Harrison

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

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MAR 27 1984

MEMORANDUM FOR: James G. Keppler, Regional Administrator
Region III

FROM: Richard C. DeYoung, Director
Office of Inspection and Enforcement

SUBJECT: IE COMMENTS ON CONSUMERS POWER COMPANY
INDEPENDENT MANAGEMENT APPRAISAL PLAN

We have reviewed the proposed independent management appraisal plan submitted by Consumers Power company (CPCo), dated March 7, 1984, and find the plan to be deficient in a number of areas. It appears that many changes to the draft plan will be required to provide the depth and scrutiny in the appraisal that we anticipated when we issued the January 12, 1984 Confirmatory Order. I offer the following comments for your consideration in preparing the NRC response to CPCo.

1. The independent management appraisal of CPCo is to be performed by Cresap, McCormick, and Paget (CMP) and TERA Corporation (TERA). The plan does not identify how the two organizations will function and interface as a team or how the responsibilities for performing the appraisal, analysing the findings, and making recommendations will be assigned or shared between the two organizations. The plan should identify the roles, authorities, and responsibilities for CMP and TERA in working together as a team in performing this appraisal.

2. The management appraisal of CPCo is limited to a prospective evaluation to determine how CPCo should proceed in completing the Midland project. The appraisal plan does not include a retrospective analysis of how the Midland project was managed in the past. In the recently completed Congressional study on quality assurance, the staff identified the importance of performing root cause analysis which includes a detailed evaluation of past events/problems in order to identify the contributing factors and causes of problems. Root cause analysis provides the reviewer with a detailed understanding of how we got to where we are, and thus the reviewer is in a much better position to prescribe future direction and activities. The Torrey Pines review of the Zimmer project is a good example of how the retrospective analysis of the Zimmer management and project control programs formed the basis for the Torrey Pines recommendations for organizational and management improvement.

   The CPCo plan should include a retrospective management appraisal. The retrospective analysis should include an examination of what went wrong and what apparently worked and should analyze the root cause for CPCo's success and/or failure in its management systems and programs.

MAR 30 1984

3. The Order specificially requires the appraisal to include an evaluation of management "capability and competency," but the appraisal plan makes no reference to an evaluation of CPCo's management competency. In addition, the appraisal plan should address the issue of prior experience in the construction of commercial nuclear power plants as an evaluation factor in examining the capability and competency of management in areas such as system turnover and startup and testing.

4. The plan should be specific in identifying the "various contractors" to be included in the appraisal (reference Part I Objective and Scope of Plan.) The list of interviewees includes only Bechtel, no other contractors are identified.

5. The depth of review of the independent appraisal is not readily evident or clear. No reference is made of specific events or cases to be independently examined to determine if the information developed through the interview process can be substantiated. The appraisal plan should address specifically the degree to which any past considerations of cost or schedule factors affected plant quality. In addition, the scope of the appraisal of the Midland process for monitoring and controlling quality appears to be limited to ensuring compliance with NRC requirements rather than an appraisal of whether or not the process would assure the quality of the Midland project (see page 4 of Exhibit II-1).

6. The participation of Tera in the independent management appraisal could potentially be a conflict of interest based on previous and current TERA involvement at Midland. This consideration could be resolved if the plan were specific in identifying the role, authority, and responsibility of TERA in this management appraisal, and if this role were to pose no conflict of interest (see also comment #1).

7. The Protocol section identifies the need for CMP and TERA to have access to all information required for the conduct of the appraisal. Has this access been granted by CPCo in writing to ensure that the auditors are not restricted in their conduct of the appraisal?

8. Appendix A includes a list of "likely" members of the appraisal team. CMP and TERA should provide the list of assigned team members with a commitment that they will actually serve on the team. This list is required for NRC review of personnel background, experience, qualifications, and independence requirements.

9. The discussion in the plan on recommendations for improving the Midland project is very brief and does not identify what might be expected as products of this effort. Perhaps better planning to anticipate the results expected from the review would provide a better focus to the overall approach and appraisal plan.

10. We briefly compared the CMP appraisal plan to the appraisal report prepared by Torrey Pines for the Zimmer facility. The Torrey Pines review was very detailed, both in its retrospective and prospective review of the Zimmer management and project controls. Using the Torrey Pines effort as a "benchmark" for a management review that was productive and useful, I believe it is worthwhile to note the following differences:

    a. The CMP plan does not examine the project from birth to the present.

    b. The CMP plan does not identify specific cases or examples to test the CPCo system to see how it operates or responds.

    c. There is no indication that CMP will interview previous employees of CPCo or Bechtel. Again, considering the benefits of a retrospective and a root cause analysis, personnel previously associated with the Midland project may provide the perspective on what went wrong, as well as what worked, that we need to learn in this management appraisal.

    d. The CMP effort consists of approximately 20 man-months of effort compared to 60 man-months of effort at Zimmer.

If you have any questions on the above comments, please contact me, Ted Ankrum (492-4774) or Bill Brach (492-4932).

Richard C. DeYoung, Director
Office of Inspection and Enforcement

cc: J. Lieberman, ELD

Position

① Submittal does not provide sufficient to allow NRC to approve the proposal as submitted.

② Suggest we send letter to CPCo ~~setting up~~ telling them of ① and requesting them to address: ⓐ Teras involvement in the management audit in light of Teras ~~[illegible]~~ performance on the IDC VP (speak to independence); ⓑ ~~[illegible]~~ provide resumes and independence statements of individuals identified to participate in the audit; ⓒ expand the scope to look at managements past handling of problems and address what changes have been made which provide assurance that similar problems won't occur in future; ⓓ Look at past CPCo management audits and review

J Harrison

CONSUMERS POWER COMPANY

PLAN TO CONDUCT AN INDEPENDENT MANAGEMENT APPRAISAL OF THE MIDLAND NUCLEAR PROJECT

March 7, 1984

Cresap, McCormick and Paget

CONSUMERS POWER COMPANY

PLAN TO CONDUCT
AN INDEPENDENT MANAGEMENT APPRAISAL
OF THE MIDLAND NUCLEAR PROJECT

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I - OBJECTIVE AND SCOPE

I - OBJECTIVE AND SCOPE

The overall purpose of this appraisal will be to review and evaluate Consumers Power Company's (CPCo's) management approach to completion of the Midland Nuclear Project. This appraisal will be prospective, focusing on the appropriateness of the management organization, systems, and methods being utilized to ensure successful completion of the Midland Project.

In scope, our appraisal will cover CPCo's management capabilities (as defined by the organization, working methods, and systems for controlling all aspects of the Midland Project that have a bearing on quality and safety of the completed facility) to meet owner and regulatory requirements. The activities and plans of the various contractors involved will be included in this scope. Our primary focus will be on CPCo's project management concepts, organizational structure, staffing, decision-making processes, project planning and control systems, and operational preparedness with respect to the Midland Project. We will assess the techniques for cost and schedule estimating used by CPCo relative to their influence on meeting project objectives, but we will not develop cost and schedule estimates as part of the study scope.

II - APPROACH AND WORK PLAN

II - APPROACH AND WORK PLAN

This appraisal will be conducted in two phases, each consisting of several steps:

Phase A - PRELIMINARY STEPS

Step I Preparation Of The Plan For The Appraisal

Conduct preliminary discussions with CPCo to determine the scope of the appraisal; then prepare the plan for conducting the appraisal, incorporating all documentation necessary for submittal to the NRC

Step II NRC Approval

Submit all documentation to the NRC; modify the plan for the appraisal to reflect any changes in scope mandated by the NRC

Phase B - CONDUCTING THE APPRAISAL

Step I Study Team Orientation

Provide orientation for study team members, and collect preliminary data for Step II

Step II Reconnaissance To Determine Project Status And Identify Issues

Conduct a focused reconnaissance of activities to establish a comprehensive statement of the current status of the Midland Project, and to identify the issues and specific areas of concern facing CPCo through construction completion and commercial operation

Step III Assessment Of CPCo's Management Plan To Complete The Midland Project

In the light of the issues and areas of concern identified in Step II, assess CPCo's project management concepts, organization, staffing, decision-making processes and project planning systems, as well as operating preparedness

Step IV Report Preparation

Prepare and submit a written draft report to CPCo to verify the factual accuracy of its contents (a copy will also be submitted simultaneously to the NRC); after review, incorporate resolution of factual inaccuracies into a final report to be submitted simultaneously to CPCo and the NRC.

Exhibit II-1 explains the major tasks and end products associated with each of the steps delineated above.

Consumers Power Company

WORK PLAN FOR CONDUCTING
AN INDEPENDENT MANAGEMENT APPRAISAL OF THE MIDLAND PROJECT

Step	Major Tasks To Be Completed	Results
	A - Preliminary Steps	
I - Preparation Of The Plan For The Appraisal	• Conduct preliminary discussion with CPCo management	• Understanding of the Project's structure, staffing, and management processes
	• Prepare study plan and related materials	• Work Plan (this document), and additional documents necessary for submittal to the NRC
	• Review study plan with CPCo management	• Agreement on study plan and timetable to complete assignment
II - NRC Approval	• Submit plan for appraisal to the NRC for review and approval	• NRC approval of plan or recommendations for changes in scope
	• Revise appraisal plan based on NRC comments	• Corrected plan of study
	B - Conducting The Appraisal	
I - Project Team Orientation	• Collect preliminary data and information	• Background information for reconnaissance
II - Reconnaissance To Determine Project Status And Identify Issues	• Conduct preliminary interviews with: - CPCo senior management - CPCo project management - Bechtel project engineering and construction management - NRC - Government Accountability Project (GAP) - Others, as necessary	• Understanding of the evolution of the current project management concept and arrangements, as well as current and impending project processes and systems at Midland • Identification of specific project problems and the steps CPCo is taking to overcome them

EXHIBIT III-1
Page 1 of 6

Step	Major Tasks To Be Completed	Results
II - Reconnaisance To Determine Project Status And Identify Issues (Cont'd)	• Interview CPCo project management in the following functional areas: - Engineering - Construction - Quality Assurance/Quality Control - Project Support - Soils - Testing - Nuclear Operations - Licensing	• Preliminary assessment of the prevailing organizational climate and management style at CPCo and Bechtel pertinent to Midland • Thorough understanding of current project status and plan for achieving construction completion and commercial operation
	• Collect additional data and information, as indicated; examples would include: - Management improvement plans - Composite and detailed project schedules - Management reports - Management system descriptions - Relevant CPCo and Bechtel policies and procedures - NRC reports - Monthly progress reports in construction, engineering, testing - Open item status reports - Problem definition reports	• Identification of major project management requirements to complete the Midland Project successfully, focusing on: - Project planning - Licensing documentation preparation, review, and approval - Engineering closeout, including design, review, and approval - Design change control - Engineering and construction schedule development and refinement - Project control information and control systems or techniques - Change order initiation review and approval - Spare parts and material control - Quality assurance and quality control - Engineering/construction interface - Construction/testing interface - Procedures for turnover to operations - Operations/engineering interface - Testing and startup

Step	Major Tasks To Be Completed	Results
III - Assessment Of CPCo's Management Plan To Complete The Midland Project	• Assess project management concepts	• Identification of strengths and opportunities for improvement in: - The roles, responsibilities, and authorities of CPCo and Bechtel in planning, designing, procuring, constructing, and starting up the Midland facility - Definitions of project management responsibility and authority in each remaining phase of the project - Use of management reports and follow-up techniques - Provisions for interface among project management, major contractors, quality assurance/quality control, testing, and operating management - Bases for measuring project management performance.
	• Assess the adequacy of project organization and staffing in: - Engineering - Construction - Qualit Assurance/Quality Control - Project Support - Soils - Testing - Nuclear Operations - Licensing	• Identification of strengths and weaknesses in project organization, staffing, and interface relationships within CPCo and between CPCo and contractors, regulators, and others • Assessment of project team capabilities in terms of qualifications and experience • Specific assessment by organization for each pertinent issue identified in Step II

Step	Major Tasks To Be Completed	Results
III - Assessment Of CPCo's Management Plan To Complete The Midland Project (Cont'd)	• Assess process for monitoring and control of quality and project status	• Assessment of: - Quality assurance and quality control processes, including records management, to ensure compliance with regulatory requirements and to minimize redesign and retrofitting - The appropriateness of reporting on project status at each level of management, including the adequacy of measurements of quality, physical work progress, and other relevant parameters - Design change processing and control, including documentation requirements, approval authorities, review cycles, and audit provisions - Techniques for cost and schedule estimating - Project control systems

Step	Major Tasks To Be Completed	Results
III - Assessment Of CPCo's Management Plan To Complete The Midland Project (Cont'd)	• Assess procedures in place to close out plant engineering and construction, and effect a smooth transition into startup and eventual operation relative to the major issues yet to be faced (as defined in Step II)	• Assessment of: - Coordination and scheduling of critical activities related to design, the FSAR, applications for permits and licenses, and startup - Planned phasing and interface requirements for design, construction, and startup - Integration of plans and schedules for design, procurement, construction, operator training, and startup - Provision for flexibility in adapting the planning and scheduling process to changing conditions - Procedures for addressing each critical issue identified in Step II
	• Review the capability of CPCo to start up the Midland facility and to reach commercial operation	• Assessment of the extent to which operating department input regarding operability and maintenance of the facility has been incorporated in design specifications • Review and evaluation of plans for roles and responsibilities in construction closeout, component and system testing, and transfer of components and systems to operations • Evaluation of CPCo's plans for commercial operation • Evaluation of CPCo's emergency planning • Evaluation of how procedures for plant modification requests from operations are followed

Step	Major Tasks To Be Completed	Results
IV - Report Preparation	• Prepare draft report including: - A description of the methodology for carrying out the study - An assessment of Project status and the requirements, issues, and areas of concern in the remaining program to completion - An assessment of CPCo's management approach and its compatibility with the identified requirements, issues, and concerns - Specific opportunities for improvement identified in CPCo's management plan to complete the Midland Project	• Draft report
	• Present draft report to CPCo and the NRC	• Draft report reviewed by CPCo for errors or omissions of fact
	• Incorporate appropriate additions, modifications and deletions into a final written report; conclusions will be changed only if based upon serious misunderstandings or omissions	• Final written report for CPCo and the NRC

III - STUDY TEAM COMPOSITION

III- STUDY TEAM COMPOSITION

Mr. Leonard R. Wass, a Vice President of Cresap, McCormick and Paget (CMP) and Director of its Energy Services Practice, will lead the appraisal and participate actively in all study tasks and each major area of inquiry. Mr. Wass has directed numerous studies of electric utilities, including many studies of project management reviews. Mr. John Beck, a Senior Vice President of TERA's nuclear engineering organization, will work closely with Mr. Wass to ensure the quality and timeliness of the work. Mr. Anastassios D. Fakonas, a Principal at CMP, will assist Mr. Wass on a day-to-day basis in administering and coordinating the appraisal team's work. Mr. Fakonas has extensive credentials in the nuclear industry and in evaluating engineering and construction projects. The résumés of Messrs. Wass, Beck, and Fakonas are presented in Appendix B.

The appraisal team will be composed of staff members from CMP and TERA who have credentials and experience pertinent to the appraisal. Assignment of specific tasks will be based upon each individual's personal expertise; for instance, an appraisal of the construction function will be preformed by a consultant having particular skills in that area. CMP will have overall responsibility for the project and will supervise TERA. This combination of the two firms will accelerate familiarization with the Midland Project and provide a wide base of experience in all aspects of the review. Because the start date is not yet established, specific assignments cannot be made; however, résumés of all potential team members from both firms are presented in Appendix B.

IV - SCHEDULE

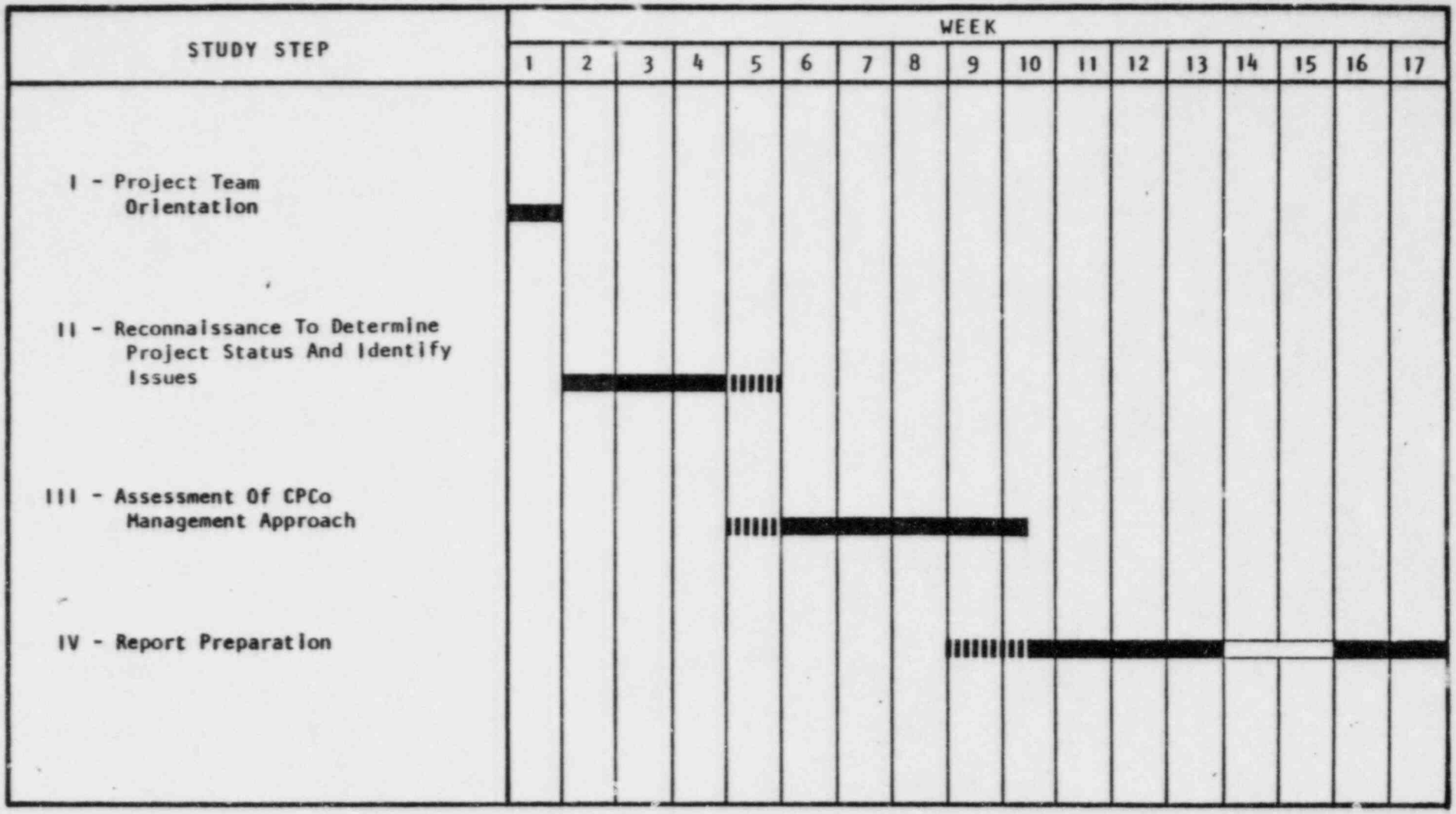
IV - SCHEDULE

Although a definite start date to begin the management appraisal has not yet been established, we are prepared to begin work about three weeks after authorization to proceed is received, but no earlier than May 1, 1984. Once work begins, we expect to take about three months for the planning and familiarization phase, the reconnaissance and analytical review process, and the draft report preparation. Review of comments and production of a final detailed report will take an additional four weeks. A proposed schedule for conducting the appraisal is shown in Exhibit IV-1.

Based on our current understanding of the scope of work, we expect that the appraisal can be completed in approximately 3000 man-hours of effort. The actual effort required may vary depending on the number of management issues that arise during the appraisal and require detailed examination, the timeliness of receipt of information requested, the timeliness of CPCo and NRC report reviews, and other similar factors.

CONSUMERS POWER COMPANY

PROPOSED STUDY SCHEDULE FOR CONDUCTING THE APPRAISAL



LEGEND:

- *Full-Time Activity*
- *Intermittent Activity*
- *CPCo Review For Factual Accuracy*

EXHIBIT IV-1

V - PRELIMINARY INFORMATION AND DATA REQUEST

V - PRELIMINARY INFORMATION AND DATA REQUEST

Exhibit V-1 on the following pages indicates the information and data that will be requested at the appraisal's outset. Modifications to this request, as well as additional information requests, will be made during the course of the appraisal.

Consumers Power Company

PRELIMINARY INFORMATION AND DATA REQUEST

Description

1. Most recent Securities and Exchange Commission Form 10-K and FERC Form 1.

2. Current set of detailed organizational charts for engineering, construction, and project management groups and their authorized staffing levels.

3. Delegations of authority for capital and operating expenditures for project-related personnel.

4. Descriptions of existing productivity or work measurement systems for all types of project-related personnel (including engineers).

5. Copies of all project labor agreements.

6. List of management studies completed relating to the Midland Project.

7. Six copies of the CPCo internal telephone directory and Bechtel's Midland Project telephone directory.

8. Description of capital budget preparation, review, approval and amendment processes.

9. Project accounting system instruction books.

10. Descriptions of manual and automated systems used to schedule and monitor construction activities.

11. Copies of current definitive (baseline) budget estimate (man-hours and cost) and all subsequent reviews and forecasts.

12. Description of processes and copies of relevant procedures for:

    - Design review
    - As-built document control
    - Change management
    - Quantity tracking.

13. CPCo and Bechtel Project Management Manuals, including the hierarchy of their interrelationships.

14. Copies of the current project contracts with:

    - Bechtel
    - Babcock and Wilcox
    - General Electric
    - Zack
    - Other major contractors.

15. Actual and schedule per cent complete for engineering by month for the past four years.

16. Monthly actual and scheduled overall per cent construction completed on the project for the past four years.

17. The most recent updated schedule for project completion, including the methodology and assumptions used to develop it.

18. Recent schedule variance reports together with explanations of reasons for actual and anticipated slippages.

19. Current actual and projected monthly manpower requirements to project completion by major building or work areas, broken down by craft trades and nonmanual.

20. Established procedures or other documentation describing the basis for key project decisions.

21. Minutes from the Midland Project review meetings for the past six months.

22. Copies of NRC evaluations.

23. Procedures governing field modifications.

24. Operating Department management procedures.

25. Copies of recent NRC open item status reports and policies or procedures describing open item or commitment tracking systems.

26. CPCo documents defining critical issues to completion.

27. Schedules for closeout in the following areas:

    - Engineering
    - Construction
    - Testing.

28. Procedures to correct problems found during testing.

29. Copies of recent major quality action reports, such as:

    - Management Corrective Action Reports (MCARS)

    - Safety Concern and Reportability Evaluations (SCRE's).

30. Description of project QA/QC programs and copies of established policies and procedures related to these programs.

31. Description of CPCo's management approach, including the Construction Completion Program.

VI - TENTATIVE INTERVIEW LIST

VI - TENTATIVE INTERVIEW LIST

Confidential personal interviews will be a primary method of fact-finding during the appraisal. The titles of selected individuals likely to be interviewed by CMP and TERA consultants are presented in Exhibit VI-1. This list is divided into the following groups and includes individuals from CPCo, Bechtel, and other contractors:

- Senior management
- Nuclear operations
- Testing
- Quality assurance
- Construction
- Engineering
- Licensing
- Soils
- Project support.

Also appearing on the list are titles of individuals associated with the Government Accountability Project (GAP) and the Nuclear Regulatory Commission who will be invited to be interviewed in the course of the study. Other persons, both directly and indirectly involved with the Midland Project, may be added to the interview list or the list may be modified during the course of the appraisal, as appropriate.

Consumers Power Company

TENTATIVE INTERVIEW LIST

Senior Management

Chairman of the Board, President, and Chief Executive Officer
Executive Vice President, Projects, Engineering and Construction
Executive Vice President, Energy Supply
Vice President, Nuclear Operations
Executive Director, Corporate Planning
Vice President - Projects, Engineering and Construction
Vice President and General Manager, Ann Arbor Division (Bechtel)
Vice President and Deputy General Manager,
Ann Arbor Division (Bechtel)
Project Manager (Bechtel)

Testing

Site Manager
Testing Superintendent
Primary Mechanical Section Head
Secondary Mechanical Section Head
Electrical/I&C/Computer Section Head
Testing Support Section Head

Quality Assurance

Executive Manager
Plant Assurance Division General Superintendent
Quality Control Division Superintendent
Design Assurance Division Manager
Quality Services Division Head
Audit Branch Head
HVAC Assurance Branch Assistant Superintendent
Plant Assurance Engineering Branch Assistant Superintendent
Plant Assurance Programs Branch Assistant Superintendent
Mechanical Quality Control Branch Head
Training Branch Head
Assistant Project Manager - Quality Activities (Bechtel)
Project Quality Assurance Engineer (Bechtel)
Assistant to the Project Manager - Quality Activities (Bechtel)

Construction

Site Manager
Construction Superintendent
Assistant Construction Superintendent
Site Manager (Bechtel)
Assistant Project Manager - Site Activities (Bechtel)
Field Construction Manager (Bechtel)
Site Engineering Manager (Bechtel)
Project Superintendent Services (Bechtel)
Site Quality Supervisor (Bechtel)
Assistant Field Construction Manager (Bechtel)
Data Base Administrator (Bechtel)
Field Contracts Administration (Bechtel)
Project Superintendent (Bechtel)
Field Project Engineer (Bechtel)

Engineering

Executive Manager Engineering and Licensing
Engineering Manager General Office
PE&C Transition Executive Engineer
Engineering Site Manager
Project Engineering Manager (Bechtel)
Assistant Project Engineer Technical Design/Production (Bechtel)
Assistant Project Engineer Technical (Bechtel)
Assistant Project Engineer Technical (Bechtel)
Engineering Coordinator Planning and Control (Bechtel)
Assistant Project Engineer Technical Field Support (Bechtel)
Resident Project Engineer (Bechtel)

Licensing

Midland Project Licensing Manager

Soils

Executive Manager - Soils and Administration
Assistant Project Manager - Soils
Construction Section Head, Soils
Design Production Section Head Civil
MPQAD Remedial Soils Division Superintendent
MPQAD Remedial Soils Division Assistant Superintendent
Underpinnings Contracts Manager
Assistant Project Manager - Soils (Bechtel)
Project Superintendent - FSO (Bechtel)
Project Engineer - Soils (Bechtel)
Assistant Resident Project Engineer - Soils (Bechtel)
Soils Quality Assistant (Bechtel)

Project Support

Administrative Manager
Cost/Schedule Manager
Cost/Schedule Manager (Bechtel)
Assistant Project Manager - Services (Bechtel)
Project Administrator (Bechtel)
Project Procurement Manager (Bechtel)

Nuclear Operations

Plant General Manager
Executive Director - Nuclear Activities
Executive Director - Nuclear Plant Administration
Human Resources Director
Technical Superintendent
Controller, Planning and Administration
Operations and Maintenance Superintendent
Planning and Scheduling Administrator
Administrative Superintendent
General Accounting Superintendent
Operations Superintendent
Maintenance Superintendent
CHP Superintendent
Midland Plant Quality Assurance Superintendent

External Organizations

Administrator - NRC Region III
Midland Section Head, Office of Special Cases - NRC Region III
Midland Project Manager - NRR
Senior Resident Inspector - NRC Region III
Director, Division of Licensing - NRR
Assistant Director for Licensing - NRR
Chief, Licensing Branch 4 - NRR
Director, Office of Special Cases - NRC Region III
Representatives from GAP

VII - REPRESENTATIVE ISSUES AND QUESTIONS TO BE ADDRESSED IN INTERVIEWS

VII - REPRESENTATIVE ISSUES AND QUESTIONS TO BE ADDRESSED IN INTERVIEWS

The following pages of this section contain representative questions that will be addressed during the fact-finding phase of this appraisal. This list is included to demonstrate the types of questions that would be addressed in each area, but is not intended to contain all the issues.

Project Management

- Do reporting relationships provide the project manager with organizational visibility and direct access to owner management?
  - Is the project manager appropriately supported by interdisciplinary teams of fully committed personnel?
  - Are the responsibilities of each section of the team clearly defined and documented, and how are section and team staff sizes determined and controlled during the life of a project?
- What flexibility is delegated to the project manager to cut across CPCos' functional lines of organization to supplement his team with general resources when required?
- What structural arrangements have been used to provide for close coordination among CPCo project management team, Bechtel and others?
  - To what extent is the project manager able to tailor these arrangements?
- What project planning and control systems are being used, and have they proved to be effective in warning of likely delays?
  - Are existing systems used to the full extent possible?

Quality Assurance

- Are the processes for managing the QA programs adequate to effectively implement the programs?

- Are the methods employed to monitor program implementation effective?

- Is there sufficient independence from and direct influence upon other project functional areas?

Licensing

- How effective is the licensing documentation preparation, review, and approval process?

- Are controls accurate for promulgating and monitoring licensing commitments?

- Do sufficient controls exist for integrating licensing milestones with project planning and scheduling activities?

- How effective are the licensing interfaces with internal and external organizations?

Project Operations And Support

- Are cost control and scheduling systems adequately integrated to ensure accurate performance measurement for the project?

  - Are the current means of cost tracking, reporting, and control adequate?

  - Are productivity (unit rate) estimates reasonably developed and accurately reflected in the budget estimates?

  - Are the engineering, construction, and startup schedules adequately integrated?

  - What capabilities exist for projecting costs at completion?

- To what extent are management information systems in place that enable the project manager to monitor, on a timely basis, the status of:

  - Engineering and design completion?

  - Installed quantities and work rates?

  - Quality control inspections and approvals?

  - Material procurement?

  - Expenditure by contract and category?

Engineering

- What systems are in place to control design inputs, outputs, and changes?
- How effectively does engineering interface with construction, testing, and operations?
- Are the controls adequate to detect design deficiencies and to correct them?
- What controls exist to ensure that engineering and design changes are incorporated into as-built drawings?
- How are change orders approved and administered? How are they linked to procurement needs?
- How has CPCo planned to close out the project as it nears completion?
  - Have freezes for design and engineering work been timely and effective?
  - Has appropriate use been made of field engineering?

Construction

- What techniques are used by CPCo to limit work scope changes, tearouts, and reworks, and to evaluate the quality and consistency of architect-engineer/constructor and other work forces committed to the project?
- How does Construction resolve problems associated with engineering designs that appear to be incompatible with plant construction?
- How effectively do scheduling activities prevent delays due to excessive work loading in specific plant areas?
- How does Construction handle design modifications in areas where construction is completed or is currently under way?
  - How does Construction ensure that it is building in accordance with the latest engineering drawings?
- Are there procedures in place that assure that approval from the NRC is obtained, where required, prior to performance of activities related to the construction completion program?
- What procedures and controls exist for material receipt inspections and temporary storage prior to installation to ensure that quality related products have not been degraded?

f r managing the QA programs in the soils
ectively implement the program?

lu es in place which ensure that prior
om the NRC is obtained, where required,
tivities?

d les been prepared to detail engineering
ivities related to soils?

e been integrated into the overall
re any impacts on the critical path of

l for soils activities handled in accor-
l document control of the project?

s exist for establishing test accep-

nd controls are in place for detection
s hat deviate from acceptance criteria
th deficiencies?

d over from Construction for testing?

r process include an open items list?

chedule been established for execution
sy tem, and multisystem tests through

r s exist to control testing activities
or construction problems arise during

r s exist to assure that untested com-
pen item list once a given system has

ial Operations

n design of management systems to
eration and maintenance adequate?

r exist to allow operations to input
d ications requests into the engi-
ycle?

- Do procedures ensure that industry lessons learned are evaluated and, where appropriate, incorporated in future plant modifications, or operating procedures?

VIII - ASSURANCES OF INDEPENDENCE AND DESCRIPTION OF PROTOCOL

VIII - ASSURANCES OF INDEPENDENCE AND DESCRIPTION OF PROTOCOL

This chapter is composed of sworn statements by Leonard R. Wass for CMP and John W. Beck for TERA assuring that both firms are free from conflicts of interest in conducting the independent management appraisal of the Midland Project. Affidavits of all individual consultants who will be working on the appraisal will be kept on file.

A statement of the protocol governing communications between CPCo and the appraisal team is also included in this chapter.

In accordance with CMP's policy on retention of documents, all working papers relating to this management appraisal, written interview notes and drafts of the final report, will be kept for a period of ninety (90) days following submission of the final report to CPCo and the NRC. At the end of ninety days all working papers will be disposed of unless other instructions from CPCo have been given to CMP in advance.

STATEMENT OF CORPORATE INDEPENDENCE

Affidavit Of Leonard R. Wass
On Behalf Of Cresap, McCormick And Paget

My name is Leonard R. Wass. I am a Vice President of Cresap, McCormick and Paget (CMP), a Division of Towers, Perrin, Forster & Crosby, Inc. (TPF&C). This statement is made on behalf of CMP and its parent firm, TPF&C.

I am in charge of Cresap, McCormick and Paget's project to conduct an independent management appraisal of the Midland Nuclear Project.

The criteria for corporate independence and individual independence of personnel assigned to work on the management appraisal are set forth in a letter from Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission (NRC), to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, U.S. House of Representatives, dated February 1, 1982.

Cresap, McCormick and Paget has determined that it and individual members of the management appraisal team satisfy the referenced independence requirements and, in particular, the following criteria:

1. CMP and individuals assigned to the Midland Nuclear Project independent management appraisal do not have any direct previous involvement with the Midland activities that they will be reviewing. TPF&C did conduct a compensation analysis of finance positions in Consumers Power Company in 1983. Fees totalled $5,700.

2. CMP and individuals assigned to the Midland appraisal have not been previously hired by Consumers Power Company Bechtel, or Babcock and Wilcox to perform management, design, construction, or quality work relative to the Midland activities that they will be reviewing.

3. CMP and individuals assigned to the Midland appraisal have not been previously employed by Consumers Power Company.

4. The individuals assigned to work on the Midland appraisal do not have present household members employed by Consumers Power Company.

5. The individuals assigned to work on the Midland appraisal do not have any relatives employed by Consumers Power Company.

6. CMP and individuals assigned to work on the Midland appraisal do not own or control significant amounts of Consumer Power Company stock.

CMP has obtained affidavits for each individual currently assigned to the Midland appraisal team. In the event that additional personnel are assigned to the team, CMP will obtain affidavits from these individuals as well.

Signed

Sworn and Subscribed Before Me This 29th Day of February 1984

Notary Public

NOTARY PUBLIC STATE OF ILLINOIS
MY COMMISSION EXP. NOV 4, 1987
ISSUED THRU ILL. NOTARY ASSOC.

My Commission Expires

STATEMENT OF CORPORATE INDEPENDENCE

AFFIDAVIT OF JOHN W. BECK
ON BEHALF OF TERA CORPORATION
AND ITS SUBSIDIARIES

My name is John W. Beck. I am a Vice President of TERA Corporation. This statement is made on behalf of TERA Corporation and its subsidiaries.

I am currently serving in the capacity of Principal-in-Charge of the TERA team which, with Cresap, McCormick and Paget, has been selected to conduct an independent management appraisal of the Midland nuclear project for Consumer's Power Company.

The criteria for corporate independence and individual independence of personnel assigned to work on the management appraisal program are set forth in a letter from Nunzio J. Palladino, Chairman, U.S. Nuclear Regulatory Commission (NRC), to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, U.S. House of Representatives, dated February 1, 1982.

TERA Corporation has determined that the Corporation and individual members of the management appraisal team satisfy the referenced independence requirements and, in particular, the following criteria:

1. TERA Corporation and individuals assigned to the Midland Project Independent Management Appraisal Program (IMAP) do not have any direct previous involvement with the Midland activities that they will be reviewing. Several individuals have been involved with the Midland Independent Design and Construction Verification Program (IDCVP) reviewing activities outside the scope of the IMAP.

2. TERA Corporation and individuals assigned to the Midland IMAP have not been previously hired by Consumers Power Company, Bechtel, or Babcock and Wilcox to perform management, design, construction or quality work relative to the Midland activities that they will be reviewing.

3. TERA Corporation and individuals assigned to the Midland IMAP have not been previously employed by Consumers Power Company.

4. The individuals assigned to work on the Midland IMAP do not have present household members employed by Consumers Power Company.

5. The individuals assigned to work on the Midland IMAP do not have any relatives employed by Consumers Power Company.

6. TERA Corporation and individuals assigned to work on the Midland IMAP do not own or control significant amounts of Consumers Power Company stock.

TERA Corporation has obtained affidavits for each individual currently assigned to the Midland IMAP team. In the event that additional personnel are assigned to the team, TERA Corporation will obtain affidavits from these individuals as well.

Signed

John W Buck

Sworn and Subscribed Before Me This 22nd Day of February 1984

Linda Lee Cobb
Notary Public

My Commission Expires My Commission Expires July 1, 1986

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF _____

I, _____, am employed by Cresap, McCormick and Paget, a Division of Towers, Perrin, Forster & Crosby, Inc. I am currently assigned to the team which is conducting an independent management appraisal of the Midland Nuclear Project. I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual funds or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives who are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

_____

Sworn and Subscribed Before Me This _____ Day of February 1984

_____
Notary Public

My Commission Expires _____

SAMPLE

STATEMENT OF INDEPENDENCE

AFFIDAVIT OF _____

My name is _____. I am employed by TERA Corporation.

I am currently assigned to the team which is conducting an independent management review of the Midland nuclear project. Prior to being given this assignment, I have been involved with the Midland Independent Design and Construction Verification Program (IDCV) reviewing activities outside the scope of the Independent Management Review Program (IMRP). With the exception of the IDCVP, I have never worked on any job or task associated with the Midland Project, or any job or task for or on behalf of Consumers Power Company, Bechtel, or the Babcock and Wilcox Company relating to issues that I am reviewing. I have never been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox Company. I do not own any shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock. Mutual fund or other funds in which I may have a beneficial interest, but over which I have no control, may own shares of Consumers Power Company, Bechtel, or Babcock and Wilcox stock, of which I am unaware. A list of such funds in which I have an interest are attached. I have no relatives which are or have been employed by Consumers Power Company, Bechtel, or Babcock and Wilcox.

Signed

_____

Sworn and Subscribed Before Me This ____ Day of February 1984

_____
Notary Public

My Commission Expires _____

SAMPLE

PROTOCOL GOVERNING COMMUNICATIONS BETWEEN
CONSUMERS POWER COMPANY AND CRESAP, McCORMICK AND PAGET,
THE ORGANIZATION CONDUCTING THE INDEPENDENT MANAGEMENT APPRAISAL

1. Cresap, McCormick and Paget (CMP) has a clear need for prompt access to all information required for the conduct of the independent management appraisal. To this end, CMP may request documentary material, meet with and interview individuals, conduct telephone conversations, or visit the site to obtain information without prior notification to the Nuclear Regulatory Commission (NRC). All communications and transmittals of information shall, however, be documented and such documentation shall be maintained in a location accessible for NRC examination.

2. Recommendations and findings presented in draft report form by CMP to Consumers Power Company (CPCo) will be submitted to the Regional Administrator of NRC at the same time as they are submitted to CPCo. For purposes of this protocol, CMP also includes TERA Corporation, and CPCo also includes contractors working on-site, such as Babcock and Wilcox, Bechtel, Management Analysis Corporation, S&W, and all of their subcontractors.

3. If CMP and CPCo agree to meet on substantive matters related to reviewing CMP's findings or conclusions in advance of completing its report, CPCo shall provide a minimum of five days advance notice to the Regional Administrator of any such meeting. Transcripts or written minutes of all such meetings shall be prepared by the organization requesting the meeting and provided to the NRC by CPCo in a timely manner. Any portion of such meetings that deals with proprietary information will be so indicated in the transcript and will be exempt from mandatory public disclosure.

4. All meetings described in item 3 (above) will be open to public observation, except where the NRC staff determines that it is appropriate to conduct a meeting(s) in private with CPCo and/or CMP. The inability of any person to attend shall not be cause for delay or postponement of any meeting. Any portion of such meeting that deals with proprietary information will be closed to the public.

5. All documents submitted to, or transmitted by, the NRC subject to this Protocol, unless exempt from mandatory public disclosure, may be placed by the NRC in the NRC Public Document Rooms in Midland, Michigan, and Washington, D.C., for public examination and copying.

APPENDIXES

APPENDIX A

RESUMES OF PROPOSED STUDY TEAM MEMBERS

RESUMES OF PROPOSED STUDY TEAM MEMBERS

The study team composition was briefly addressed in Section III of this plan. Specific project assignments have not been made, but resumes of Cresap, McCormick and Paget (CMP) and TERA Corporation consultants who are likely to be assigned to the proposed study are presented below.

CRESAP, McCORMICK AND PAGET

Leonard R. Wass

Mr. Wass, a Vice President, has extensive experience in electric utility engineering, operations, and major project management, as well as in organizational planning, marketing, market research, and corporate strategy. He is currently officer-in-charge of our worldwide electric utility consulting practice. He has appraised a broad spectrum of functions and operations in numerous electric utilities, including Northeast Utilities, Salt River Project, Tennessee Valley Authority, Toledo Edison Company, Platte River Power Authority, Philadelphia Electric Company, Rochester Gas and Electric Corporation, Kansas Gas and Electric Company, Kansas City Power & Light Co., State Electricity Commission of Victoria (Australia), Public Service Company of Colorado, Georgia Power Company, Alabama Power Company, Electricity Trust of South Australia (ETSA), Public Service Company of New Hampshire, Houston Lighting and Power Company, Pacific Gas and Electric Company, Los Angeles Department of Water and Power, and Carolina Power & Light Company.

In addition to his electric utility consulting experience, Mr. Wass has extensive consulting experience in market strategy and research for both industrial and consumer product/service clients. Before devoting most of his time to electric utility clients, he served as CMP's Regional Director of Marketing Services in Chicago for five years. In this capacity he led and conducted numerous industry surveys, facilities location studies, consumer research studies, market surveys, and market/product strategy studies.

Before joining CMP in 1973, Mr. Wass directed all marketing functions for an industrial products manufacturer of electrical and electronic components. His responsibilities encompassed all product development, product introduction, market research, advertising, and marketing for multiproduct lines marketed in 90 countries. Before that, he served five years as an officer in the U.S. Naval Submarine Force and received several decorations for his service in the Pacific during the Vietnam War.

Mr. Wass is an active member of the American Nuclear Society, the American Marketing Association, and the Project Management Institute. He is a graduate of the U.S. Naval Academy, and holds an M.B.A. degree from the University of Chicago. He is currently a Commander in the U.S. Naval Reserve and was licensed by the Navy as an operating engineer on S1C and S5W naval nuclear reactors. He also serves on the Board of Directors of Chartmasters Inc. and on the Board of Advisers of the Sisters of St. Joseph.

Jeffrey A. Schmidt

Mr. Schmidt, a Vice President, has had extensive consulting experience in engineering and general construction management and in major capital project management.

He recently directed our review of management and operations at Carolina Power & Light Company. In this role, he addressed electric system planning and operations, engineering and construction, fuels management, and major projects management. The study emphasized the company's approach to the construction of Mayo 1, a 720-MW coal-fired unit, and Harris 1 and 2, two 90-MW nuclear generating plants. Mr. Schmidt also led two assignments at the State Electricity Commission of Victoria (Australia). The first evaluated the overall organization of the commission, which has more than 22,000 employees, in light of expected growth, future activity, and improvements needed in current organizational arrangements. The second assignment resulted in a recommended management development program to ensure the availability of suitable future candidates for senior management succession.

Mr. Schmidt directed our independent evaluation of the schedule and cost of the Limerick Nuclear Generating Station, which resulted in a schedule forecast and an independent projection of the total cost under various alternative scenarios. Mr. Schmidt was also the project manager for our recent operational and financial audit of the Wolf Creek Nuclear Generating Station, which included a thorough review of the project's cost and schedule history, an evaluation of the project's financial outlook, and an analysis of the effectiveness of project management organization, planning, and control.

Mr. Schmidt served as a team leader on CMP's comprehensive management audit of Pacific Gas and Electric Company (PGandE). His responsibilities in this audit encompassed the engineering, general construction, quality assurance, and materials functions. In addition, he was responsible for the review and evaluation of all aspects of major projects management at PGandE, including design, construction, testing, and startup activities. He also held a leadership role in our management audits of Rochester Gas and Electric Corporation, Public Service Company of Colorado, Ohio Edison Company, and Arizona Public Service Company. These studies included reviews of major project management activities for the construction of both fossil and nuclear generating facilities.

For General Petroleum and Mineral Organization of Saudi Arabia (Petromin), Mr. Schmidt studied the construction management organization and management processes for a $2 billion oil refinery expansion project. This assignment included an in-depth review of management systems and techniques, including the application of automated methods for monitoring project schedules and costs.

Other clients Mr. Schmidt has served include Standard Oil Co. (Indiana), Caltex Petroleum Corporation, the State of California, the Hydro-Transmission Division of Sundstrand Corporation, the Atchison, Topeka and Santa Fe Railway Company, Kimberly-Clark Corporation, Grupo Industrial Saltillo (Mexico), the Advanced Technology Group of Sundstrand Corporation, Georgia Power Company, Grupo Industrial Alfa (Mexico), and the Platte River Power Authority.

Mr. Schmidt graduated with distinction in engineering from the U.S. Military Academy and holds an M.B.A. degree from Harvard University. He is a member of the American Institute of Industrial Engineers and has served on the Finance Committee of the Engineers Joint Council.

Anastassios D. Fakonas

Anastassios D. Fakonas, a Principal, has performed numerous assignments related to the utility industry. He has critically reviewed all areas of electric operations, including system planning, engineering, construction, system and plant operations, and fuel management. His experience encompasses both nuclear and fossil fuel power plants of all types.

Mr. Fakonas is currently involved in three confidential studies for utility clients to evaluate the management of nuclear projects. He is also participating in an organizational review of the Houston Lighting and Power Company. Recently he managed our review of the planning, engineering, construction, and operation of the bulk power supply function of the Allegheny Power System. Before that, he was CMP's project manager for an in-depth review of the engineering, construction, and major project management activities at Carolina Power & Light Company.

In 1981, Mr. Fakonas was involved in an extended assignment to reorganize the 2,000-person engineering and construction group of the State Electricity Commission of Victoria (Australia). After participating in the development of the new organizational structure, Mr. Fakonas remained at the SECV to manage the detailed implementation of our recommendations to improve the organizational arrangements, management processes, and systems related to construction of ten coal-fired generating units. He also led a review of the progress made in implementing the reorganization.

Other utilities Mr. Fakonas has worked with are Arizona Public Service Company, Ohio Edison Company, Philadelphia Electric Company, Kansas Gas and Electric Company, and South Carolina Electric & Gas Company.

Mr. Fakonas was previously involved in an operational audit of the engineering and construction activities of a large industrial concern in Brazil. This audit provided a management evaluation of in-house, heavy construction capabilities, including construction of residential, commercial, and industrial facilities. He has also participated in an organizational and compensation study for The General Petroleum and Mineral Organization of Saudi Arabia (Petromin) and in a similar study for a high-technology electronics firm here in the United States.

Mr. Fakonas formerly served as a Licensing Project Engineer in the Nuclear Safeguards and Licensing Division of Sargent & Lundy, where he directed the licensing effort for nuclear generating stations being constructed by utility clients. He holds a B.A. degree (cum laude) in physics from the University of California at Irvine, an M.S. degree in nuclear engineering from the University of Illinois at Urbana, and an M.B.A. degree (with honors) from the University of Chicago.

Bruce R. Pittenger

Mr. Pittenger, a Vice President, has an extensive background in conducting major management improvement studies for utilities and other clients.

In recent years, he has undertaken project leadership roles in a number of the large, mandated management audits conducted by CMP. For example, Mr. Pittenger led our review of customer service, distribution practices, and human resource management functions in our study of the Public Service Company of Colorado. At Ohio Edison Company, he was responsible for the foregoing areas as well as procurement and materials management, information systems, and finance and accounting. In our study of Carolina Power & Light Company, he has primary responsibility for directing our efforts in customer service, distribution, finance and accounting, public relations and communications, materials management, information systems, and human resource management. Mr. Pittenger also managed or contributed significantly to our major assignments with Arizona Public Service Company, Brooklyn Union Gas Company, Rochester Gas and Electric Corporation, Philadelphia Electric Company, Pacific Gas and Electric Company, Alabama Power Company, West Penn Power Company, and the Los Angeles Department of Water and Power.

Mr. Pittenger also led our study of human resource management practices at Con Edison and directed our current studies of business planning, marketing, and load management at Orange and

Rockland Utilities, Inc. (ORU). Moreover, for ORU, he has provided counsel to an internal task force reviewing corporate strategic and business planning functions. Mr. Pittenger has also studied power plant operations and employee communication activities for the Georgia Power Company.

Other clients served by Mr. Pittenger include Amoco Minerals and Cyprus Coal Companies, Northwest Industries, Brown and Williamson Industries, the Department of the Navy, and the Environmental Protection Agency.

Mr. Pittenger holds a B.A. degree in economics from Pomona College and an M.B.A. degree from the Wharton School of the University of Pennsylvania.

Alden R. Taylor

Mr. Taylor, a Principal, provides counsel to clients regarding financial management and accounting organization, policies, and practices.

Within the past year, Mr. Taylor has played a major role in our management audits of the Rochester Gas and Electric Corporation, Ohio Edison Company, Arizona Public Service Company, Carolina Power & Light Company, and West Penn Power Company. At West Penn, Mr. Taylor is serving as project manager with responsibility for leading our review of finance and accounting, other corporate-level activities, and division operations.

Before joining CMP, Mr. Taylor held a position in the financial management function of the Philadelphia Electric Company and served in a series of increasingly responsible positions with Arthur Young & Co., where he was an audit manager and directed the development of professional education programs.

Mr. Taylor holds a B.S. degree and an M.S. degree in industrial administration from Carnegie-Mellon University and has participated in the Professional Accounting Program at Northwestern University's Graduate School of Management. He is a Certified Public Accountant and a member of the American Institute of Certified Public Accountants.

William E. Ehrensperger

Mr. Ehrensperger, a special adviser to CMP, is a retired utility executive who now acts as a consultant to various electric utility industry clients. He is also active in several professional associations and is a trustee of Newberry College in South Carolina.

Mr. Ehrensperger retired from the Georgia Power Company as Senior Vice President - Power Supply and a member of the Board of Directors. As Senior Vice President, he was responsible for all

matters pertaining to design, construction, operation, maintenance, and fuel procurement for the company's generating plants. Other positions he held during his 40 years with Georgia Power include Chief Civil Engineer, Manager of Construction, and Vice President of Engineering and Construction.

During his career with Georgia Power, Mr. Ehrensperger was extensively involved with the design and construction of new generating facilities. This experience included the licensing and construction of the company's first nuclear facility, Plant Hatch, where he was the on-site project manager responsible for the construction close out and startup of the first unit. Mr. Ehrensperger implemented Georgia Power's formal project management structure as well as supporting management and control systems for nuclear plant construction.

Mr. Ehrensperger also participated in the initial decision to build the Vogtle Nuclear Station, and was Project Executive responsible for the engineering, licensing, and construction of this plant until shortly before his retirement. In addition, he participated, in various capacities, in the design and construction of some 18 coal-fired and 6 hydro-electric generating units.

Mr. Ehrensperger held primary responsibility for construction labor relations at Georgia Power for approximately 15 years.

Mr. Ehrensperger holds a B.S. degree in mechanical engineering from the Georgia Institute of Technology and has completed the Advanced Management Program at Emory University Graduate School of Business Administration. He is a registered professional engineer, a fellow of the American Society of Civil Engineers, and, before his retirement, a member of the construction committees of the Edison Electric Institute and the Business Roundtable. Mr. Ehrensperger is currently an honorary member of the Georgia Power Board of Directors.

Patrick A. Nevins

Patrick A. Nevins is an independent consultant on long-term, full-time contract with CMP. He is a Registered Professional Engineer in the States of Illinois and Ohio. Mr. Nevins is also an attorney and member of the Illinois Bar. He has 15 years of experience in a variety of positions relating directly to the nuclear power industry. This experience encompasses engineering management of large nuclear and fossil projects. In addition, he has extensive experience in dealing with the Nuclear Reactor Regulations Branch of the Nuclear Regulatory Commission (NRC) and the Advisory Committee on Reactor Safeguards.

Before establishing his relationship with CMP, he was a Senior Director with NUTECH Engineers for over one year. In that capacity he oversaw the quality and timeliness of technical nuclear consulting projects that drew upon his electric utility, architect-engineer, and construction experience.

Mr. Nevins also worked for Cleveland Electric Illuminating Company from 1981 to 1983 as Senior Project Engineer for the Perry Nuclear Power Plant. In this position he was in charge of the Plant Design Unit which consisted of multidisciplined engineers whose efforts represented CEI's nuclear safety-related engineering capability. Unit responsibilities included plant modification engineering, total safety systems responsibility, probabilistic risk assessment, and engineering support of licensing activities. Performance of this unit resulted in timely issuance of the NRC Safety Evaluation Report and ACRS approval for a 100 per cent power license.

From 1969 to 1981, Mr. Nevins worked for Sargent and Lundy Engineers in a variety of nuclear-related positions. As Senior Electrical Project Engineer, he directed all electrical activities related to the design of a nuclear power plant. He established a method for tracking design man-hours, which led to significant improvement in man-hour/manpower estimates required for various design tasks and served as the prime interface between construction and engineering activities. In addition, he directed electrical procurement (specification preparation, bid review, contract award) for $100 million of material, equipment, and labor contracts. Mr. Nevins was also responsible for the electrical interface between the NRC and Sargent and Lundy for this particular nuclear power project. Finally, he occasionally provided legal opinion on various engineering-related matters.

Mr. Nevins holds a BSEE degree from the Illinois Institute of Technology and a Juris Doctor degree (cum laude) from DePaul University. His professional affiliations and memberships include Institute of Electrical and Electronic Engineers (Member of the Power Generation Committee and Chairman of the Nuclear Power Subcommittee), the American Bar Association, and the Illinois State Bar Association.

Gary D. Skala

Gary D. Skala, a Managing Consultant, has ten years of management consulting experience, primarily in the utility industry. He has managed and performed broad management and operational studies as well as engagements that focused on specific functions.

He has conducted numerous assignments that called for assessing the organization and management of electric production, transmission and distribution, engineering, marketing, and customer service organizations; refineries and petrochemical plants; paper mills; and city government units.

Mr. Skala served as a lead consultant in our recent studies of the organizational structure, management succession planning, and human resource development functions of the State Electricity Commission of Victoria (Australia). He was also a project manager during our study of Carolina Power & Light Company; his team was responsible for assessing the company's power plant startup, modification, operations, and maintenance activities. He also assessed work force management systems throughout the company.

During our focused management study of Arizona Public Service Company, Mr. Skala assessed the company's productivity measurement and work force management activities. He assessed similar functions during our study of Ohio Edison Company in 1982. He performed a project management role in our study of South Carolina Electric & Gas Company, where his areas of responsibility encompassed engineering, construction, and operations and maintenance of electric generation, substation, transmission, and distribution facilities. Explicit subjects of analysis in each of these areas included organization and manpower planning and control. He recently served as the project manager of our organizational and productivity study of the Potomac Electric Power Company.

Other utility clients he has served include the Allegheny Power System, Arkansas-Louisiana Gas Company, Citizens Electric Company, Connecticut Natural Gas Corporation, Florida Power & Light Company, Georgia Power Company, Kansas City Power & Light Company, Los Angeles Department of Water & Power, Luzerne Electric Division of UGI Corporation, Philadelphia Gas Works, Portland General Electric Company, Seattle City Light, Washington Gas Light Company, Wellsboro Electric Company, and West Penn Power Company.

Mr. Skala earned a B.S. degree in management engineering from Rensselaer Polytechnic Institute and completed the course requirements for an M.A. degree in psychology at Hofstra University. He is a former chairman of the midwest chapter of the Utility Division of the Institute of Industrial Engineers (IIE) and has made presentations on a variety of topics to the IIE, Edison Electric Institute, and the Association of Rural Electric Cooperatives.

David Grender-Jones

David Grender-Jones, a Managing Consultant, is a member of CMP's London office. He is experienced in project management, organizational planning, and human resource management.

Before he joined CMP, he was a Commander in the submarine service of the Royal Navy, specializing in strategic weapon system development, operation, and support. During his naval career, he gained considerable experience in the management of large, complex and successful projects both in the U.K. and the U.S.A.

He has been involved in major studies in the United Kingdom, Latin America, the Middle East, and West Germany in the areas of

organizational and management systems development, human resource planning, job evaluation, and salary administration. He has worked with major multinational companies in evaluating organizational effectiveness, and in developing and implementing significant cost-reduction programs. He is currently involved in a confidential assignment evaluating the prudence of nuclear power plant construction.

Mr. Grender-Jones was educated at the Royal Naval Colleges, Dartmouth and Greenwich, and graduated in electrical engineering.

Garrett L. Dietz

Garrett L. Dietz, a Managing Consultant, specializes in the areas of project and general construction management, management systems, and utility operations. He is currently managing our project team responsible for the audit of Melbourne airport operations for Qantas Airways Limited (Australia). He has previously worked on our management audits of the West Penn Power Company and the Carolina Power & Light Company. As a key member of the CMP teams on both these studies, his responsibilities included reviewing power plant operations and maintenance as well as fossil fuels management. In addition, he investigated the effectiveness of the outage management organizations, and their use of planning and scheduling techniques.

Mr. Dietz was also recently involved in our review of the organizational effectiveness of the Development Group of the State Electricity Commission of Victoria (Australia). He has worked on a complex organization and development study for Burns and Roe, Inc., a large international architect-engineering firm. This study involved a review of the firm's project management and control operations supporting the design, construction, and startup of both nuclear and fossil fuel power plants.

Before joining CMP, Mr. Dietz worked for four years with the North Central Division of the U.S. Army Corps of Engineers. Serving as an internal consultant, he was responsible for the development and implementation of an automated project scheduling and control system. As a project manager for the same organization, his work included engineering management responsibilities for numerous design and construction projects throughout the Midwest.

Mr. Dietz graduated with distinction from the U.S. Military Academy, holds an M.S. degree in civil engineering (project management) from the Massachusetts Institute of Technology, and an M.B.A. degree from the University of Chicago. He is also a Registered Professional Engineer.

Robert C. Lesuer

Robert C. Lesuer, a Senior Consultant, specializes in service to utility/energy enterprises. He has helped clients evaluate materials management practices, the organization of customer service and engineering departments, and the effectiveness of engineering and operations departments.

He served as project coordinator for our recent management audit of Arizona Public Service Company (for the Arizona Corporation Commission) and also analyzed company performance in the areas of customer service, materials management, and transportation. For Pacific Power & Light Company, he participated in an organizational study involving the engineering and construction departments. Currently, he is evaluating the engineering and operations functions of West Penn Power Company, with emphasis on management of major construction projects.

Before joining CMP, Mr. Lesuer was a Lead Hydraulic Engineer for Stone & Webster Engineering Corporation, where he developed detailed engineering designs of numerous hydraulic systems. In this capacity, he accumulated more than six years of experience on major nuclear power station construction projects, serving such clients as Virginia Electric and Power Company, Gulf States Utilities Company, Long Island Lighting Company, and Wisconsin Electric Power Company.

Mr. Lesuer holds a B.S. degree in civil engineering from Northeastern University, an M.S. degree in civil engineering from Stanford University, and an M.B.A. degree from The Wharton School of the University of Pennsylvania (with a concentration in finance and strategic planning). In addition, he is a registered Professional Engineer.

Richard P. Snaider

Mr. Snaider, a Senior Consultant, has an extensive background in energy and project management, having been involved for over 16 years in design, licensing, operation, and maintenance of nuclear power plants. He has participated in all aspects of utility management, having worked successively in the generation engineering department of a utility, as a member of the U.S. Nuclear Regulatory Commission (NRC) staff, and a project manager and technical resource in an engineering consulting firm. In this latter position he led a project team in the resolution of heavy-loads handling reviews mandated by the NRC at one plant owned by Northeast Utilities. He was also involved in various projects for, among others, Florida Power Corporation, Mississippi Power & Light, Niagara Mohawk Power Corporation, and Louisiana Power & Light Company. He is currently involved in a management assessment of an electric utility; review of the management of a nuclear construction project is a key element in this assessment.

In addition to his experience in energy-related services, Mr. Snaider has been involved extensively with the implementation of computer-based systems that are designed to increase productivity and ensure management's awareness of potential problems resulting from substantially increased regulatory scrutiny. Such systems include records management, commitment-tracking, and maintenance control.

Mr. Snaider graduated with distinction from the U.S. Naval Academy with a B.S. degree in systems engineering. He holds an M.B.A. degree from the Wharton School of the University of Pennsylvania.

Gregory S. Wolcott

Gregory S. Wolcott, a Senior Consultant, concentrates in the areas of management processes, operations, and strategy. He participated in our management audit of the Carolina Power & Light Company, and was responsible for reviewing that utility's engineering and construction activities. In this role, Mr. Wolcott examined and evaluated management processes, controls, and reporting systems for developing and monitoring project budgets and schedules.

In another study, he acted as lead analyst of our review of the organization of the State Electricity Commission of Victoria (Australia) in which he was responsible for reviewing generation operations and maintenance, system planning, administration, and corporate planning functions. Mr. Wolcott subsequently acted as project manager for this same client on a second assignment, which focused on development of a corporate-level strategic planning process.

Mr. Wolcott participated in our review of the organizational and management processes of Burns and Roe, Inc., its parent company, and its related subsidiaries. For this major architect-engineering firm, he was responsible for examining the organization, responsibilities, and interrelationships among the holding company and operating companies for both line and staff groups.

Earlier, Mr. Wolcott helped conduct our management audit of Public Service Company of Colorado, and was responsible for reviewing all thermal and hydroelectric generating facilities. This study included examining company policies, procedures, and staffing for operations, maintenance, training, industrial relations, and environmental affairs functions. Mr. Wolcott's most recent assignment was a study of management prudence for a major electric utility company in the United States. Other clients Mr. Wolcott has served include Grupo Industrial Alfa (Mexico); the Warner Insurance Group; Grupo Industrial Saltillo (Mexico); and the Chicago Board of Trade.

Before joining CMP, Mr. Wolcott worked for a highway and heavy construction company in New York State and for one of the home product divisions of Procter & Gamble Company. He holds a B.S.E. degree in civil engineering from Duke University and an M.B.A. degree from the University of Chicago Graduate School of Business.

Clayton M. Press, Jr.

Clayton M. Press, Jr., an Associate affiliated with CMP's Energy Services Practices, participated in the analysis of several utility assignments, including our management audit of the Wolf Creek Nuclear Generating Station, our study of nuclear project cost and schedule estimates for Philadelphia Electric Company, our management audit of Rochester Gas and Electric Corporation, and other studies for Public Service Company of Colorado, Platte River Power Authority, and Tennessee Valley Authority. Currently, he is assessing management and construction of a major electric generating facility.

Among the other clients he has served are Burns and Roe, Inc.; Allied Van Lines, Inc.; Josten's Inc.; Monsanto Plastics and Resins Company; Marubeni America Corporation; and Tiger Financial Services, Inc. Mr. Press also completed the organizational implementation plan for General Petroleum and Mineral Company of Saudi Arabia. Earlier he participated in a review and evaluation of the organizational and administrative processes of Petromin Marketing.

Mr. Press received his A.B. degree from the University of Rochester and an M.Ed. degree from the University of Pittsburgh. In his postgraduate studies at Southern Illinois University, he specialized in quantitative and nonquantitative methodologies. Before joining CMP, he was a Research Fellow and Visiting Scholar of the Organization of American States attached to the Institute for Social and Economic Research, University of the West Indies (Barbados).

TERA CORPORATION

John W. Beck

John W. Beck, a Senior Vice President and director of TERA's southern and southeastern operations, has extensive experience in technical and corporate management. He has managed projects and engineering support activities in the areas of fuel management and procurement, power plant licensing, environmental systems, electrical and mechanical engineering, reactor physics, and nuclear safety analysis. His corporate management experience was as the Chief Operating Officer of Vermont Yankee Nuclear Power Corporation, which owns and operates a 525-MW nuclear generating station. He also served as Chairman of the Electric Power Research Institute's (EPRI) Nuclear Engineering and Operations Task Force and as a member of the Nuclear Divisional Committee of EPRI.

Mr. Beck held several other positions of responsibility at Yankee Atomic Electric Company before his election as Chief Operating Officer of Vermont Yankee Nuclear Power Corporation. As Director of Engineering, he was responsible for the general supervision and management of the plant, the reactor and environmental engineering department, as well as research and engineering development and computer applications. Earlier Mr. Beck was the Reactor Engineering Manager with direct responsibility for fuel management and transient and safety analyses for the Yankee Rowe, Vermont Yankee, Maine Yankee, Seabrook, and New England Electric System nuclear installations. Mr. Beck began his association with Yankee Atomic Electric Company in 1967 as an engineer/licensing engineer, after serving as a scientist at Bettis Atomic Power Laboratory.

A member of the American Nuclear Society, Mr. Beck received his B.S. in engineering physics from the University of Tulsa. He later obtained an M.S. in mechanical enginering from Northeastern University.

James I. Owens

James I. Owens, a Principal Associate Engineer, has more than 30 years of experience in the design and construction of nuclear- and fossil-fueled power plants. Before joining TERA, he held several positions at Delmarva Power & Light Company (DPL), where he was the General Manager for Production Engineering and Construction. As such, he was responsible for the design and construction of a 500-MW coal-fired plant and the conversion of a two-unit oil-fired plant to coal. As Manager of Production Engineering and Construction, he was responsible for planning new facilities and all preliminary engineering and licensing work on a 500-MW coal-fired power plant. Earlier, he was DPL's Manager of Power Plant Design and the Project Manager of the Summit nuclear power plant. In this capacity, he was responsible for staffing the project organization and negotiating contracts for the nuclear steam supply system, turbine generators, and most major auxiliaries. He was also responsible for nuclear engineering for the station.

Mr. Owens was also employed by the General Electric Company, Gibbs & Hill, Inc., and General Atomic Company. His responsibilities included numerous engineering and management assignments, including the development of control systems for the Peach Bottom and Dresden nuclear power plants and the Sea Wolf nuclear submarine and the preparation of PSAR's for 16 research and test reactors.

A participant in General Electric's advanced engineering program, Mr. Owens received his B.S.E.E. degree from Iowa State University. He is a registered professional engineer in the State of New York and a member of the American Nuclear Society of the Electric Power Research Institute's Nuclear Divisional Committee.

Martin B. Jones, Jr.

Martin B. Jones, Jr., a Senior Project Manager, has more than 20 years of experience in the electric utility industry and has directed or participated in a number of major plant construction projects. He has also had direct responsibility for the development and implementation of quality control, warehousing, and records management programs and systems.

Before joining TERA, Mr. Jones held management and supervisory positions at South Carolina Electric & Gas Company (SCE&G). Among his primary responsibilities as Manager of Construction were the $200 million Fairfield pumped storage facility and the $800 million Summer Station. He also established a quality control group within the Construction Department and developed and implemented the initial quality control, warehousing, and records management systems for the Summer project. Earlier, he organized SCE&G's Construction Department's electrical startup group.

Mr. Jones was also a project engineer and a staff electrical engineer for the Carolinas Virginia Nuclear Power Association, Inc., where he was involved with the design, building, operation, and ultimate decommissioning of a prototype nuclear power plant.

Mr. Jones received his B.S.E.E. degree from The Citadel.

Donald K. Davis

Donald K. Davis, Manager of Nuclear Safety and Licensing, has 15 years of nuclear engineering experience and has been affiliated with TERA Corporation since 1979. At TERA Mr. Davis has been the Project Manager for two key projects related to the Diablo Canyon nuclear plant: the performance of seismic design studies to verify the safety design basis of the plant, and the development of an earthquake emergency plan to address the potential effects of an earthquake on emergency planning activities.

Before joining TERA, Mr. Davis held several positions with the Nuclear Regulatory Commission (NRC). As Chief of the Systematic Evaluation Program Branch, he was responsible for the safety evaluation of 11 older nuclear plants in more than 130 technical areas, ranging from seismic design to accident analyses. Earlier, in the position of Chief of the Operating Reactor Project Branch, Mr. Davis oversaw licensing activities for 15 nuclear power reactors. While at the NRC Mr. Davis also served as a technical assistant in the Division of Operating Reactors, section leader in the Office of Nuclear Reactor Regulation, and as Project Manager of Light Water Reactors.

Earlier, Mr. Davis was a Reactor Engineer with Hittman Associates and a research assistant at North Carolina State University. At Hittman, he was responsible for the design and safety analyses of several nuclear power plants and spent-fuel shipping

containers. He also conducted analyses of primary and secondary system transients and loss-of-coolant accident analyses for several power reactor designs. While studying for his B.S. degree in nuclear engineering at North Carolina State University, he was responsible for dosimetry research associated with a 10-KW research reactor and 30,000 Curie Cobalt-60 irradiator.

Mr. Davis also pursued graduate studies in numerical sciences at Johns Hopkins University. He is a member of the American Society of Mechanical Engineers and has received academic honors from Tau Beta Pi and Sigma Pi Sigman, engineering and physics honorary societies, respectively.

Frank A. Dougherty

Frank A. Dougherty, a Project Manager, has more than 14 years of experience in the nuclear power industry. He has managed numerous projects for utility and architect-engineer clients, including licensing, quality assurance, design review, and design engineering tasks. The plants for which these services were provided were both BWRs and PWRs, ranging from the pre-PSAR stage through backfit modifcation for operating plants. His recent projects have included the evaluation of the quality assurance program and implementation procedures for a major utility, the performance of a design evaluation for an architect-engineer, and the management of a project involving backfit modifications during a plant outage.

Before joining TERA, Mr. Dougherty was employed by EDS Nuclear, consulting engineers, where he held management and supervisory positions in the areas of project management, utility services, and nuclear systems. As manager of the company's Project Management Division, he was responsible for all major projects in the western region, including engineering and design and analysis, quality assurance, licensing, and design reviews. In other divisions, Mr. Dougherty directed nonnuclear work in the areas of project management, environmental services, and management consulting, and directed plant safety evaluations, prepared system design criteria, and managed design review projects. Earlier Mr. Dougherty was a mechanical engineer and nuclear analyst with Sargent & Lundy.

After receiving his B.S. degree in chemistry at Illinois Institute of Technology, Mr. Dougherty obtained an M.S. degree in nuclear engineering at the Georgia Institute of Technology and an M.B.A. degree from the University of Chicago. He is a member of both the American Management Association and American Nuclear Society, where he has actively participated on committees and subcommittees. He also is a licensed professional engineer in the State of California.

Howard A. Levin

Howard A. Levin, a Project Manager, is responsible for the management and implementation of large projects for clients in the nuclear services areas. Moreover, he has more than nine years of experience in the commercial nuclear field with emphasis in nuclear plant design and construction, operating reactor safety, licensing, project management, and federal regulation.

Before joining TERA, Mr. Levin was employed by the Nuclear Regulatory Commission (NRC) in several positions of responsibility. As Technical Assistant to the Director, Division of Engineering, he was responsible for the development of policies and programs related to the technical review of license applications and operating reactor safety. He also administered technical qualification, structural, materials, chemical, hydrological, geotechnical, earthquake, and environmental engineering. He represented the Director and provided testimony before the NRC, as well as the ACRS and ASLB. Earlier, Mr. Levin was Program Manager of the Systematic Evaluation Program, where he was responsible for the development of program goals, scope, technical criteria, and scheduling for the SEP structural, mechanical, and seismic safety review of older operating reactors. As a senior engineer, he coordinated technical assistance programs; reviewed safety analysis report information, and prepared licensing criteria documents, codes, and standards.

Mr. Levin has also worked for Stone & Webster Engineering Corporation as a structural engineer, responsible for the analysis and design of nuclear power plant structures, systems, and components for normal and extreme loading conditions. In addition, he worked for Slattery Associates and Hercules, Inc.

Mr. Levin received his B.S. degree in civil engineering from the Stevens Institute of Technology and an M.S. degree in structural engineering from the Massachusetts Institute of Technology. A member of the American Society of Civil Engineers, he holds many awards and honors. In addition, he has written and presented numerous technical papers and publications.

Donald B. Tulodieski

Donald B. Tulodieski, a Project Manager, manages and participates in the evaluation, design, development, and implementation of projects relating to document, information, and management control systems. In addition, he has conducted evaluations and seminars and has consulted in major utility corporate material control programs. The scope of the projects he has managed range from project control and management systems to integrated information systems, including material control, maintenance management, cost and schedule control, records management, and systems interface

evaluation. He also has extensive experience in nuclear- and fossil-fueled power plant licensing, warehousing procurement, testing, and operations.

Before joining TERA, Mr. Tulodieski served as a project manager and site support supervisor for Babcock & Wilcox Company. As project manager, he was directly responsible for all aspects of interfacing and focusing technical and licensing related resources to satisfy client needs as stipulated in contractual agreements, while maintaining cost and schedule goals outlined in company guidelines and as required by clients. In addition, he established database and real-time systems for site-generated test data and implemented a reliability and availability tracking system for the company's systems and equipment. Earlier, Mr. Tulodieski was a qualified stationary engineer with Public Service Electric & Gas Company of New Jersey, where he was responsible for the generation and implementation procedures associated with the precritical and critical testing of two 1,1000-MW nuclear generating units.

After receiving his B.S. degree from the Naval Academy, Mr. Tulodieski served as a Lieutenant in the U.S. Navy Nuclear Submarine Force. He is a member of both the American Nuclear Society and the National Micrographics Association.

Frank Z. Bamford

Frank Z. Bamford, Manager of Quality Services, has more than 28 years of experience in the nuclear power, defense, aerospace, and construction industries.

Prior to joining TERA in 1983, Mr. Bamford was an engineering manager and consultant at Nutech Engineers where he was responsible for management of the Quality Assurance group.

Earlier, Mr. Bamford served as a Project Quality Assurance Engineer for the Ralph M. Parsons Company, being responsible for monitoring and auditing the quality assurance activities performed on the Fluornel Dissolution Process and Metal Clad Fuels Storage Project. He was also a quality control coordinator at the Sacramento Utility District, and a project engineer in the Nuclear Energy Division of General Electric Company.

Mr. Bamford attended Denver University, where he studied engineering, and took part in General Electric Company's Manufacturing Management Program. He is a member of ASQC and ASME.

Frederick A. Pellerin

Frederick A. Pellerin, an Associate Quality Engineer, has over 20 years of experience in all facets of developing, implementing, monitoring, supervising, and evaluating quality assurance and quality control programs.

Before joining TERA, Mr. Pellerin was responsible for the development and implementation of an on-site construction completion control program at Nine Mile Point, Unit 2, of Niagara Mohawk Power Company. He has also worked on quality and audit plans for nuclear projects in Mexico and South Africa.

Mr. Pellerin is a graduate of the United States Army Corps of Engineers School, and has studied quality assurance, engineering and development, at the University of Rhode Island. He is a professional engineer in the State of California.

Lawrence H. Wight

Lawrence H. Wight, Vice President of Engineering Analysis, has over 15 years of engineering experience ranging from geotechnical engineering to civil engineering and engineering management. At TERA he is responsible for the coordination and management of the firms' efforts in the areas of geotechnical engineering, structure reliability, and system safety analysis. Before becoming a Vice President in 1979, Mr. Wight was Director of Geotechnical Engineering for three years.

Prior to joining TERA, Mr. Wight served as a Geotechnical Engineer at Lawrence Livermore Laboratory. He was principal investigator for a soil-structure interaction project and a co-investigator for a seismic design basis project.

He received a B.S. degree in Engineering management from Boston University and an M.S. degree in Engineering mechanics from Penn State University. He has pursued graduate studies in geophysics at the University of Washington, and has been a University instructor ir both Turkey and the West Indies. Mr. Wight is a member of several professional scientific associations including the American Geophysical Union and the Seismological Society of America.

APPENDIX B

QUALIFICATIONS OF CRESAP, McCORMICK AND PAGET AND TERA CORPORATION

QUALIFICATIONS OF CRESAP, McCORMICK AND PAGET AND TERA CORPORATION

This appendix includes brief descriptions of Cresap, McCormick and Paget (CMP) and TERA Corporation, including capsule descriptions of recent studies performed by both firms.

A - CRESAP, McCORMICK AND PAGET

Cresap, McCormick and Paget, now the general management services division of Towers, Perrin, Forster & Crosby, is recognized as one of the leading management consulting organizations in the world today. Since CMP's conception nearly 40 years ago, the size of the professional staff has grown more than 150, and offices have been established in New York, Washington, Atlanta, Chicago, Los Angeles, San Francisco, London, and Melbourne.

CMP serves clients throughout the United States and in Europe, Canada, Africa, Latin America, the Middle East, and Australia. Because it is a general management consulting firm, its clients include virtually every industry, as well as government at the federal, state, and local levels, and a variety of nonprofit organizations, including colleges, universities, and hospitals.

PROJECT MANAGEMENT QUALIFICATIONS

Presented below are capsule descriptions of a representative sample of projects that CMP has recently undertaken that were devoted, all or in part, to the review of project management activities.

Philadelphia Electric Company (PECo)

In November 1979, CMP completed a management and operations review of PECo, which provides electric service to the City of Philadelphia and surrounding suburban counties, and gas service to the suburban areas. PECo provides service to 1.2 million electric and 270,000 gas customers, and generates over $1.5 billion in revenue. PECo owns more than 7,700 MW of electric generating capacity, obtains gas from two major pipelines, and operates an LNG facility for winter peak shaving. It also provides steam service to Philadelphia.

Areas of particular inquiry in this review included approaches by which the company and the Pennsylvania Public Utility Commission could more effectively collaborate in resolving issues critical to ratepayers; the construction and plans for operation of the Limerick Nuclear Generating Station; means by which PECo could respond to near-term resurgence in new gas hookups without expandings its permanent staff; the need to improve performance of the Eddystone plant, PECo's largest fossil generating station; opportunities to be more creative and aggressive in reducing personnel costs and in improving management organization; and ways in which the development of work force productivity measurement and control systems could be accelerated.

The review resulted in the identification of several important areas (such as acceleration of Limerick construction and reductions in staffing) in which the costs of service to ratepayers could be reduced. Of 58 major recommendations made, 39 were accepted, 16 were accepted with qualifications, and only 3 were rejected.

A year after the completion of this review, CMP was retained to conduct a more intensive, independent study of the scheduling and construction for and the probable cost to complete the Limerick Station. This analysis included the development of several methods and techniques for projecting the time required to complete design and construction, as well as system testing and startup. On the basis of CMP's estimations of time needed to complete Limerick's two units, a range of cost estimates for the plant was prepared, again using multiple approaches. The results of this study helped PECo determine the most effective strategy to pursue in view of current load growth projections and financial requirements.

As part of the review of the Limerick Station, CMP worked with the law firm of Morgan, Lewis & Bockius in preparing expert testimony in connection with the Limerick Nuclear Generating Station Investigation (Docket I-80100341), which was conducted by the Pennsylvania Public Utility Commission. CMP gave testimony at commission hearings regarding its evaluation of the schedule and budget of the Limerick nuclear project and its (CMP's) independent forecast of the plant's total cost at completion, excluding fuel.

Kansas Gas And Electric Company (KG&E)

CMP conducted a comprehensive, detailed financial and operational review of the Wolf Creek (Kansas) Nuclear Generating Station, which is currently under construction. The study examined the design, construction, preoperational testing, and startup phases of the project, as well as the owner-operators' preparedness for commercial operation. Because the Wolf Creek facility is jointly owned by KG&E and Kansas City Power & Light Company, each

company's involvement in the project was studied. In addition, the study's scope encompassed the architect-engineers (Bechtel Power Corporation and Sargent & Lundy) as well as the constructor (Daniel International Corporation).

In this assignment CMP compared the project's past performance with schedules and budgets, and we documented causes of significant variances. Furthermore, the current project concept, organization, and planning and control systems used to manage the construction of this facility were thoroughly evaluated. KG&E's preparedness to start and operate the facility was also examined in detail. Ways to improve the participating utilities' control over the design and construction of the project were identified, and recommendations for capitalizing on them were formulated.

CMP also made a detailed, independent assessment of project schedules - i.e., fuel load and commercial operation dates - and of total project costs using probable, optimistic, and pessimistic scenarios. Finally, the financial implications of the project costs for KG&E were identified, particularly the rate relief required to furnish an adequate level of financing.

Carolina Power & Light Company (CP&L)

CMP recently completed a comprehensive management review of CP&L on behalf of the North Carolina Utilities Commission. The study was conducted in two phases. The first phase was a reconnaissance of corporate staff functions and activities, and also included an analysis of the company's progress in implementing the recommendations of an earlier management performance audit completed in January 1977. CMP reviewed CP&L's progress in implementing an automated Construction Management System, which was designed to assist distribution management in planning and scheduling internal and contractor crews, identifying equipment and materials requirements, establishing optimum crew sizes, and providing data on work force management.

Similarly, CMP reviewed progress in implementing an automated materials management system, efforts to strengthen business planning and the linkage of capacity planning and load management/ conservation activities, and actiyities to improve the management of information services.

The second phase of the study was an in-depth review of the company's major project management approach with emphasis on engineering, construction management, and startup for nuclear and fossil generating facilities, particularly for the Harris nuclear and Mayo fossil projects. A comprehensive review of operating power plant operations and maintenance activities for both nuclear and fossil stations was also conducted.

The Brunswick nuclear plant, with two 790-MW (net) boiling water reactors, was emphasized in this review. Although CP&L had taken steps to strengthen Brunswick's organization and management, the operating performance of Brunswick's two generating units had been declining and was generally less than the industry average for comparable units. The study team identified several opportunities for improvement and formulated recommendations to address each of them. Recommendations covered the planning, scheduling, and control of nuclear plant outages; organizational arrangements for executing outages; staffing in the plant's operation unit; construction backlog reporting; and the use of the Nuclear Plant Reliability Data System to improve preventive maintenance and to develop a predictive maintenance program.

Pacific Gas And Electric Company (PGandE)

PGandE is the largest regulated energy utility in the nation, serving 3.4 million electric and 2.8 million gas customers in an area that includes San Francisco, Oakland, and San Jose, California. PGandE employs more than 25,000 people to operate 33,000 miles of gas transmission and distribution pipeline, 73 electric generating units with a total 8,636-MW capacity, 99,000 miles of electric transmission and distribution lines, and 45 district offices located throughout the northern two-thirds of California.

In 1978, CMP completed an in-depth study of the fuels management policies and practices of PGandE under the mandate of the California Public Utilities Commission. In 1980, again at the direction of the California PUC, CMP completed a comprehensive audit of the company as a whole, encompassing all facets of PGandE's management and operations. Aspects of the electric business studied in this audit included electric supply planning; the design, engineering, and construction of new facilities; and generation, transmission, and distribution operations. Particular attention was devoted to then-current planning for the construction of two new coal-fired generating stations and to plans for operating the new Diablo Canyon Nuclear Generating Station. Areas of the gas business examined included demand projections, gas supply forecasting and acquisition, operation of a major intrastate pipeline and large underground storage facilities, and management of the distribution system. Also explored were PGandE's relationships with an extensive network of intrastate and interstate subsidiaries engaged in gas and coal exploration, development, and transportation.

In addition to these reviews of the electric and gas businesses, each companywide activity was studied, including financial management, management of human resources, customer service, and support activities (such as the company's large general construction department). CMP also reviewed PGandE's diverse range of

conservation and load management initiatives, and the organizational structure and working relationships of the company's general offices and the decentralized field divisions and districts.

Although significant opportunities for both one-time and continuing savings were identified during the audit, the final report noted that the most important benefits could be secured through organizational and management systems improvements, especially major refinements of the systems used to plan, execute, and control major construction projects.

After a review of the 131 audit recommendations by the California PUC and PGandE's Policy-making Management Committee, 126 recommendations were accepted in principle and are being implemented. CMP was retained to assist in the implementation process, especially in the conceptual design of strengthened capital, operations, and maintenance budgeting approaches; and the development of an executive information system based on key financial, operational, and human resource performance indicators.

Rochester Gas And Electric Corporation (RG&E)

CMP conducted a comprehensive review of the management and operations of RG&E on behalf of the New York Public Service Commission. The study included a review of the project management organization and systems in use to control NRC-mandated retrofits to the Ginna nuclear plant, the contractual relationships with the architect-engineer for the Ginna modifications, the adequacy of RG&E's oversight of the Nine-Mile Point 2 nuclear project, and the disposition of nuclear plant components purchased by RG&E for its Sterling nuclear project (which was canceled in 1980).

Salt River Project

The Salt River Project is a multipurpose project authorized under the Federal Reclamation Act of 1902. The project provides electric service to residential, commercial, industrial, and agricultural users in the greater Phoenix (Arizona) area. It also operates and maintains the irrigation transmission and distribution system that provides water for agricultural, municipal, and industrial uses.

CMP first conducted a diagnostic audit of Salt River Project. The focus of the audit was to help a new management team identify opportunities for improving the organization, operations, and management practices of the project. As a result of the findings, which were presented in August 1977, CMP was asked to undertake detailed studies of power engineering and major construction project management, water operations, top management reporting, and personnel management. The Coronado Station, a dual-unit, 700-MW,

coal-fired generating plant, was under construction at the time, and major construction items were being completed at the Navajo Station, which has three 750-MW, coal-fired generating units.

The detailed study of power engineering and major construction project management, completed in November 1977, led to recommendations for strengthening the control over power plant design and over the cost, schedule, and quality of performance of the project's engineer/constructor. CMP's recommendations resulted in major changes in the organization and staffing of the Power Group, improvements in project control reporting and performance analysis, and more effective interfacing with the engineer/constructor.

CMP's work in the area of top management reporting resulted in the design-in-principle of a management early warning system. This system consists of a series of key performance indicators, which are reported on an exception basis, and procedures for written explanation of variances and follow-up on corrective action plans. A total of 40 indicators were identified for reporting to top management.

A more recent study of personnel management encompassed the full range of personnel functions, with emphasis on affirmative action programs.

State Electricity Commission Of Victoria (Melbourne, Australia) (SECV)

In late 1980, CMP conducted a reconnaissance audit of SECV, a large, state-owned utility engaged in the design and construction of brown-coal generating stations at three sites, with a total capacity of about 5,000 MW. The results of the inquiries indicated that these major construction programs were all behind schedule and experiencing significant cost overruns, raising the risk of severe capacity shortages in the early- to mid-1980's. This condition was attributed to shortfalls in organization and staffing, project management concepts and processes, design and construction approaches, industrial relations, and human resource development practices.

On the basis of these findings, CMP reorganized the SECV's design and construction groups and helped the company implement the recommended changes. In addition to developing new project design and construction management approaches, CMP helped SECV design and implement new processes and systems for improved cost and schedule controls on its major construction projects.

As a direct result of CMP's work, the first generation unit under construction was brought up to full power ahead of schedule,

and work on the remaining units is proceeding well. These changes were all accomplished during a nine-month period of intense assistance.

In early 1983, CMP also examined the performance effectiveness of the engineering and construction organization. This work focused on the acceptance and implementation of many of the changes resulting from the 1980 study. Specific areas of evaluation included the development and use of programming and measurement techniques; the success of the value engineering and quality assurance programs; the interfaces between design, project engineering, and construction departments; and the support provided to engineering and construction by other SECV organizations.

This study resulted in a number of practical recommendations, among which were the reemphasis of the matrix concept of project management, the development of a formal vendor evaluation program, improvements to existing cost control systems, further development of the programming and measurement systems and organization, enhancement to the design review process, and strengthening of the support provided by the project services organization. In addition, recommendations were made to more closely integrate fuels management and industrial relations activities with the project organizations.

Public Service Company Of New Hampshire (PSNH)

In 1978, CMP completed a comprehensive review of the management and operations of PSNH. This electric utility, serving most of New Hampshire, was going through a period of rapid growth and development. The study covered all aspects of the company's business, including provisions for managing construction of the Seabrook Nuclear Generating Station. It also included a review of the utility's external relations.

The review indicated that PSNH had adopted many effective approaches to Seabrook construction management, but the effort had heavily taxed the utility's financial resources and diverted executive resources from other important company functions, creating a need for remedial action. In fossil generation, CMP noted the need for action to reverse the deteriorating condition and performance efficiency of PSNH's coal-fired, base-load generating capacity.

B - TERA CORPORATION

TERA Corporation is a professional services and systems engineering organization that provides engineering and environmental consulting, project management, proprietary systems, processes, and software to industry and government in the United States and

abroad. The firm has 225 senior professionals with extensive experience and advanced degrees in disciplines ranging from nuclear engineering and geophysics to economics and law, and supports these individuals with engineering, biological, and electronics research laboratories and extensive computer facilities. TERA is headquartered in Berkeley, California, and operates from several major regional offices.

RECENT CLIENT EXPERIENCE

Central & South West Corporation (C&SW)

C&SW, a public utility holding company with several wholly owned operating subsidiaries, initiated a program to consolidate and centralize selected corporate functions to improve the cost-effectiveness of overall corporate operations and respond to regulatory and economic trends. The purpose of this program was to provide technical assistance to the operating companies in certain areas and to give C&SW increased responsibilities for the planning, engineering, licensing, and construction of new facilities.

C&SW asked TERA to help establish the general policy and program decision bases for future responsibilities of the Engineering and Construction Department relative to project management, construction management, engineering design, environmental programs, and interfaces with the operating companies. To accomplish this goal, TERA reviewed projected needs for an engineering, construction, and project management organization, and identified and documented existing capabilities, organizational structures, and management control techniques available within the operating companies for engineering, construction, and project management that could ultimately be consolidated to enhance coordination and standardization for C&SW. Furthermore, TERA defined and documented C&SW's strategic goals and objectives, and assessed the impact of the projected needs on the goals and objectives and developed alternative organizational capabilities and schedules. Finally, TERA made specific recommendations for implementing long-term, intermediate, and immediate organizational objectives and defined the scope of specific tasks by which C&SW's Services Engineering and Construction Department should implement the selected plan.

Texas Power Pool, Inc. (TPPI)

For TPPI, TERA provided master planning services for the engineering, construction, and operation of a 500-MW lignite-fueled power plant. Master planning activities included identifying key design and construction tasks; preparing detailed specifications

of task requirements; scoping manpower requirements, duration, and responsibilities; scheduling; and making critical path models. Key tasks involved:

- Scheduling
- Administration
- Mining study
- Local liaison
- Preliminary engineering
- Environmental
- Construction
- Startup
- Architect-engineer selection
- Site selection
- Financial
- Land acquisition
- Regulatory approval
- Detail engineering
- Procurement

TERA also assisted TPPI in implementing various tasks such as architect-engineer selection, administration, scheduling, and site selection.

New York State Electric & Gas Corporation (NYSEG)

TERA has been retained to provide master planning and management consulting services for NYSEG in a broad range of areas. For example, TERA helped plan and implement a new matrix organization-1 structure for the Engineering, Construction, Operations and Generating Services Departments and evaluated the existing Plant Betterment Engineering Department, providing recommendations for improving overall responsiveness of the department.

In another assignment, TERA evaluated the information management needs of the Engineering, Construction, and Operations Departments and recommended a system design to meet the identified needs. The primary objective of this study was to define project control systems for an 800-MW coal-fired generating station. Included in the system definition were the following major functional areas:

- Records management
- Material control
- Maintenance management
- Action item tracking
- Cost and schedule control.

Finally, TERA was asked to prepare the Somerset Project procedures. This activity included the identification of required procedures, the collection and evaluation of input data, the writing of the procedures in draft form, and the issuance of final procedures for incorporation in the Somerset Project Procedures Manual.

Public Service Company Of Oklahoma (PSO)

PSO contracted TERA to analyze its existing management information control systems (MICS) and develop recommendations for future system implementation on the Black Fox Station (BFS), two 1150-MW BWR's under construction. TERA provided Black Fox Station project management with a thorough analysis of the MICS and computer hardware/software and made recommendations on the scope of functions yet to be implemented, the operational requirements to be made, and the most effective computer hardware to be included.

TERA personnel were required to make evaluations in a complex organizational setting, where PSO was providing both project management and construction management. The architect-engineer assisted PSO in the development and implementation of the MICS. TERA's recommended emphasis for future development was focused at the site and on construction management activities in general.

The systems reviewed on this assignment included document control and filing, project planning and scheduling, engineering data control system, cost control system, nuclear plant reliability data system, and quantity tracking and construction inventory management systems.

Louisiana Power & Light Company (LP&L)

TERA was selected to provide LP&L with an objective analysis and program description of the Contractor Management Program as defined in the LP&L Nuclear Operations Program Objectives. The scope of work included reviewing existing documents, policies, and procedures relating to the contractor management function; defining program requirements commensurate with the scope of other corporate programs being developed, corporate policies and responsibilities, cost control and accounting requirements; preparing transaction flow charts of the generic activities of the program and the organizational relationships and responsibilities of the corporate nuclear services division and plant; and preparing a detailed program description in accordance with the specifications of LP&L.

In another engagement, TERA provided cost control/contract administration support services to LP&L's Nuclear Administrative Services Group. These services included review and documentation of the current contract administration, cost control and budgeting systems, group operations, and the existing coordination of monetary and quantitative data between the group and other service organizations; definition of the contract administration, cost

control and budgeting responsibilities of the group and the associated data interface requirements with other corporate departments; development of recommendations for procedures to enhance operations and a specific organizational strategy relative to budgeting activities; and finally, development of a general plan for implementing the proposed recommendations.

Florida Power Corporation (FPC)

The overall objective of TERA's project for FPC was to develop an accurate matrix system of quality requirements and commitments for training and qualification of FPC personnel who perform nuclear safety and quality-related functions. The matrix system identifies the functional areas where the requirements and commitments apply within the FPC organization. A procedure for the use and updating of the matrix system was developed, and key FPC personnel were trained in the application of this procedure.

Vermont Yankee Nuclear Power Corporation

TERA is preparing a contract administration and procurement program for the Vermont Yankee Nuclear Power Corporation. Specifically, TERA will define specific administration and procurement activities, recommend contract negotiation strategies, develop specific transaction flows, define responsibility/action/instructional procedures, develop specific organizational responsibilities, and conduct initial orientation training sessions for personnel.

APPENDIX C

CRESAP, McCORMICK AND PAGET CLIENT REFERENCES

CRESAP, McCORMICK AND PAGET CLIENT REFERENCES

The individuals on the following list may be contacted regarding the qualification of Cresap, McCormick and Paget to perform studies of public utilities, major project management, nuclear power plants, and other areas related to the appraisal of the Midland project.

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