow is advantageous in the summer months. Additionally, there is no significant MWe penalty to supply the higher CW flow rates during cold water (winter) conditions. This eliminates the need for two-speed motors or variable speed drives.

To realize higher Circulation Water System flow, new circulating water pump impellers and larger motors will be required. The circulating water pump supplier, Flowserve, has determined that a 22% increase in flow to 207,400 gpm per pump is achievable. Therefore, a revision to the circulating water pump and motor specification is required to reflect this higher flow. The specification should include a requirement to maximize the motor efficiency to offset the impact on the electrical distribution system. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections are applicable to this task.

Two EC packages are required, one to procure the four new CW pump impellers and motors (columns and casings are not being replaced) and a separate EC package to install these new pumps and motors in the plant. As part of the EC package to install the new CW pumps, the CW expansion joints at the condenser need to be upgraded to accommodate the expected higher pump discharge pressure. In 2007, new expansion joints are being installed with Beaudrey flow straightener modifications on the A and B water boxes. Flow straightener and new expansion joints will need to be installed on the C and D water boxes in 2009. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.9 Condensate Pump and Motor CDP-1A and –1B Replacement

Replacement of the two Condensate pump impellers is necessary to produce the required flow at EPU conditions. The calculated condensate system flow conditions at uprate are approximately 19,300 gpm at a temperature of 108 °F. The new pump should be designed to produce 9670 gpm + 4% margin for a capacity of 10,060 gpm at 800 feet total developed head (TDH). The currently installed pumps are six stage Ingersoll-Rand pumps with a design flow of 8,000 gpm at 745 feet TDH driven by a 2000 horsepower (HP) motor at 1185 rpm through a magnetic drive coupling assembly. The thrust bearing is incorporated in the magnetic drive coupling assembly.

Flowserve has advised that the existing Ingersoll-Rand six stage pumps can be upgraded by replacing the rotating stages while retaining the internal casing to achieve the desired flow and TDH. The proposed uprate of Condensate pumps for EPU conditions will increase margin from 1.5% (existing) to 4% (EPU).

Concurrent with the replacement of the Condensate pump impellers, elimination of the magnetic drive coupling will also be accomplished. A direct driven pump and motor with a variable speed digital control system (VSD) is to be procured and installed. Since the existing design incorporates the assembly thrust bearing in the magnetic drive coupling, the new design will require that the new motor include the thrust bearing assembly. Control of condensate flow will be accomplished by powering the new motors through a variable speed drive. The existing condensate pump controls are not compatible with a direct drive VSD system and require replacement. The current condensate flow recirculation to the condenser (CDV-39) is designed to maintain the minimum CD flow requirements (1600 gpm per pump). Changes to the minimum CD pump flow requirement are not expected.

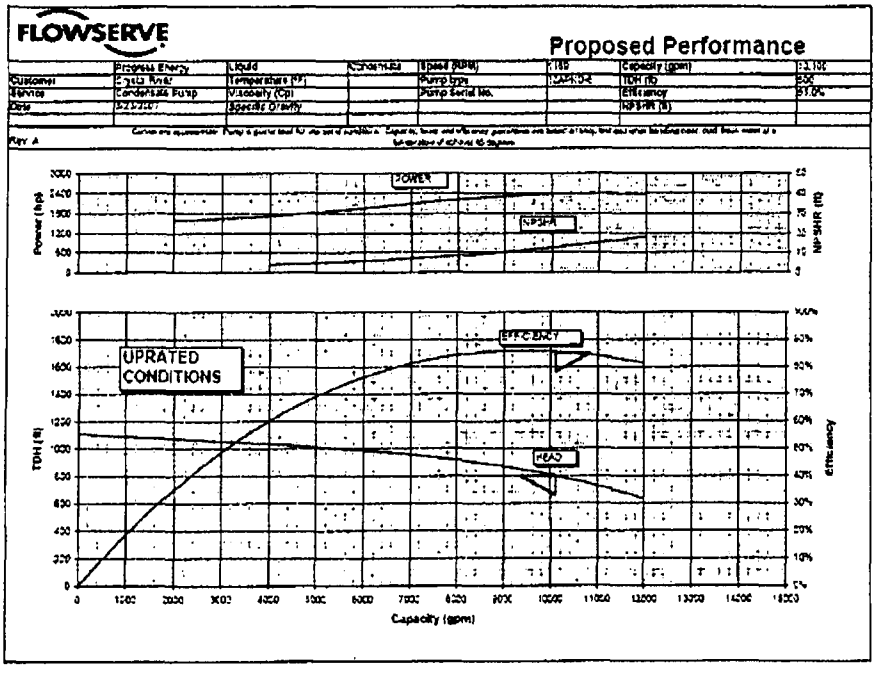
To realize higher Condensate System flow, a design specification, a specification for the new Condensate pump impellers and larger motors equipped with variable speed drives, an EC package to purchase the impellers, motors and drives, and an EC package to install the design change into the plant are required. Procedure EGR-NGGC-0005, Engineering Change, Section 9.3.1, provides the list of information necessary for a design specification. This information includes the following.

Scope Description
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Revision to the Condensate pump and motor specification is required to reflect this higher flow and to incorporate the variable speed drive into the design. The specification should include a requirement to maximize the motor efficiency to offset the impact on the electrical distribution system. The revised CD pump specification should establish the requirements for new 6 stage rotating elements suitable for the EPU flow requirements (see proposed pump performance curve below). The specification for the new CD pump motors should require motors rated for 4000 volts, 1180 rpm, 2500 HP, an integral thrust bearing, and compatible with a variable speed drive. The revised specification needs to

incorporate a variable speed drive compatible with a 4 KV and 2500 HP with the capability to be bypassed. The VSD must be capable of providing minimum and maximum motor speeds to support system flow requirements at all loads. The specification must incorporate features that will assure high reliability and require compatibility with the expected environmental conditions. VSD specification should include dry type isolation transformer at the input side with 3-phase secondary windings that can provide required phase shifting to reduce harmonic currents and voltages reflected back to the primary power system. VSD design could include either inductance or capacitance coupling at the DC link (between rectifier and inverter circuits). Either design can provide reliable operation provided that proper design precaution has been taken to eliminate voltage spiking or prevent current/voltage harmonics increase at the inverter output. The requirements for revised condensate flow control must be included in the specification. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections are applicable to this task.

Proposed Condensate Pump Performance Curve



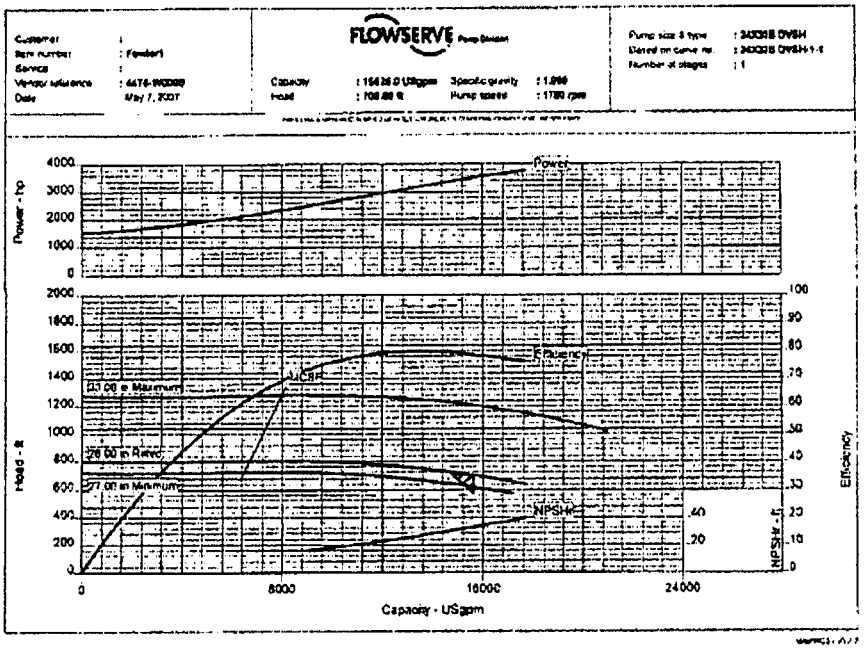
Two EC packages are required, one to procure the two new CD pump impellers, motors and drives, and a separate EC package to install these new impellers, motors, and drives in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.10 Feedwater Booster Pumps and Motors, FWP-1A and –1B

The 3030 MWt PEPSE model estimated required minimum feedwater system flow at uprate to be 14,155.6 gpm per pump. The present design conditions are 12,760 gpm at 305 °F, 725 feet TDH and 50.37 feet NPSHA. A larger booster feedwater pump and motor can provide increased flow and pressure allowing the main feedwater pumps to develop a smaller portion of the pressure required at the steam generators. This will allow the existing main feedwater pumps and turbine drives to be used for EPU conditions. The existing Feedwater Booster pumps and drivers will be replaced to realize feedwater flow margins of approximately 10% at EPU conditions.

Revision of the Feedwater Booster pump (FWP-2A and 2B) and motor specification is required to reflect the new pump requirements. The revised specification should establish the requirements for new Feedwater Booster pumps and motors consistent with the performance curve below supplied by Flowserve. Confirmation that the proposed pump performance curve is adequate must be completed. The specification for the new Feedwater Booster pump motors should require motors rated for 4000 volts. The specification should include a requirement to maximize the motor efficiency to offset the impact on the electrical distribution system. Procedures EGR-NGGC-0020, Preparation and Control of Specifications, MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping), NUA-and NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections are applicable to this task.

Proposed Feedwater Booster Pump with 10% Margin



Two EC packages are required, one to procure the two new Feedwater Booster pumps and motors, and a separate EC package to install these new pumps and motors in the plant. Procedure EGR-NGGC-0005, Engineering Change describes the steps necessary to prepare an EC package.

1.9.11 Feedwater Control Valves and Feedwater Control System Stability

Feedwater flow is regulated by feedwater pump speed and the Startup FW control valves, FWV-39 & FWV-40, from 0 to 15% flow, by feedwater pump speed and the Low-Load Flow Control Valves, FWV-37 & FWV-38, from 15 to 50%and by opening Feedwater Block Valves, FWV-29 & FWV-30, and feedwater pump speed above 50% flow. The switch over to the low-load flow control valves will be at the same mass flow rate flow but at a slightly lower percentage of total feedwater flow. The block valves opening will be at the same mass flow rate ($6x10^6$ lbm/hr) flow but at a slightly lower percentage of total feedwater flow. The valve will pulse open to 15% and them ramp full open. When the loop feedwater flow demand decreases to 45% of the loop flow range, the associated main block valve will receive a close signal. The valve will ramp closed to 17% open and then pulse to full closed. The block valves close of a main feedwater isolation actuation signal.

The initial assessment is that the feedwater flow control and block valves are adequate for EPU conditions. The developed feedwater pressure exiting the feedwater pumps is being raised from 1013 psia to 1092 psia. A hydraulic evaluation of the feedwater system (FATHOM or equal) is being performed as part of the Phase 1 detailed design. Verification of proper operation of the feedwater isolation valves at the maximum differential pressure is required after the hydraulic analysis is complete. The feedwater control and block valves require further evaluation of the MFP runback set point and control oscillations after the final PEPSE and hydraulic models are complete.

The proposal for this task should include 1) an evaluation of the feedwater control system setpoints and 2) an evaluation of the stability of the feedwater control system and valves over the operating range of the system at EPU conditions.

1.9.12 Condenser Performance and Flow-Induced Vibration Calculations

Condenser performance requires evaluation using the final PEPSE results for 3030 MWt including CW pump flow of 207,400 gpm each. In addition, a baseline case should be evaluated for 2568 MWt and existing CW flow for baseline comparisons against current plant data. A condenser flow-induced vibration evaluation is required using the final 3030 MWt results.

These evaluations are to be sub contracted to Heat Exchanger Services. The proposal should include the cost for the HES analysis.

1.9.13 Electrical Distribution System Calculations

A number of upgrades to the secondary plant will result in an increase in the electrical load on the CR3 electrical distribution system. The Redundant Isophase Bus Duct Cooling System, Circulating Water pump motors, SC pump motors, Feedwater Booster pump motors, and Condensate pump motors will result in significant load increases on the electrical distribution system. An analysis of the distribution system is required that must include new load flow, short circuit, motor starting and protection system coordination studies. The goal of this calculation revision is to evaluate the adequacy of existing power system equipment ratings (auxiliary transformers, load centers, motor control centers, switchgear, cables, etc) to support the higher system load and identify required upgrades of the electrical distribution system.

An initial evaluation of the impact of expected electric load increases on the Station Auxiliary Transformer, 4KV buses, circuit breakers, switchgear, and cabling is required to determine any required equipment replacements.

The calculation revision will ensure that power system sources and components, such as offsite power, transformers, cables and system protection circuits will either continue to operate within their designed limits with the load increases expected, or identify system changes needed to assure the planned reconfiguration will not affect the plant licensing commitments. This study should be completed 2 years prior to the planned uprate in 2011 to support procurement of equipment and modification packages as required.

This calculation revision will update existing CR3 electrical distribution calculations. The calculations currently utilize ETAP and other computer programs for the analysis as follows.

Voltage Drop/Short Circuit for AC Electrical System - SKM Software
Non Safety 125 VDC - ETAP Software

The seller must identify any additional calculations that require revision as a result of the EPU upgrades. Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

1.9.14 Mechanical Ultimate Heat Sink Calculations

Update of four nuclear safety related calculations, Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11, Calculation M95-0020, "DCHE Performance Evaluation," Rev 1, Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1, and Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2 is required to reflect EPU conditions. A discussion of each of the calculations follows.

Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11

Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11 needs to be revised to account for increased heat load from the Reactor Building Cooling Unit heat loads, the Spent Fuel Heat Exchanger heat loads, and the Make Up Pump motor heat loads. In addition, an allowance for macrofouling and an increase in the allowable number of plugged tubes should be included in this calculation update. When revising Calculation M97-0133 for the EPU conditions, the existing sensitivity study of tube blockage versus RW inlet temperatures needs to be updated since the existing study is based on 0% macrofouling with only 10 tubes plugged per SWHE.

The maximum SWHE shell side outlet temperature for emergency operating conditions is 110 °F. Per CR3 Calculation M97-0133, during emergency operating conditions, the SWHE shell side outlet temperature must be less than 104 °F no greater than 90 minutes after a LOCA with LOOP and must be less than 104 °F no greater than 100 minutes after a LOCA without LOOP in order to maintain the Control Complex air temperatures below their design limits. Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11 must be updated to reflect EPU conditions using the new design heat loads for the affected equipment.

Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

Calculation M95-0020, "DCHE Performance Evaluation," Rev 1

Calculation M95-0020, "DCHE Performance Evaluation," Rev 1 for the Decay Heat Closed Cycle Cooling (DC) System needs to be revised to account for increased heat load of the Decay Heat Heat Exchangers and the Makeup Pumps at EPU conditions and to reduce the allowable number of plugged tubes to 10% (69 tubes). Also, there are inconsistencies between Calculation M95-0044 and Calculation M95-0020 that require resolution. The thermal conductivity of the DCHE tubes should be relatively equal; however, there is significant difference between the thermal conductivity and the maximum shell side velocities for the DCHE design conditions used in these two calculations. The existing sensitivity study of tube blockage versus RW inlet temperatures needs to be updated when revising Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1 and Calculation M95-0020, "DCHE Performance Evaluation," Rev 1 for EPU conditions.

Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1 for the Decay Heat Closed Cycle Cooling (DC) System needs to be revised to account for increased heat load of the Decay Heat Heat Exchangers and the Makeup Pumps at EPU conditions and to reduce the allowable number of plugged tubes to 10% (69 tubes). Also, there are inconsistencies between Calculation M95-0044 and Calculation M95-0020 that require resolution. The thermal conductivity of the DCHE tubes should be relatively equal; however, there is significant difference between the thermal conductivity and the maximum shell side velocities for the DCHE design conditions used in these two calculations. The existing sensitivity study of tube blockage versus RW inlet temperatures needs to be updated when revising Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1 and Calculation M95-0020, "DCHE Performance Evaluation," Rev 1 for EPU conditions.

Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2

Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2 needs to be updated for EPU conditions including Verification that the SW thermal relief set points will not be affected. Procedure EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations, applies to this task.

1.9.15 Turbine Building Structural Evaluation

The planned secondary system upgrades will result in increased loads on the turbine building structure and, in some cases, increased loads for equipment supports. Equipment that will result in significant load increases include the new MSRs, MSR drain heat exchangers, turbine rotors and casings, main generator and exciter, feedwater heaters, SC heat exchangers, larger motors for pumps with larger impellers or new pumps, and Condensate pump variable speed drives. An evaluation of the expected increase in loads on the supports and structures is required to identify any significant physical and/or calculation changes to that are required.

10.2 Specifications

CR3 Piping Specification SP-5206 Rev. 8
SWHE Heat Exchanger Specification Sheet
DCHE Heat Exchanger Specification Sheet
Instrument Data Sheets for HD Control Valves
Isophase Bus Duct Cooling Specifications
Specification for Third Point Feedwater Heaters, CDHE-3A and 3B
Circulating Water Pump and Motor Specification
Secondary Cooling Pump and Motor Specification
Condensate Pump and Motor Specification
Booster Feed Pump and Motor Specification

10.3 P&ID's:

Flow Diagram Index 302-000—SH-001
Symbols 302-001—SH- 001
Main & Reheat Steam 302-011--SH-001
Main & Reheat Steam 302-011--SH-002
Main & Reheat Steam 302-011--SH-003
Main & Reheat Steam 302-011--SH-004
Feedwater 302-081--SH-001
Feedwater 302-081--SH-002
Feedwater 302-081--SH-003
Feedwater 302-081--SH-004
Condensate 302-101--SH-001
Condensate 302-101--SH-002
Condensate 302-101--SH-003
Heater Drains 302-111--SH-001
Heater Drains 302-111--SH-002
Heater Drains 302-111--SH-003
Heater Drains 302-111--SH-004
Circulating Water 302-201--SH-001
Secondary Services Closed Cycle Cooling 302-221—SH-001
Secondary Services Closed Cycle Cooling 302-221—SH-002
Secondary Services Closed Cycle Cooling 302-221—SH-003
Secondary Services Closed Cycle Cooling 302-221—SH-004

10.4 Calculations

Calculation M87-0002, "SW Thermal Analysis," Rev 3
Calculation M90-0071, "CR3 FW Booster Pump NPSH Evaluation," Rev. 1
Calculation M95-0020, "DCHE Performance Evaluation," Rev 1
Calculation M95-0035, "SW System Inventory Transient Analysis," Rev. 2
Calculation M95-0044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1
Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11

Calculation FW 7.1, Feedwater Booster Pump NPSHA and Deaerator Volume Check, dated September 19, 1969.
Calculation DST-1, GAI Design Deaerator Storage Tank Size, dated July 11, 1968.
Calculation E90-0044, Non Safety Related Buses Short Circuit, ARC Flash and Voltage Drop Analysis Under Normal Plant Operating Conditions, Revision 5
Non Safety 125 VDC

10.5 Procedures

EGR-NGGC-0005, Engineering Change
EGR-NGGC-0012, Engineering Product Quality
EGR-NGGC-0017, Preparation and Control of Design Analysis and Calculations
EGR-NGGC-0020, Preparation and Control of Specifications
MCP-NGGC-0401, Material Acquisition (Procurement, Receiving, Shipping)
NUA-NGGC-1530, Equipment, Pressure Test, Protective Coatings, and Special Process Inspections
NGGM-PM-0020, Vendor Quality Program for Critical Non-Safety Equipment

Spec Page #	Section Reference	AREVA C - Conform	AREVA X - Exception	AREVA A - Alternate	AREVA E - Enhance	Enercon C - Conform	Enercon X - Exception	Enercon A - Alternate	Enercon E - Enhance	TCI C - Conform	TCI X - Exception	TCI A - Alternate	TCI E - Enhance	Crystal River Unit 3 Nuclear Power Station Extended Power Uprate Bid Specification Table of Conformance - Technical	AREVA NP Team	Enercon	TCI
10	1.2													**SCOPE OF SERVICES**			
	1.9.1													**Update the following computer models for EPU conditions**			
		C				C				X				• PEPSE		Due date stipulated in RFP has been amended by Attachment 1 to the RFP. Our proposed date is later than the original date.	TechCom elects not to bid on this item at this time.
		C				C				X				• FATHOM			TechCom elects not to bid on this item at this time.
		C				C				X				• CHECWORKS			TechCom elects not to bid on this item at this time.
	1.9.2													**MSR Replacement and MSR Belly Drain Heat Exchanger Addition**			
		C				C				X				• Prepare an EC to install 4 new Moisture Separator Reheaters including an evaluation of the MSR Relief Valves			TechCom elects not to bid on this item at this time.
		C				C				X				• Provide the following for the four new MSR Belly Drain Heat Exchangers			TechCom elects not to bid on this item at this time.
		C				C				X				• Design specification			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an MSR Belly Drain Heat Exchanger specification			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to purchase four new MSR Belly Drain Heat Exchangers			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to install four new MSR Belly Drain Heat Exchangers			TechCom elects not to bid on this item at this time.
	1.9.3													**Turbine Generator Modifications**			
		C				C				X				• Prepare an EC to install two new low pressure turbine rotors and inner casings			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to install a new high pressure turbine rotor and inner casing			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to install a new Main Generator and Exciter			TechCom elects not to bid on this item at this time.
	1.9.4													**Deaerator Bypass Line Addition**			
		C				C				C				• Prepare a Design specification for Deaerator Bypass Line Addition			
		C				C				C				• Prepare a specification for a new control valve			
		C				C				C				• Prepare an EC to purchase new control valve			
		C				C				C				• Prepare an EC to install new valves, piping, and controls			
	1.9.5													**Upgrade of the Isophase Bus Duct Cooling System**			
		C				C				C				• Determine the adequacy of the existing isophase bus ampacity			
		C				C				C				• Prepare a design specification			
		C				C				C				• Prepare a specification for new Isophase Bus Duct Cooling System including fans, motors and controls			
		C				C				C				• Prepare an EC to purchase new equipment			
		C				C				C				• Prepare an EC to install new Isophase Bus Duct Cooling System			
11	1.9.6													**Feedwater Heater and Feedwater Heater Drain Modifications**			
		C				C				X				• Replacement of Feedwater Heaters CDHE-3A and -3B			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare a Feedwater Heater specification			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to purchase two new third point feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to install 2 new third point feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C				X				• Evaluation of the existing feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C				X				• Characterize the condition of the existing feedwater heaters that will remain in service			TechCom elects not to bid on this item at this time.
		C				C				X				• Establish a monitoring program following EPU implementation for these feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C				X				• Heater Drain Valves HDV-101, -102, -103, and -104			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare a Valve specification for the first point heater drain valves			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to purchase four new first point feedwater heater drain valves			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to install four new first point feedwater heater drain valves			TechCom elects not to bid on this item at this time.
		C				C				X				• Heater Drain Valves HDV-247, -248, -249, and -250			TechCom elects not to bid on this item at this time.
		C				C				X				• Prepare an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and -250 with piping with a higher pressure and temperature rating			TechCom elects not to bid on this item at this time.
	1.9.7													**Secondary Services Closed Cycle Cooling System Modifications**			
		C				C				C				• Perform an evaluation to determine the maximum capacity and cooling flow of the Secondary Cooling Heat Exchangers based on existing space limitations. Perform an evaluation to determine the maximum flow by replacing the SC pump impellers and motors			
		C				C				C				• Prepare a new specification for the Secondary Cooling Heat Exchangers 1A and 1B			
		C				C				C				• Prepare an EC to purchase two new SC heat exchangers			
		C				C				C				• Prepare an EC to install two new SC heat exchangers			
		C				C				C				• Revise Secondary Cooling pumps and motors, SCP-1A and -1B specification			
		C				C				C				• Prepare an EC to purchase two new SC pump impellers and motors			
		C				C				C				• Prepare an EC to install two new SC pump impellers and motors			
12	1.9.8													**Circulating Water System Modifications**			
		C				C				C				• Revise specification for Circulating Water pumps and motors CWP-1A, -1B, -1C, and -1D to achieve a nominal flow of 207,400 gpm			
		C				C				C				• Prepare an EC to purchase four new CW pump impellers and motors			
		C				C				C				• Prepare an EC to install four new CW pump impellers and motors and upgrade the circulating water system expansion joints at the condenser as required			
	1.9.9													**Condensate pumps and motors**			

| | | |

April 10, 2008

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PROGRESS ENERGY SERVICE COMPANY, LLC
CR3 NUCLEAR PLANT
ENGINEERING SERVICES FOR SECONDARY SYSTEMS UPGRADE
REQUEST NO. KS12007

Dear Bidder:

This addendum adds requirements to the above-referenced Request for Proposal and provides answers to several questions raised by bidders. The questions and respective answers are attached. In addition, the following two new requirements are added to the RFP:

- Bidder shall include an analysis of Internal flooding due to the increased "Circulation Water" flow rate of approximately 22%.

- Bidder shall include provisions in their bid for License Amendment input.

All other terms and conditions remain unchanged. Questions pertaining to this addendum should be directed to the appropriate individual listed in the original Request for Proposal.

Your acknowledgement of receipt of this addendum should be noted on your proposal. Failure to do so may constitute grounds for rejection of your bid.

PROGRESS ENERGY SERVICE COMPANY, LLC

_____

Tony Owen

Manager NGG Major Projects

__/__

Attachment

Attachment A to Request No. KS12007

Certain bidders have asked the following questions in regards to RFP No. KS12007, so this addendum is in answer to those questions and available to all bidders. A question and answer format has been used.

Turbine building structural evaluation comments/clarifications:

Question: Sections 1.2.13 and 1.9.15 discuss "Conduct an evaluation of the Turbine Building structure considering the expected additional loads resulting from installation of new and larger equipment" and "Perform an evaluation of the Turbine Building structure and supports to identify if any significant changes are required to accommodate the expected increases in loads resulting from new and larger equipment such as turbine motors, main generator, etc.". Both statements imply there is an evaluation for the existing building loads. What calculations cover the existing TB evaluations, and will these be made available?

Answer: Original calculations are Gilbert Commonwealth structural calculations and will be made available. Estimate 200 hours to review and revise calculations as necessary.

Question: The statements in sections 1.2.13 and 1.9.15 ask for an evaluation to see if significant changes are required. Please define the term "significant" changes versus others?

Answer: "Significant changes" in design loads would be those that would not meet current acceptance criteria and would require modifications to the existing floor or support columns.

Question: There is no mention of what to do when changes are required. When changes are required, are they included with this scope or handled separately outside of this scope?

Answer: The modifications would be scope addition and would be priced separately as T&M, if required.

Question: Section 1.12 discusses the schedule for the Turbine Building evaluation (Item 15) and is scheduled to be completed 12/13/07. It is noted that a PO will not be submitted to anyone before late August. Before the TB evaluation can be done, inputs for the weights and footprints of all equipment must be known. This includes major components such as the turbine and MSRs. When will the detailed vendor information be available and the locations within the TB be defined? The schedule indicates that equipment information will not be known until after the deadline for the TB evaluation, which would invalidate the TB evaluation schedule. It appears the schedule needs to be reworked to define predecessor activities for all tasks.

Answer: The weights of the replacement components are readily available and will be provided as part of the Owners deliverables within the schedule.

Electrical comments/clarifications:

Question: Section 1.9.5 asks for the complete replacement of the existing system with the 2 X 100% new system each with 100% motor/fan and cooling coils, while Section 1.2.1 discusses upgrade cooling unit to have redundant fan/motor and cooling coils. The existing unit can not be upgraded to have redundant fans. Therefore two 100% new units would be required.
Is the plant replacing the existing cooling unit with two new 100% redundant units or upgrading the existing unit with redundant motors to meet the design requirements?

Answer: Iso phase bus duct coolers should be replaced with 2 X 100% redundant coolers and fans.

Attachment A to Request No. KS12007

Question: Booster Feed Water pump motors are up-rated to 4000 HP. The 4 KV Aux and startup transformers may become overloaded and 4KV switchgear will not likely handle all of EPU load requirements. It is recommended that before writing the spec proposal for the FW Booster Pump, an evaluation on the power distribution system be performed to determine what voltage class motors are required. This should be performed prior to preparing the pump/motor specification. Should the Bid Specification identify the need to prepare a preliminary electrical system design review prior to preparing the FW Booster Pump motor spec (4KV level)?

Answer: The Feed Water Booster pump motor replacement and modification should include rerouting the load center from the 4160V to the 6900V switch gear.

Question: The draft bid specification identifies the need to revise the Non-Safety 125 VDC calculation using the ETAP model. If this calculation will not be affected by the EPU, what is the basis for upgrading the 125 VDC calculation using the ETAP program?

Answer: If 125VDC calculations are not affected then state as such within your exception conformance tables for the proposal.

Question: The bid specification recommends performing the voltage drop and short circuit calculation using the SKM software tool. Can CR3 provide the overall plant model in the SKM software environment?

Answer: CR3 will provide modeling as currently exists for electrical load centers.

Question: The specification limited this scope to a revision of calculation E90-0044. Is it Progress Energy's intention to limit the scope of the ETAP proposal to only one calculation? The ability to comprehensively update all the individual calculations using multiple software programs, spreadsheets, etc. is limited (especially those calculations performed by other third parties). Would Progress Energy support developing an overall plant electrical distribution model using the Progress Energy ETAP program to incorporate all design changes from the EPU?

Answer: Provide a comparison of costs for updating the entire electrical system to ETAP instead of revising all current software programs and calculations. Prudence will dictate decision. If costs, resource, and schedule are better by modeling the whole system in ETAP then CR3 can support this approach.

Clarification/Comments to Condensate Pump/VFD/Motor Request:

Question: Suggest separating the pump and motor ECs from the VFDs. These are actually 2 different product offerings and if the equipment is combined, it may limit the options available for separating pumps from VFD vendors.

Answer: Condensate Pump and Motor and Control system may be separated and designed as separate ECs.

Attachment A to Request No. KS12007

Clarification on the ICS system:

Question: Is it the intent that the Integrated Control System modifications be performed in-house by PEF or other contracted entities?

Answer: PEF will perform ICS modifications.

Clarification/Comment to Equipment Specification and Design Specification definition:

Question: The terms Equipment Specification and Design Specification appear to be interchangeable. Are these reference terms the same in the PEF system? Please clarify if they are not the same.

Answer: Design Specifications are the requirements for the component or system parameters provided in an engineering document. Equipment Specifications are the PEF Engineering Documents that are used to order equipment in accordance with EGR-NGGC-0020. Note 4 has the issuance of Equipment Specifications developed per NGGC-EGR-0020 also requires generation of an EC per EGR-NGGC -0005

Clarification/Comment on the Reference to Affected Calculations:

Question: Section 1.9.14 references more than 5 calculation documents out of the ~1500 calculations that will need to be revised or evaluated. Are these other affected documents to be included in the respective EC package preparation, or are the critical documents determined to be the 5 identified in the RFP with any other documents to the scope to be defined later?

Answer: Additional calculations not identified within the RFP should be identified and may be bid as part of a fixed price proposal or identified that they will be addressed separately as T&M.

Clarification/Comments on the schedule:

Question: A brief review of the schedule noted that there are a number of instances where items are to be completed prior to a predecessor task being completed, or, not enough time has been allotted for the task based on a projected authorization date. A couple of examples include: the reference to the PEPSE model being completed by 9-20-07 when a typical PEPSE analysis and documentation takes 8 weeks to complete after the receipt of the turbine thermal kit. As mentioned previously, the turbine building structural evaluation is scheduled to be completed prior to the completion of the ordering and ECs for turbine items, MSRs, etc. Please clarify.

Answer: A completed PEPSE Analysis was requested by the TG Vendor in order to perform the Thermal Kit Analysis. Subsequent conversations have identified that a completed PEPSE run is not required. However, the data sheet in the RFP shows what data will be required by the end of Sept to support the LP and HP turbine rotor designs. The weights of replacement components are readily available and can be provided for the Structural evaluation in order to meet desired schedule.

CR3 Extended Power Uprate, Secondary Systems Upgrade, Enercon Bid Proposal Review Meeting

Meeting Date: 8/28/2007

The RFP bid specification identified fifteen (15) major tasks. The RFP requested each major task be bid separately and include estimated manhours. Combined total work scope pricing and maximum not to exceed pricing was to be identified. A request for proposal # KS12007 addendum letter was issued on August 14, 2007. The addendum letter added two (2) additional work scopes (item 16 & 17).
The major task areas included:

1) Computer models.
2) MSR replacement and MSR belly drain heat exchanger addition.
3) Turbine generator modifications.
4) Deaerator bypass line addition.
5) Isophase bus duct cooling system.
6) Feedwater heater and heater drain system modifications.
7) Secondary service closed cycle cooling system modifications.
8) Circulating water system modifications.
9) Condensate pumps and motors.
10) Feedwater booster pumps and motors.
11) Feedwater control valves and control system stability analysis.
12) Condenser evaluations.
13) Electrical distribution calculations.
14) Mechanical ultimate heat sink calculations.
15) Turbine building structural evaluation.
16) Internal flooding analysis due to increased circulating water flow.
17) Plant operating license amendment support.

Enercon Proposal Review Notes:

- Proposal includes total work scope.
- Proposal includes estimated man hours per major task. Proposal includes cost per major task as well as total not to exceed cost for full work scope.
- Enercon appears qualified to perform work scope based on work references and personnel resumes included in proposal. Review Enercon project management team for power uprate project experience.

- BOP Piping Analysis Scope does not appear to be included. Areva scoping study report # 51-9043794-000 Section 3.4.1.3 "pipe support / water hammer" identifies 16 piping calculations (ref. App. J) and the main steam pipe hammer calculation M73-1002 need developed or revised.

- Schedule Comment: Prioritize the 2007 procurement of the 2 feedwater heaters (CDHE-3A/B), the 2 SC heat exchangers and the SC pumps / motors. All other equipment procurement EC can be postponed to 2008.

- Verify existing design basis documents and affected FSAR sections will be "marked up" for each EC.

- Pg.5, PEPSE Model, add YUBA estimated feedwater heater TTD's and DCA's for retained heaters; validate MUR PEPSE model against plant data following MUR implementation. Siemens will provide preliminary turbine PEPSE model input in September 2007. PEPSE model to be updated with final turbine PEPSE model input after final turbine design is established.

- Pg.5, FATHOM model; add Secondary Cooling System (SC) to list of systems. Need to verify uprated SC system will provide sufficient cooling water to specific locations in the system (i.e. Generator H2 coolers). System flow control valves should be evaluated. The LO Cooler temperature control valve may need to be enlarged. The SC system header pressure control setpoint can be increased 10-15 psi due to increasing the generator H2 gas pressure from 60 psig to 75 psig.

- Pg.9, Commercial and Resource Proposal; review "billing in accordance with master service agreement for T&M" vs. the not to exceed prices stated in the proposal.

- Pg.10, Item 7; CHECWORKS program at CR3 will be utilized.

- Pg.10, Item 8; Final PEPSE model after all new equipment is specified is not in scope.

- Pg.10, Item 9; Enercon site liaison is expected to obtain design basis information. Reliance on site engineering to provide design basis information is not desired.

- Pg.11, Item 12; The proposal does not include a PEPSE model for the 2009 plant condition. The 2009 plant configuration heat balance model will be performed by Siemens to support turbine performance guarantee and performance testing. Add, "Enercon shall support this effort as needed to accurately model the plant configuration". Evaluate having Enercon perform an independent 2009 model to compare with Siemens model.

- Pg.20, Assumption item 3 and 4; all valves on piping associated with the new MSR belly drain heat exchangers shall be evaluated. New valves shall be specified for procurement however a procurement EC should not be required.

- Proposal requires CR3 plant cable databases will be updated by plant engineering.

- Pg.24, Turbine Vendor Information; will not be as extensive as described in the proposal. The turbine vendor will provide new complete turbine generator instruction manuals and the turbine generator installation instructions. The existing turbine generator vendor drawing file will have to be reviewed for impact. A turbine performance test procedure shall be developed and shall be in accordance with ASME PTC 6 – 2004, Alternate test for nuclear plant.

- Pg.28, Turbine Generator Assumptions; The SC piping to the generator H2 coolers may be impacted; Turbine Generator instrument and control setting changes will be provided by Siemens and shall be included in the turbine EC; Generator Instruments will be impacted and shall be evaluated; Turbine Generator support systems will be evaluated by Siemens. Any impacts identified by Siemens shall be included in the turbine EC.

- Pg.29, Turbine Generator Assumptions 17; Calculation S95-0021, Turbine Generator Pedestal Structural Analysis, shall be "updated" using the methodology contained in the analysis. A three dimensional analysis model of the turbine pedestal structure is included.
- Pg.39, Bus Duct Deliverables; Verify evaluation of bus duct electrical capacity (bus duct rating) will be performed in conjunction with the bus duct cooling EC.

- Pg.59, SC System Workscope Item 10; Verify hydraulic evaluation includes system flow balance, system heat loads are satisfied and system flow control valves are evaluated. Note the SC system pressure setpoint can be increased due to increasing generator H2 pressure.

- Pg.59, SC System Workscope Item 11; The turbine lube oil temperature control valve should be replaced with a larger valve.

- Pg.60, SC System Work Performed by Others; Enercon should interface with equipment vendors to obtain design input information and not rely on PE to perform this function. This comment applies to all equipment and all "work by others" sections of the proposal.

- Pg.64, SC system Assumptions; defined work scope does not address interferences to replace the major SC components. EC installation instructions must address these issues.

- Pg.94, FW Booster Pump Assumption 15; A larger pump / motor will be specified. Impacts to the support pedestal and piping can be expected.

- Pg.99, Condenser Evaluation, HES shall provide the Condenser Evaluation CFD Analysis. The HES CFD analysis is an input to the condenser tube bundle tube vibration analysis which is subcontracted by HES. The Condenser Tube Bundle Tube Vibration Analysis should be identified as a deliverable and shall identify tube bundle locations where steam impingement plates should be installed. Impingement plate additions were recommended by HES during the CR3 previous condenser tube failure analysis. Steam impingement plates should be installed during the 2009 LP turbine replacement.

- Pg.115, Electrical Distribution Calculations; Review proposal to consolidate existing electrical calculations into new ETAP. Evaluate cost of converting vs. updating existing electrical calculations.

Appendix B, Consolidated Project Schedule Comments:

- October 07 PEPSE model is "initial" EPU model. Final PEPSE model shall be submitted after all plant design changes have been specified and inputted into the model.
- MSR drain mod procurement EC can be postponed to 2008.
- All turbine generator and MSR schedules shall be compared to and coordinated with the equipment vendor's engineering deliverable schedules. The schedule for issuing the installation EC packages shall be determined by the owner.
- The turbine pedestal calculation schedule shall be accelerated and will support final calculation expeditiously upon receiving final input data from Siemens.
- Deaerator procurement EC can be postponed to 2008.
- Isophase Bus Duct procurement EC can be postponed to 2008.
- Isophase Electrical Capacity Calculation shall be performed in conjunction with designing the bus duct cooling system.
- Turbine Building Structural Evaluation is scheduled to complete by 12/12/07. This does not appear feasible.

Proposal for

Design Engineering of
Power Uprate for the
Crystal River Three Nuclear Plant

Prepared for:

Progress Energy

Submitted By:

TechCom International

440 Goddard
Irvine, CA 92618

August 2, 2007

UNPRICED COPY

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Date: August 2, 2007

Mr. Tony Owen
Progress Energy Service Company, LLC
P. O. Box 1551 (PEB 2C3)
Raleigh, NC 27602

Subject: Proposal for Engineering Service for Power Uprate of Crystal River Three Nuclear Plant
Reference: Request for Proposal #KS12007 from Progress Energy Florida Inc., including addenda dated July 27, 2007

Dear Mr. Owen,

TechCom International (TCI) is pleased to have an opportunity to submit this proposal to support your Power Uprate Project. TCI intends to provide the design and engineering deliverables as specified in your Request for Proposal #KS12007. The TCI team will ensure the cost efficiency for your project while maintaining your schedule and the highest standards of quality that Progress Energy demands.

The table of contents on the next page provides an inventory of the contents of this proposal. Progress Energy may copy any of the enclosed materials, for their exclusive use in the evaluation of this proposal. If there are any questions, please do not hesitate to contact me.

Sincerely,

Bob Katebian, Ph.D.
President

/Encl. – TCI Proposal dated 8-2-2006

PEF-NCR-02024

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Attachments:

1.) General Information Form
2.) TCI Small Business Certification
3.) TCI Disadvantaged Business Certification
4.) Table of Conformance
5.) Contractor Safety
6.) TCI Insurance Certifications
7.) Resumes of Key Personnel
8.) NOT USED

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1. PROPOSED PROJECT SCOPE AND APPROACH

1.1. Project Scope

TechCom International (TCI) is submitting this proposal for a *partial scope of work*. Based on our expert analysis of the project scope, we have determined that it is in Progress Energy's (PE) interest to split the project tasks to ensure that the project is completed on time and with a high degree of confidence in the resulting design.

TCI proposes to complete the following tasks in their entirety:

Task 4: Deaerator Bypass Line
Task 5: Isophase Bus Cooling
Task 7: Secondary Cooling System Modifications
Task 8: Circulating Water System Modifications
Task 10: Feedwater Booster Pumps and Motors
Task 11: Feedwater Control System
Task 13: Electrical Distribution
Task 14: Mechanical Calculations
Task 15: Turbine Building Structural Evaluation

TCI also acknowledges receipt of the addenda dated July 27, 2007 and proposes to complete both of the additional requested tasks.

Task A: Analysis of Internal flooding due to the Increased Flow Rate
Task B: License Amendment Input

TCI has estimated the project cost by including ten (10) new or revised drawings for tasks 4, 5, 7, 8, 10 and 13. Additional drawings will be prepared based on time and material rates.

Because the specifications for the pump replacements have not been completed as yet, the required motor sizes are indeterminate and, therefore the power requirements are indeterminate. This proposal does not include the engineering work required to accommodate changes to the electrical distribution system as a result of increased pump power requirements.

1.2. Approach

TCI will analyze and prepare the engineering documentation required for each task, in our Irvine, CA offices. All TCI Engineers utilized on this project will be trained to the QA program in effect at PE's Crystal River Three Nuclear Plant.

1.2.1. Preliminary Work

Throughout the project TCI's On-Site Engineering Liaison will coordinate with the discipline Lead Engineers to locate and transmit the requisite information to begin each of the designated tasks. As required, the On-Site Engineering Liaison will conduct system walkdowns at the direction of the discipline Lead Engineers and will interface with PE personnel as needed.

Steps included in the preliminary may include the following subtasks as applicable:

1. Training
2. Identify and review of vendor documentation
3. Walkdown of plant systems
4. Review and determination the affected plant design documents
5. Review and updates the affected design calculations

1.2.2. Design Specification

In order to complete the required design specifications, TCI staff will perform the following subtasks as applicable:

1. Identify required system interfaces and component changes required
2. Identify the system component quality classifications
3. Determine the applicable references for design input and any additional information needed
4. Provide justification and validation of assumptions
5. Evaluate effects of the changes on design margins
6. Confirm that the change conforms to the design basis
7. Assess changes to the design inputs and design records
8. Evaluate the interfaces with other system component changes
9. Confirm that the field conditions match the design
10. Evaluate impacts to the non-design records

1.2.3. Equipment Specifications and EC Purchase Packages

TCI will submit to PE equipment specifications of sufficient detail for PE to procure the necessary components required for each task. The packages will include parts lists and TCI will assist by supplying any technical information required by PE's procurement department.

1.2.4. EC Installation Packages

TCI will submit in the PE required format the completed EC installation package that will include the following information, as required, for each task:

1. Precautions and Limitations:
    a. Identify any significant plant conditions, partial turnovers, etc.;
    b. Identify any condition requirements for installation and testing and
    c. Identify precautions and limitations associated with operation.
2. Installation Requirements:
    a. Specify inspections, engineering hold points, and clearances;
    b. Provide detail required sequencing steps and
    c. Identify applicable installation documents.
3. Prepare new/change label requests
4. EC parts list:
    a. Provide EC parts list by form, sketch BOM , or drawing reference
    b. Provide design parameters required for procurement
    c. Identify long procurement or fabrication lead times
5. Test Requirements:
    a. Identify component, sub-system, or system functions to be tested;
    b. Identify design inputs/parameters to be tested and acceptance criteria
    c. Identify interface, pre-turnover and post-turnover testing and
    d. Identify the test procedure to be performed
6. Turnover to Operations: TCI will determine the turnover requirements and develop the turnover transition plan.
7. EC Installation Package Review and Approval:
    a. TCI will determine the required reviewers;
    b. Provide the appropriate review forms and materials to the reviewers;
    c. Collect review comments;
    d. Disposition and incorporate valid comments of each reviewer;
    e. Obtain the concurrence of the reviewers for comment incorporation and
    f. Provide for PE approval and issue the completed EC Installation Package.

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1.3. Support Required

In order to ensure the timely and accurate completion of each task, the support of PE will be required in several areas. TCI foresees that support will be need in the following areas:

1. This project will require that TCI personnel, located in the Irvine, California office have access through electronic means, to the document management system of the Crystal River Three site. This may be in the form of a VPN or other type of network access.
2. TCI personnel will require training in the QA program and engineering site procedures of the Crystal River Three Nuclear Power Plant. TCI anticipates that this training can be done remotely at the TCI Irvine offices.
3. TCI expects that their On-Site Engineering Liaison will be furnished with the generally acceptable level of support including a phone, computer workstation, desk space and other support as required to function effectively at the CR3 site.
4. PE will grant authority for TCI personnel to obtain any information need for completion of this project to be obtained directly from the vendor.
5. PE will support TCI as needed for site walkdowns and visits. This includes security badging, escorting or other means needed to ensure adequate access to site systems and components.
6. TCI expects that PE will be sensitive to the schedule time constraints and to provide for timely review, comment and approval of documents submitted by TCI. This includes any third party reviews that may be required.
7. TCI is proposing to complete only a portion of the workscope as defined in the PE request for proposal. Therefore TCI anticipates that PE will direct other firms involved with this project to coordinate with and interface with TCI personnel as required.

2. PROJECT ORGANIZATION

2.1. Proposed Organization

TechCom International's goal is to be highly responsive to your RFP for Engineering, Analysis, Construction Management and other Services. The following is our analysis of the organization, and required skill sets to ensure the successful completion of the project task items, in a timely manner.

TCI will provide the following personnel, required to complete this project, based on our analysis of the project tasks:

A.) One Project Manager
B.) One Lead Mechanical Engineer and six Mechanical Engineers.
C.) One Lead Civil Engineer and two Civil Engineers.
D.) One Lead I&C Engineer and one I&C Engineer.
E.) One Lead Electrical and four Electrical Engineers.
F.) One on-site Engineering Liaison.
G.) One Project Secretary

In order to provide the most efficient use of personnel for this project the following duties will be distributed as follows:

1.) The Project Manager will have the responsibility of planning and scheduling the work, and deliver of the work products to PE.
2.) The Lead Mechanical Engineer will also act as the Project Engineer, since the bulk of the engineering is mechanical. He will provide technical management for the project and serve as a technical contact to PE at the TCI Irvine office.

Please refer to figure 1 for the proposed organizational chart.

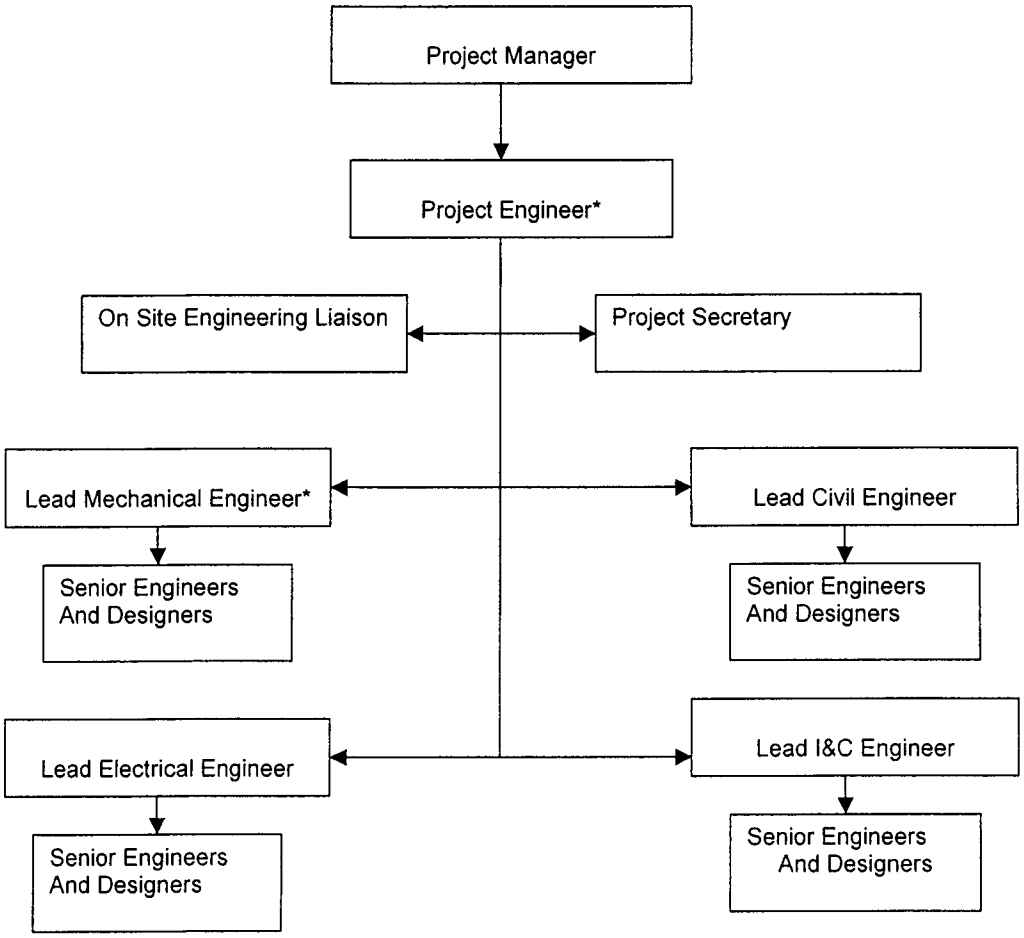


Figure 2-1: Proposed Organizational Cart

Note: The Lead Mechanical Engineer will also function as the Project Engineer as required.

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2.2. Classification of Personnel

TCI uses stringent qualification criteria to ensure that the proposed staff has the experience and education to complete the project. Table 2-1 defines the minimum requirements for each classification of personnel to be placed on the project. For purposes of classification, a Doctor of Philosophy in a related field may be substituted for a Registered Professional Engineering license (RPE).

Table 2-1

Classifications of Proposed Staff

Classification	Minimum Requirements		
	Education	Certifications	Years of Applicable Experience
Project Manager	Advanced Engineering Degree	None	25 years
Project Engineer	Advanced Engineering Degree	RPE	25 years
Project Planner/Scheduler	Degree in Related Field	None	10 years
Project Secretary	High School	None	5 years
Lead Engineer	BS in Field	RPE in Field	20 years
Sr. Engineer	BS in Field	RPE in Field	15 years
Engineer/Designer	BS in Field	None	10 years
On-Site Engineer Liaison	None	None	20 years

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3. KEY PERSONNEL

TCI is pleased to present our Management and Analysis team for your consideration for the Crystal River Power Uprate project. The attached resumes provide a concise overview of a sample of our team's capabilities we have provided a summary of the key qualifications Table 3-1, which includes the available staff for onsite and main office support.

Table 3-1:

Qualifications of Proposed Staff

Engineering Support Staff at TCI Main Office

Name	Position	Discipline	Years of Experience	Degrees Earned	Professional Registrations (State)
Katebian, Bob, Ph.D.	Project Manager	All	30	BS EE MS EE PhD Engr	(For pay grade purposes PhD qualifies.)
I&C					
Whittle, C B (Butch) Jr., PE	Lead I&C Engineer	I&C	25	BS EE, MS EE	RPE I&C (CA)
Koleff, William Steve, PE	Sr. I&C Engineer	I&C	22	BS EE	RPE (FL)
Electrical					
Pilot, Pete, PE	Lead Engineer	EE	25	BS EE	RPE EE (FL)
Root, Mike, PE	Sr. Electrical Engineer	EE/I&C	25	BS EE	RPE EE (CA) RPE I&C (CA)
Carmoa, Gil, PE	Sr. Electrical Engineer	EE	35	BS EE MS EE MBA	RPE EE (CA & IL)
Grosze, Andrew A., PE	Sr. Electrical Engineer	EE	21	BS EE	RPE EE (TX)
Coupe, Henry	Electrical Engineer/ Designer	EE	36	BS EE/ BS Phys	
Mechanical					
Richard Bockhorst, PE	Project Engineer & Lead Mechanical Engineer	ME	40	BS Eng.	RPE ME (CA) SRO
Sima, Fred, PE	Sr. Mechanical Engineer	ME	40	MS ME	RPE ME (CA)

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Table 3-1:					
Qualifications of Proposed Staff					
Engineering Support Staff at TCI Main Office					
Name	**Position**	**Discipline**	**Years of Experience**	**Degrees Earned**	**Professional Registrations (State)**
Valandai, Parviz, PE	Sr. Mechanical Engineer	ME	30	PhD ME MS ME BS NE	RPE ME (CA)
Troy, Jeff, PhD	Sr. Mechanical Engineer	ME	20	PhD ME MS ME BS Env.	(For pay grade purposes PhD qualifies.)
Santa Ana, Fabian, PE	Sr. Mechanical Engineer	ME	40	BS Eng.	RPE ME (CA)
Cheng, Johnson	Mechanical Engineer/Designer	ME	25	BS ME	
Har, Stephen, PE	Mechanical Engineer	ME	25	BS ME	RPE ME (CA)
Civil					
Hadidi, Hassan PhD, SE, PE	Lead Civil/Structural Engineer	CE/ SE	25	BS SE, MS SE, PhD CE	RPE SE (CA) RPE CE (CA)
Lu, Tim, PhD, SE, PE	Sr.Civil/Structural Engineer	CE/ SE	17	BS CE, MS SE, PhD SE	RPE CE (CA)
Baker, Ray, PE	Sr. Civil Engineer	CE	30	BS CE MS CE MS MT	RPE (CA), S.E. (CA)
On-Site Engineering Staff					
Brannon, James	On-Site Engineer Liaison	I&C	30		

NOTES:
Scientific/Engineering Disciplines and Degrees: CE-Civil; Env- Environmental; EE- Electrical; I&C- Instrumentation and Control; ME- Mechanical; MBA- Management and Business Administration; MT- Management of Technology; N-Nuclear; Phys- Physics; SE- Structural; RPE - Registered Professional Engineer.

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4. MAN-HOUR ESTMATES AND MILESTONE SCHEDULE

4.1. Project Start Date

Since time is of the essence, TCI requests that we receive authorization to proceed no later that August 15, 2007. If this authorization is received, TCI will proceed with a start date of August 20, 2007. Later authorization may impact the completion dates of some of the earlier tasks. In any event, TCI will make every effort to complete each task by the identified due date.

4.2. Project Milestone Schedule

TCI will perform the project tasks based on the schedule of milestones shown in Table 4-1. The Project Manager will be responsible for creating a detailed schedule of the project based on the

Table 4-1

Project Milestone Schedule

No.	TASK	SUBTASK	PRIORITY	MILESTONE DUE DATE
1	TechCom elects not to bid on this item at this time.			
2	TechCom elects not to bid on this item at this time.			
3	TechCom elects not to bid on this item at this time.			
4	Deaerator Bypass Line	Design Specification	1	10-03-07
		Equipment Specification	1	10-17-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
5	Isophase Bus	Evaluate electrical capacity	4	6-18-09
	Isophase Bus Duct Cooling System	Design Specification	1	10-03-07
		Equipment Specification	1	10-17-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
6	TechCom elects not to bid on this item at this time.			
7	SC Modifications	Maximization Report	1	9-20-07
	SC Heat Exchangers	Equipment Specification	1	10-03-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
	SC Pump Impellers and Motors	Equipment Specification	1	10-03-07
		Purchase EC package	2	10-31-07
		Install EC package	3	12-12-08
8	CW Pump Impellers and Motors	Equipment Specification	4	6-18-09
		Purchase EC package	5	7-2-09

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Table 4-1

Project Milestone Schedule

No.	TASK	SUBTASK	PRIORITY	MILESTONE DUE DATE
		Install EC package	6	12-16-10
9	TechCom elects not to bid on this item at this time.			
10	FW Booster Pump Impellers and Motors	Equipment Specification	4	6-18-09
		Purchase EC package	5	7-2-09
		Install EC package	6	12-16-10
11	FW Control System	Evaluation	4	4-8-10
		Stability Analysis	4	6-11-10
12	TechCom elects not to bid on this item at this time.			
13	Electrical Distribution	Evaluate Station Auxiliary and Startup Transformers, and 4KV System	4	12-12-08
		Calculation E90-0044	6	1-08-09
	Non Safety 125 VDC	Calculation	6	6-19-08
	Emergency Diesel Generators	Calculation	6	1-08-09
	Vital 120 VAC	Calculation	6	1-08-09
	Safety 125 VDC	Calculation	6	1-08-09
	TSC Security Diesel	Calculation	6	1-08-09
14	Calculation M97-0133	Calculation	4	6-19-08
	Calculation M95-0020	Calculation	4	6-19-08
	Calculation M95-0044	Calculation	4	6-19-08
	Calculation M95-0035	Calculation	4	6-19-08
15	Turbine Building Structural Evaluation	Evaluation	1	12-13-07

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4.3. Estimated Man-Hours for Project Completion

Based on our analysis of the tasks, TCI estimates that it will take a total of 53,530 man-hours to complete. **Table 4-2** provides a breakdown of our estimate based on task and employee classification.

Table 4-2

Estimated Man-Hours for Each Task Proposed Staff Classification

Task	Engineering Classifications			Support Classifications			Totals
	Lead	Senior	Designer	Manager	On-Site Liaison	Secretary	
4	880	2640	400	453	905	453	5730
5	1458	4373	400	719	1439	719	9107
7	1430	4290	400	707	1413	707	8947
8	743	2228	400	389	778	389	4926
10	770	2310	400	402	804	402	5087
11	165	495		76	152	76	965
13	550	1650	400	300	600	300	3801
14	193	578		89	178	89	1126
15	55	165		25	51	25	322
A	275	825		127	254	127	1608
B	28	83		13	25	13	161
Total	6545	19635	2400	3300	6600	3300	41780

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ATTACHMENTS:

1.) General Information Form
2.) TCI Small Business Certification
3.) TCI Disadvantaged Business Certification
4.) Table of Conformance
5.) Contractor Safety
6.) TCI Insurance Certifications
7.) Resumes of Key Personnel
8.) NOT USED

Spec Page #	Section Reference	AREVA C	AREVA X	AREVA A	AREVA E	Enercon C	Enercon X	Enercon A	Enercon E	TCI C	TCI X	TCI A	TCI E	Crystal River Unit 3 Nuclear Power Station Extended Power Uprate Bid Specification Table of Conformance - Technical	AREVA NP Team	Enercon	TCI
10	1.9													**SCOPE OF SERVICES**			
	1.9.1													**Update the following computer models for EPU conditions**			
		C				C					X			• PEPSE		Due date stipulated in RFP has been amended by Attachment 1 to the RFP. Our proposed date is later than the original date.	
		C				C					X			• FATHOM			TechCom elects not to bid on this item at this time.
		C				C					X			• CHECWORKS			TechCom elects not to bid on this item at this time.
	1.9.2													**MSR Replacement and MSR Belly Drain Heat Exchanger Addition**			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to install 4 new Moisture Separator Reheaters including an evaluation of the MSR Relief Valves			
		C				C					X			• Provide the following for the four new MSR Belly Drain Heat Exchangers			TechCom elects not to bid on this item at this time.
		C				C					X			• Design specification			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an MSR Belly Drain Heat Exchanger specification			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to purchase four new MSR Belly Drain Heat Exchangers			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to install four new MSR Belly Drain Heat Exchangers			TechCom elects not to bid on this item at this time.
	1.9.3													**Turbine Generator Modifications**			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to install two new low pressure turbine rotors and inner casings			
		C				C					X			• Prepare an EC to install a new high pressure turbine rotor and inner casing			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to install a new Main Generator and Exciter			TechCom elects not to bid on this item at this time.
	1.9.4													**Deaerator Bypass Line Addition**			TechCom elects not to bid on this item at this time.
		C				C				C				• Prepare a Design specification for Deaerator Bypass Line Addition			
		C				C				C				• Prepare a specification for a new control valve			
		C				C				C				• Prepare an EC to purchase new control valve			
		C				C				C				• Prepare an EC to install new valves, piping, and controls			
	1.9.5													**Upgrade of the Isophase Bus Duct Cooling System**			
		C				C				C				• Determine the adequacy of the existing isophase bus ampacity			
		C				C				C				• Prepare a design specification			
		C				C				C				• Prepare a specification for new Isophase Bus Duct Cooling System including fans, motors and controls			
		C				C				C				• Prepare an EC to purchase new equipment			
		C				C				C				• Prepare an EC to install new Isophase Bus Duct Cooling System			
11	1.9.6													**Feedwater Heater and Feedwater Heater Drain Modifications**			
		C				C					X			• Replacement of Feedwater Heaters CDHE-3A and -3B			
		C				C					X			• Prepare a Feedwater Heater specification			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to purchase two new third point feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to install 2 new third point feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C					X			• Evaluation of the existing feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C					X			• Characterize the condition of the existing feedwater heaters that will remain in service			TechCom elects not to bid on this item at this time.
		C				C					X			• Establish a monitoring program following EPU implementation for these feedwater heaters			TechCom elects not to bid on this item at this time.
		C				C					X			• Heater Drain Valves HDV-101, -102, -103, and -104			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare a Valve specification for the first point heater drain valves			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to purchase four new first point feedwater heater drain valves			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to install four new first point feedwater heater drain valves			TechCom elects not to bid on this item at this time.
		C				C					X			• Heater Drain Valves HDV-247, -248, -249, and -250			TechCom elects not to bid on this item at this time.
		C				C					X			• Prepare an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and -250 with piping with a higher pressure and temperature rating			TechCom elects not to bid on this item at this time.
	1.9.7													**Secondary Services Closed Cycle Cooling System Modifications**			
		C				C				C				• Perform an evaluation to determine the maximum capacity and cooling flow of the Secondary Cooling Heat Exchangers based on existing space limitations. Perform an evaluation to determine the maximum flow by replacing the SC pump impellers and motors			
		C				C				C				• Prepare a new specification for the Secondary Cooling Heat Exchangers 1A and 1B			
		C				C				C				• Prepare an EC to purchase two new SC heat exchangers			
		C				C				C				• Prepare an EC to install two new SC heat exchangers			
		C				C				C				• Revise Secondary Cooling pumps and motors, SCP-1A and -1B specification			
		C				C				C				• Prepare an EC to purchase two new SC pump impellers and motors			
		C				C				C				• Prepare an EC to install two new SC pump impellers and motors			
12	1.9.8													**Circulating Water System Modifications**			
		C				C				C				• Revise specification for Circulating Water pumps and motors CWP-1A, -1B, -1C, and -1D to achieve a nominal flow of 207,400 gpm			
		C				C				C				• Prepare an EC to purchase four new CW pump impellers and motors			
		C				C				C				• Prepare an EC to install four new CW pump impellers and motors and upgrade the circulating water system expansion joints at the condenser as required			
	1.9.9													Condensate pumps and motors			

				C				C				C			• Revise specification for the Condensate pumps and motors, CDP-1A and -1B to achieve the required flow for EPU conditions including incorporation of variable speed drives and compatible condensate flow control					
							E	C				C			• Prepare an EC to purchase two new CD pump impellers and motors equipped with variable speed drives	VSDs EC will be developed separately from the pump and motor EC			
							E	C				C			• Prepare an EC to install two new CD pump impellers, motors and the associated variable speed drives	VSDs EC will be developed separately from the pump and motor EC			
		1.9.10													**Feedwater Booster pumps and motors**				
				C				C				C			• Revise specification for the Feedwater Booster pumps and motors, FWP-1A and -1B to achieve the required flow for EPU conditions including increasing the flow margin to 10%				
				C				C				C			• Prepare an EC to purchase two new feedwater booster pumps and motors				
				C				C				C			• Prepare an EC to install two new feedwater booster pumps and motors				
		1.9.11													**Feedwater Control Valves and Feedwater Control System Stability**				
				C				C				C			• Perform an evaluation to determine if the feedwater control valves and feedwater control system are stable under EPU conditions				
		1.9.12													**Condenser**				
				C					X			X			• Conduct an update to existing condenser performance and flow-induced vibration calculations. This shall also include an evaluation of waterbox temperature limits and shielding designs for internal components. The update is to be subcontracted to Heat Exchanger Services		The RFP requires ENERCON to use HES as a subcontractor to perform the activities described. We wer unable to make contact with HES or get a return phone call from them. After discussion with Ted Williams - Progress Energy PM, ENERCON is not submitting a bid for this particular activity. We desire and expect to work out details with HES if awarded this scope of work.	
		1.9.13													**Electrical Distribution Calculations**				
				C				C				C			• Perform an evalution of the station auxiliary transformer, startup transformer, and the 4kV buses, switchgear, circuit breakers and cabling to support the expected increase in the electrical load				
				C						E	C				• Update the following electrical distribution calculations to evaluate the adequacy of existing power system equipment ratings (auxiliary transformers, load centers, motor control centers, switchgear, cables, etc) to support the higher system load and identify required upgrades of the electrical distribution system		ENERCON has proposed an option to prepare detailed project planning upfront by evaluating the existing calculations and/or simulations models which can be consolidated and streamlined.	
13				C				C				C			• Voltage Drop/Short Circuit for AC Electrical System - SKM Software				
					X			C				C			• Non Safety 125 VDC - ETAP Software	The scope of this proposal does not include an ETAP model for the CR3 DC system since the proposed EPU should not impact the DC system load analysis.			
		1.9.14													**Mechanical Ultimate Heat Sink Calculations**				
				C				C				C			• Update the following Mechanical Ultimate Heat Sink Calculations to reflect EPU conditions				
				C				C				C			• Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11				
				C				C				C			• Calculation M95-0020, "DCHE Performance Evaluation," Rev 1				
				C				C				C			• Calculation M95-044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1				
				C				C				C			• Calculation M95-0035, "SW System Inventory Transient Analysis," Rev 2				
		1.9.15													**Turbine Building Structural Evaluation**				
				C				C				C			• Perform an evaluation of the turbine building structure and supports for major equipment to identify if any significant changes are required to accommodate the expected increases in loads resulting from new and larger equipment such as turbine rotors, main generator, etc				
4	1.3														**PROPOSAL PRICING**				
		1.3.1			X			C				X			Each of the major tasks described in section 1.9 should be bid separately	Pricing is presented as a combined total work scope. This enables cost efficiencies to be realized for project administration and management and also allows a reduction in responsible contract and technical interface issues.			Partial workscope, items not included in bid as described above.
		1.3.2			X			C				X			Each of the computer model updates described in section 1.9 should be bid separately	Pricing is presented as a combined total work scope. This enables cost efficiencies to be realized for project administration and management and also allows a reduction in responsible contract and technical interface issues.			Partial workscope, items not included in bid as described above.
		1.3.3		C				C				X			Combine the total work scope				Partial workscope, items not included in bid as described above.
13	1.10														**SCHEDULE**				
				C				C				C			Proposals shall be submitted within 28 days of receipt of the proposal request				
15	1.12					A		C				C			Tasks must be completed in accordance with the schedule detailed in section 1.12	The AREVA NP Team provides an alternate schedule to meet aggressive input needs and also accomodating resource load leveling for low priority items. Specifically, the FAC evaluation requires the use of the final PEPSE (post-procurement reconciled cases) to be used which will not be available until mid-2008). Please review alternate approach.			
16	3.0														**REFERENCES**				
															All work will be done in accordance with the:				
18	3.0	3.1		C				C				C			• Codes and Standards detailed in section 3.1				
19		3.2		C				C				C			• Regulatory Requirements detailed in section 3.2				
		3.3		C				C				C			• Owner Procedures detailed in section 3.3				
43	10.2			C				C				C			• Specifications detailed in section 10.2				
	10.3			C				C				C			• P&ID's detailed in section 10.3				
	10.4			C				C				C			• Calculations detailed in section 10.0				

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10	1.9					**SCOPE OF SERVICES**	
	1.9.1					Update the following computer models for EPU conditions	
						• PEPSE	
						• FATHOM	
						• CHECWORKS	
	1.9.2					MSR Replacement and MSR Belly Drain Heat Exchanger Addition	
						• Prepare an EC to install 4 new Moisture Separator Reheaters including an evaluation of the MSR Relief Valves	
						• Provide the following for the four new MSR Belly Drain Heat Exchangers	
						• Design specification	
						• Prepare an MSR Belly Drain Heat Exchanger specification	
						• Prepare an EC to purchase four new MSR Belly Drain Heat Exchangers	
						• Prepare an EC to install four new MSR Belly Drain Heat Exchangers	
	1.9.3					Turbine Generator Modifications	
						• Prepare an EC to install two new low pressure turbine rotors and inner casings	
						• Prepare an EC to install a new high pressure turbine rotor and inner casing	
						• Prepare an EC to install a new Main Generator and Exciter	
	1.9.4					Deaerator Bypass Line Addition	
						• Prepare a Design specification for Deaerator Bypass Line Addition	
						• Prepare a specification for a new control valve	
						• Prepare an EC to purchase new control valve	
						• Prepare an EC to install new valves, piping, and controls	
	1.9.5					Upgrade of the Isophase Bus Duct Cooling System	
						• Determine the adequacy of the existing isophase bus ampacity	
						• Prepare a design specification	
						• Prepare a specification for new Isophase Bus Duct Cooling System including fans, motors and controls	
						• Prepare an EC to purchase new equipment	
						• Prepare an EC to install new Isophase Bus Duct Cooling System	
11	1.9.6					Feedwater Heater and Feedwater Heater Drain Modifications	
						• Replacement of Feedwater Heaters CDHE-3A and -3B	
						• Prepare a Feedwater Heater specification	
						• Prepare an EC to purchase two new third point feedwater heaters	
						• Prepare an EC to install 2 new third point feedwater heaters	
						• Evaluation of the existing feedwater heaters	
						• Characterize the condition of the existing feedwater heaters that will remain in service	
						• Establish a monitoring program following EPU implementation for these feedwater heaters	
						• Heater Drain Valves HDV-101, -102, -103, and -104	

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						• Prepare a Valve specification for the first point heater drain valves	
						• Prepare an EC to purchase four new first point feedwater heater drain valves	
						• Prepare an EC to install four new first point feedwater heater drain valves	
						• Heater Drain Valves HDV-247, -248, -249, and -250	
						• Prepare an EC to replace the piping upstream of Heater Drain Valves HDV-247, -248, -249, and -250 with piping with a higher pressure and temperature rating	
	4.9.7					Secondary Services Closed Cycle Cooling System Modifications	
						• Perform an evaluation to determine the maximum capacity and cooling flow of the Secondary Cooling Heat Exchangers based on existing space limitations. Perform an evaluation to determine the maximum flow by replacing the SC pump impellers and motors	
						• Prepare a new specification for the Secondary Cooling Heat Exchangers 1A and 1B	
						• Prepare an EC to purchase two new SC heat exchangers	
						• Prepare an EC to install two new SC heat exchangers	
						• Revise Secondary Cooling pumps and motors, SCP-1A and -1B specification	
						• Prepare an EC to purchase two new SC pump impellers and motors	
						• Prepare an EC to install two new SC pump impellers and motors	
12	4.9.8					Circulating Water System Modifications	
						• Revise specification for Circulating Water pumps and motors CWP-1A, -1B, -1C, and -1D to achieve a nominal flow of 207,400 gpm	
						• Prepare an EC to purchase four new CW pump impellers and motors	
						• Prepare an EC to install four new CW pump impellers and motors and upgrade the circulating water system expansion joints at the condenser as required	
	4.9.9					Condensate pumps and motors	
						• Revise specification for the Condensate pumps and motors, CDP-1A and -1B to achieve the required flow for EPU conditions including incorporation of variable speed drives and compatible condensate flow control	
						• Prepare an EC to purchase two new CD pump impellers and motors equipped with variable speed drives	
						• Prepare an EC to install two new CD pump impellers, motors and the associated variable speed drives	

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	1.9.10					Feedwater Booster pumps and motors	
						• Revise specification for the Feedwater Booster pumps and motors, FWP-1A and -1B to achieve the required flow for EPU conditions including increasing the flow margin to 10%	
						• Prepare an EC to purchase two new feedwater booster pumps and motors	
						• Prepare an EC to install two new feedwater booster pumps and motors	
	1.9.11					Feedwater Control Valves and Feedwater Control System Stability	
						• Perform an evaluation to determine if the feedwater control valves and feedwater control system are stable under EPU conditions	
	1.9.12					Condenser	
						• Conduct an update to existing condenser performance and flow-induced vibration calculations. This shall also include an evaluation of waterbox temperature limits and shielding designs for internal components. The update is to be subcontracted to Heat Exchanger Services	
	1.9.13					Electrical Distribution Calculations	
						• Perform an evalution of the station auxiliary transformer, startup transformer, and the 4KV buses, switchgear, circuit breakers and cabling to support the expected increase in the electrical load	
						• Update the following electrical distribution calculations to evaluate the adequacy of existing power system equipment ratings (auxiliary transformers, load centers, motor control centers, switchgear, cables, etc) to support the higher system load and identify required upgrades of the electrical distribution system	
13						• Voltage Drop/Short Circuit for AC Electrical System - SKM Software	
						• Non Safety 125 VDC - ETAP Software	
	1.9.14					Mechanical Ultimate Heat Sink Calculations	
						• Update the following Mechanical Ultimate Heat Sink Calculations to reflect EPU conditions	
						• Calculation M97-0133, "SW Heat Loads During LBLOCA and SW Temperature Decay Times," Rev 11	
						• Calculation M95-0020, "DCHE Performance Evaluation," Rev 1	
						• Calculation M95-044, "RW/DC/DH Thermal Analysis - DC Temperature Calculation," Rev 1	
						• Calculation M95-0035, "SW System Inventory Transient Analysis," Rev 2	
	1.9.15					Turbine Building Structural Evaluation	
						• Perform an evaluation of the turbine building structure and supports for major equipment to identify if any significant changes are required to accommodate the expected increases in loads resulting from new and larger equipment such as turbine rotors, main generator, etc.	

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6	**1.3**							**PROPOSAL PRICING**	
		1.3.1						Each of the major tasks described in section 1.9 should be bid separately	
		1.3.2						Each of the computer model updates described in section 1.9 should be bid separately	
		1.3.3						Combine the total work scope	
13	**1.10**							**SCHEDULE**	
								Proposals shall be submitted within 28 days of receipt of the proposal request	
15	1.12							Tasks must be completed in accordance with the schedule detailed in section 1.12	
18	**3.0**							**REFERENCES**	
								All work will be done in accordance with the:	
18	3.0	3.1						• Codes and Standards detailed in section 3.1	
19		3.2						• Regulatory Requirements detailed in section 3.2	
		3.3						• Owner Procedures detailed in section 3.3	
43	10.2							• Specifications detailed in section 10.2	
	10.3							• P&ID's detailed in section 10.3	
	10.4							• Calculations detailed in section 10.0	

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CR3 Extended Power Uprate, Secondary Systems Upgrade Bid Proposal Technical Evaluation

08/23/07

Progress Energy issued Request for Proposal No. KS12007, Engineering Services for Secondary Systems Upgrade on June 6, 2007. The bidders were Areva NP, Enercon Services, Sargent & Lundy, TechCom International and Worley Parsons. Three proposals were received on August 10, 2007. Proposals were received by Areva / Worley Parsons (combined proposal), Enercon Services and TechCom International.

The following proposal technical comments were developed by reviewing unpriced copies of each proposal. The RFP bid specification identified fifteen (15) major tasks. The RFP requested each major task be bid separately and include estimated manhours. Combined total work scope pricing and maximum not to exceed pricing was to be identified.

The major task areas included:

1) Computer models.
2) MSR replacement and MSR belly drain heat exchanger addition.
3) Turbine generator modifications.
4) Deaerator bypass line addition.
5) Isophase bus duct cooling system.
6) Feedwater heater and heater drain system modifications.
7) Secondary service closed cycle cooling system modifications.
8) Circulating water system modifications.
9) Condensate pumps and motors.
10) Feedwater booster pumps and motors.
11) Feedwater control valves and control system stability analysis.
12) Condenser evaluations.
13) Electrical distribution calculations.
14) Mechanical ultimate heat sink calculations.
15) Turbine building structural evaluation.

A request for proposal # KS12007 addendum letter was issued on August 14, 2007. The addendum letter added two (2) additional work scopes and responded to questions by the bidders.
The additional work scope items included:

1) Internal flooding analysis due to increased circulating water flow.
2) Plant operating license amendment support.

TechCom International (TCI) Proposal Review Notes:

- TCI proposed to perform 9 of the 15 tasks (task # 4, 5, 7, 8, 10, 11, 13, 14 and 15) and the 2 additional tasks. The proposal estimates a total of 41,780 man hours to complete the proposed work scope. Estimated man hours are provided for each major task area proposed.
- Proposal includes no references to TCI similar previous work experience.
- Proposal identifies a project organization of 20 people. The proposal identifies 19 engineering support staff at TCI main office in Irvine, CA. 17 resumes were attached. Several of the resumes indicate that TCI "proposed staff" are presently employees of other companies. I verified one person is presently employed by Southern California Edison and another is presently employed by Areva. Several additional resumes appear to be suspect.
- Proposal includes only 10 new or revised drawings for task 4, 5, 7, 8, 10 and 13.
- Proposal does not include changes to the electrical distribution system.

Areva / Worley Parsons Proposal Review Notes:

- Proposal includes total work scope and is teaming effort by both companies.
- Proposal does not include estimated man hours or cost per task. Proposal includes one fixed cost price for total work scope.
- Areva (formally Babcock and Wilcox) is NSSS OEM. Worley Parsons (formally Gilbert Commonwealth) is CR3 AE. These companies provide the most capability. This is expected require less PE project management support and should reduce project risk.
- Pg.2, background, states "BOP phase 2 evaluations and implementation will be defined later and are not part of this proposal scope". Verify this is not an accurate statement. All EPU BOP identified work is to be in scope of proposal. BOP Piping Analysis Scope does not appear to be included. Areva scoping study report # 51-9043794-000 Section 3.4.1.3 "pipe support / water hammer" identifies 16 piping calculations (ref. App. J) and the main steam pipe hammer calculation M73-1002 need developed or revised.
- Pg.4, Table 1.4-1; add "Iso-Phase Bus Duct Electrical Evaluation" to engineering evaluation list.
- Pg. 4, Table 1.4-1; add "Condense Steam Impingement Plate Mods" to EC list. This is an expected output of the HES condenser tube vibration analysis. This modification should be scheduled during the 2009 LP turbine modification.
- Pg.5, Table 1.4-1; add "Feedwater Heater CDHE-3A/B" to equipment specification list.
- Pg.19, EPU PEPSE Model; add MSR belly drain, add deaerator bypass mod, add YUBA estimated feedwater heater TTD's and DCA's for retained heaters.
- Pg.19, PEPSE Model; validate MUR PEPSE model against plant data following MUR implementation. PEPSE model will be used as equipment design input.
- Pg.19, PEPSI Model; Siemens will provide preliminary turbine PEPSE model input in September 2007 as requested. PEPSE model to be updated with final turbine PEPSE model input after final turbine design is established.
- Pg.20, FATHOM model; add Secondary Cooling System (SC) to list of systems. Need to verify uprated SC system will provide sufficient cooling water to specific locations in the system (i.e. Generator H2 coolers). System flow control valves should be evaluated. The LO Cooler temperature control valve may need to be enlarged. The SC system header pressure control setpoint can be increased 10-15 psi due to increasing the generator H2 gas pressure from 60 psig to 75 psig. Ref.Pg.43, SC Pump EC section.
- Pg.22, Condenser Evaluation; Required output of the HES flow induced vibration analysis is to identify tube bundle locations where steam impingement plates should be installed. Impingement plate additions were recommended by HES during the CR3 previous condenser tube failure analysis.
- Pg.23, Feedwater Heater Evaluation, add "feedwater heater relief valve setpoints and relieving capacity evaluation" to scope of work.
- Pg.24, Secondary Cooling Maximum; add logistical evaluation for removing existing SC coolers and installing larger heat exchangers into turbine building.
- Pg.28, Turbine Building Structural Evaluation; Turbine Pedestal Foundation Evaluation will NOT be performed by the turbine manufacturer. The turbine manufacturer will provide the increased loading data. The Turbine Generator Pedestal Structural Analysis, S95-0021, must be revised under this scope of work. Analysis S95-0021, dated June 20, 1995, was performed by Gilbert Commonwealth.
- Pg. 30, Engineering Change Packages; Areva shall perform all work in accordance with current revision to EGR-NGGC-0005, Engineering Change. Same comment Pg.51.

- Pg. 30, Engineering Change Packages; include "mark-up" of FSAR for each EC to support consolidated EPU FSAR revision.
- Pg. 30, Engineering Change Packages; Separate EC packages will be issued for equipment procurement specifications.
- Pg.35, LP Turbine Replacement; The turbine vendor will not perform turbine foundation calculations or revise design basis foundation calculations. Calculation S95-0021 shall be revised under this workscope. Same comment Pg. 37, Pg.55, Pg.60 and Pg.61.
- Pg.35, LP Turbine Replacement; Turbine Generator Instrument calibration or range changes, including AEH controller scaling, provided by the turbine generator OEM shall be included in the EC package. Same comment Pg. 37. Anticipated instrument changes are identified on Pg.60 and 61.
- Pg.35, LP Turbine Replacement; Turbine EC shall include turbine performance test procedure in accordance with ASME PTC 6 – 2004, Alternate test for nuclear plant. Same comment Pg. 37.
- Pg.38, MSR Replacement, add "MSR relief valve evaluation" to scope of work.
- Pg.39, MSR Belly Drains, Evaluate 2 new heat exchangers (2 MSR drain inlets each) rather than 4 new heat exchangers. If feasible, this may be less expensive and tie into condensate system better (less piping required).
- Pg.42, Isolated Phase Bus Duct, include evaluation of bus duct electrical capacity (bus duct rating) in conjunction with the bus duct cooling EC.
- Pg.47, Circulating Water Pump EC, include C/D water box flow straighteners and expansion joints.
- Pg.49, Equipment Specifications, reliance on original equipment specifications should not be assumed. There should be no additional scope to develop the equipment specifications identified. Same comment Pg.60.
- Pg.51, Deliverables, review of deliverables should not be limited to 10 working days nor limited to one review. Depending on the quantity and complexity of the deliverable more than one review may be required to support owner acceptance.
- Pg.53, Condenser Evaluation, HES shall provide the condenser evaluation CFD analysis. HES stated the HES CFD analysis is an input to the condenser tube bundle tube vibration analysis which is subcontracted by HES. The condenser tube bundle tube vibration analysis should be identified as an additional deliverable and should include recommended locations where tube bundle steam impingement plates should be installed.
- Pg.53, SC Maximization, final report should include verification of system flow balance and heat loads satisfied. SC system flow control valves shall be evaluated.
- Pg.57, PEPSI model, Siemens to provide initial turbine inputs in September, 2007. Siemens to provide final turbine inputs following turbine design and submittal of turbine thermal kit. PEPSI model to be verified with plant operating data following MUR power uprate. YUBA estimated EPU condition feedwater heater TTD's and DCA's to be included in EPU model. Should the EPU model be validated and corrected following EPU implementation?
- Pg.57, Electrical Calculations, impact assessment of 54 electrical calculations is included. Revision of these calculations is not included. Review optional workscope for ETAP electrical system modeling consolidation.
- Pg.58, Updates. Design Basis Documents and applicable FSAR sections should be "marked up" and included in each EC package.
- Pg.61 / 62, MSR assumptions, New MSR vessels will be longer. Modifications to piping supports may be required and will not be extra work. MSR vendor is to provide revised piping drawings.

- Pg.62, MSR Belly Drain assumptions, location of new heat exchangers as stated in not correct. Need to consider piping runs and strategically locate the new heat exchangers. Consider one new heat exchanger for each condensate train each receiving two MSR drains.
- Pg.64, Main Generator and Exciter assumptions, SC water piping to the H2 coolers may be impacted; Generator instruments shall be reviewed for impacts; turbine supervisory instrument probe mounting brackets shall be reviewed and modified if required; EH tubing mounted to the MSR's will be impacted. Siemens shall provide all turbine generator vendor drawings to PE for review. How should turbine generator VTI be coordinated?
- Pg.67, Mechanical Inputs, A "preliminary" turbine thermal kit should be provided by Siemens in September, 2007. Turbine Generator and MSR structural load inputs may not be available in September, 2007. This should not impact schedule.
- Schedule Attachment, review for equipment specifications / procurement EC's needed by end of October, 2007. Too much equipment is identified to be specified by October, 2007. The feedwater heaters (CDHE-3A/B) and the SC heat exchangers are priority components.

Enercon Proposal Review Notes:

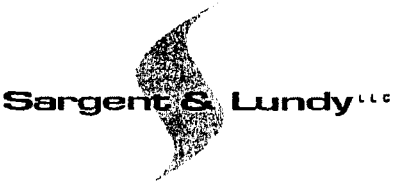
- Proposal includes total work scope.
- Proposal includes estimated man hours per major task. Proposal includes cost per major task as well as total not to exceed cost for full work scope.
- Enercon appears qualified to perform work scope based on work references and personnel resumes included in proposal. Recommend to review Enercon project management team for power uprate project experience.
- BOP Piping Analysis Scope does not appear to be included. Areva scoping study report # 51-9043794-000 Section 3.4.1.3 "pipe support / water hammer" identifies 16 piping calculations (ref. App. J) and the main steam pipe hammer calculation M73-1002 need developed or revised.
- Schedule Comment: Prioritize the 2007 procurement of the 2 feedwater heaters (CDHE-3A/B), the 2 SC heat exchangers and the SC pumps / motors. All other equipment procurement EC can be postponed to 2008.
- Verify existing design basis documents and affected FSAR sections will be "marked up" for each EC.
- Pg.5, PEPSE Model, add YUBA estimated feedwater heater TTD's and DCA's for retained heaters; validate MUR PEPSE model against plant data following MUR implementation. Siemens will provide preliminary turbine PEPSE model input in September 2007. PEPSE model to be updated with final turbine PEPSE model input after final turbine design is established.
- Pg.5, FATHOM model; add Secondary Cooling System (SC) to list of systems. Need to verify uprated SC system will provide sufficient cooling water to specific locations in the system (i.e. Generator H2 coolers). System flow control valves should be evaluated. The LO Cooler temperature control valve may need to be enlarged. The SC system header pressure control setpoint can be increased 10-15 psi due to increasing the generator H2 gas pressure from 60 psig to 75 psig.
- Pg.9, Commercial and Resource Proposal; review "billing in accordance with master service agreement for T&M" vs. the not to exceed prices stated in the proposal.
- Pg.10, Item 7; CHECWORKS program at CR3 will be utilized.
- Pg.10, Item 8; Final PEPSE model after all new equipment is specified is not in scope.

- Pg.10, Item 9; Enercon site liaison is expected to obtain design basis information. Reliance on site engineering to provide design basis information is not desired.
- Pg.11, Item 12; The proposal does not include a PEPSE model for the 2009 plant condition. The 2009 plant configuration heat balance model will be performed by Siemens to support turbine performance guarantee and performance testing. Add, "Enercon shall support this effort as needed to accurately model the plant configuration". Evaluate having Enercon perform an independent 2009 model to compare with Siemens model.
- Pg.20, Assumption item 3 and 4; all valves on piping associated with the new MSR belly drain heat exchangers shall be evaluated. New valves shall be specified for procurement however a procurement EC should not be required.
- Proposal requires CR3 plant cable databases will be updated by plant engineering.
- Pg.24, Turbine Vendor Information; will not be as extensive as described in the proposal. The turbine vendor will provide new complete turbine generator instruction manuals and the turbine generator installation instructions. The existing turbine generator vendor drawing file will have to be reviewed for impact. A turbine performance test procedure shall be developed and shall be in accordance with ASME PTC 6 – 2004, Alternate test for nuclear plant.
- Pg.28, Turbine Generator Assumptions; The SC piping to the generator H2 coolers may be impacted; Turbine Generator instrument and control setting changes will be provided by Siemens and shall be included in the turbine EC; Generator Instruments will be impacted and shall be evaluated; Turbine Generator support systems will be evaluated by Siemens. Any impacts identified by Siemens shall be included in the turbine EC.
- Pg.29, Turbine Generator Assumptions 17; Calculation S95-0021, Turbine Generator Pedestal Structural Analysis, shall be "updated" using the methodology contained in the analysis. A three dimensional analysis model of the turbine pedestal structure is included.
- Pg.39, Bus Duct Deliverables; Verify evaluation of bus duct electrical capacity (bus duct rating) will be performed in conjunction with the bus duct cooling EC.
- Pg.59, SC System Workscope Item 10; Verify hydraulic evaluation includes system flow balance, system heat loads are satisfied and system flow control valves are evaluated. Note the SC system pressure setpoint can be increased due to increasing generator H2 pressure.
- Pg.59, SC System Workscope Item 11; The turbine lube oil temperature control valve should be replaced with a larger valve.
- Pg.60, SC System Work Performed by Others; Enercon should interface with equipment vendors to obtain design input information and not rely on PE to perform this function. This comment applies to all equipment and all "work by others" sections of the proposal.
- Pg.64, SC system Assumptions; defined work scope does not address interferences to replace the major SC components. EC installation instructions must address these issues.
- Pg.94, FW Booster Pump Assumption 15; A larger pump / motor will be specified. Impacts to the support pedestal and piping can be expected.
- Pg.99, Condenser Evaluation, HES shall provide the Condenser Evaluation CFD Analysis. The HES CFD analysis is an input to the condenser tube bundle tube vibration analysis which is subcontracted by HES. The Condenser Tube Bundle Tube Vibration Analysis should be identified as a deliverable and shall identify tube bundle locations where steam impingement plates should be installed. Impingement plate additions were recommended by HES during the CR3 previous condenser tube failure analysis. Steam impingement plates should be installed during the 2009 LP turbine replacement.

- Pg.115, Electrical Distribution Calculations; Review proposal to consolidate existing electrical calculations into new ETAP. Evaluate cost of converting vs. updating existing electrical calculations.

Appendix B, Consolidated Project Schedule Comments:

- October 07 PEPSE model is "initial" EPU model. Final PEPSE model shall be submitted after all plant design changes have been specified and inputted into the model.
- MSR drain mod procurement EC can be postponed to 2008.
- All turbine generator and MSR schedules shall be compared to and coordinated with the equipment vendor's engineering deliverable schedules. The schedule for issuing the installation EC packages shall be determined by the owner.
- The turbine pedestal calculation schedule shall be accelerated and will support final calculation expeditiously upon receiving final input data from Siemens.
- Deaerator procurement EC can be postponed to 2008.
- Isophase Bus Duct procurement EC can be postponed to 2008.
- Isophase Electrical Capacity Calculation shall be performed in conjunction with designing the bus duct cooling system.
- Turbine Building Structural Evaluation is scheduled to complete by 12/12/07. This does not appear feasible.



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August 10, 2007
Proposal No. 00273-406
Letter No. SLCR3-2007-015

Progress Energy
Crystal River Unit 3

Engineering Services for Secondary Systems Upgrade
Response to Request for Proposal No. KS12007

Mr. Tony Owen
Progress Energy Service Company, LLC
P.O. Box 1551 (PEB-2C1)
Raleigh, North Carolina 27602

Dear Mr. Owen:

After careful consideration of the requirements specified in Request for Proposal No. KS12007 and the information provided in the bid specification, Sargent & Lundy LLC (S&L) has decided not to offer a proposal for the work as described. While we have a good understanding of the general scope of the secondary system upgrades through review of the bid documents and our meeting with the project team at Crystal River and have the requisite experience from past power uprate projects, we can not provide a proposal that meets the requirements of the bid documents. There are a significant number of unknowns that affect scope and will impact schedule. This includes detailed development of scope for the specified tasks in Article 1.9 as well as defining the overall project approach.

While the bid specification provides a considerable amount of information on the system analyses and functional requirements associated with the required plant modifications, it does not define the physical scope of the plant changes. In fact for some modifications, there are significant decisions still to be made before the full nature and scope is determined. Large equipment replacement projects are very complex and widely varied and require a significant amount of study and investigation to accurately define the physical scope of work and the associated engineering activities required for their implementation. This scoping requires walkdowns, drawing and document reviews, study of alternatives, and meetings with stakeholders to develop a clear understanding of the exact scope of the plant change, its potential impact on plant operation and the extent and nature of engineering required. We firmly believe that this scope definition is critical to the overall success of a project but is beyond what is reasonable to develop in a proposal. Without such definition, no reliable estimate of engineering cost can be provided.

PEF-NCR-02056

Relative to project approach, it was indicated during our site visit that some unique organizational approach was likely necessary due to concerns over the ability of plant staff to support reviews. We recognize that there are innovative teaming arrangements that could be beneficial for a project of this nature, but the specific terms would need to be established and the appropriate policy and procedural changes agreed upon before the impact on engineering scope could be determined. Furthermore, the success of the project will be greatly influenced by the participation of experienced and knowledgeable plant staff. Reviews and input at the appropriate stages of modification development will be critical.

An additional concern is with schedule. S&L could not commit to the delivery dates specified nor agree to the associated commercial risk. The initial project tasks have delivery dates that could not be achieved even with the most optimistic contract award date. The heat balance analysis will require several months to complete and thus could not be issued by September 20, 2007. Submittal dates for subsequent tasks such as the equipment procurement specifications are also unrealistic as they do not reflect the necessary precedence of the thermal and hydraulic analyses that are necessary inputs to equipment sizing and other specification requirements. We are also concerned with the large number of deliverables being issued at roughly the same time and the overall ability of the project to perform the requisite reviews and support the issuance of the documents.

As an alternative to the all inclusive not-to-exceed approach, S&L suggests an approach that has been used successfully on several other large projects of this nature. It is a two step model that breaks the work into a scoping effort and then the detailed engineering work (similar to a conceptual design – detailed design approach). This model was used for the Brunswick Extended Power Uprate and is currently being used for analysis tasks in support of the Crystal River steam generator replacement. The first step for each proposed modification or major engineering task is to perform a scoping task that will develop the detailed scope of work and approach. Scoping tasks are performed under individual work authorizations on a time-and-materials basis per the rates and terms of our general services agreement (Contract No. 257117). After the full scope of a modification is clearly defined and the approach agreed upon, a firm fixed-price proposal is offered for development of the modification, and a separate work authorization is issued. This model has proven to be mutually beneficial. The task scoping efforts are performed at relatively low cost and produce clear understanding of the engineering scope. With that understanding and agreement between the organizations the amount of contingency needed to accommodate unknowns is greatly reduced, and the work has been completed with very few scope changes.

We consider Progress Energy an important client and regret that we can not support this request, but we do not believe that we can offer a proposal consistent with the RFP that is in the best interests of Progress Energy and Sargent & Lundy. We would be happy to further discuss the approach outlined above or other ways in which S&L can support Progress Energy in their power uprate efforts for Crystal River.

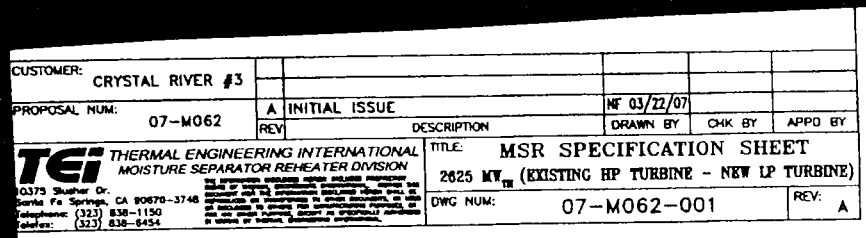
Should you have any questions or would like to further discuss our position, please call John Regan at 312-269-6566 or me.

Yours very truly,

Chris A. Sward
Project Manager

CAS
Copies:
J. D. Regan
File: LAN

REDACTED



CUSTOMER: CRYSTAL RIVER #3					
PROPOSAL NUM: 07-M062	A	INITIAL ISSUE	NF 03/22/07		
	REV	DESCRIPTION	DRAWN BY	CHK BY	APPD BY

THERMAL ENGINEERING INTERNATIONAL
MOISTURE SEPARATOR REHEATER DIVISION
10375 Slusher Dr.
Santa Fe Springs, CA 90670-3748
Telephone: (323) 838-1150
Telefax: (323) 838-6454

TITLE: MSR SPECIFICATION SHEET
2625 MW_{TH} (EXISTING HP TURBINE - NEW LP TURBINE)

DWG NUM: 07-M062-001 REV: A

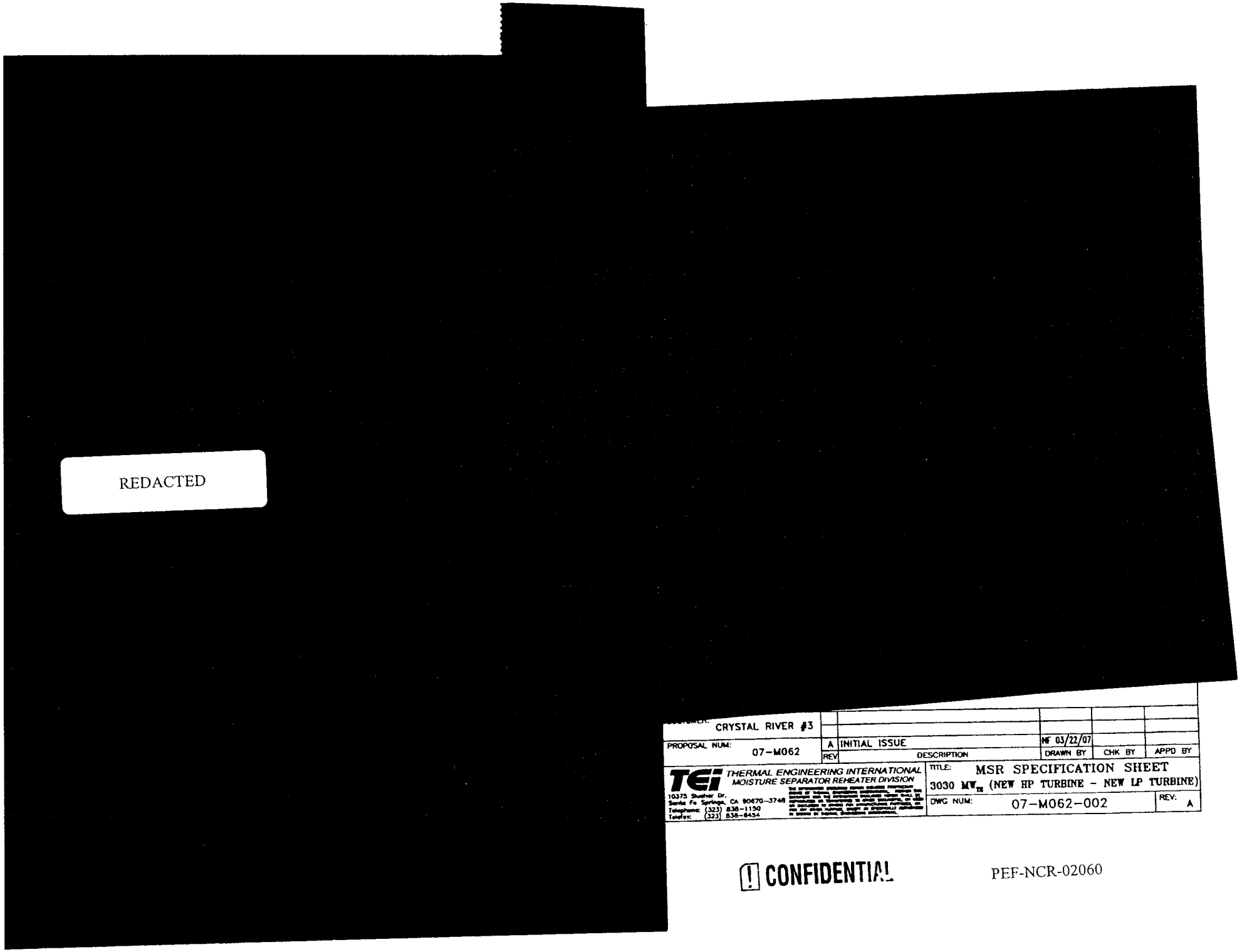
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PEF-NCR-02059

03238 MAR 22 8

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CRYSTAL RIVER #3					
PROPOSAL NUM: 07-M062	A	INITIAL ISSUE	NF 03/22/07		
	REV	DESCRIPTION	DRAWN BY	CHK BY	APPD BY

THERMAL ENGINEERING INTERNATIONAL
MOISTURE SEPARATOR REHEATER DIVISION
10375 Shoemaker Dr.
Santa Fe Springs, CA 90670-3748
Telephone: (323) 838-1150
Telefax: (323) 838-8454

TITLE: MSR SPECIFICATION SHEET
3030 MW_{th} (NEW HP TURBINE - NEW LP TURBINE)

DWG NUM: 07-M062-002 REV. A

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PEF-NCR-02060

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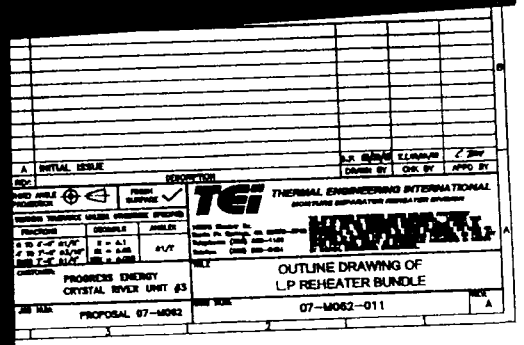
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M. S. R.
OUTLINE DRAWING

SCALE	N.T.S	DATE
DRAWN BY	B.F.	03/19/07
CHECKED BY	T.L	03/21/07
APPD BY		
JOB ENG'R		03/21/07
07-M062-010		REV. A

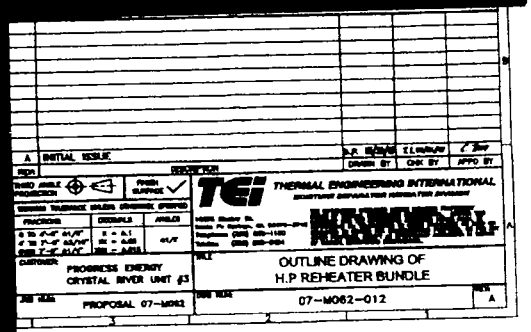
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REDACTED



PEF-NCR-02062

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PEF-NCR-02063

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GENERAL ARRANGEMENT OF MSR CROSS SECTION

SCALE	N.T.S.	DATE
DRAWN BY	B.F.	03/20/07
CHECKED BY	T.L.	03/21/07
APPD BY		
JOB ENG'R	C. TAM	03/21/07
07-M062-021		REV. A

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GENERAL ARRANGEMENT
AT LP END BULKHEAD

SCALE	N.T.S	DATE
DRAWN BY	A.F.	03/20/07
CHECKED BY	T.L.	03/21/07
APPD BY		
JOB ENG'R		03/21/07
07-M062-023		REV. A

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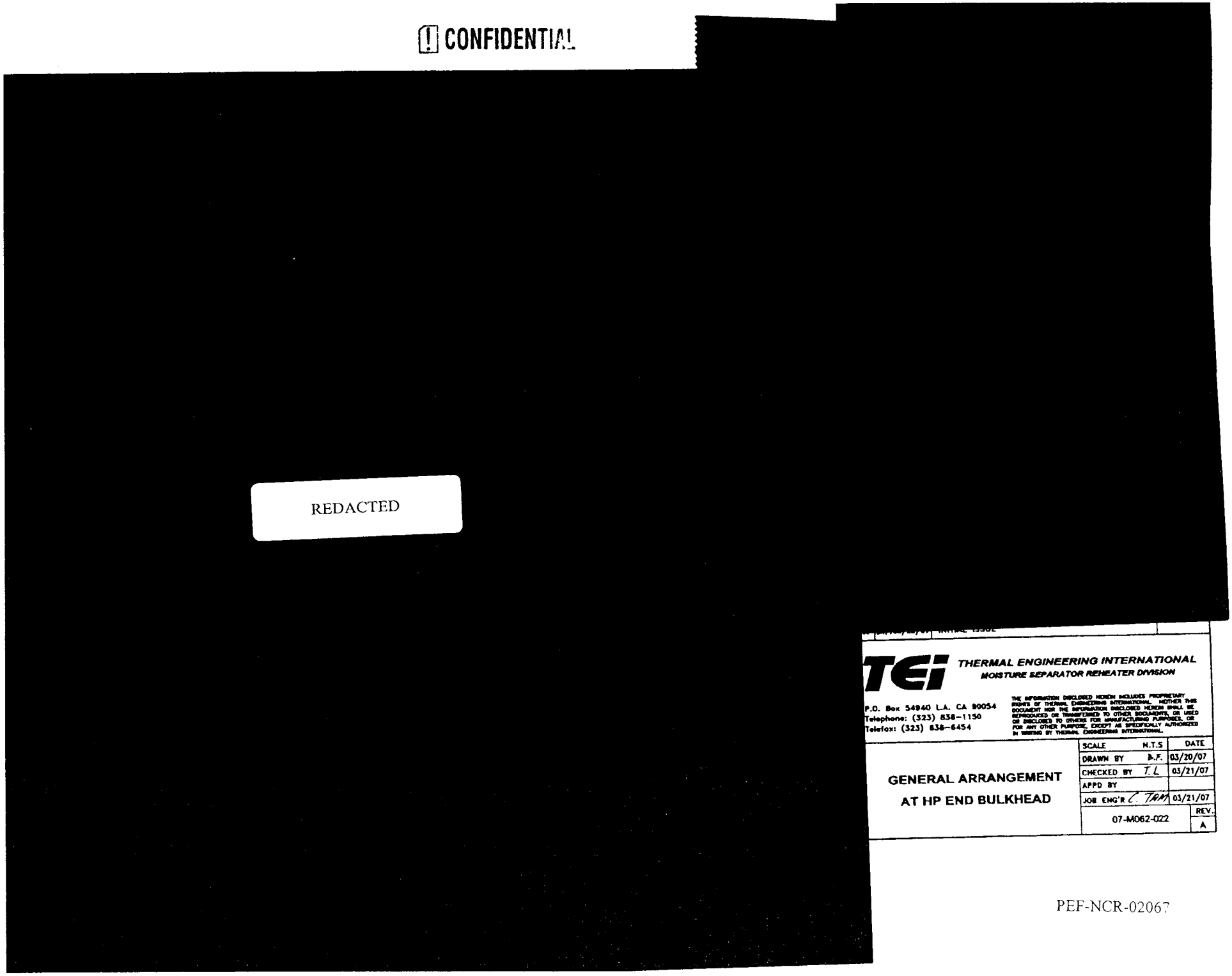
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PLAN VIEW AT MANIFOLD
SLOT PLATES

SCALE	N.T.S	DATE
DRAWN BY	A.F.	03/20/07
CHECKED BY	T. L	03/21/07
APPD BY		
JOB ENG'R	[illegible]	03/21/07
07-M062-024		REV. A

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GENERAL ARRANGEMENT
AT HP END BULKHEAD

SCALE	N.T.S	DATE
DRAWN BY	B.F.	03/20/07
CHECKED BY	T.L	03/21/07
APPD BY		
JOB ENG'R	C. TRAN	03/21/07
07-M062-022		REV. A

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REDACTED

JOB NO.	FLEXIBLE SIDE SHROUD PLATE	REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL		MSR-111		BY T.L.	APPD C. TAM

CONFIDENTIAL

90054

REDACTED

JOB NO.	"ACTION" OF FLEXIBLE SIDE SHROUD	REV. A	DATE 04/28/05	CHK A.L.
PROPOSAL		MSR-112	BY T.L.	APPD

CONFIDENTIAL

A 90054

REDACTED

JOB NO.		REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL	FUNCTION OF BY-PASS RESTRICTOR	MSR-113		BY T.L.	APPD C. TAM

PEF-NCR-02070

CONFIDENTIAL

CONFIDENTIAL

90054

REDACTED

JOB NO.		REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL	"RADIUSED HOLE"	MSR-114		BY T.L.	APP'D T.A.M.

PEF-NCR-02071

REDACTED

NO.	REVISED BY	REVISIONS	APPD

TEi THERMAL ENGINEERING INTERNATIONAL
MOISTURE SEPARATOR REHEATER DIVISION

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Telephone: (323) 838-1150
Telefax: (323) 838-8454

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GENERAL ARRANGEMENT
OF REHEATER CHANNEL
TYPE 1-3-4-2

SCALE	N.T.S	DATE
DRAWN BY	T.L	03/11/05
CHECKED BY	T.L.	03/11/05
APPD BY		
JOB ENG'R		03/11/05
MSR-115		REV. A

PEF-NCR-02072

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NO.	REVISED BY	REVISIONS	APPD

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GENERAL ARRANGEMENT
OF CHEVRON BANKS

SCALE	N.T.S	DATE
DRAWN BY	T.L	04/28/05
CHECKED BY	A.L.	04/28/05
APPD BY	C. Tsai	
JOB ENG'R	C. Tsai	04/28/05
MSR-116		REV. A

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NO.	REVISED BY	REVISIONS	APPD

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ARRANGEMENT FOR STACKING AND JACKING OF CHEVRON VANES

SCALE	N.T.S	DATE
DRAWN BY	T.L	04/28/95
CHECKED BY	A.L.	04/28/95
APPD BY	C. Tsay	
JOB ENG'R	C. Tsay	04/28/95
MSR-117		REV. A

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REDACTED

JOB NO.	STACKING OF CHEVRON VANES	REV. A	DATE 04/28/05	CHK A.L.
PROPOSAL		MSR-118	BY T.L.	APPD C TRAM

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REDACTED

[redacted]

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[redacted]

REDACTED

[redacted]

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REDACTED

Yuba
Heat
Transfer, LLC

2121 N. 161st East Ave
Tulsa, OK 74116 -4802
Phone (918) 234 -6000
Fax (918) 234-5589

A Connell
Limited Partnership
Company

SERVICES

Rev. 01/30/2007

DOMESTIC TRAVEL
FIELD ENGINEER RATES

1. Field Engineer charges are a fixed fee based on a normal 8 hour working day.
2. Overtime charges:
   a. All daily time over 8 hours during the normal work week (Monday through Friday) shall be considered overtime.
   b. All time on Saturday shall be considered overtime.
   c. All time on Sundays and Yuba holidays shall be considered premium time.

LONG TERM – RATE SCHEDULE

CONFIDENTIAL

Year	2007	2008	2009	2010
Fixed Fees/8 Hr. Day	REDACTED			
Overtime/Hr.				
Premium Time/Hr.				

Notes:

a. Travel time will be billed as straight time.
b. Travel and living expenses will be invoiced at cost, plus 5%.
c. Timesheets will be provided daily for approval by the customer's representative.
d. In no event shall either party be liable to the other for consequential, special or incidental damages arising in any way out of the performance of this contract.

DOCUMENT NUMBER-DATE
03238 APR 22 08
FPSC-COMMISSION CLERK

TEi

Document Number: 07-924
Proposal Number: 07-M088

A PROPOSAL TO SUPPLY

REPLACEMENT CONDENSATE FEEDWATER HEATERS (FWH) LP-3A/3B

At

The CRYSTAL RIVER NUCLEAR POWER STATION UNIT 3

Submitted To

PROGRESS ENERGY SERVICE COMPANY, LLC
100 E. DAVIE STREET (TPP-08)
RALEIGH, NC 27601

By

THERMAL ENGINEERING INTERNATIONAL
SANTA FE SPRINGS, CALIFORNIA

A.L. Yarden
President,
MSR Technology & Advanced Programs

November 27, 2007

TEi

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	[redacted]		

CONFIDENTIAL

REDACTED

REDACTED

TEi

5.0 **SUBCONTRACTORS** ⚠ CONFIDENTIAL 17

REDACTED

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OPC
1st POD

#1

080009

BATES NOS. PEF-NCR
02083 THROUGH
PEF-NCR-02162

REDACTED

OPC

1ST POD

#1

080009

BATES NOS. PEF-NCR-02163 THROUGH PEF-NCR-02185

NON-RESPONSIVE

Thermal Equipment Incorporated (TEI)
Contract #XXXXXX

Executive Summary
August XX, 2007

Moisture Separator Reheaters (MSRs)

Progress Energy

DOCUMENT NUMBER-DATE
03238 APR 22 08
FPSC-COMMISSION CLERK

TEI Contract Summary
Contents:

- Scope
- Payment Milestones
- Performance Incentives
- Warranty
- Performance Liquidated Damages
- Delivery Liquidated Damages
- Limits of Liability
- Project Review Team

Progress Energy

TEI Contract Summary
Scope of Work:

Contractor shall provide the necessary management, personnel, material and facilities (except as specified to be furnished by Owner) and do all things necessary or incidental to the design, engineering, fabrication, testing, furnishing, delivery to Owner, of four Moisture Separator Reheaters (MSRs) with two stages of reheat.

TEI Contract Summary
Payment Milestones:

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Milestone Date	Payment Milestone	% of Total Selling Price	Payment Amount
Sep-07	• Net 60 after order of MSR • Verification Tube Strip material has been ordered for Owner	[redacted]	
Nov-07	• Engineering Design Package- Complete		
Dec-07	Provide Fabrication Schedule (Level 2) to Owner		
Mar-08	• Material Receipt provided showing Tube Strip inventoried at Valtimet • Tube production: September – October 2008 • True Finning: December 2008 – February 2009		
Oct-08	• Forgings arrive TEI		
Dec-08	• Major materials arrive and TEI begins fabrication		
Feb 09	• TEI receives tubes	[redacted]	
Jun-09	• MSR Vessels are readied for shipping		
Jul-09	• MSR Vessels arrive at Crystal River site, offloaded by TEI and are received without damage		
Dec-09	• Provisional Acceptance – or – 120 days after installation completion, whichever is shorter		

REDACTED

Progress Energy

TEI Contract Summary
Performance Guarantees:

CONFIDENTIAL

Parameter \ Load	Max Expected	Guaranteed	Max Expected	Guaranteed
TTD L.P. -F°	REDACTED			
TTD H.P. -F°				
ΔP -PSID			REDACTED	
M.S. Eff. -%				

Note: Tolerances – None

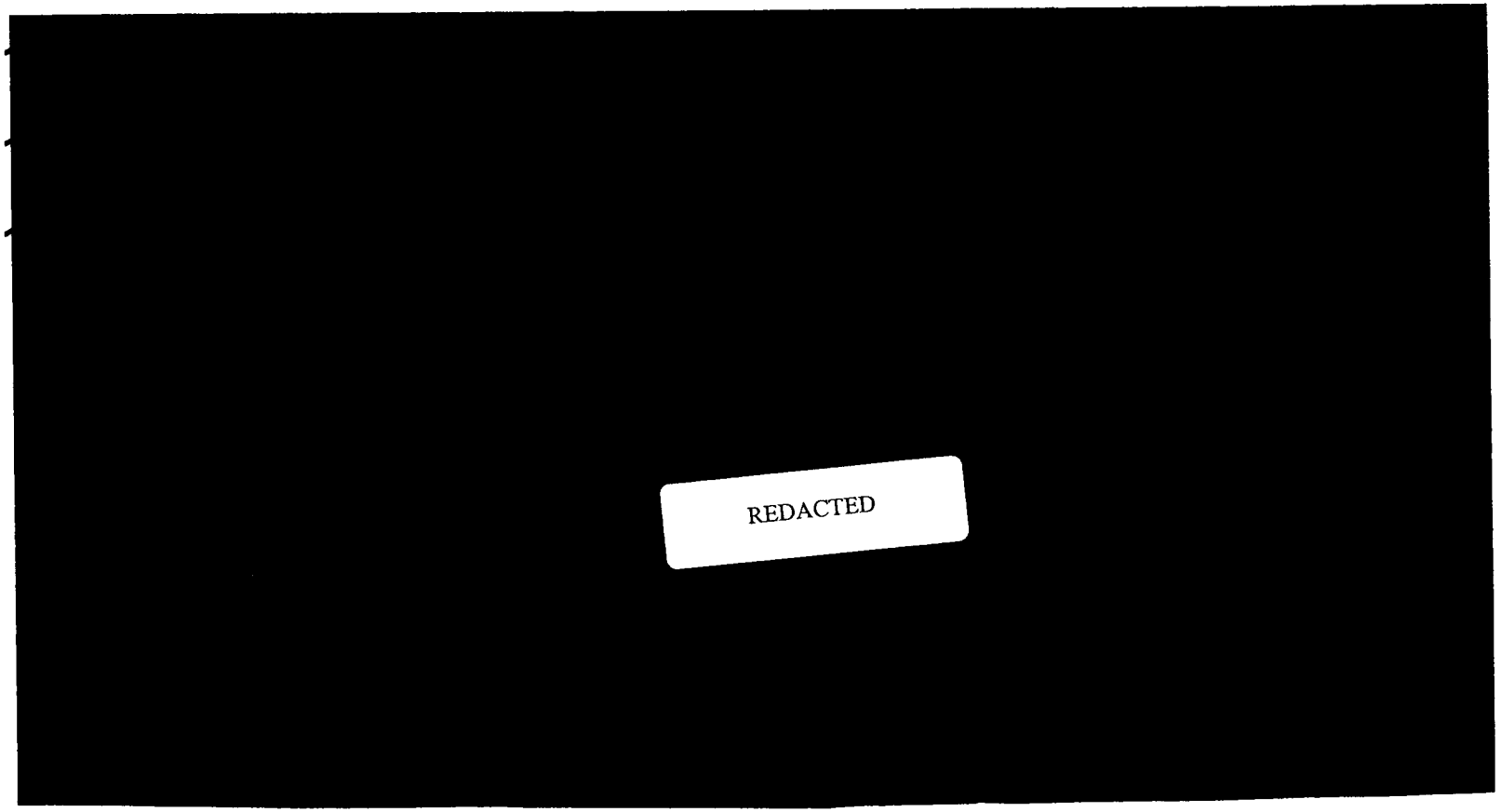
Instruments readings will be rounded to the nearest integer.

Progress Energy

PEF-NCR-02190

TEI Contract
Performance Guarantees

CONFIDENTIAL



■ TTD LP - Guaranteed ▩ TTD LP - Expected ■ TTD HP - Guaranteed
▩ TTD HP - Expecetd ■ P - Guaranteed ▩ P - Expected

Progress Ener

PEF-NCR-02191

TEI Contract Summary
Performance Liquidated Damages:

REDACTED	For each one (1) F° H.P. reheaters above 10 F° (overall TTD)
REDACTED	For each one (1) PSI of MSR vessel above 6 PSI (Δ P)
REDACTED	For each one (1) % of M.S. efficiency below 98 %(MS%)

CONFIDENTIAL

Progress Energy

TEI Contract Summary
Delivery Liquidated Damages:

No. of Days Beyond September 1, 2009	Liquidated Damages per Day
1-5	REDACTED
6-11	
12-21	

CONFIDENTIAL

Progress Energy

TEI Contract Summary
Warranty:

Warranty Period:

[redacted] REDACTED [redacted]

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Corrective Measures:

[redacted] REDACTED

Recurring Corrective Measure*:

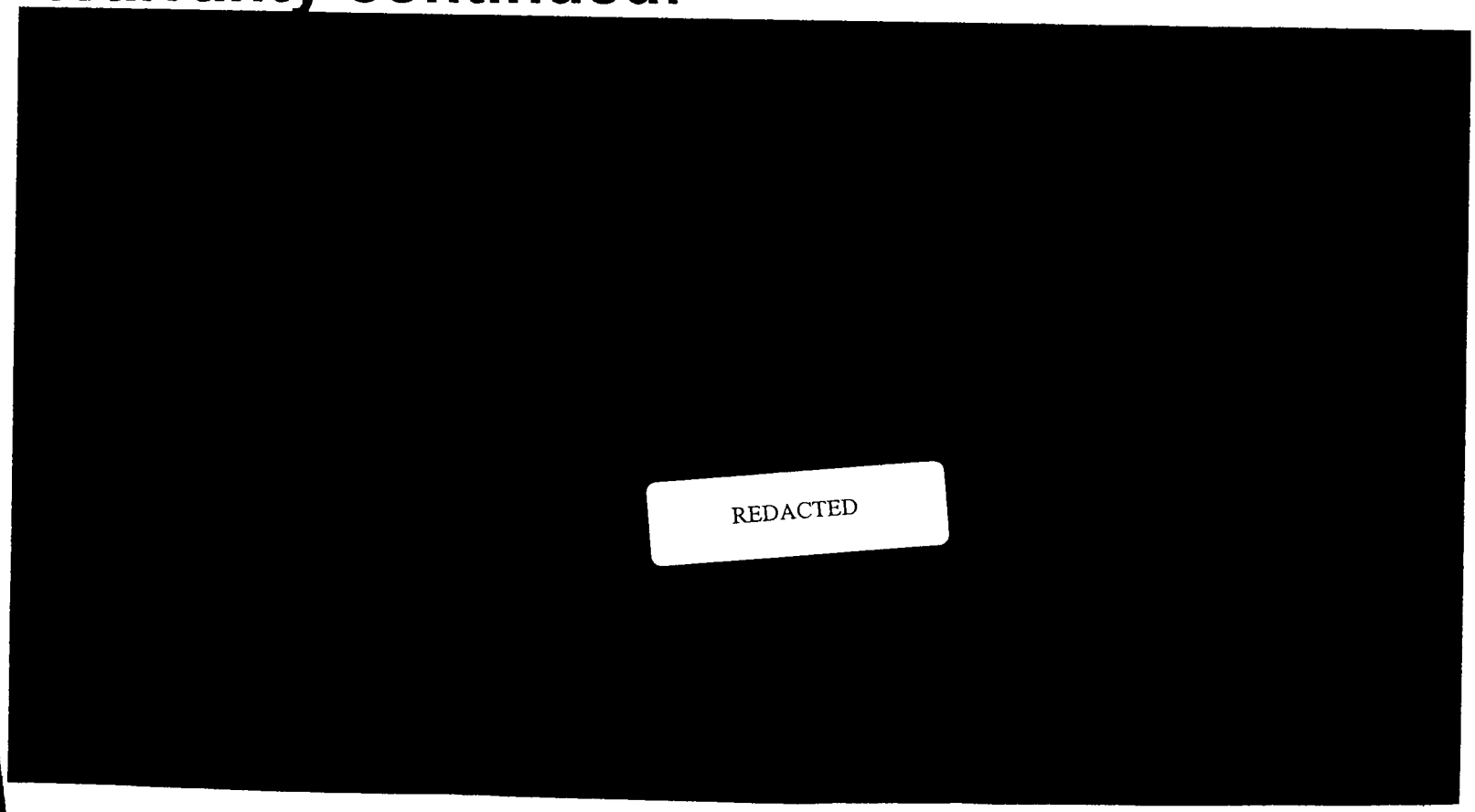
[redacted] REDACTED

* Corrective Measure taken to correct the same warranty problem for three (3) times during the Warranty Period (or any extension thereof under the preceding paragraph) hereinafter "Recurring Corrective Measures."

Progress Energy

TEI Contract Summary
Warranty continued:

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Progress Energy

TEI Contract Summary

Limits of Liability:

CONFIDENTIAL

- The liability of Contractor (excluding indemnity obligation of Contractor)
- [redacted]

REDACTED

REDACTED

Progress Energy

TEI Contract Summary:
Project Review Team

Project Manager	Ted Williams
Project Technical Lead	Scott Deahna
Legal	Dave Conley
Tax	Paul Matthews
Financial	Gerry Dowd
Audit	Elwyn Wood
Contracts	Tony Owen
Executive Sponsor	Danny Roderick

THERMAL ENGINEERING INTERNATIONAL
MSR TECHNOLOGY AND ADVANCED PROGRAMS DIVISION

10375 Slusher Drive
Santa Fe Springs, CA. 90670
Phone: 323-838-1150
Fax: 323-838-6454
msr@thermalengint.com

March 26, 2007

Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Powerline Street
Mail Code: SA2C
Crystal River, Florida 34428-6708

Attention: Mr. Ted E. Williams
Superintendent, Major Projects
Power Level Uprate

Subject: **A PROPOSAL TO FURNISH REPLACEMENT MOISTURE SEPARATOR REHEATER VESSELS FOR CRYSTAL RIVER UNIT #3**

Reference: TEI Proposal 07-M062

Dear Mr. Williams:

We are pleased to forward to you our proposal for the new upgraded and modern Moisture Separator Reheaters (MSRs) vessels which meet your betterment goal at Crystal River #3.

It is our conviction that TEI's advanced MSR technology must be presented to Progress Energy highlighting TEI design and experience as well as other critical project related elements. TEI, in its many years of unique MSR service to the Nuclear Power Industry, has always maintained its tried-and-true design principles and proprietary features, while adapting them to the specific plant's architecture and steam conditions. We are committed to bring to Progress Energy a high value MSR equipment.

We trust you will find this proposal worthy of your consideration.

We thank you for the opportunity to submit this proposal and hope to hear from you soon.

Sincerely,

THERMAL ENGINEERING INTERNATIONAL
MSR Technology & Advanced Programs Division

A.L. Yarden
President

ALY/no/06-04

DOCUMENT NUMBER-DATE
03238 APR 22 08
FPSC-COMMISSION CLERK

TEi

Document Number: 07-248

Proposal Number: 07-M062

A PROPOSAL TO FURNISH

REPLACEMENT MOISTURE SEPARATOR REHEATER (MSR) VESSELS AT CRYSTAL RIVER UNIT 3 NUCLEAR POWER PLANT

Submitted To

PROGRESS ENERGY FLORIDA, Inc.
CRYSTAL RIVER NUCLEAR PLANT
15760 W. POWERLINE STREET
CRYSTAL RIVER, FLORIDA 34428-6708

By

THERMAL ENGINEERING INTERNATIONAL (USA), Inc. (TEI)
10375 SLUSHER DRIVE
SANTA FE SPRINGS, CA 90670-3748

DOCUMENT NUMBER-DATE
03238 APR 22 80
FPSC-COMMISSION CLERK

A.L. Yarden
President, MSR Technology
& Advanced Programs Division

March 2007

TEi

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1.0 INTRODUCTION

1.1 General

TEI – MSR Division is submitting this unsolicited proposal to Progress Energy to design, manufacture, ship and install four (4) new Moisture Separation Reheater (MSR) vessels, for and at the Crystal River Plant. The new MSRs incorporate advanced and improved design features and are fully compatible with the current and uprated steam conditions. The new MSRs will be optimized to achieve high thermohydraulic performance, smooth and sustained operation, high reliability and ease of inspection. TEI, based on a final plant heat balance will fine-tune the design so as to match the most favorable turbines' steam conditions. Such matchings have been effectively accomplished by TEI in cooperation with the selected turbine supplier.

We have recently cooperated directly with Siemens on other projects to arrive at a best design conditions for the turbines / MSRs configuration. Over the years, TEI's complete new MSRs have been paired, with Siemens / KWU machines (Grand Gulf & Comanche Peak) with W machines (North Anna) with MHI machines (Ikata) with GEC machines (Fermi, Kori) with G.E. machines (Duane Arnold, Seabrook). MSR replacement reheaters have been fitted to Alstom machines (Ulchin) very successfully, too.

TEI's record of effectively modernizing OEM MSRs, extend across a wide range of turbines makes, types and sizes, as well as various rated power levels and operating floor layouts. TEI's MSR vessels can be commercially procured directly or can be placed in a combined turbine/MSR package for contractual convenience and optimized project execution. Therefore, at Siemens request, TEI has provided them a similar technical proposal to be integrated into their solicited proposal for a turbine/MSR package. However, if the MSRs are procured by Progress Energy directly from TEI, we will fully and effectively cooperate with the turbine supplier, such as Siemens and fully guarantee the attainment of the proposed performance parameters (TTD, ΔP, M.S. efficiency, subcooling level).

Finally, this unsolicited proposal grossly defines and provides the proposed scope of supply and work, the offered selling prices, the commercial terms and the technical input and descriptions necessary for orientation and evaluation. It is expected that additional information will be required by Progress Energy at this or a later time. Such will be promptly provided by TEI upon request.

If TEI is selected as an MSR supplier, TEI as a provider of an unsolicited proposal will be ready to enter into negotiations to cover all aspects of this procurement, such as: scope, costs, technical and Q.A. requirements, project coordination, labor relations, etc. It is TEI's intent to bring maximum value to this project, regardless of TEI's role, being either a direct vendor or a nominated sub-supplier.

1.2 **Purpose**

TEI proposes to replace the four (4) existing MSRs at Crystal River 3 (CR-3) with completely new highly improved and fully fit-for-purpose MSR vessels. The new vessels will be designed to accommodate the contemplated 20% uprate conditions. TEI considers such replacement as practical and economically reasonable. It will certainly enhance the overall betterment of the secondary steam cycle. TEI proposes to undertake the project on a turnkey basis, i.e., it will design, model test, fabricate, ship and install all four (4) vessels and crossaround piping spools.

The proposed MSR system will complement the rest of the uprated and upgraded steam plant. The MSR interfaces with major plant components, and its optimal performance yields positive effects on the rest of the system. Remarkable improvements will be attained by:

Performance

(1) Lower TTD - higher superheat
(2) Lowest pressure drop - practical
(3) Complete moisture separation
(4) Low excess steam rate - optimal

Reliability

(5) FAC endurance and erosion resistance

(6) Resistance to and relief from thermally induced stresses (which can lead to distortions and cracks)

(7) Sound 4-pass mechanical partitioning – pressure spike, erosion

(8) Vibration-free internals structure and tube banks

Operability

(9) Steady and smooth operation

(10) Streamlined transients

1.3 Merits Of The Proposed MSR Vessels Replacement

The existing MSR vessels are 11 feet in diameter as compared to the typical 12 feet. In spite of the available space on the turbine floor, the fairly short MSR and its inlet section are very restricted. TEI has concluded that a **small** increase in overall dimensions would result in **large** increase in performance and reliability. Improvements such as the lowering of internal velocities, streamlining the flow paths, and increasing the heat transfer area, result in **significantly** lower overall TTD, remarkably lower pressure drop and virtually **complete** moisture separation. While redesigning the new larger vessels, the flow paths and material of construction will be made corrosion/erosion resistant. TEI has selected a 12.5 feet diameter as best candidate for the proposed replacement along with longer shell which will extend the new vessel's **overall length** but with the same supports locations as the existing vessels. The crossaround nozzles locations stay the same, ready to reconnect to the existing piping. With the shell diameter increased to 12-1/2 feet, the internal flow path is streamlined to avoid direct steam impingement, sharp turns and to reduce hydraulic expansion and contraction losses.

1.4 Single Source Responsibility – If Installation Is Included

As TEI is responsible for the design, manufacturing and installation, it will make the job a turnkey project, from design through manufacturing to installation; as such, it will assure complete coordination and a continuous job execution. It will result in a single source responsibility for CR-3 and it will provide continuous and consistent technical support by TEI's experienced MSR engineers during all phases of the project with additional benefits as follows:

1. **On the spot engineering resolution** to any "as is" deviations or nonconformances, thus protecting schedule.
2. **A single responsibility** and expertise in the installation execution and a consistent **continuity**.
3. **Contingency plans for unexpected bottleneck**, delays or obstructions. Adjusting, if needed, day to day current work plan to meet any obstacles. Assessing potential problems will assure preparedness and expeditious resolution of same.
4. TEI, as an **MSR** designer / fabricator will assure careful installation of the vessels so as to avoid damage to existing MSR structure.
5. **Key installation people** are veterans of similar jobs with hands-on and recent experience. They will do-it-right at CR-3 the first time, since for them it will not be the first time.
6. TEI's **knowledge of the job** provides for responsible, realistic and achievable installation schedule.
7. TEI when installing its own MSR replacement equipment carries an undivided responsibility for the integrity of the vessels and structure.
8. TEI is a custom installer of this type of equipment. We are not a general construction company. This job will be reviewed week-by-week by TEI's top management; CR-3 will be given direct access to TEI's corporate management.

2.0 SCOPE OF SUPPLY AND SERVICES

2.1 Equipment

a. Four (4) complete MSR vessels, built to ASME Code (as shown below), delivered to site F.O.B., N_2 purged, uninsulated, painted, with integral supports to match existing locations.

b. Eight (8) excess steam flow regulating valves, S.S. trim.

c. Monitoring, integral instrumentation and matching readout devices.

d. All required pipe spools, designed to B31.1, to match existing cut lines.

e. Spare gaskets, tube plugs, chevron vanes and sample tube sections.

f. Complete documents package including: Q.A. documentation file, design calculations, operation/maintenance manual and equipment drawings.

2.2 **Services**

a. Scaled down model testing and a summary report establishing good flow distribution.

b. All manufacturing procedures for review and acceptance, such as manufacturing and welding procedures, NDE procedures, Q.A. program.

c. Documents needed for DCP preparation (by others).

d. Meetings at the CR-3 Station for orientation, coordination and project support – four (4) meetings.

e. Monthly progress reporting.

f. Preliminary installation procedure and crossaround piping isometrics.

g. Site installation support – if installation is excluded from TEI scope, ten (10) man-weeks.

h. Prepare performance test plan and participate in its execution when MSRs are back in service.

i. All needed site surveys.

j. All engineering analyses. (Vibration and stress analysis, etc.)

k. Transportation plan.

2.3 **Installation – Not in Sequence**

The general and major installation activities are:

a. Off-loading major equipment at gate Items 2.1(a),(b)&(c) to temporary storage.

b. Crossaround pipes cutting (flame and/or mechanical) typically two cuts per pipe.

c. Removal of existing shells with their insulation to pre-designated onsite location.

d. Removal of mechanical and structural interferences.

e. Hauling new MSRs by transporters, to crane bay.

f. Lifting to turbine floor with turbine crane (175 tons capacity).

g. Installing/securing weld piping spools/nozzles as required.

The TEI resources provisions are:

a. All labor union or unionized. All supervision, Q.A., engineering onsite support.

b. All weld rods or wire.

c. All tools, lifting trucks, disposable welding machine, special jigs and tooling.

d. All procedures preparation for FME, safety, fire prevention, cleanliness, some generic, some plant-specific as applicable.

2.4 **Scope – By Owner**

a. Off-loading at site – (F.O.B. rail) and placing at temporary storage.

b. Insulation (TEI can provide as an option).

c. Scaffolding – (Plan by TEI)

d. Workers' training for unescorted access during installation.

e. Removal of I&C and electrical interferences.

f. Turbine building crane and operator.

B.	Outage Activities – Main Activities For Milestones Identification	CR-3	TEI
	1. Remove insulation around cut lines	X	
	2. Mark cut lines of all piping		X
	3. Mark all electrical and structural interferences		X
	4. Provide protective barriers		X
	5. Cut all piping interfaces		X
	6. Install FME barriers		X
	7. Remove existing vessels to staging area		X
	8. Prepare new MSRs in staging area		X
(*)	9. Lift / move new MSRs to existing foundation		X
	10. Check pre-fabricated pipe spools		X
	11. Tack / weld piping spools – remove FME		X
	12. NDE functions		X
	13. Mount relief valves		X
	14. Replace all interferences previously removed		X
	15. Remove scrap and clean area		X
	16. Routing thermocouples		X
	17. Vessel insulation	X	
(*)	At a cost adder for heavy hauling (logger and crane) pass through cost +5%.		

C.	Post-Outage Activities	CR-3	TEI
	1. Q.A. reports		X
	2. A.I. data sheets – as applicable		X
	3. Demobilization		X

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3.0 **COMMERCIAL**

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4.0 TECHNICAL

4.1 Performance

The purposed upgraded MSR will achieve high performance under current and uprate load levels. Such will directly affect positively the L.P. turbines' longevity and efficiency in providing a higher superheated steam to the L.P. turbines, while lower pressure drop across the MSR will make additional enthalpy available for conversion to power. It has been demonstrated, over the years, that improved MSR performance contributes directly to MWe gains. It is certain that this proposed MSR upgrade will not only increase electric production gain but also allow the station to uprate the power (flow and pressure) to at least 120% without any adverse impact due to vibration, FAC, erosion or mechanical design limitations.

TEI guarantees the attainment of the following performance parameters values:

Parameter \ Load	
TTD L.P.	- F°
TTD H.P.	- F°
ΔP	- PSID
M.S. Eff.	- %

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Tolerances – none

Instruments' readings will be rounded to next integer.

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4.2 Fitness-For-Purpose

- Installation by others
- Architecture

The new vessels are somewhat larger but they do not alter the turbine floor arrangement. Pull space is sufficient, floor loading is within limits, flanged connection in the crossover location is the same. Larger MSR vessels by TEI were installed in North Anna #2 with no reported problem. Larger MSR vessels are now being fabricated by TEI for both reactor units at Almaraz Nuclear Station.

4.3 Thermohydraulic And Mechanical Design Of The Reheaters

4.3.1 The Existing And The Proposed Reheater Bundles

In the last 30 years, TEI has been involved in the design and fabrication of reheater bundles for service in its own line of MSRs, as well as in Westinghouse, G.E. and Alstom MSRs.

TEI's design approach is to provide a **reheater tube field whose width is greater than its height** as compared to your OEM "standard" reheater, whose height is larger than its width. The benefits of TEI's design approach are quite evident in view of the excessively high pressure differentials across the MSR internals. TEI proposes to Progress Energy such a wider design, (High Capacity), as the best suitable for CR-3.

The reasons for such proposed replacement are as follows:

1. The existing bundles reportedly are deficient in performance (TTD and ΔP) as compared to the original design heat balance.
2. The existing bundles are, by now, in all likelihood, distorted and may contain tubes which are damaged and failing. This trend for decay has shown to be accelerating for older bundles. (The ones in CR-3 are about 20 years old).
3. Continuing maintenance of the existing bundles is costly and time consuming.
4. The existing bundles, due to their excessively "slim" tube layout, caused an unacceptable pressure drop, and are susceptible to "lift" during flow spikes (valve testing).
5. The new High Capacity bundles proposed for replacement at CR-3 are very effective, and proven to last in hundreds of applications over many years.
6. The High Capacity bundles are of **refined** ferritic S.S. tubing. They utilize much higher quality material (restricted chemistry) and contain fins of premium quality as compared to your existing ones.
7. The High Capacity bundles are designed to maintain their structural form (no deformations) for the remaining plant life so as to eliminate any future tube distortion and tube failures.

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8. The 4-pass box redesign assures optimum operability, best performance, zero leakage and longest life.

TEI has installed, over the last 26 years, over 400 replacement bundles in scores of nuclear plants. These bundles are operating very successfully and are expected to do so for the remaining lives of the plants. We believe that Progress Energy can benefit from such improved and effective reheaters.

On the basis of our experience we have selected a working and **proven** design for this proposal which fits the specific conditions of the CR-3 cycle and meets your betterment goals, for both 2625 MWth and 3030 MWth loads and beyond.

We believe your request for a proposal is aimed to procure equipment and components which are **better** - and obviously **different** - than the current, deficient ones. The proposed bundles which are of sound mechanical and thermohydraulic design are **optimized** for CR-3 secondary cycle conditions.

The offered design for the bundles is a 4-pass High Capacity tube field design with 3/4" O.D. finned tubes in vertical U-bend orientation, but with an **octagonal** tube field extended to include the side segments of the **larger** tubesheet internal circumference. The tubes are finned with 27 fins/in.

The octagonal tube field outline has its sides conform **precisely** to the prescribed arrangement of the side outermost tubes while **maximizing** the total tube count.

The details of the design are shown in the attached Mechanical Outline Drawings No. 07-M062-010, -021, -011 & -012.

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4.3.2 Other Reasons For Selecting The Proposed Bundle

The remarkable features of the 4-pass arrangement were recognized by worldwide MSR manufacturers in the mid-'70s. Virtually all original equipment designers of MSRs have various patents covering different elements of this fundamental 4-pass design (TEI has two). The conception and evolution of the 4-pass came as a result of the inadequacy of the 2-pass to provide long-term reliable equipment. In addition, the 4-pass proved not only to operate more efficiently, but also to produce a higher performance, as compared to the primitive 2-pass.

The specific features comprising the proposed 4-pass which is considerably improved over the existing OEM design are described below and are mentioned throughout this technical section.

The performance advantage of the octagonal High Capacity type field layout vs. your existing rectangular one is a sufficient advantage to prefer this type of design. But there are other benefits also, such as a **heavier bundle** which is less susceptible to lift; lower number of tube rows which reduces tubeside channeling and which increases the cross section of the upper flow channel, thus reducing pressure drop and enhancing longitudinal, even cross flow distribution. Moreover, due to larger number of tubes, each tube is subject to a lesser heat duty, which is a desired state during abrupt change in unit load.

The replacement reheaters offered here are of customized design which completely eliminates existing problems typical to the OEM equipment and furthermore, enhances the MSR performance. The design was especially developed by TEI for replacement of reheaters in MSRs of the same make as the ones at your CR-3.

The design includes mechanical features which provide for structural integrity and for improved operation. It also provides for easy maintenance.

The design incorporates the state-of-the-art, extensive field experience gained by TEI MSR Division over the years. Also, it integrates the results of in-house development and testing effort. The demonstrated performance of TEI replacement reheater bundles to date shows no evidence of structural and/or operational problems, of generic nature, which have afflicted original equipment with detrimental consequences. Thus, the offered reheater design, within a new larger MSR vessel will exceed your requirements.

4.3.3 **Mechanical Description**

(Refer to the attached mechanical Outline Drawing No.07-M062-010 for configuration). The replacement reheater tube bundles are obviously, compatible with new proposed MSR vessels.

The offered bundle design provides for integral relief from mismatched thermal expansion so that structural deformation is eliminated and service life is greatly extended. The header internal design is an improved arrangement to fully satisfy reliability, operation and maintenance requirements. It is designed to endure erosion and to withstand high spikes of pressure differentials across its pass partitioning plates.

Each tube-to-tubesheet joint is both rolled and welded to provide two structurally independent tube joints for increased reliability. Specifically, the features incorporated into the proposed designs are as follows:

A. **A larger header** with a larger size manway opening for maintenance convenience. **Strong** internal partition construction to withstand sudden pressure fluctuations, associated with instantaneous load changing, thus, avoiding severe plate deformation. The internally mounted parts, as well as the field of tube joints, are totally accessible for inspection, maintenance and/or field inspection. Nozzles on the header are dimensionally and metallurgically **compatible** with the existing reheater piping. (Refer to Dwgs. No. 07-M062-011 and -012).

PEF-NCR-02216

B. **A flexible tube support system (cage)** allows for controlled intermittent relief of mismatched thermal expansions between hotter tubes and progressively cooler shrouding side plates. **This is a most significant design feature** which preserves the alignment of the tubes with respect to their support plates, thereby preventing side plate deformation which leads to tube binding, steam bypassing and other consequent failures.

C. **Tube to shrouding side plate design tolerances** are precisely set by design, and are maintained during fabrication to prevent side-stream steam bypassing. Such tolerances remain intact during the equipment service life by virtue of the **flexible** support system design mentioned in B. above.

D. **Sealing bars** are welded longitudinally in selected locations along the shrouding side plates to further block steam bypassing and to achieve a virtually ideal tube bank configuration for an even cross flow.

E. **Tube holes in support plates are "radiused"** to facilitate unobstructed movement of tubes with respect to their support plates' holes during reheater pressurization and decompression. The support plates enveloping dimensions conform to the new tube field, which are 5/8" thick with no exceptions.

F. **An integral temperature sensing grid**, comprised of at least 18 thermocouples welded in proper tube-end locations in each reheater, indicates condensate/steam discharge temperature which confirms good system operation. The thermocouples are routed to an externally mounted terminal box. A portable readout device is also furnished.

4.3.4 Tubeside Design In The 4-Pass Arrangement Of The High Capacity Design

This improved 4-pass design, which is much superior to the existing "add-on" 4-pass, now in CR-3, provides for:

- A higher and self-induced **automatic purging** of the critical lowermost tube legs, which comprise the second pass, to achieve a virtual elimination of subcooling at all load levels. It also provides for a high condensation transfer rate and uniform tube temperatures. This purging scheme needs no "artificial" perforated plate or orifice restrictors at the tubes' inlets.

- A higher **structural integrity** by stronger construction of the internal partitions and the 4th pass box, to endure sudden pressurization and/or decompression. This eliminates deformation and rupture failures.
- An easier access for inspection and maintenance, which is possible by a large manway and by the ability to remove internal covers, rather than entire components.
- A service-worthy full circumference flat surface seal, **on the back of the 4-pass box. The box is welded to the tubesheet**. The flat surface **seal is subject to considerably lower differential pressure** than in your current design due to tube pass sequence.
- Tube passes in a "downhill" top-to-bottom sequence of 1,3,4,2 which provides a logical thermal head arrangement and a true co-current two-phase flow, thus promoting condensate drainage and preserving stable hydraulics in the U-bend sections. This arrangement also results in very low pressure drop across the internally welded 4-pass box, thus preserving the sealing gasket, on top of the box.
- Bottom discharge holes from the 4th pass box. The box is designed also as a "sump" to avoid condensate buildup and submergence of lower tubes.
- Since the end pass (4th pass) is nested above the 2nd pass, the maximum potential for subcooling, under unlikely worse case conditions, (insufficient excess steam during low load, transients and/or full heating steam pressure) is considerably reduced.
- The rate of excess steam **is regulated** by a valve to establish optimal rate.

This is the highly recommended and best design for the CR-3 MSRs. It provides a larger effective surface, but by utilizing the side segments of the circular tubesheet, which are not used in the original design. Such tube arrangement reduces the cross flow velocity and, as a result, caused **a lesser pressure drop** across the tube bank. It also reduces the susceptibility to local vibration. The lower pressure drop, coupled with a comparable heavier bundle, reduces the "lift-off" tendency of the bundle.

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4.3.5 **Condensate Drainage**

As mentioned above, the condensate drainage is accomplished in two steps. **First**, the water inventory condensing in the 1st and 2nd passes is withdrawn from the lowermost area of the head via a drain nozzle to the **existing** drain tank. No excess steam is withdrawn at this point. **Second**, the condensate generated in the 3rd and 4th passes is discharged into the sump of an internally welded box from which it is discharged, together with the excess steam through a discharge pipe and a valve directly into the receiving feedwater heater.

The drain and discharge nozzles are sized properly to allow a fully vented gravity flow from the 2nd pass and well established flows from the 4th pass. The sizing, which constitutes a very important design requirement, is based on the proven Froude Number criterion for the drain nozzle and on a two-phase critical flow design procedure for the 4th pass. We do not anticipate any change in the existing 2nd pass drain since after the uprate to 3030 MWth power; it will still carry **less** condensate than its original design capacity.

This method of discharge is a simple and proven method. It is simply to discharge the two-phase flow to a feedwater heater through a critical two-phase flow valve. This method only requires one valve in the existing pipe line per reheater. It is a pressure reducing valve which can be **adjusted**.

The desired flow rate can then be determined by monitoring the amount of subcooling at the exit of the 4th pass with the thermocouples installed in the header. The valve is trimmed to restrict flow until the onset of subcooling occurs and then it is trimmed open slightly to provide for more vapor flow. This technique requires thermocouples to be installed in discharge legs of the tubes comprising the 4th pass.

4.4 MSR Performance Tests

4.4.1 Scope

TEI will provide a sufficient number of internal sensors and provisions for the lead wires or pressure tubing to exit the pressure boundary (proprietary - see photographs at end of chapter), as well as locally mounted read-out devices so as to be able to gather and record data which positively indicates internal performance. Performance verification instruments will be installed on the four MSR vessels to determine performance parameters. The internal sensors will be located in zones which are indicative of the actual thermohydraulic events.

TEI has had a great deal of practical experience in the planning of data requirements, hardware, installation, and recording. Our engineering Methods Group is highly qualified to evaluate such data and assess its impact on plant parameters.

The performance of the MSRs will be verified by the direct measurements of pressures, temperatures and flow rates of steam/condensate around each reheater and vessel. All pressure taps will be installed with isolation valves supplied by TEI, ready for connecting to the pressure gauges. All temperature connections will be fitted with thermowells or thermocouples. Annubars or equivalent meters, will be used to measure the steam and condensate flow rates. Other data required for heat balance calculations will be mutually established with CR-3 personnel.

TEI will prepare data sheets in a format which allows a complete and a consistent recording of all data necessary for the performance verification. TEI will coordinate and participate with your plant personnel in recording the data and evaluating same, as requested.

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4.4.2 **Determination of Performance Parameters**

1. **TTD**

   TTD is determined as the difference between the main steam saturation temperature and/or the heating steam inlet temperature, and the average cycle steam exit temperature above the H.P. reheater bundle.

2. **ΔP**

   For the complete MSR vessel, the pressure drop is determined as the difference between the average static pressures measured at the inlet and outlet nozzles.

3. **Subcooling**

   Subcooling is determined as the difference between the liquid drainage temperature and the corresponding steam temperature in the discharge space.

TEI Workscope

* TEI will design, procure, fabricate and install - as applicable - all internal instrumentation: conduits, valves, read-out devices, integral junction boxes and valves integral to the bundles. Tubing extension, wire extension and instrument connections will be done by the plant I&C people.
* TEI will furnish all tubing, extension wires, valves and read-out devices.
* TEI will prepare "data sheets" in a format which allows a complete and a consistent recording of all data comprising a "data run".
* TEI will coordinate and participate with CR-3 plant personnel in the recording of data and the assembly of plant data to comprise consistent "data runs".
* TEI, in conjunction with CR-3, will reduce and evaluate the collected data.
* TEI will issue to CR-3 an engineering report adequately covering aspects of the testing and documentation of results.

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CUSTOMER: CRYSTAL RIVER #3					
PROPOSAL NUM: 07-M062	A	INITIAL ISSUE	NF 03/22/07		
	REV	DESCRIPTION	DRAWN BY	CHK BY	APPD BY

TEI THERMAL ENGINEERING INTERNATIONAL
MOISTURE SEPARATOR REHEATER DIVISION
10375 Shoemaker Dr.
Santa Fe Springs, CA 90670-3748
Telephone: (323) 838-1150
Telefax: (323) 838-6454

TITLE: MSR SPECIFICATION SHEET
2625 MW_{TH} (EXISTING HP TURBINE - NEW LP TURBINE)

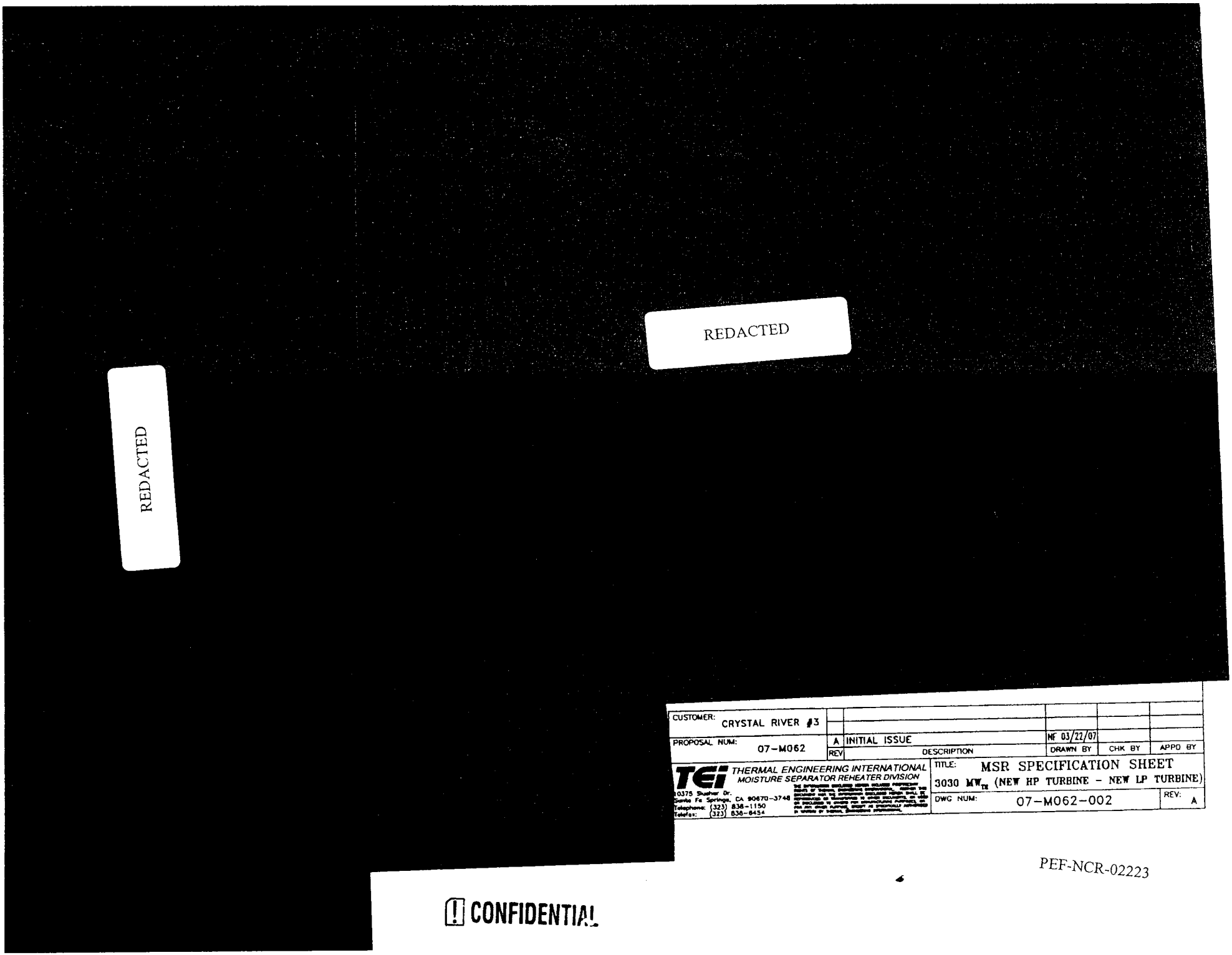
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CUSTOMER: CRYSTAL RIVER #3					
PROPOSAL NUM: 07-M062	A	INITIAL ISSUE	NF 03/22/07		
	REV	DESCRIPTION	DRAWN BY	CHK BY	APPD BY

THERMAL ENGINEERING INTERNATIONAL
MOISTURE SEPARATOR REHEATER DIVISION
10375 Shoemaker Dr.
Santa Fe Springs, CA 90670-3748
Telephone: (323) 836-1150
Telefax: (323) 836-6454

TITLE: MSR SPECIFICATION SHEET
3030 MW_{TH} (NEW HP TURBINE - NEW LP TURBINE)

DWG NUM: 07-M062-002 REV: A

PEF-NCR-02223

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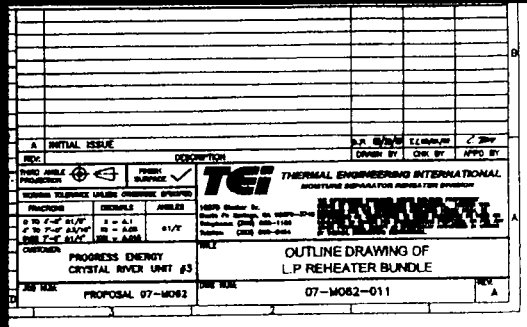
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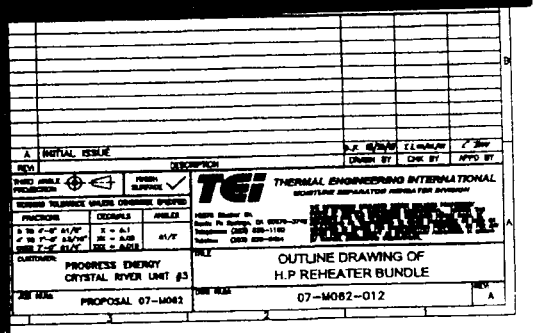
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GENERAL ARRANGEMENT
OF MSR CROSS SECTION

SCALE	N.T.S	DATE
DRAWN BY	B.F.	03/20/07
CHECKED BY	T.L.	03/21/07
APPD BY		
JOB ENG'R	C. TAPP	03/21/07
07-M062-021		REV. A

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GENERAL ARRANGEMENT AT LP END BULKHEAD

SCALE	N.T.S	DATE
DRAWN BY	B.F.	03/20/07
CHECKED BY	T.L	03/21/07
APPD BY		
JOB ENG'R	C. TRAN	03/21/07
07-M062-023		REV. A

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PLAN VIEW AT MANIFOLD
SLOT PLATES

SCALE	N.T.S	DATE
DRAWN BY	A.F.	03/20/07
CHECKED BY	T.L	03/21/07
APPD BY		
JOB ENG'R	[illegible]	03/21/07
07-M062-024		REV. A

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GENERAL ARRANGEMENT AT HP END BULKHEAD

SCALE	N.T.S	DATE
DRAWN BY	D.F.	03/20/07
CHECKED BY	T.L.	03/21/07
APPD BY		
JOB ENG'R	C. TARA	03/21/07
07-M062-022		REV. A

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[redacted]

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JOB NO.	FLEXIBLE SIDE SHROUD PLATE	REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL		MSR-111		BY T.L.	APPD C. TAM

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JOB NO.		REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL	"ACTION" OF FLEXIBLE SIDE SHROUD	MSR-112		BY T.L.	APPD TAM

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JOB NO.		REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL	FUNCTION OF BY-PASS RESTRICTOR	MSR-113		BY T.L.	APPD C. TAM

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JOB NO.		REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL	"RADIUSED HOLE"	MSR-114		BY T.L.	APVD T.A.M.

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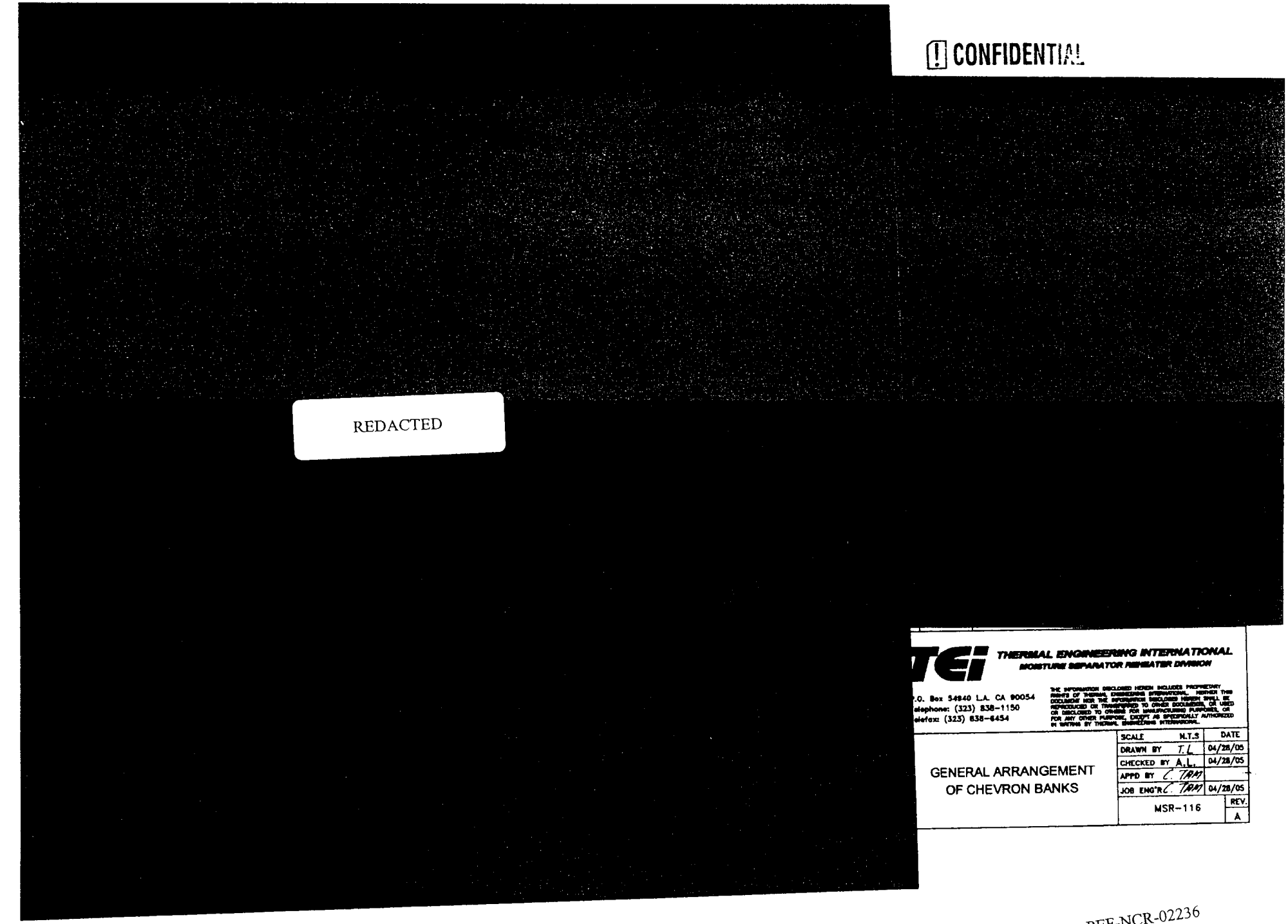
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GENERAL ARRANGEMENT
OF REHEATER CHANNEL
TYPE 1-3-4-2

SCALE	N.T.S	DATE
DRAWN BY	T. L	03/11/05
CHECKED BY	T.L.	03/11/05
APPD BY	C. Tran	
JOB ENG'R	C. Tran	03/11/05
MSR-115		REV. A

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GENERAL ARRANGEMENT
OF CHEVRON BANKS

SCALE	N.T.S	DATE
DRAWN BY	T.L	04/28/05
CHECKED BY	A.L.	04/28/05
APPD BY	C. TRAN	
JOB ENG'R	C. TRAN	04/28/05
MSR-116		REV. A

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NO.	REVISED BY	REVISIONS	APPD

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ARRANGEMENT FOR STACKING AND JACKING OF CHEVRON VANES

		DATE
SCALE	N.T.S	
DRAWN BY	T.L.	04/28/05
CHECKED BY	A.L.	04/28/05
APPD BY	C. Tam	
JOB ENG'R	C. Tam	04/28/05
MSR-117		REV. A

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90054

[redacted]

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JOB NO.	STACKING OF CHEVRON VANES	REV.	A	DATE 04/28/05	CHK A.L.
PROPOSAL		MSR-118		BY T.L.	APPD C. TRAN

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