BECHTEL SAIC COMPANY, LLC

ROOT CAUSE ANALYSIS REPORT

For

YUCCA MOUNTAIN PROJECT TECHNICAL DOCUMENT DEFICIENCIES

John Hosmer — Date 8/17/01

Jim King — Date 8/17/01

August 17, 2001

ENCLOSURE 2

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EXECUTIVE SUMMARY

Bechtel SAIC Company, LLC (BSC), Manager of Projects chartered an independent team to perform a root cause investigation that would analyze Total System Performance Assessment for Site Recommendation Model and Report (TSPA-SR), document deficiencies in accordance with AP-16.4Q Revision 1 ICN 0, *Root Cause Determination*. The independent team was made up of selected members from the team that performed the root cause evaluation for Bechtel SAIC Company, LLC for CARs BSC-01-C-001 and BSC-01-C-002 (RCAR), supplemented with two BSC Project employees.

The team investigated and analyzed the TSPA-SR deficiencies identified by the NRC and the Yucca Mountain Project Technical Review Team[1], as well as identified deficiencies in other technical documents, i.e., Supplemental Science and Performance Analyses Volumes 1 and 2. The team reviewed historical and current documents and conducted 35 interviews with management and employees at BSC, contractors and the U.S. Department of Energy (DOE). The Root Cause Report specified four root causes and one generic cause.

Interviewees were candid and willing to share issues and solutions. The interviews revealed the following consistent themes:

- Employees are committed to the success of the Project.
- Employees are willing to change for the success of the Project.
- Employees' first impressions of the BSC management team and their approaches has been positive.
- Management placed a strong reliance on parallel checking and review of technical documents as an effective barrier to protect project document quality.
- Employees and management were inconsistent in their explanation of configuration management and its application to the development of technical documents.

The team concluded that the following four root causes and one generic cause contributed to the project issuing technical documents with deficiencies:

- Ineffective Configuration Management. Scope and schedule changes forced the Checking and Review (C&R) process to be performed in a compressed period of time. In addition to a shortened C&R period, the C&R process was negatively impacted by parallel reviews, which lacked revision control.
- Expectations And Accountability. Management believed that meeting schedules was more important than producing error free documents, because the documents could be corrected before License Application.

[1] As discussed in the Management Plan for TSPA-SR and other Identified Issues, Rev. 2 dated July 6, 2001.

- Ineffective Program Management. This Root Cause is identical to Common Cause No. 1 in the *Root Cause Analysis Report for CARs BSC-01-C-001 and BSC-01-C-002, dated July 30, 2001* (RCAR), except as noted below[2].

- Low Expectations For Effective Issues Management Process. This Root Cause is similar to Common Cause No. 3 in RCAR. Interviews at YMP made it very clear that problem identification is viewed negatively by many employees. Several current problems documented in the problem identification process that have direct relationship to this Root Cause Report, defined in the Documents Reviewed List, have had their corrective actions delayed until the Project begins preparing License Application documents.

The team concluded that one generic cause existed:

- Leadership. DOE and the Management & Operating Contractor (M&O) believed meeting the timeline window (schedule) was more critical to project success than producing error free documents at this time, in the life of the Project. Consequently, the M&O and the DOE managed accordingly, resulting in documents being issued with deficiencies.

The conditions that affected TSPA-SR and the quality of other technical documents were very similar to the root causes identified in the RCAR. Root causes or corrective actions that are identical to those in the RCAR noted above are identified. They are repeated so this document can stand-alone.

[2] Removed: "inactive or stagnant middle management (i.e., unwilling to change, unable to remove barriers, uninvolved with the work), and lack of a critical mass of change management leaders, and" from this fourth bullet because middle management was more involved with the technical documents.

CONTENTS

1. PROJECT BACKGROUND

1.1 PROJECT HISTORY

In 1982, the United States Congress passed the Nuclear Waste Policy Act (NWPA) to set national policy on the issue of high-level nuclear waste disposal. Congress based this law on the scientifically supported premise that a deep burial, retrievable storage concept was the best way to dispose of nuclear waste.

The NWPA made the DOE responsible for locating, building, and operating an underground geologic repository for the permanent disposal of high-level nuclear waste, and spent nuclear fuel.

In December 1987, Congress amended the NWPA and directed DOE to study only Yucca Mountain in Nevada to determine whether the site would be suitable for a potential repository. The Act specifies studies will stop immediately if Yucca Mountain is found unsuitable.

In November 1992, work began at Yucca Mountain on the Exploratory Studies Facility (ESF). The ESF is seven miles of tunnel, consisting of a north entrance ramp, a main drift, a south ramp, and an east west cross drift. Alcoves will house individual laboratory and test facilities 100 - 1,200 feet below the mountain ridge.

Based upon completed work the site recommendation will be submitted to the Secretary of Energy, who will then recommend appropriate action to the President. If the site receives Presidential approval, DOE will seek a license from the U.S. Nuclear Regulatory Commission (NRC) to begin construction. The State of Nevada will have an opportunity to submit a "notice of disapproval" (veto) after the Presidential decision. Work would continue only if a majority vote in Congress overturns the State disapproval.

1.2 OWNERSHIP/CONTRACTOR HISTORY

The DOE's Office of Civilian Radioactive Waste Management (OCRWM) is the owner, and potential licensee and operator of the Yucca Mountain Site Characterization Project. Before 1990, DOE directly contracted with various agencies to perform required work. In 1990, the M&O philosophy was adopted and TRW Corporation was awarded a 10 year M&O contract to develop the scientific basis for determining the suitability of Yucca Mountain as a repository. The M&O under TRW was a conglomeration of scientific and technical companies with seven major subcontractors and as many as 14 more lower tier subcontractors.

In 2000, DOE rebid the contract and after an extension awarded the new contract to Bechtel SAIC Company, LLC (BSC). BSC brought a "single company" and unified project management approach to the contract. BSC was awarded the new contract November 14, 2001, and assumed control February 12, 2001.

During the transition, BSC became a 1,050-person organization retaining approximately 73 percent of the previous M&O staff. Between February and July, BSC attempted to align the values of the 14 previous contractors in line with BSC's expectations. Significant scope and schedule issues that have occurred since BSC contract accountability include:

- requirement to address the DOE concerns related to remaining uncertainties in the process models,
- consideration of low-temperature operating modes,
- increase the emphasis of effects of coupled processes; and
- increase emphasis on NRC Key Technical Issues.

Additionally, BSC received two corrective action requests; BSC-01-C-001 on May 3, 2001, and BSC-01-C-002 on June 12, 2001. Under procedure AP-16.1Q, *Management of Conditions Adverse to Quality*, BSC was required to develop the root causes for these CARs and present corrective actions to prevent recurrence.

1.3 REGULATORY FRAMEWORK

There are presently two federal agencies, the NRC and the U.S. Environmental Protection Agency (EPA), that influence the Project.

The NRC has a requirement to determine whether there is "sufficient completion confidence" in the site recommendation. Additionally, the NRC will license the Project under NRC regulations if the Project moves from the scientific site characterization phase to the design, build, and operational phases.

The EPA sets standards for groundwater radiation levels and provides permits. The EPA has issued 40 CFR 197 concerning groundwater expectations for the Project, which are stricter than the draft regulation set forth by the NRC.

Additionally, the Nuclear Waste Technical Review Board (NWTRB) oversees the Project as an independent technical agency, appointed by the President, as a result of the NWPA 1987 amendment. The NWTRB reviews the engineering and scientific activities undertaken to investigate the Yucca Mountain for its suitability as a location for a high level waste repository.

1.4 TECHNICAL DOCUMENT HISTORY

In accordance with the NWPA, DOE is preparing for a potential Site Recommendation.

DOE had originally planned to release a Site Recommendation Consideration Report (SRCR) in late 2000. This would have been a three volume report containing site characterization and design information, a preliminary site suitability evaluation, and plans for addressing the thermal and uncertainty issues emphasized by the NWTRB. The SRCR was to initiate the public review process.

The SRCR was deferred to allow enhancement of the technical basis for a site recommendation decision and the completion of the DOE Inspector General's review of the project based on an allegation of bias related to document preparation. The FY01 scheduled work was re-planned to enhance the technical basis.

The key elements of the revised Site Recommendation strategy are to:

- identify a possible Site Recommendation decision in early FY 02,
- include analyses and documentation needed to enhance the technical basis for a possible SR decision,
- use the TSPA-SR Rev. 00, ICN 1 (December 2000) as a basis and compare results to include evaluation of a flexible design that will accommodate a range of thermal operating modes,
- emphasize what the effects on performance would be across a range of lower-temperature operating environments,
- address NWTRB priority concerns such as treatment of uncertainties, understanding of corrosion mechanisms, evaluation of a lower-temperature repository environment,
- consider multiple lines of evidence, and
- address a limited set of the NRC Key Technical Issues (KTIs).

The documents included in the Site Recommendation include:

- Total System Performance Assessment – Site Recommendation (TSPA-SR) - Evaluates postclosure performance of the natural and engineered systems over the 10,000-year regulatory period and beyond.
- Yucca Mountain Science & Engineering Report (S&ER) - Provides a summary of the technical information compiled during site characterization and updates site and design information since the 1998 Viability Assessment.
- Preliminary Site Suitability Evaluation (PSSE) - Preliminary evaluation against DOE's site suitability guidelines in proposed 10 CFR 963 and evaluates repository performance over a range of thermal operating modes.
- Supplement to the Draft Environmental Impact Statement (SEIS) - Addresses the evolution of the potential repository design reflecting evaluation of design options.
- Supplemental Science and Performance Analyses (SSPA) Volume 1 Scientific Bases and Analyses - Incorporates new science beyond what was used for TSPA-SR Rev 00, ICN 1 and uses less conservative process models with revised ranges of uncertainties.
- Supplemental Science and Performance Analyses (SSPA) Volume 2 Performance Analyses. Based on TSPA-SR Rev 00 ICN 1. - TSPA sensitivity studies that investigate the effects on predicted performance of alternative process models, revised ranges of uncertainty, and cooler operating modes.

- Preliminary Preclosure Safety Assessment (PPSA) - Preliminary evaluation of potential repository performance during the preclosure period.

1.5 NUCLEAR CULTURE HISTORY

An attempt to define and transition to a project culture consistent with commercial nuclear operating plants was started with TRW Senior Management offsite meetings in April 1998, subsequent to the issue of the super Corrective Action Requests. This effort was followed in October 1998 by all-hands meetings with TRW management and DOE management. Among the initiatives that resulted from this effort are a Uniform Human Resources Accountability Process in November 1998, a Lessons Learned Program in January 1999, completion of Process Validation and Reengineering Report (PVAR) in June 1999, and a Project-wide Commitment Management System in August 1999.

2. PROBLEM AND SCOPE

2.1 PROBLEM STATEMENT

In a letter dated May 17, 2001, the NRC identified "eight apparent technical errors and/or inconsistencies" in the Total System Performance Assessment for Site Recommendation model and report documents. The specific issues were subsequently documented in BSC Deficiency Report BSC-01-D-078.

2.2 SCOPE

Perform an independent root cause evaluation of why the project issues technical documents with deficiencies in accordance with *AP-16.4Q Root Cause Determination*.

3. INVESTIGATION METHOD

3.1 EVALUATION TEAM

3.1.1 Independent Team

The Bechtel SAIC Company, LLC, Manager of Projects chartered an independent team to perform a root cause investigation of technical product errors. No organizational or time boundary was placed on the evaluation.

3.1.2 Team Qualifications

The following individuals served on the Yucca Mountain Project root cause evaluation team. Resumes of all individuals are included as Addendum A.

Team Member	Company
1) Dana Cooley	Beckman & Associates, Inc.
2) Jim Cross	Beckman & Associates, Inc.
3) Tom Doering	Bechtel SAIC Company, LLC
4) Sam Hobbs	Beckman & Associates, Inc.
5) John Hosmer, Team Lead	Marathon Consulting Group, Inc.
6) Jim King	Bechtel Jacobs Company LLC
7) Richard Laing	BWXT Idaho, LLC
8) Robert McCook	BWXT Idaho, LLC
9) Stephen Metta	Bechtel Nevada
10) Lisa Pascoe	Bechtel SAIC Company, LLC
11) Larry Zajac	Bechtel Nevada

Ken Beall (BSC) and Tom Doering (BSC) provided Project interface and support.

Expertise and experience provided by the root cause team include:

- nuclear power plant management experience,
- nuclear power plant troubled plant experience,
- root cause expertise,
- DOE project experience, and
- project management expertise.

3.2 PROCEDURE

To provide an investigation of the circumstances and a timely report, members of the team had previously been provided an introduction to the TapRooT® process and the requirements of Root Cause Determination as explained in Procedure AP-16.4Q. A team member certified in TapRooT® led the training. A correlation between the root causes and generic cause and standard TapRooT® Cause Codes is provided in Addendum B.

Kepner Tregoe (K-T) techniques were used to validate candidate causes and supplement TapRooT®. K-T is identified in DOE-NE-STD-1004-92, DOE Guideline for Root Cause Analysis, as an acceptable methodology. A team member certified in K-T led this methodology.

3.3 TEAM PROCESS

3.3.1 Process

Team members were provided orientation and had previously been provided training classes and background materials (e.g., procedures, history, etc.). General briefings provided an opportunity for team members to direct questions to a variety of key YMP personnel. This provided the team with an introduction to the basic problems and conditions represented by the Technical Product Deficiencies. Team members then met and conducted a preliminary K-T analysis to develop a refined problem statement. Based on this analysis, a set of structured interview questions were developed and utilized by two-person teams that interviewed personnel involved in, or knowledgeable of the management, technical product development, checking, and review process. The team conducted 35 confidential interviews. After the interviews were completed, the responses were tabulated and analyzed by the team using the TapRooT® process and the logic provided in Addendum C, to develop root causes and recommended corrective actions.

3.3.2 Interview Population

The key element of the investigation was the information collected by the teams during the detailed confidential interviews. A list of the individuals interviewed by team members, including their title and area of responsibility, is included as Addendum D.

3.3.3 Documents Reviewed

Members of the team reviewed relevant documents. A list of relevant documents reviewed is included as Addendum E.

3.3.4 Events and Causal Factors

The team produced an Events and Causal Factors (ECF) chart for the TSPA-SR event (see Addendum F), beginning with TSPA-Viability Assessment (VA) delivery in 1998. The Technical Basis Document for VA had also been checked, approved, and signed with numerous errors (LVMO-98-D-141). From the ECF chart, combined with Kepner-Tregoe validation of candidate causes, it was evident that many of the same causes prevailed after the TSPA-VA, leading to a similar outcome.

3.3.5 Pareto Analysis Conclusions

In its May 17, 2001 letter, NRC cited eight apparent technical errors and/or inconsistencies in the TSPA-SR report and model. In response, a Yucca Mountain Project technical review team performed detailed vertical and horizontal reviews of not only the TSPA-SR, but also the Supplemental Science and Performance Analyses (SSPA) Volumes 1 and 2, the Draft Environmental Impact Statement (DEIS), and the Yucca Mountain Science and Engineering Report (S&ER).

Using data from this effort, the root cause analysis team developed a simple Pareto analysis of a sample of the technical review team's data (See Addendum G). The root cause team's goal was to determine if there were any apparent error concentrations, e.g. in one document or subject area, or if there were any apparent biases toward a particular error type, e.g., document-to-document discrepancies.

SSPA Volume 1 contained significantly more "minor errors" and "weak basis/assumptions/text" than any other document, including SSPA Volume 2. SSPA Volume 1 is much larger than Volume 2, and it underwent multiple-version reviews with continual incorporation of new information by its authors. The TSPA-SR was written by TRW; the SSPA-SR was written by BSC. Although the management of the technical documents was different, the authors remained the same. Errors and inconsistencies appeared in both documents.

The root cause team then sampled raw comments from the technical team's TSPA model and technical report vertical reviews. The categorization of deficiencies was accepted as provided from the review team.

The root cause team noted no topical areas where problems appeared to be concentrated. Disagreement between and within documents and inability to verify data and other references or results were the two most prevalent error types. This supports the root cause team's conclusion that YMP relied excessively on parallel C&Rs and draft materials during TSPA-SR preparation, without the benefit of a final C&R of a "frozen" document. The technical questions cited by the technical review team did not appear to significantly change the TSPA-SR conclusions.

4. TECHNICAL DOCUMENT DEFICIENCES ROOT CAUSES AND CORRECTIVE ACTIONS

The conditions that affected the quality of TSPA-SR and other documents were very similar to the root causes identified in *the Root Cause Analysis Report for CARs BSC-01-C-001 and BSC-01-C-002, dated July 30, 2001,* (RCAR). Where root causes or corrective actions are identical or similar to those in the report noted above they are identified. They are repeated so that this document can stand-alone. **Corrective Actions unique to this report will be indicated by italicized text.**

The team concluded that four root causes and one generic cause produced the following problem (See Figure 1):

> ***The Yucca Mountain Project (YMP) issued technical documents containing deficiencies.***

Each root cause and a generic cause is described in the following sections, supported by information derived from document reviews, presentations to the team and interviews.

4.1 ROOT CAUSE NO. 1

4.1.1 INEFFECTIVE CONFIGURATION MANAGEMENT

Considering the reduced time to perform the C&R, parallel C&R without a final assessment of a frozen document, and the lack of revision control while checking and reviewing, it was not possible to produce error free documents.

Scope and schedule changes forced the process to be performed in a compressed period of time. The checkers and reviewers lacked sufficient C&R time to perform thorough work but performed the C&Rs anyway and signed off the documents. In addition to a shortened C&R period, the process was negatively impacted by parallel C&Rs on document sections and subsections, which lacked revision control. Although it is common to perform parallel C&Rs on large documents, it is not common for them to be the final assessment. Normally when parallel C&Rs are conducted, one final review is performed after the document has been frozen, and the only changes that are allowed are corrections to deficiencies that the final review identifies. Additionally, insufficient time was allowed for C&R. This root cause applies to the TSPA-SR and other document deficiencies.

4.1.2 RECOMMENDED CORRECTIVE ACTIONS

1. *Senior management must value a robust checking and review process to ensure errors in documents are identified and reconciled before a document is issued. This can be accomplished by management adopting this as a project value.*

2. *Senior management must establish the proper configuration management process, which must include a final C&R of a frozen document. Document planning must explicitly plan for a final C&R process of a frozen document.*
3. *Benchmark and assess configuration management processes used to develop technical documents. Where gaps are determined prepare and issue appropriate configuration management procedures.*

4.2 ROOT CAUSE NO. 2

4.2.1 EXPECTATIONS AND ACCOUNTABILITY

During the period of TSPA-SR development and submittal there was a lack of clear M&O and DOE expectations for an error free document. Management believed that meeting schedules was far more important than producing error free documents, because the documents could be corrected before License Application (LA). This belief caused the Project to cut the C&R process short when modeling activities failed to meet scheduled dates. This resulted in the departments doing the best checking they could within schedule constraints. Checks and reviews were performed on incomplete documents in time frames much shorter than required for a thorough check.

This root cause is similar to the Generic Cause described in the RCAR. Since the issue being investigated in this root cause is narrower than those in the RCAR more specific recommendations will be provided in this report.

4.2.2 RECOMMENDED CORRECTIVE ACTIONS

1. *Senior management must set high values and expectations for technical document quality. This can be accomplished by management adopting this as a project value. A good example of such a value is AP 3.11Q Section 3.18 (Signature of Author, Checker and Responsible Manager).*

2. Conduct facilitated management off-site sessions with participation, as applicable, from DOE, BSC, the National Laboratories, and USGS. In these sessions, document, sign, and communicate a high-level set of common:

   - project values,
   - consistent rewards and consequences, and
   - processes to hold each other accountable.

3. Establish a set of performance indicators to track the recommended common and generic corrective actions listed in the RCAR. Set goals, monitor, trend, conduct assessments and take management actions when progress fails to achieve expectations. Communicate goals and progress to all personnel. Report results quarterly to Bechtel corporate management. Bechtel corporate management should

challenge the Projects' performance and conduct field evaluations to validate the performance.

4.3 ROOT CAUSE NO. 3

4.3.1 INEFFECTIVE PROGRAM MANAGEMENT

Several key elements of an effective program management structure for the scope and magnitude of the Project were missing. Primary areas of concern were:

- lack of appropriate contract management and compliance by the DOE and the M&O with contractual requirements (i.e., flowdown, change control, impact, and communication),
- inconsistent use of integrated resource loaded schedules and integrated baseline schedules with effective change control,
- lack of lower level resource-loaded schedules with accurate depiction of process steps, and realistic duration necessary to perform work consistently,
- *middle management unwilling to change, unable to remove barriers, and lacked a critical mass of change management leaders*[3], *and,*
- lack of fundamental understanding that quality should be built in vs. inspected in.

This root cause was identical to Common Cause No. 1 in the RCAR.

4.3.2 RECOMMENDED CORRECTIVE ACTIONS

1. Assess the management and supervisory capabilities of the current BSC organization (Suggest: DOE consider a parallel management and supervisor capabilities assessment) with emphasis on:
   - management skills (plan, organize, schedule, contract implementation, people development),
   - performance,
   - capability to change and lead change, and
   - nuclear culture and culture change experience.
2. Where deficiencies are identified in the above assessment, develop and implement a plan to train, mentor, and/or replace project management staff. (Suggestion: Many

[3] Removed: "inactive or stagnant middle management (i.e., unwilling to change, unable to remove barriers, uninvolved with the work), and lack of a critical mass of change management leaders, and" from this fourth bullet because middle management was more involved with the technical documents.

troubled complex high-risk technical facilities and DOE facilities have used organizational development consultants to facilitate this process).

3. Train BSC and DOE organization staff on the requirements of the current contract, set the expectation that the contract will be followed, and hold the management accountable.

4.4 ROOT CAUSE NO. 4

4.4.1 LOW EXPECTATIONS FOR AN EFFECTIVE ISSUES MANAGEMENT PROCESS

Interviews at YMP made it very clear that problem identification is viewed negatively by many employees and management. There are very few issues identified and, when issues are identified management is often ineffective at resolving them.

Several of the issues encountered in this root cause investigation were already identified in the Project problem identification program but not resolved. Several current problems documented in the problem identification process that have direct relationship to this root cause report, have had their corrective actions delayed until the Project begins preparing License Application documents. This means that documents prepared from now to LA could have the same magnitude of errors even though the problem has been identified in the Projects' problem identification program. This is a clear indication of low expectations for an effective issue management process.

This root cause is similar to Common Cause No. 3 covered in the RCAR.

4.4.2 RECOMMENDED CORRECTIVE ACTIONS

1. *Senior management must establish a value and expectation for a positive issue management process. This will require that issues management process be separated from commitment tracking*[4].

2. *Senior management must implement a positive and definitive process for self-identification, tracking, and resolution of issues. This process should allow for easy documentation and closure of minor issues.*

3. Develop a BSC quality assurance plan that implements the existing contract allowing management assessments and independent assessments, and change the contract to allow BSC to perform surveillances.

4. Benchmark issue management programs at DOE facilities and/or commercial nuclear facilities to identify best practices and revise as appropriate the issue management program (IM). As a minimum:

[4] Separate commitment tracking and accountability meetings from issues management meetings.

- Set a lower threshold for initiation of root cause evaluations, management directed self-assessments and employee self-identification of issues.
- Establish a senior manager to conduct daily screening and assignment of responsibility for employee self identified issues.
- Create performance measures for root cause evaluations, self-assessments and employee issues identification, set goals and trend.
- Conduct an effectiveness review of the revised issues management program and performance measures six months after implementation.

5. Communicate and train the Project staff on the issue management program requirements and management expectations for implementation, and

6. Continue development of an effective issues management trending program for the identification of potential issues.

4.5 GENERIC CAUSE

4.5.1 LEADERSHIP

The team determined that one generic cause was a fundamental weakness that promoted or allowed the four root causes:

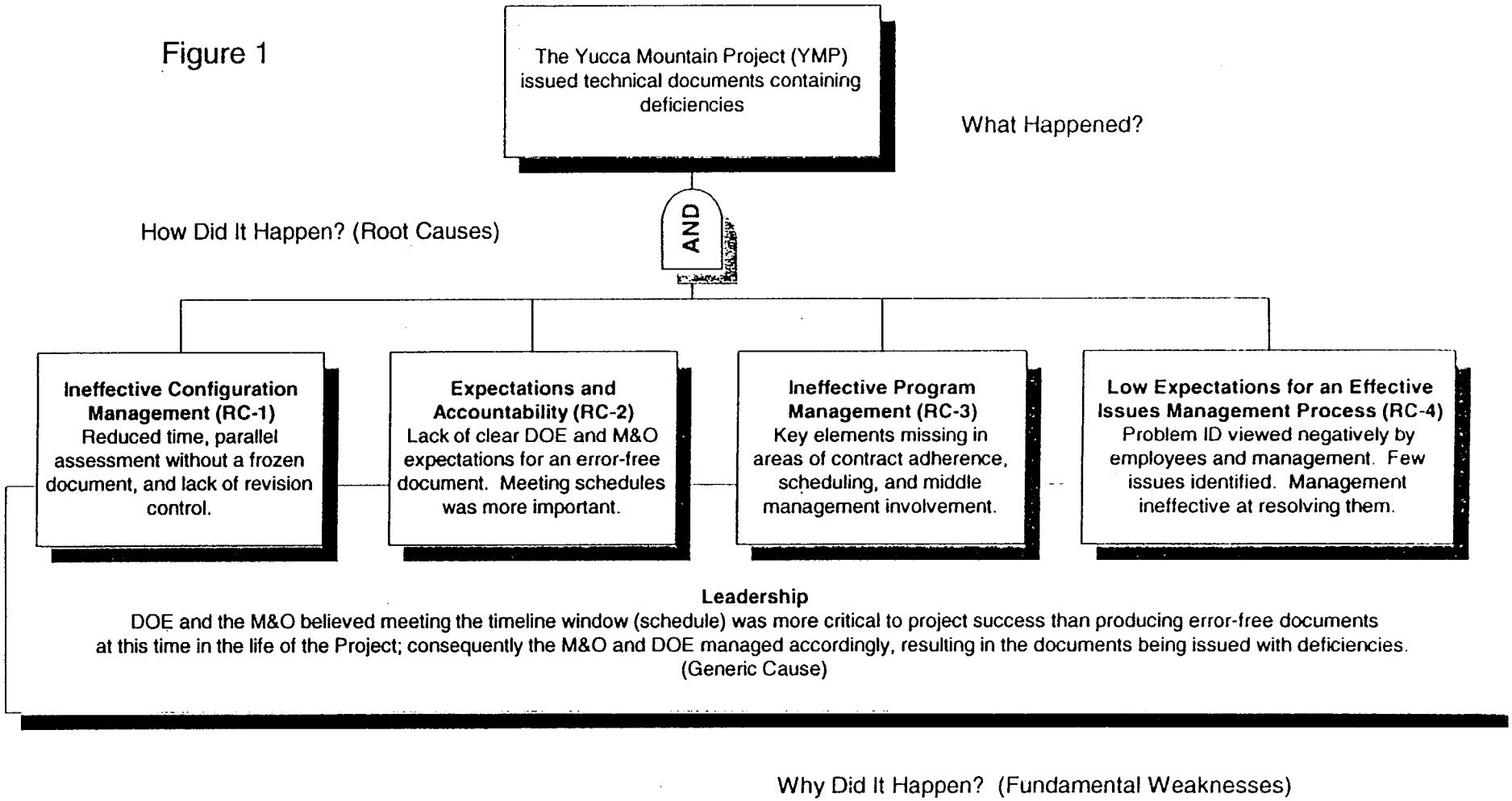
DOE and the M&O believed meeting the timeline window (schedule) was more critical to project success than producing error free documents at this time in the life of the Project; consequently, the M&O and the DOE managed accordingly resulting in documents being issued with deficiencies.

4.5.2 RECOMMENDED CORRECTIVE ACTIONS

1. *DOE and the M&O must embrace, support and communicate the expectation that Project products will be error free, and they must create performance measures that will track progress towards meeting the goal of error free documents.*

2. *DOE and the M&O should celebrate the many past achievements of the Project. DOE and the M&O must accept that manager behavior and expectations need to change. Develop a performance improvement plan that incorporates the recommendations from the Modeling and Software Root Cause Analysis and this Root Cause Analysis, including performance indicators, communicate the plan and performance indicators to the DOE, NRC and employees.*

Figure 1


The Yucca Mountain Project (YMP) issued technical documents containing deficiencies
What Happened?
How Did It Happen? (Root Causes)
AND
Ineffective Configuration Management (RC-1)
Reduced time, parallel assessment without a frozen document, and lack of revision control.
Expectations and Accountability (RC-2)
Lack of clear DOE and M&O expectations for an error-free document. Meeting schedules was more important.
Ineffective Program Management (RC-3)
Key elements missing in areas of contract adherence, scheduling, and middle management involvement.
Low Expectations for an Effective Issues Management Process (RC-4)
Problem ID viewed negatively by employees and management. Few issues identified. Management ineffective at resolving them.
Leadership
DOE and the M&O believed meeting the timeline window (schedule) was more critical to project success than producing error-free documents at this time in the life of the Project; consequently the M&O and DOE managed accordingly, resulting in the documents being issued with deficiencies. (Generic Cause)
Why Did It Happen? (Fundamental Weaknesses)

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ADDENDUM A

RESUMES

ADDENDUM A

RESUMES

	NAME	ORGANIZATION
1)	Dana E. Cooley	Beckman & Associates, Inc.
2)	James Cross	Beckman & Associates, Inc.
3)	Tom Doering	Bechtel SAIC Company, LLC
4)	Sam Hobbs	Beckman & Associates, Inc.
5)	John Hosmer	Marathon Consulting Group, Inc.
6)	James E. King	Bechtel Jacobs Company LLC
7)	Richard O. Laing	BWXT Idaho, LLC
8)	Robert H. McCook	BWXT Idaho, LLC
9)	Stephen Metta	Bechtel Nevada
10)	Lisa V. Pascoe	Bechtel SAIC Company, LLC
11)	F. Larry Zajac	Bechtel Nevada

ADDENDUM A

RESUMES

Dana E. Cooley, P.E. — SeaState Group, Inc.

144 Dante's Drive
Hockessin, Delaware 19707
(302) 234-8188 (Phone)
(302) 234-8084 (Fax)

ROOT CAUSE ANALYSIS CONSULTANT, WORKSHOP FACILITATOR, AND TEAM LEADER

- Determines fundamental problem causes
- Pinpoints organizational weaknesses
- Raises human performance levels
- Strengthens management effectiveness

PROFESSIONAL EXPERIENCE

SeaState Group, Inc., Hockessin, Delaware (see RESULTS below)

President (1996 - Present)

Established a consulting practice whose mission is strengthening problem-solving partnerships among managers, supervisors, and front-line workers. Analyzed issues and generated improvements in nuclear energy processes, event response, and problem analysis. Delivered root cause analysis training workshops at advanced and basic levels. Supported executives and corrective action program managers to improve programs, measure effectiveness, and integrate human performance and leadership initiatives.

Clients include Arizona Public Service Company, Constellation Energy Group (BG&E), FirstEnergy (Duquesne Light), Consolidated Edison, New York Power Authority, Exelon (PECO Energy), PPL Corporation (Pennsylvania Power & Light), PSEG Nuclear, Maine Yankee, Niagara Mohawk, a New England law firm, Fluor Daniel Hanford, and Rodel, Inc.

Public Service Electric and Gas Co., Newark and Hancocks Bridge, NJ

Manager - Quality Performance, Onsite Safety Review Engineer, and Manager - Environmental Licensing (1977 - 1996)

Supported nuclear power plants and other gas and electric energy facilities through every stage of their life cycles: site selection, assessment, and development, initial licensing, plant startup, power ascension, sustained operation, event investigations, and continuous improvement. Led or supported numerous problem solving and process improvement initiatives, including the first comprehensive assessment of Salem and Hope Creek's performance (1993).

Ebasco Services, Incorporated, New York, NY

Environmental Engineering Consultant and Project Leader (1973 - 1977)

U. S. Naval Reserve, Hyattsville, MD and Philadelphia, PA

Commissioned Naval Officer, Engineering Duty (1968 - 1972)

EDUCATION AND DEVELOPMENT

M.S. Environmental Engineering - Drexel University
B.S. Mechanical Engineering (Highest Distinction) - University of Rhode Island
Distinguished Naval Graduate - U.S. Naval Officer Candidate School
Small Group Facilitator Internship Program - The Napier Group
Advanced Management Course - American Management Association
Innovative Problem Solving - Synectics, Incorporated

ADDENDUM A

RESUMES

Management Oversight and Risk Tree (MORT) Certification – Conger & Elsea, Inc.

RESULTS

Public Service Enterprise Group (Salem and Hope Creek Generating Stations)

Reduced voluminous root cause analysis guidance to flow charts and visual reminders. Determined essential content for root and apparent cause analyses and developed "ideal" report templates and investigator prompts meeting all program requirements and CARB needs. Delivered plant-specific experiential root cause initial and refresher workshops for 56 investigators. (November 1999 – Present)

Niagara Mohawk Power Company (Nine Mile Point Unit 2)

Independently re-evaluated client equipment failure analyses for significant forced outage series originating from reactor recirculation flow control indication malfunctions. Applied Kepner-Tregoe methods to confirm detailed technical causes. Identified problem specification improvements and made recommendations to explore management causes for problem recurrence. (December 2000 – Present)

Consolidated Edison Company of New York (Indian Point 2 and Steam Business Unit)

Analyzed more than 15 significant operational, engineering, and maintenance events to determine root causes. Coached and consulted with engineers, operators, planners, test developers, and others. Supported human performance improvement, root cause analytical process, and collective issue assessment, including condition report and corrective action trending. Developed root cause analysis guide and training lesson plans. Trained 40 new and requalifying root cause investigators. Designed and performed corrective action effectiveness reviews. (February 1997 – present)

Pennsylvania Power & Light Company (Susquehanna Steam Electric Station)

Determined root causes and corrective actions for fire protection program omissions, with sensitivity to employee concerns and an allegation. Recommendations addressed conduct of operations, workforce motivation, contractor control, training and qualification, and change management. (April 1997)

Supported in-depth, quantitative observation of mechanical, electrical, and I&C maintenance by the Independent Safety Engineering Group. Recommended improvements to quality, safety, and efficiency of work planning and execution. (March – April, 2000)

Led multidiscipline root cause investigation team to determine how and why self-assessment activities and management actions did not anticipate and avoid National Academy for Nuclear Training probation for four technical training programs. (May – June 2000)

PECO Energy (Limerick Generating Station)

Determined common themes in 20 departmental and functional self-assessments. Prioritized corrective actions. Ensured accountability and tracking. Evaluated root causes and corrective actions for ~200 condition reports. Wrote case studies for operating experience lessons-learned presentations. Supported Site Vice President's leadership plan based on self-assessments, root cause analyses, and third party evaluations. (August – October, 1996; June – July 2000)

Baltimore Gas and Electric (Calvert Cliffs Nuclear Power Plant)

Developed and delivered targeted root cause refresher workshops for approximately 80 plant (system) engineers and others responsible to find technical, organizational, programmatic, and human performance causes of significant and repetitive equipment failures. Sessions included interviewing sensitively, securing sponsorship, and winning approval for corrective actions. (May – September 1999)

Arizona Public Service Company (Palo Verde Nuclear Generating Station)

Examined significant event and equipment failure root cause analyses and corrective actions. Determined investigator strengths and skill deficiencies. Developed comprehensive investigation manual for operational events and equipment failures, including several electronic "templates," equipment failure guidelines, and a digest of best industry practices. (May – June 1999)

Duquesne Light Company (Beaver Valley Power Station)

Evaluated root cause analysis processes, practices, and results. Interviewed event response team leaders and members to determine skill needs. Designed and delivered unique, 3-day workshops for approximately 30 senior investigators that immersed

them in a realistic, plant-specific case Evaluated ERT performance in plant event. Developed desktop guide for efficient team mobilization and deployment. (October 1998 – February 1999)

New York Power Authority (Indian Point 3)

Supported QA problem reporting and corrective action audit based on NRC Inspection Manual. Planned investigator retraining and overhaul of root cause analysis reference materials. (June – November 1998)

Fluor Daniel Hanford (U.S. Department of Energy)

Planned and delivered intensive, experiential workshops in root cause analysis basics, investigative interviewing, and mini-MORT. Tailored special session for B&W Hanford Company personnel at the Plutonium Finishing Plant. (May 1997 – February 1998)

Maine Yankee Atomic Power Company

Assistant team leader for root cause analysis of cable separation issues cited in NRC confirmatory action letter. Defined team scope and charter, organized client and consultant members, aligned with separate engineering issue team, applied MORT-based analytical tools. Briefed chief nuclear officer and executive management. (December 1996 – January 1997)

Attorney (Confidential)

Drafted testimony on critical and costly issue for rate case proceedings. Demonstrated that facility's directors, managers, engineers, and operators acted prudently during a series of challenging engineering and human performance occurrences, and showed that they fully met the requirements of the rate-making body. (September – December 1997)

Rodel, Inc.

Designed, developed, and facilitated the initial meeting of a diverse community advisory council. The group's functions include understanding facility operations, developing open and frank lines of communication, and exploring mutual needs in the areas of emergency planning, environmental quality, community relations, and corporate philanthropy. (March 2001)

Startups, Turnarounds, Continuous Improvement (at PSEG)

Established and led the Hope Creek independent safety engineering group (ISEG) for eight years, convincing operations, maintenance, and engineering managers to adopt 275 risk-reducing changes.

Secured executive decisions on repairs and process changes for Chapter 0350 restart of Salem Generating Station. NRC praised the "tough, probing questions" and willingness to "reject presentations that needed more work."

Event Investigations (at PSEG)

Led 12-member team collectively assessing 27 significant Salem/Hope Creek incidents. Management later incorporated team's findings into Salem Watch List recovery plan.

Significant Event Response Team manager who recruited and led intensive multi-disciplined investigations of facility transients. Extracted causal patterns from clusters of lesser events.

Human Performance and Appraisal Issues (at PSEG)

Designed and implemented appeals process for resolving disputes about individual performance rankings. Chaired panel that heard oral statements from affected persons and recommended disposition of appeal.

Investigated and settled challenges of unescorted access denials. Recommended improvements to medical, psychological, and security reviews.

Provided root cause guidance to an internal team investigating significant whistleblower concern.

ADDENDUM A

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PROFESSIONAL AFFILIATIONS

Registered Professional Engineer, New York
Tau Beta Pi Engineering Honor Association
American Nuclear Society
Organizational Behavior Teaching Society
Delaware State Chamber of Commerce

ADDENDUM A

RESUMES

JAMES CROSS

2728 Muir Woods Dr
Hampton Cov, Al 35763

Phone 256-536-5107
E-mail Gemer@home.com

Education

1964 - 1969 University of South Florida Tampa, Fl.
BS Electrical Engineering

Professional experience

2000 – 2001 Independent Consultant
Senior Management Consultant
(303) Performed Due Diligence for a major corporation.
(304) Member of Root Cause Evaluation Team. Yucca Mountain Project

1996 – 2000
President of Generation Group and Chief Nuclear Officer
Duquesne Light Company

Major responsibilities were the day to day safe operation of Beaver Valley Nuclear Plant; operation of four gas turbines and four coal plants and the power supply for company's service area. Total Employees were 1500 with a budget in excess of 500 million. Reported to the Chairman of the Board of Directors of DQE.

- Senior Manager in charge of Beaver Valley Nuclear Units 1 & 2
  Direct management of Quality Assurance, Engineering, Fuel Supply, Operation, Human Resources and Licensing
- Senior Manager in charge of four gas turbines, four coal units and power supply.
  Direct reports included Manger of Fossil Plants and Manager of Power Supply

1994 -- 1996
Senior Vice President Nuclear and Chief Nuclear Officer

Major responsibility was the safe operation of Beaver Valley Nuclear Plant. Represented the company with the NRC, INPO, NEI, and the Department of Energy. Developed licensing strategies involving the operation of Beaver Valley. This included many personal meetings with NRC managers in Washington and King of Prussia.

- Senior Manager in charge of Beaver Valley Units 1& 2.
  Direct Management of Quality Assurance, Engineering, Nuclear Fuel Supply, Operation, Licensing, and Human Resources.

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1990 – 1994
Senior Vice President of Generation and Chief Nuclear Officer
Portland General Electric

Major responsibilities included the safe operation of Trojan Nuclear Plant, managing plant operation, Quality Assurance, Licensing and Engineering.

- Planned the decommissioning of Trojan Nuclear Plant. Participated in a Red Team Investigation and Report on the Operation of Rocky Flats Facility at the request of The Department of Energy Director.
- Managed the closure of Trojan Nuclear Plant. This included the development of employee benefits and retention programs.
- Coordinated the closure with Bonneville Power Administration and The Department of Energy.
- Testified before the Oregon Public Utility Commission on the closure and decommissioning of Trojan Nuclear Plant.
- Senior Manager In charge of the operation of Trojan Nuclear Plant and the company's representative to the NRC, INPO, NEI and EPRI.

1988 - 1990
Plant Manager of Turkey Point Nuclear Plant
Florida Power and Light Company

Major responsibilities included the day to day safe operation of Turkey Point. In 1987 Turkey Point was placed on the NRC Plant Problem List and the NRC threatened to shut Turkey Point down if plant operation didn't improve. I was brought in to improve operation and get Turkey Point off the Plant Problem List. The Plant was removed from the list within approximately six months. Turkey Point has improved to the point that it is recognized as one of the top performing plants in the country.

- Direct reports were Operations Manager, Radiation Protection Manager, Plant Engineering Manager, Maintenance Manager, Licensing Manager, and The Manager of Training.
- Develop the Operation Improvement Plan, which detailed the areas needing improvement and the specific plans, objectives and schedules for achieving the necessary improvements. Presented the plan to the NRC and managed its implementation for the successful removal of Turkey Point from the NRC list.
- Won the Deming Award for Quality. Turkey Point was the first plant outside of Japan to be judged for and win the Deming Award for Quality.

1983 - 1988
Site Director, Plant Manager, Manager of Operations
Middle South Utilities

Major responsibilities varied during my employment at Middle South Utilities. I was initially hired as the Manager of Operations during the initial startup of Grand Gulf Nuclear Plant. I was soon promoted to the Plant Manager to oversee the initial startup of the plant. Eventually I was promoted to Site Director and reported to the senior vice President and Chief Nuclear Officer.

- Managed the initial startup of Grand Gulf.
- Testified at NRC Commission Meetings involving the initial Full Power License for Grand Gulf.
- Direct reports as Plant Manager included Operations Manager, Chemistry Manager, Radiation Protection Manager, and Maintenance Manager.
- Direct reports as Site Director were Plant Manager, Engineering Manager, and Training Manager.

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1972 - 1983
Assistant Plant Manager, Engineering Manager and Instrument Engineer
Tennessee Valley Authority

I was hired as an Instrument and Controls Engineer in the Design Engineering Department. Soon I was transferred to the Operations Department, which operated the plants in the TVA system. I was assigned as an Instrumentation and Controls Engineer, responsible for assisting the plants in trouble shooting and repair of control system problems that the plant was unable to solve. I was promoted to Engineering Manager at Watts Bar Nuclear Plant. This position managed the Instrument and Controls Section, the Reactor Engineering Section, and the Chemistry Section.

Within 2 years I was promoted to Assistant Plant Manager.

1970 - 1972
Instrument and Controls Engineer
Florida Power Corporation

Major responsibilities included the design of an oil conversion for two large coal units, and the initial design review of Crystal River Unit 3 nuclear plant.

ADDENDUM A

RESUMES

THOMAS W. DOERING

920 Morning Sun Court
Las Vegas, Nevada 89110
702 459-0192

PROVEN TRACK RECORD

- ABLE TO ORGANIZE AND LEAD A STAFF IN A TECHNICALLY CHALLENGING AND POLITICALLY CHARGED ENVIRONMENT.
- MANAGE BUDGETS OF 20 M - PLUS DOLLARS/YEAR.
- PRINCIPAL ON MAJOR CONTRACTS PROPOSAL AND START UP TEAMS.
- FAMILIAR WITH COMMERCIAL AND FEDERAL PROJECTS.
- STRONG PRESENTATION AND MOTIVATIONAL SKILLS.
- 'TEAMS' LEADERSHIP PROCESS; STRONG TROUBLESHOOTING SKILLS.
- ENGINEERING, FABRICATION, OPERATION, AND LICENSING EXPERIENCE

PROFESSIONAL EXPERIENCE

Sr. Project Manager:

- Plan, allocate, and track annual budget of 20 million plus dollars/year. Over ten-fold increase in project responsibility and staff, staff over 125 FTEs. Have met the allocations within 3% each year. Responsible spanned research, engineering, fabrication, installation, and licensing.
- Activities included in-house and outside contract support. National and international responsibilities.
- Coordination of government and private companies, i.e., DOE, National Laboratories, Commercial Vendors and Utilities.
- Profit and loss responsibilities.

Department Manager:

- Responsible for developing and running the a number of Design Departments, multi-discipline scientific and engineering staffs, i.e., structural, thermal, nuclear, fabrication/construction techniques, engineering and fabrication drawings; remote instrumentation, handling and manipulation of materials/data. Responsible for the design and licensing of components and facilities. Multi-discipline staff of 80 *plus* engineers, scientists and technicians. (FEA codes and other in-house engineering codes.)
- Developed a risk-informed methodology (PRA) for component/system evaluations, an industry-accepted best estimate/nominal thermal evaluation methodology, and elastic-plastic methodology. (Using ASME codes)
- Responsible for planning, directing, and organizing the technical efforts of engineering staff, national laboratories and subcontractors to ensure integration with the design efforts.
- An understanding of the detailed design/system and how to apply the testing/research.
- A balance between management, licensing, design, science and manufacturing needs and activities.
- ISO 9000 and other Quality Control and Quality Assurance systems (NRC and DOD approved)
- State and federal requirements, DOT, DOE, EPA and NRC regulations and regulators.
- Familiar with industry standards, for example: ASME, AWS, ASTM, ANSI, ASCE.

Engineering:

- Specific responsibilities have included the thermal, structural, nuclear and metallurgical design evaluations. A wide range of industry-accepted computer codes where used.
- Developed the engineering parts list, fabrication drawings, and the design specifications.
- Functioned as technical spokesman to customer and federal and state licensing agencies for the project.
- Authored numerous design evaluations, documents used for licensing.
- Coordinated scientific investigations associated with design activities.
- Quality assurance and control systems (NRC, DOE, DOD, and ISO 9000).

Construction:
Large and small construction efforts, field engineer, design office representative and millwright.

- Power plant and industrial facility construction/engineering.
- English Channel tunneling system. (TML)

PROJECTS WITH VARIATY OF FOCUS:

- Component and system design, fabrication, and installation.
- High performance and long life components in adverse environments, large metal and ceramic systems.
- Risk informed design processes, risk assessment of complex systems (PRA).
- Thermal, structural, and nuclear analysis (standard and leading edge processes)
- Metallurgical specification of components
- Managed Machine shop. Component, facility design and build.
- Remote instrumentation, fast acting sensors in high temperatures and radiation fields.
- High and Ultra-High Vacuum system design, fabrication and installation.
- Design investigation for Utilities.
- Supported The Robbins Company on developing new tunneling methods and TML on the Channel TBM, on-site representative for the Robbins Company in England.

WORK HISTORY:
BECHTEL SAIC COMPANY LLC: SR.Project Manager, 2-2001 to Present. Key Individual for contract (asked to join project.)
ELECTRIC POWER RESEARCH INSTITUTE (EPRI): Program Manager, 2000 to 2-2001, Fuel performance, Storage, Transportation and Disposal issues
FRAMATOME TECHNOLOGIES (FORMERLY BABCOCK AND WILCOX), 1989 TO 2000:
Sr. Project Manager/Department Manager.
BOEING AEROSPACE, 1984-1989: at the Physical Science Research Center (skunk-works). Manager of Engineering/Construction.
SIEMENS (then Exxon) 1978-1984, Design Engineer & Project Design Engineer, youngest in company: Overall responsibility for implementing the fuel design for the PWR and BWR Power Plants, a multimillion dollar international contract.
BECHTEL AND BABCOCK AND WILCOX, 1973 – 1978, Power plant construction/engineering experience.

RELEVANT SKILLS
"Teams" approach to leadership: Strong presentation skills; Quick study. Excellent interpersonal and group motivational skills. Have used a number of project control and planning software systems. Set up and management a number of three-dimensional *CAE/CAD/CAM* systems. Considered an international expert on nuclear issues.

EDUCATION
Bachelor of Science degree, University of Missouri-Rolla, 1978: double major in Civil and Nuclear Engineering. Post-graduate work in Metallurgy and Small Business Administration. Nominated and attended management classes with the Boeing Company. Selected and attended Framatome's Senior Management Leadership Training.

Major Awards Department of Energy's Doer of Deeds Award (two awards); Invited Plenary speaker for ANS Conference; Framatome Technologies, Leadership Conference/Class. Invited Plenary speaker for Czech Republic conference; Briefed Secretary of Energy, Bill Richardson; Brief congressional technical review boards.
PUBLICATIONS: Authored numerous technical papers and licensing documents, 35 plus.
CLEARANCES DOD Secret, 8/84 to 4/91; DOE "Q", 1/89 to 9/94; DOE 'L' Present
PROFESSIONAL SOCIETIES

- American Society of Mechanical Engineers, Chair (for two years) and Vice-Chair for the Silver State Chapter (Nevada)
- American Nuclear Society, vice-president and Member-at-Large, Nevada Chapter, member of National NCCS Committee, elected position
- Lead Organizer, 1994 & '95, International High Level Radioactive Waste Conference
- American Society of Mechanical Engineers, committee member, national committee member, elected position

Beckman & Associates, Inc.

1071 STATE ROUTE 136 ‹ BELLE VERNON, PA 15012

724-872-9157 ‹ FAX 724-872-6347 ‹ BAAOFFICE@AOL.COM

SOCIAL ORGANIZATIONS

- University Missouri-Rolla Alumni Association, former Vice President and President, Seattle (Pacific Northwest) chapter
- United States Soccer Federation, state soccer referee, State Director of Instruction for Nevada
- NCAA soccer referee, and Continental Indoor Soccer League (CISL) referee

Sam H. Hobbs

Education

MBA Finance, University of Houston 1978
MS, Nuclear Engineering, Georgia Tech 1972
BA, Physics, Vanderbilt 1971

Registration

Registered Professional Engineer, Texas

Other Training

- Pressurized Water Reactor Technology and Simulator Training
- Boiling Water Reactor Technology and Simulator Training
- Kepner-Tregoe Training (Root Cause, Problem and Decision Analysis)
- TapRoot® Training (Root Cause Determination)

Experience

Mr. Hobbs has over twenty-six years of experience in the commercial nuclear power industry in engineering, licensing, and project management. He has strong communications and people skills and extensive experience in hands on project management of diverse project activities. He has worked on Boiling Water and Pressurized Water Reactors in management and supervisory jobs with broad administrative and technical duties and has conducted numerous safety analyses and managed probabilistic studies. He served as Chairman of the Mark III Containment BWR Owners Hydrogen Control Group and played a key role in resolving major technical specifications problems at Grand Gulf Nuclear Station. He served as the Interim Director of Safety and Licensing at the Beaver Valley Power Station and played a key role in restart of an extended two unit shutdown. He is currently serving as a senior consultant on the Yucca Mountain Project with broad responsibilities in management and technical support including root cause analyses, transition planning, planning for License Application preparation and submittal, pre-closure safety strategy, and development of a design alternative for a cooler repository.

1998-Present:

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Beckman & Associates, Inc.

Assigned to the Yucca Mountain Project M&O Contractor Regulatory and Licensing staff as a senior consultant. Serving as the Regulatory & Licensing root cause coordinator. Served as the corporate level team leader in doing root cause investigation on repetitive failures to comply with software procedures. Conducted corporate level root cause analyses for four major quality program issues, leading to eventual submittal of the analyses and corrective action plans to the U.S. Nuclear Regulatory Commission. Conduct special management assessments of problem areas. Was instrumental in development of the plans and schedule for development of the Yucca Mountain NRC License Application and the processes and infrastructure to support the application. Served as the Acting Manager of License Application Support. Assisted in review of broad safety issues including the repository pre-closure safety strategy. Serve in coordinating interactions for specific meetings as assigned and as the overall coordinator for the interactions calendar and twice annual planning of forthcoming meetings. Assisting in the development of possible repository design change strategy to incorporate a cooler (below boiling) design in response to concerns over uncertainty. Assisted in development of Regulatory and Licensing transition plans and briefings for the transition effort to a new DOE contractor and now serving as a senior staff member on assignment to the new contractor (Bechtel-SAIC). Responsible for coordination of Department of Energy/Nuclear Regulatory Commission management meetings, quality assurance interface, audit observations, commitment management system department coordinator, and development of recommendations and positions in a broad variety of regulatory areas.

HGP, Inc.

- Onsite assignment as Interim Director of Safety and Licensing at the Beaver Valley Power Station responsible for directing department of 41 (inluding direct employees and contractors) during restart of a dual unit PWR facility following a six month shutdown of both units. Responsible for interface with the Nuclear Regulatory Commission, development of License Amendment Requests, coordinating regulatory activities between departments, overseeing FSAR verification and all other department activities. Reported directly to the Senior Vice-President of Nuclear Support.

1988-1998: GDS Associates, Inc.

- Testified before the New Hampshire Public Utilities Commission on behalf of the Commission Staff and the Office of Consumer Advocate in several proceedings regarding Millstone 3, Seabrook, and Connecticut Yankee outage prudence as well as policy matters regarding credit for transfer of Seabrook Unit 2 spare parts to Unit 1, appropriate methodology for quantifying outage disallowances, and economic analysis and prudence of the sale of the Seabrook Unit 2 steam generators. These efforts included independent evaluations of:
  - Design decisions involving the Millstone 3 Service Water System regarding chlorination, material selection, and drainage;
  - Seabrook engineering determination of potential loose parts (ultimately found to be

Reactor Coolant Pump capscrews.

- Assisted in developing recommendations for steam generator replacement strategy for non-operating owners of Catawba and in evaluating Duke Power proposal to the non-operating owners for steam generator replacement. This included a statistical evaluation of expected degradation based on history of plugged tubes.

- Prepared calculations of heat balance on waste heat recovery for an industrial facility to determine eligibility for treatment as a qualified facility.

- Responsible for reviewing CP&L nuclear outages for reasonableness in fuel cases and testifying before the South Carolina Public Service Commission for an industrial intervenor.

- Reviewed proposed changes to regulation governing fuel cost recovery in South Carolina and testified before the South Carolina Public Service Commission for an industrial intervenor.

- Assisted private counsel for Darlington County, South Carolina in reviewing federal regulatory requirements on fire protection and provided testimony with regard to taxation of the Robinson 2 Nuclear Plant by the Darlington County Fire Protection District.

- Analyzed historical information on the range of probable consequences following an NRC Diagnostic Evaluation Team visit and provided report to the City of Austin, a non-operating owner of the South Texas Project.

- Assistant team leader for document review in support of nuclear litigation on behalf of plant owner/operator.

- Supported development and provide ongoing support for the Georgia Public Service Commission nuclear performance standard.

- Supported development of issues, discovery, preparation of testimony, and quantification of damages for several decommissioning and operating prudence cases.

- Assisted in discovery and issue development and developed project delay cost quantification in Palo Verde rate case on behalf of a municipal intervenor.

- Reviewed DOE study of Dry Cask Storage of Spent Nuclear Fuel and prepared formal comments on behalf of the Georgia Public Service Commission. Responsible for the Georgia Public Service Commission audit of Southern Company Services support activities for Georgia Power Company.

- Conducted monitoring for minority owner of Comanche Peak and assisted in discovery work in support of Comanche Peak litigation.

- Team member in conducting monitoring review visits to the Duane Arnold Energy Center for the minority owners.

- **1981 - 1988: System Energy Resources, Inc. (SERI) and Mississippi Power & Light, Inc. (MP&L)** in management and supervisory positions. Responsible during this period for supervising and administering up to 14 employees and as many as 20 consultants.

- Responsible for a broad variety of special containment issues including secondary containment operability requirements, drywell leakage, suppression pool issues, system blowdown loads, airlock operability concerns and sealing problems and post accident hydrogen control.

- Responsible for postulated degraded core hydrogen control issue and served as the Chairman of the BWR Mark III Containment Hydrogen Control Owners Group for three years. In this capacity, led the effort to construct a quarter scale model of the Mark III Containment for burn testing. Evaluated extensive analysis of hydrogen burn issues. Developed generic Emergency Operating Procedures and Technical Specifications for using igniters. Made presentations to ACRS on Grand Gulf specific issues.

- Took lead utility role in assessing the Humphrey issues regarding the Mark III Containment: made presentations before the ACRS subcommittee overseeing the issue, recommended testing of selected systems to determine extent and nature of the problem at Grand Gulf.

- Responsible for probabilistic risk assessment issues including:
  - Evaluation of RSSMAP study and presentation to ACRS subcommittee;
  - Supervising preparation of the Grand Gulf Individual Plant Evaluation (IPE) which provided a more detailed and plant specific assessment of risk.
  - Re-evaluated probability of chlorine barge accidents and effects on control room habitability. Presented results of recommendation to ACRS subcommittee.

- Responsible for licensing submittals of Middle South Utilities nuclear management consolidation in which Arkansas Nuclear One and Waterford 3 operating licenses are being transferred to SERI. This job involved coordinating the activities of seven working groups involved in all aspects of the consolidation including organizational review, contracts and interface with the Nuclear Regulatory Commission (NRC).

- Coordinated all aspects of transferring operating license for the Grand Gulf Nuclear Station (GGNS) from MP&L to SERI.

- Responsible for all aspects of Nuclear Licensing department administrative activities, including goal development, budgeting, cost tracking and variance reporting, computer support, recruiting and personnel matters and providing staff assistance for Nuclear Operations budgeting and variance reporting. This included review of the overall budget and preparation of the Board of Directors presentation for budget approval.

- Responsible for major portions of pre-outage license work for two outages including obtaining work deferrals and technical specification changes from the NRC.

- Contributed heavily to keeping plant operational by coordinating efforts to successfully obtain discretionary enforcement action or Emergency Technical Changes from the NRC.

- Played a key role in obtaining low power and full power operating license for GGNS with responsibility for a number of issues including onsite and offsite power sources, unresolved safety issues, containment issues and preparation of exemption requests.

- Served as the resident liaison with the NRC (in Bethesda, Maryland) during 1984 resolution of open Technical Specification issues.

- Responsible for development and maintenance of GGNS Technical Specifications.

- Responsible for the Operating Experience program including evaluation of NRC Bulletins and Information Notices as well as INPO operating experience notices.

- Responsible for preparation of Licensee Event Reports, Special Reports, Part 21 reports, and responses to deviations and violations.

- Responsible for tracking licensing commitments.

- Prepared annual reports of safety evaluations,

- Responsible for generic issues such as TMI and BWR Owners Group work.

1974-1981: Brown & Root, Inc. - Senior Engineer

- Served as the senior staff member of the licensing group for the Brown & Root Power Division for six years;

- Responsible on the South Texas Project (STP) for several licensing and mechanical areas including:
  - Served as TMI Coordinator;
  - Conducted Regulatory Guide evaluations.
  - Prepared STP FSAR material on codes and standards and site related hazards.
  - Prepared calculations of turbine missile impact probability.
  - Prepared calculations involving site hazards analyses including probability of aircraft crash hazards and control room habitability following toxic gas releases.
  - Prepared detailed and analyses of tornado missile related hazards including preparation of a topical report on tornado missiles.

- Responsible engineer for the Main Steam System:
  - Responsible for interface between the nuclear and balance of plant aspects of the system;
  - Evaluated vendor drawings and revisions for determination of impact on system design;
  - Revised substantial portions of the system pressure drop calculations;
  - Prepared engineering aspects of an ASME audit of the system (which was concluded with no adverse findings).

- Served as the Senior Staff Licensing Engineer responsible for coordinating and managing all aspects of the development of the Brown & Root Standard Safety Analysis Report and responsible for coordinating all licensing reviews and input for the South Dade Environmental Report. Conducted assessment of natural draft cooling tower aesthetic impact.

- Served as a Mechanical Engineer on the Alcoa/SIGECO Plant Warrick Improvement Program involving major improvements to a four-unit coal-fired plant. Prepared recommendation for control of Asiatic Clam infestation. Prepared turbine water induction protection calculations and associated control valve settings. Prepared pipe specifications for system improvements. Prepared specifications for pre-engineered buildings to house water treatment facilities.

1972-1974: Southern Company Services, Inc. - Project Licensing Engineer on the Farley FSAR responsible for preparing and submitting the FSAR and responding to two rounds of review questions. The Farley FSAR was the first FSAR to be docketed on initial mini-review. Responsibilities in the development of the Farley FSAR included all interface and input to and from all technical disciplines and with the operating organization on Technical Specifications and Emergency Procedures. There was heavy emphasis on diesel generator issues, site related hazards, cooling pond temperature analysis, electrical and instrumentation aspects, failure mode and effects analyses, and accident analyses.

Also assisted in development of the Vogtle PSAR and Hatch Environmental Report.

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JOHN HOSMER

SUMMARY

Mr. Hosmer has extensive experience with three major utilities and a large international engineering and construction firm, Bechtel. Member of senior executive turnaround team at two utilities hired to improve troubled Plants performance while building and leading engineering team Performance improvement. Recognized for turnaround, team building, project management, technical problem solving, and business development skills. Mr. Hosmer is an energetic doer capable of "out of the box" thinking in creating a vision and finessing implementation. Overseas and military officer experience.

EDUCATION

M.B.A., California State University, Long Beach, California - 1983
M.S. Chemical Engineering, Purdue University, West Lafayette, Indiana - 1968
B.S. Chemical Engineering, Purdue University, West Lafayette, Indiana - 1967

EXPERIENCE

1998-Present Marathon Consulting Group

Senior Vice President, responsible for business development and execution of personal and group consulting engagements. As an individual consultant, prepared corporate restructuring plan for large public utility facing deregulation. Independently assessed the market and challenged a proposed joint venture for a large engineering and construction firm. Additionally, lead configuration management assessments and developed procedures and training and was the senior mechanical and nuclear member of a design review board.

1994-1998 Unicom Corporation

As Vice President, was a member of senior executive turnaround team hired to improve troubled plant performance while building an in-house engineering organization and leading performance improvement in support of 12 operating nuclear generation stations. Within 6 months, developed and implemented common tools, processes, organizations, and performance measures. Improved technical quality cost and schedule performance 10 to 20% annually, saving $20 million annually. Shifted work performed in house from 40 to 80% and permanently reduced contractor costs $80 million annually. Successfully completed complex "fixed cost" steam generator replacement and core shroud repair projects. Optimized the engineering work control system and product processes.

1988-1994 Florida Power and Light

As Director, Nuclear Engineering, was a member of senior executive turnaround team, hired to improve troubled plant performance while separating fossil and nuclear engineering and developing a cost effective engineering support team for 4 operating nuclear generation stations. Within 1 year, set strategic direction and separated fossil and nuclear engineering while implementing a cost-effective engineering model. Shifted work in-house from 30 to 95% and reduced contractor reliance by $200 million annually. Performance as measured by regulatory agencies improved to a 1. Successfully completed complex 1 year dual unit outage at Turkey Point station.

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1987-1988 Tennessee Valley Authority

As Engineering Manager, hired to lead the Performance turnaround of the Sequoyah nuclear station engineering department during the last year of a 3 year restart effort. Within 1 month, developed and implemented management control tools and performance measures that focused the organization on restart. Developed a self confident organization by coaching and directing the organization on complex technical negotiations with station management and the regulatory agencies. Completed restart successfully in 1 year while down sizing the organization from 3000 to 360 personnel saying $240 million annually.

1973-1987 Bechtel Power Corporation

As Chief Mechanical & Nuclear Engineer during 1985-1987, directed the organization transition from a domestic new construction market to a domestic Operating Plant market and an international new construction market. Redistributed Personnel overseas and to domestic job sites while downsizing the organization by 500 People with no adverse legal action. Optimized "lessons learned" processes to prevent reoccurrence of repetitive design error. Senior company technical official accountable for technical Policy, technical processes, personnel development, business development and recruiting during a Period of significant market size reduction and market shift.

As Project Manager during 1984-1985, developed "Out of the box" restart strategy for Southern California Edison's San Onofre facility. Booked the job and project managed the 700 person construction engineering and procurement work force to successful restart. "Out of the box" strategy resulted in a 7 month $30 million project that prevented premature retirement of the unit and saved $270 million and 2.5 years of schedule.

As Chief Environmental & Nuclear Engineer during 1983-1984, accountable for technical policy, technical processes, personnel allocation and development, and business development during an industry growth period.

As Project Manager during 1981-1983, assigned to manage the first major project in Bechtel Asian joint venture company, PECL, in Taipei, Taiwan. Project scope included the Yenliao nuclear station bid evaluation and initiation of engineering and construction. Completed $10 billion power plant bid evaluation on budget and 1 month ahead of schedule. Award as recommended was accepted by Taipower, the President of Taiwan and the legislature. Engineering and construction was initiated on schedule.

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1973-1981 Various Technical Management Assignments

1969-1973 United States Navy

Officer on operating fleet ballistic missile nuclear submarine USS Woodrow Wilson. Successfully completed 5 Patrols and passed 2 Operational Reactor Safeguards Exams.

AFFILIATIONS

American Nuclear Society
Professional Engineer - CA, FL, IL

ADDITIONAL MANAGEMENT DEVELOPMENT

Deming Statistical Training and Deming Medal Winner at FPL
Advanced Business Concepts, Stanford, California - 1983

3343 White Eagle Drive
Naperville, IL 60564
Residence: 630-904-0632
Office: 630-922-3299

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Name: JAMES E. KING, P.E.

Title: Engineering Manager, Project Manager

Education: Master of Engineering, 1963, Structural Engineering and Engineering Mechanics, University of Florida, Gainesville
B.S., 1962, Civil Engineering, Drexel University, Philadelphia, Pennsylvania

Special Training: Six Sigma Training, Bechtel, 2000
Project Manager Course, Jacobs, 1997
Radiation worker Training, Bechtel Jacobs, 1998

Registration: Professional Engineer, 1972, Colorado

Clearance: DOE Q Clearance (Active)
DOD Top Secret Clearance (Inactive)

Employment History:

Bechtel Jacobs Company LLC Manager of Projects, Site Manager	03/98 to date
Jacobs Engineering Group Inc. Project Manager	06/90 to 03/98
Westinghouse Materials Co. of Ohio Manager, Environmental Projects Project Manager Manager, Engineering Services	04/86 to 06/90
Rockwell International Corp., Rocky Flats Plant Project Administrator	06/83 to 04/86
Charter Oil Company, Multi-Mineral Division Director of Project Operations	03/79 to 06/82
Wyoming Minerals Corporation, subsidiary of Westinghouse Electric Corporation, Nuclear Fuels Division Project Manager, New Facilities Manager, Plant Design	06/74 to 03/79
Various Mineral Processing Firms Design Engineer	1962 to 1974

Mr. King has over 35 years of experience as a Project Manager in the design, construction, permitting, and operation of innovative projects in mining, chemical processing, nuclear fuel and nuclear weapons manufacturing facilities.

He has managed major line item projects at DOE nuclear weapons and fuel processing plants; and directed the review and preparation of operating procedures to assure conformance to DOE Orders, and federal and state regulations. Mr. King has

conducted extensive research, design, and operation of in situ uranium recovery processes and related groundwater remediation processes, and has managed the research, development, and reduction to practice of an in situ oil shale process.

In addition to his technical assignments, Mr. King provided marketing support for Jacobs and Bechtel, participating in several large proposals. He was a primary author of technical sections; participated in oral interviews with the client; and was responsible for developing cost estimates and pricing.

Mr. King is currently with Bechtel Jacobs Co. LLC as the Manager of Projects and site manager at the DOE Portsmouth Gaseous Diffusion Plant, a uranium enrichment facility. Bechtel Jacobs serves as the landlord for uranium enrichment facilities leased to the U.S. Enrichment Corporation. Both DOE and the Nuclear Regulatory Commission regulate portions of this facility. Mr. King led a phase-in team at the onset of the contract to restructure the organization and implement the M&I concept. Subsequently he led the development of scopes and detailed estimates for preparation of bid packages for subcontracting work that was previously self performed. Bid packages included waste management, radiation control, groundwater monitoring, engineering, nuclear criticality safety, site operations and maintenance, and administrative services. Mr. King negotiated directly with the Ohio and US EPA to develop working relationships for expedited review and approval of regulatory documents. He also served as the Bechtel Jacobs representative to the Portsmouth Emergency Operations Center and directed recovery activities for Bechtel Jacobs during a critical transformer rupture emergency.

Assignments with Jacobs Engineering Group have included:

Project Manager for the Army Corps of Engineers project to remediate POL facilities at a remote Air Force Base in the Aleutian Islands. Directed permitting, design, logistics and construction to correct environmental problems at the Base.

Project Director, Operable Unit 3, DOE's Fernald Environmental Management Project (FEMP), at the Fernald Feed Material Production Center (FMPC) in Ohio. Supervised a project team of more than 400 personnel from varied disciplines in the remediation of all former uranium processing facilities, comprising over 200 buildings, structures and related waste storage and shipping facilities with an annual budget of $52 million. Developed staffing plans and negotiated staffing needs with functional managers. Acquired and directed consultants, remedial design and construction contractors performing decontamination and decommissioning (D&D) activities, waste storage and shipping activities, and related permitting and health and safety activities. Activities included:

- preplanned the entire remedial program at inception, for Operable Unit 3, resulting in a reduction in overall schedule of three years and a savings of $300 million
- devised innovative regulatory strategies to speed remediation and cut costs. This plan was approved by DOE and the EPA and is being implemented. In conjunction with the DOE and EPA, restructured the field characterization program for Operable Unit 3, resulting in a cost savings of $16 million in one fiscal year over the previously validated budget

- Program Manager at the DOE Pantex Plant in Amarillo, Texas, a nuclear weapons assembly facility. This project was a task order contract to provide engineering and technical services for support of environmental, safety, and health requirements to the operating contractor at the Pantex facility. Directed preparation of all task order proposals and estimates, acquired and assigned staff from Jacobs or teaming subcontractor organizations, and supervised technical, cost and schedule performance and reporting. Tasks included:

- drafted environmental restoration and waste management program documents for low-level and mixed wastes, hazardous and sanitary wastes; and classified, TRU, and TRU/mixed wastes.
- prepared and updated Safety Analysis Reports for the Pantex facility to bring them in line with revised DOE Orders.

- staffed and supervised a team in a complete waste inventory of over 300 Pantex site buildings, developed a sitewide environmental database, developed waste flowsheets for each process, and developed a waste minimization program.
- reviewed Pantex Plant operating contractor's waste management program for compliance with DOE Orders, and assessed Pantex compliance to the Orders with recommendations to be implemented for full compliance
- directed preparation of work plans, sampling plans, quality control plans, and health and safety plans for soils investigation at two buildings at the Pantex Plant used for high explosive machining, filtering, and disposal.

Prior to joining Jacobs, Mr. King was Manager, Environmental Projects with Westinghouse at DOE's Fernald FMPC. He managed a $360 million major environmental improvement line item consisting of 90 subprojects. He was responsible for developing budgets, staffing plans, and for engaging numerous design and construction subcontractors who were performing the work. Subprojects included refurbishment of existing manufacturing and waste handling facilities, stormwater systems, and new air and water quality facilities. Other assignments at the site included:

Manager, Engineering Services. Managed a department of 40 people with responsibility for staffing and resource assignment to provide technical support to project and production activities. Developed estimates for all modification work on site. Led an in-house staff to review all designs and modifications to operations, to assure conformance with DOE Orders, state and local codes, and safety regulations.

Project Manager. Managed the construction, operational readiness, start-up, and turnover of a uranium hexafluoride conversion facility.

As Project Administrator with Rockwell International at the DOE Rocky Flats Plant, an operating nuclear weapons manufacturing facility, Mr. King was responsible for managing design and construction contractors for numerous research, line item and GPP projects sitewide. He also directed a team of project engineers with responsibility for all engineering and construction projects in the 400 area (uranium processing).

As Director of Project Operations with Charter Oil Co.'s multi-mineral division, Mr. King directed the planning, design, and construction of process facilities for a large integrated in situ oil shale mining project on the western slope of Colorado. This $1.6 billion project consisted of oil and nahcolite processing equipment located both above and below ground. His activities included:

Obtained and supervised consultants who developed conceptual and preliminary designs for the project, which included complete process flowsheets and P&IDs, cost estimates, environmental impact assessments, and management and subcontracting plans for this project.

Obtained consultants who performed design and construction of all surface and underground processing equipment for the existing U.S. Bureau of Mines 2,200-foot deep by 8-foot diameter test shaft, which was developed into a research stope.

Directed design and construction of a corporate research center and pilot plant which included a 12-foot diameter by 35-foot high test retort and associated oil and gas processing equipment, piping, oil/gas coalescers, separation equipment, thermocouples, gas chromatographs, and analytical equipment. A complete analytical facility was built which included Fischer assay capabilities.

As Project Manager and Design Manager with Wyoming Mineral Corporation, a Westinghouse Nuclear Fuels Division, Mr. King supervised scientists, consultants and engineering firms conducting research, design, and operation of an in situ uranium recovery process. He also designed a groundwater restoration system using reverse osmosis and evaporation processes.

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Earlier, Mr. King was an Engineer in the minerals and chemical processing industry, responsible for wastewater treatment and handling and process plant equipment design and installation.

ADDENDUM A

RESUMES

RICHARD O. LAING

1005 Ada Avenue
Idaho Falls, Idaho 83402

Home: 523-5473
Office: 526-2678

EXPERIENCE:

July 1986 to present: Idaho National Engineering and Environmental Laboratory

Current contractor October 1999 to present: Bechtal, BWXT Idaho
Contractor October 1994 –September 1999: Lockheed Martin
Contractor July 1986 to October 1994: EG&G Idaho, Inc.

Advisory Engineer/Scientist: April 1999 - Present: Perform special projects for Director of Quality Systems on complex quality processes including implementation of commercial services program and definition of quality classification for work. December 1999 – April 1999 Acting manager of Quality Assurance Independent Oversight Department. Lead Auditor performing audits on quality assurance and conduct of operations issues for INEEL. October 1994 – December 1999 Perform compliance oversights, audits, and analysis including statistical process control on safety data, for Environmental Management (EM) on EM operations and programs. Provide root cause analysis of deficiencies, accident/injury events and other issues within the INEEL. Designated the LMITCO Root Cause Analysis Champion to the Compliance Review Board - providing root cause analyses on actual and potential problems or events. Serve as principal accident investigator and root cause analyst for the EM Branch and as accident investigator for the INEEL and DOE complex. Investigations and analysis include: Procedure non-compliance at ATR, Standard Waste Box quality event at RWMC, Cesium 137 source event at RWMC, Idaho Chemical Processing Plant Old Waste Calcining Facility contamination event, Mercury Retort operation propane spill, Mercury Retort operational shutdown, and Mercury Retort FRAC Tank fire. Provide safety and operational trend analysis to Environmental Management (EM) Vice President and General Manager. Provide leadership and guidance on safety and health issues related to Federal, DOE, DOE-ID and ASME NQA-1 requirements and regulations. Served as EM VPP coordinator; championed the organization and implementation of the DOE VPP within EM including teaching Total Safety Culture and SAM IV. Conduct independent technical and management assessment Operational Readiness Reviews for EM programs to assure compliance to regulations and operability. Recent ORR assessments include the Waste Storage Facility - 635 and the Transuranic Storage and Retrieval Enclosure at the RWMC. Review and provide technical comments on EM and LMITCO safety and health documents.

Provided technical safety expertise to the DOE on nuclear and non-nuclear operational efforts on Safety Analysis Reports (SARs), Technical Safety Requirements (TSRs), Unreviewed Safety Questions (USQ), and Operational Readiness Reviews (ORR). Project Leader and instructor on the DOE HQ TSR Course to DOE facilities/sites throughout the U.S. Developed and presented the TSR Generic Rules sections on Limiting Control Setting (LCS)/Limiting Conditions for Operations (LCO) and Surveillance Requirement (SR), TSR LCO/LCS specific Surveillance Requirements, TSR Administrative Controls, and TSR Review and Approval processes.

Engineering Specialist – Environmental Management: December 1991 - October 1994: Provide technical nuclear and non-nuclear waste management and environmental remediation/operations expertise in the development of the DOE HQ TSR Course. Provided technical nuclear and non-nuclear expertise to the Independent Safety Review Committee on the operations, documentation, and D&D of facilities and operations at the Idaho National Engineering Laboratory (INEL). Specific facilities reviewed included the Radioactive Waste Management Complex (RWMC), Waste Storage Facilities (WSF), Stored Waste Examination Pilot Plant (SWEPP), Test Area North (TAN), Waste Experimental Reduction Facility (WERF), Waste Reduction Operations Complex (WROC), and Waste Experimental Development Facility (WEDF). Provided technical review comments on SARs, TSRs, USQs, ORRs and other nuclear and non-nuclear safety documents and processes, averaging some 60 documents per year. Provided guidance and training on ORRs including establishment of, and participation on, ORR teams for various facility ORRs including RWMC, TAN Hot Cells, WERF, WSF and others. Provided systems engineering and project management support to the ISRC. Developed training and trained all ISRC members on all initial and refresher reviewer techniques and processes. Analyzed, organized and directed a systematic document review process. Developed and maintained a Program Management Plan, directive and procedures governing document reviews and ORRs for the Environmental Operations department.

Safety and Engineering Manager 3 - Training and Emergency Preparedness Unit: July 1989 -December 1991: Responsible for technical and nuclear training and emergency preparedness for Waste Management and Environmental Restoration Department. Organized a new unit, hired and trained staff, directed development and implementation of a department wide DOE 5480.20 based technical Training Program Plan and DOE 5500.3A based Emergency Preparedness Plans for RWMC, TAN, WERF, and WROC.

Management Specialist: July 1986 - July 1989: Technical Leader of Environmental Safety and Health Training Unit responsible for nuclear and non-nuclear safety and health training for EG&G. Directed development of performance based technical lesson plans in radiation safety, hoisting and rigging, respirator, and OSHA. Developed then taught Instructional Course Construction and Design, as an adjunct instructor to Idaho State University. Provided management and training consultation to Nuclear Operations. Taught Kepner-Tregoe: Problem Solving and Decision Making, Blanchard and Associate: Situational Leadership, and several other management and leadership courses.

May 1979 - July 1986: American Microsystems Inc., Pocatello, Idaho

Manager - Training: 1984 - 1986: Managed the training and development of this custom integrated circuit manufacturing company. Developed technical and engineering video training tapes on semiconductor fabrication processes. Developed and taught a first line supervisor training course, also taught management and leadership courses based on the Ken Blanchard Situational Leader model and the Development Dimensions International, Interaction Management model. Assisted in the development and implementation of statistical process controls based on Demming and Juran models.

Manager - Fabrication Section: 1979-1984: Managed the testing, assembly and production of custom designed, integrated semiconductor circuits. Responsible for budget, production line flow, equipment evaluation, and personnel training.

August 1973 - May 1979: The Church of Jesus Christ of Latter Day Saints, Salt Lake City, Utah

Principal and Teacher: Provided daily classroom instruction to secondary level seminary students as well as being responsible for all budget, procurement, and equipment and building maintenance needs.

May 1967 - July 1972: United States Marine Corps

Pilot: Squadron pilot in both fixed wing and helicopter. Flight instructor in the Naval Training Command with ancillary duties as personnel officer. Served in Viet Nam 1969-1970, honorable discharge-medical.

EDUCATION:

- 1967 – B.S. Engineering: Industrial Technology with emphasis in aeronautics, Utah State University, Logan, Utah. Teaching certificate in Industrial Education – currently expired.
- Certified Lead Auditor
- Certified U.S. Department of Energy Accident Investigator
- Certified in Environmental, Health & Safety Law (Institute for Applied Management and Law, Inc.)
- Certified instructor in:
  - Problem Solving and Decision Making (Kepner-Tregoe)
  - Situational Leadership (Blanchard Training and Development)
  - Interaction Management (Development Dimensions International)
  - Quality Education System (Philip Crosby Associates)
  - Principle Centered Leadership (Steven Covey Associates)
- Company Courses completed:
  - Systems Thinking
  - TapRoot Root Cause Analysis

- Cost Account Manger/Project Manager Level I & II
- Risk Based Prioritization
- Unit Manager Development Program

- Computer proficient in: Microsoft Office, Word Perfect, Freelance Graphics, and others.

PERSONAL:
Disabled Viet Nam Veteran DOE L Clearance Hobbies: Fishing, Camping, Golfing, Gardening, and Reading

ADDENDUM A

RESUMES

ROBERT H. McCOOK
PO BOX 508
GRACE, ID. 83241
(208) 425-3661

EDUCATION

- DOE 5480.20A, 5480.19, Systematic Approach to Training
-Twenty three years of Naval service with twenty in positions of upper to middle maintenance management/supervision.
-Supply/logistics [stock control/management, OPTAR (financial/budget management), shipping/receiving, shipment routing, expediting, etc.] computer operations, office administration, tool control & management, maintenance control and management.
-Extensive Naval aircraft maintenance technician/manager's courses including: support equipment , airframes/hydraulics, systems troubleshooting, corrosion control/prevention, painting/final finishing, dye penetrant inspection.
-Persuasive Communicating Skills.
-Contract management/administration--University of Dallas: Acquisition & Government Contract Management, DCAS: Quality Assurance in Contract Admin, CNATRA: Production Monitoring in Contract Admin.
-Extensive training in Quality Assurance & Production Monitoring/Evaluation, under Naval Aviation Operations and Maintenance requirements.
-Flight deck fire fighting, accident prevention, first aid, emergency response/rescue.
-Consistent Outstanding performance on all Physical Readiness Tests (PRT) since it's conception.
- Fifty-two credit hours in attendance at ISU- 4.0 GPA to date.

BACKGROUND KNOWLEDGE/EXPERIENCE

* 1 year Training Supervisor Central Facilities Area (CFA) at the Idaho National Engineering and Environmental Laboratory (INEEL)
* 2 Years Conduct of Operations, Conduct of Maintenance & ISMS Subject Matter Expert at INEEL
* 1 year Root Cause Analysis & Critique Leader at INEEL, CFA
* 23 years Maintenance engineer/supervisor/manager-numerous type/models of Naval aircraft
* 5 years maintenance supervisor-habitation/building maintenance upkeep.
* 15 years office administrator/computer operator/mid-upper level manager/supervisor.
* 12 years technical writing/data collection for scheduled maintenance tracking/trend analysis/production output monitoring/product quality evaluating.
* 23 Years interpreting/applying/complying/enforcing-strict military regulations/policies/directives.
* 8 years Quality Assurance Specialist/Inspector/Monitor/Evaluator.
* 20 years developing/evaluating/implementing aircraft maintenance training programs (U.S. , Japanese, and Australian military personnel).
* 3 Years supply/requisitioning/stock control/logistics support/OPTAR (Financial Management).
* 3 Years tool control, procurement & management of program, management of tool bins/room.
* 4 years Hazardous Material Management & Control Officer.
* 10 years emergency airfield (runway) response/fire fighting/rescue--2 years in Supervisory.
* 18 Months retail floor/store management

WORK HISTORY

INEEL- Lockheed/BBWI- Supervisor of training, providing oversight and management of training requirements, development, tracking and delivery to Central Facilities Area personnel in direct support and report relationship to the Site Area Director. Promoted after approx 6 mnths of assignment.

Conduct of Operations, Conduct of Maintenance and ISMS Subject Matter expert: Each area previously filled w/ three employees. Responsible for oversight at the Facility, under the Site Area Director, ensuring compliance w/ contract requirements, DOE orders and company implementing procedures.

Senior Supervisory Watch: Responsible for oversight of operations & maintenance conducted at the Facility through actual production/site visits, reviews of work control documents, RWPs, SWPs, etc and review of compliance w/ ESH&QA requirements and procedures.

Critique Leader: Responsible for conducting/facilitating all critiques held at or involving the Facility and for Root Cause Analysis of the event/incident incurring the critique requirement.

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United States Navy- Documented Superior Performer in every assignment/environment with ability to adapt/learn quickly. Selected from top 10% of Naval Enlisted personnel: Commissioned as a Naval Officer.
Office Administrator- Supply Officer/Maintenance Control Officer, supervising 20-525 personnel.

Responsibilities include : Administration/Quality/Organization of department administration routing/work, financial tracking/management of operational funding (OPTAR), personnel evaluations of performance, supervision of all supply/stock control management, expediting of supply requisitions, scheduling of maintenance production requirements, supply logistics/tracking/support for away from home/ship detachments, expediting repair components between stateside supply centers to Persian Gulf/Japan and in-between, Staffing of Tool Control & management workcenters; ensuring that all production workcenters were properly tooled with quality, but cost effective tools, tool material condition analysis and upkeep.

Contract Administrator/Quality Assurance/Production Specialist- Administer/Inspect/Monitor/Evaluate quality assurance and production processes/procedures implemented by four major corporations (Lockheed (LSSI), Ford Aerospace, Burnside-Ott, Dynacorp) in performance of multi-million dollar government contracts (in compliance with Mil-Q and Mil-I standards/requirements).

Hazardous Material Coordinator- Responsible for management of the overall HAZMAT program, including supervision and training of personnel. Responsibilities included procurement/storage/waste disposal/emergency response and handling.

Structural Mechanic- Responsibilities included Sheet metal/Fiberglass repair, Hydraulic system maintenance and troubleshooting, flight control rigging, weapons system troubleshooting, preventative maintenance management, quality assurance processes/inspections.

Maintenance Manager- Managing/Supervising 50-300 personnel, coordinating/scheduling/ensuring quality of compliance with maintenance requirements, training in the formal (classroom) and on-hands environment. Manage tool/test equipment material condition, procurement, calibration, repair.

Retail-Support Management-Wal*Mart (Chubbuck, Idaho)- Supervising floor personnel, Customer Service Management, Courtesy Desk operations, Financial (Deposit) Verification, Stocking/Cleaning/Floor supervision in closing-preparation for next days business. Advanced rapidly (5 months/with four pay raises) from entry level Floor Associate position to Management.

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RESUMES

Bechtel Nevada

RESUME

NAME: Stephen (Steve) Metta DATE: 12/22/00
EMPLOYEE NUMBER: 183824

BN CLASSIFICATION: Senior Manager
BN COMPANY: Bechtel Nevada Corporation
WORKING TITLE: Performance (Quality) Assurance Manager
ORGANIZATION & DEPARTMENT: Performance (Quality) Assurance
LOCATION: Las Vegas Nevada
CITIZENSHIP: U.S. A.
BN HIRE DATE: 1/1/96
ORIGINAL COMPANY SERVICE DATE: 1/96
MILITARY SERVICE & RANK: USCG E-4

PROFESSIONAL LICENSES AND SOCIETIES

Member, American Society for Quality
DOE AQ@ Clearance
DOD Secret Security Clearance (inactive 1990)
Lead Auditor, NQA-1
ISO-9000 Certified Lead Auditor, Q04176

EDUCATION AND PERSONNEL DEVELOPMENT PROGRAMS

DEGREE, CERTIFICATE, ETC.	SCHOOL	MAJOR (OR SUBJECT)	DATE
B.S.	Northrop University, Inglewood, California	Engineering	6/74
	FAA Airframe and Powerplant Teterboro School of Aeronautics Teterboro, New Jersey	Certification	3/70

Company/Professional Sponsored Courses

Effective Management Program .... Project Engineering Program .... Six Sigma...Reactor Installation and Construction .... Welding Supervisor .... Lead Auditor .... Various Nondestructive Testing Courses .... Kepner/Tregoe Problem Analysis and Decision Making .... Cost/Schedule Control System Criteria .... Total Quality Management (Crosby) .... Team Building .... Project Management Program .... Advanced EPA Regulations .... Environmental Expert Witness .... Conduct of Operation .... ISO-9000 .... ISO-14000... Six Sigma.

OTHER SIGNIFICANT INFORMATION:

ACHIEVEMENT LANGUAGE CAPABILITY GEOGRAPHIC PREFERENCE

GEOGRAPHIC PREFERENCE

International: South and North America, and Australia preferred. Will consider Europe, Western Asia, Far East Asia (South Korea, Japan, and Indonesia). National: Southwest preferred. Will consider south and east coast.

Overall experience includes a working knowledge of Uniform Boiler Code .... ASME Boiler and Pressure Vessel Code .... 10 Code of Federal Regulations (CFR) Series .... 40 CFR Series .... 20 CFR Series .... 49 CFR Series .... Uniform Fire Code .... American Welding Society Codes .... NQA-1 and NQA-2 .... ANSI Piping Codes .... American Petroleum Institute Codes .... Department of Energy (DOE) Orders .... International Standard Organization (9000 and 14000 series) .... MIL Specifications and DOD specifications.

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SKILLS/EXPERIENCE (KEYWORD LIST):

Chemical Industry
Contractor Officer Technical Representative
Field Engineer
Modular Process Systems
NDE
Nuclear Power Industry
Petroleum Industry
Pressure Piping
Project Management
Quality Control
Quality Assurance
Subcontractor Evaluations
Task Manager
Welding

WORK HISTORY

DATES FROM	TO	COMPANY OR DEPARTMENT LOCATION AND SUPERVISORS	POSITION HELD, SUMMARY OF RESPONSIBILITIES AND SIGNIFICANT ACCOMPLISHMENTS
6/74	8/79	**General Electric Company** **Installation and Service Engineering Division**	**Project /Field Engineer**

Responsible for planning, scheduling, and supervising activities during construction and maintenance outages at several nuclear and fossil power stations. Typical projects included in-service and baseline inspections, spent fuel pool piping modification, reactor pressure vessel safe end and core spray replacement, feedwater sparger modification, reactor pressure vessel move and set, reactor internals installation, high pressure piping spool fabrication, moisture separator reheator installation, heat exchanger replacement, and start-up operations.

8/79	10/83	**Applied Engineering Company** **(Subsidiary of Daniel International)**	**Quality Assurance Manager**

Responsible for the Quality Assurance/Control operations .... developed an integrated Quality Assurance/Control system for materials and processes based on the quality and safety aspects of customer requirements .... provided technical counsel to functional organization on welding and nondestructive evaluations .... evaluated subcontractor performance. Maintained the company ASME certifications
(N, NPT, U, UM, H, S, PP). Product line included chemical petrochemical process modules, nuclear power plant components, propane air plants, liquefied natural gas plants, heat recovery units, and piping systems.

10/83	12/90	**Science Applications International Corporation** **Task/Program Manager**	

Program Manager assigned to the SAIC Sector QA operation. The focus of this program was to provide corporate Quality overview and support of all SAIC projects within the Space, Energy, and Environment Sector.

Task Manager on SAIC=s QA and Safety support contract to the U.S. Army Chemical Stockpile Demilitarization Program (CSDP). Responsibilities involved the development and implementation of CSDP Quality and Safety Management Program for the design, construction, operation, and decommission phases of several CSDP facilities. Also assisted the CSDP with operational readiness reviews, operational verification testing, and support to environmental permitting and transportation.

Task Manager on SAIC=s Technical and Management Support Service contract with the DOE=s Office of Civilian Radioactive Waste Management (OCRWM). Responsibilities involved the development and implementation of the Yucca Mountain Project Quality Assurance Program, which set forth controls and requirements that provided reasonable confidence for quality achievement and quality demonstration/verification. Support to the project included a quality assurance overview of the primary project activities, such as repository design, waste package design, site characterization, performance assessment, and environmental monitoring. In addition, served on a steering committee to the

DOE Deputy Project Manager to formulate management policies and program direction.

12/90 Manager	12/95	**Reynolds Electrical & Engineering Co., Inc.** (A division of EG&G)	**Performance Assurance**

Responsible for the coordination and implementation of the company=s Quality, Self Assessment, and Conduct of Operation Programs in support of the management and operations contract with the DOE. Major functional responsibilities included Quality Assurance and Control .... Procurement Quality Assurance .... ES&H and Quality Compliance Assessment .... Performance Indicator Programs .... Productivity Program .... Diagnostic Cable Inspection .... Calibration Services .... Welding Operations .... Hazardous Waste Certification. The companies focus was the operation and maintenance contractor at the Nevada Test Site for the DOE. Contractual functions included: facility maintenance .... construction .... mining .... drilling .... engineering .... safety .... environmental restoration .... facility operations.... research and development .... fleet and equipment maintenance .... hazardous waste removal .... medical support.

1/96 Manager	Present	**Bechtel Nevada Corporation** **Las Vegas, NV**	**Performance Assurance**

Responsible for the coordination and implementation of the company=s Performance Assurance and Integrated Safety Management Programs in support of the management and operations contract with the DOE. Major functional responsibilities includes Quality Assurance Engineering .... Procurement Quality Assurance .... Performance Assurance .... Compliance Assessment .... Management Systems Integration/Facilitation .... Hazardous Waste Certification .... Suspect Counterfiet Material Program .... PAAA.... Contractual functions includes: facility maintenance .... construction .... mining .... facility operations .... drilling .... engineering .... safety .... environmental restoration .... research and development .... weapons demilitarization .... hazardous waste removal .... medical support .... aviation operations .... research and development activities .... emergency response .... fleet and equipment maintenance. In addition, serve as the BNI Six Sigma Champion for deployment at Bechtel Nevada and the NTS.

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Lisa V. Pascoe

WORK HISTORY:

12/00* – Present **Bechtel SAIC Company, LLC, Office Assistant, Las Vegas, NV**
*** Includes first 4 months' service with OfficeTeam Staffing**

- Administrative and secretarial support to Manager of Projects senior management staff
- Assigned as administrative support to Root Cause Analysis Teams
- Schedule meetings and coordinate all related details
- Arrange travel and prepare expense reports

02/99* – 11/00 **Beau Rivage Casino, Table Games Secretary I, Biloxi, MS**
*** Includes first 6 months' service with Interim Staffing**

- Administrative and secretarial support to Table Games Department management staff
- Process, monitor, and track all employee status change documentation, i.e., attendance, disciplinary actions, commendations, employment leaves, transfers, etc.
- Audit departmental payroll timekeeping reports; coordinate correction of timesheets

11/98 – 01/99 **Arizona Information Systems, Temporary Assignments, Scottsdale, AZ**

- Arizona Biltmore Resort & Spa - Desert Jewel Destinations & Sales Departments
- Pinnacle West Corporation

10/97 – 10/98 **City of Phoenix, Public Works Confidential Secretary II, Phoenix, AZ**

- Administrative and secretarial support for two Assistant Directors, one Deputy Director
- Provide clerical support to Personnel Officer and staff

11/95 – 08/97 **La Plata County, Human Resources/Finance Tech., Durango, CO**

- Conduct new hire orientations and exit interviews
- Process and data entry all employment and benefits related paperwork
- Liaison between employees and all benefit providers
- Generate, track, data entry and file all employee status change and payroll documentation
- Prepare internal/external position recruitment bulletins and conduct qualifying tests

04/88 – 08/95 **City of Burbank, Police Department Secretary, Burbank, CA**

- Confidential administrative and secretarial support to Division Captain and command staff
- Prepare internal investigations, search warrants, disciplinary actions, commendations, monthly statistical reports and correspondence, and Dictaphone transcription
- Generate, track and process employee status change documentation, i.e. assignment, salary change and evaluation documentation
- Schedule meetings and coordinate all related details
- Police Chief's relief secretary

WORK HISTORY (cont.):

08/85 – 03/88 City of Burbank, Community Development Int. Clerk, Burbank, CA
*** Includes first 2 months' service with Kelly Services Staffing**

- Type, assemble, and delivery staff reports for weekly City Council meetings
- Track, verify accuracy, and process invoices for payment
- Maintain division project and correspondence files
- Maintain and requisition departmental office supplies

EDUCATION:

Graduate, **Herbert Hoover High School,** Glendale, California

SKILLS & ABILITITES:

Computer and Internet literate
Type 70+ wpm
Dictaphone Transcription
Able to maintain discretion and confidentiality
Able to create and maintain working relationships with fellow employees
Able to work with government and elected officials, and the public tactfully and courteously

PROFESSIONAL OR PERSONAL REFERENCES:

Available upon request

ADDENDUM A

RESUMES

F. Larry Zajac
10560 Haven Street
Las Vegas, NV 89123
(702) 617-3275

Summary

Twenty-nine years of diversified work experience including management and technical participation in a wide range of technical and administrative activities. Management experience includes contract execution, equipment control, avionics repair, Aviation Spares Stockroom, and aircraft quality assurance. Technical experience includes construction crafts, mechanical repair, and avionics repair. Administrative experience includes government personal property control, contract administration, technical writing, cost estimating and budgeting activities. Developed complex technical specifications for requests for proposals for the procurement of items such as aircraft refueling vehicles and helicopters. Participated in the development of the EG&G desk instruction system. Established the Aviation Spares Stockroom, which is currently recognized by the DOE as one of the best. Developed the cost model for DOE/NV aircraft cost reporting and the establishment of aircraft rates.

Education

- Graduate, Basic High School, Henderson, Nevada, 1971
- Graduate, U.S. Air Force Avionics Systems Repair, 1973
- Graduate, U.S. Air Force Survival Instructors Course, 1975
- Graduate, Glazier Apprenticeship Program, Las Vegas, Nevada, 1978
- Undergraduate studies (35 credits) in Electrical Engineering, Clark County Community College, Las Vegas, Nevada, 1985
- U.S. Office of Personnel Management, Federal Budget Execution Course, Sacramento, California, 1995

Employment History

1996 - Present Bechtel Nevada

Manager (1998 - Present). Manage activity of the Department Operations Support Section, which provides administrative and WFO logistics support to the Remote Sensing Department Project Managers. Participated in the Bechtel Nevada Work Control Implementation Team. Developed annual Aviation operating budget and established aircraft service rates.

Administrative Staff Assistant (1996 - 1998). Departmental interface for work for others (WFO) customers, developed cost estimates and coordinated proposal packages. Managed WFO contractual issues, such as funds authorization, period of performance, work start/stop. Developed annual Aviation operating budget and established aircraft service rates.

1983 - 1996 EG&G Energy Measurements, Inc.

Administrative Staff Assistant, Aviation Section (1993 - 1996). Formulate the annual operating budget for the Aviation Section. Monitor the execution of the operating budget and provide weekly reports to the section manager. Establish the job number system used to track and report annual aviation costs to the DOE. Produce the annual A-126 aircraft cost report. Review and revise draft operating procedures. Provide logistical support to the section manager for special requirements.

Section Head II, Technical Support Section (1990-1993). Provided supervision and logistical support for a section comprised of Avionics Technicians, Aircraft Quality Control personnel, Material Handlers and a Chief Clerk. Provided budget formulation and execution information to the department manager. Developed technical documents to support procurement activities. Produced annual aircraft cost reports.

Senior Administrative Assistant, Aviation Section (1990). Acted as the Department Administrative Coordinator; produced and monitored budgets, reported aircraft costs, initiated procurement actions, maintained record files, maintained section P.C. Network, coordinated development of Aviation Support software, and supervised casual employees.

Material Handler III, Technical Support Section (1988 - 1990). Established and managed the NTS/RSL Aviation Spares Stockroom. Managed ground-support equipment and related service contracts. Established procedures to define stockroom operations.

Property Specialist, Property Management Section (1984 - 1988). Managed the data input to the NTS Equipment Control Computer System. Performed data manipulation and report development; developed location codes for inventory control; wrote desk procedures and did troubleshooting on perplexities with record keeping and equipment tracking. Developed annual operating budget.

Material Handler II, Property Management Section (1983 - 1984). Established initial identification and control of DOE property purchased by EG&G. Maintained computer records of equipment and manipulated data to provide customer reports in support of customer requests. Conducted field inventories of equipment.

1982 - 1983 Vegas World Hotel

Resident Glazier and Facilities Maintenance Technician. Responsible for glass and mirror installation on major remodeling projects. Performed entrance door maintenance and general facility maintenance.

1981 - 1982 Fuller O'Brien Paint and Glass

Glass Contracts Manager. Responsible for project management to include calculating estimates for material and labor based on blueprint interpretations; formulating competitive bids for construction projects; procuring materials to support projects; and, ensuring timely contract performance. Managed work crew; performed maintenance on automatic entry systems, and installed glass and mirror.

1978 - 1981 The Import Yard

Operations Manager. Responsible for the initial organization and ongoing management of an auto recycling facility. Evaluated recycle potential and submitted bids on salvage vehicles for inventory. Established inventory system to track parts and vehicle locations. Established daily priorities for employees. Determined critical shipping requirements to secure favorable freight rates. Expedited lost and delayed shipments.

1976 - 1978 Silver State Glass & Mirror

Journeyman Glazier. Responsible for the timely fabrication, installation and maintenance of glass storefronts and entry systems for contract work. Provided labor estimates to supervisors. Managed activities of co-workers. Repaired electrical screw guns and drills.

ADDENDUM A

RESUMES

1976 - 1978 Cylinder Head Exchange Machine Shop

Machinist Trainee (part-time). Operated machine shop equipment, such as surfacing mills, vertical mills, glass bead abrader, various boring and honing equipment and other machines, tools, instruments, and indicators associated with full service auto machine shops.

1974 - 1976 U. S. Air Force

Survival Instructor. Trained USAF aircrew members to employ a diverse range of survival techniques and principles to protect themselves from harsh environments and hostile encounters. Primarily responsible for the supervision, safety, and welfare of student groups while conducting extended field-training sessions. Accompanied helicopter crews on aerial searches. Developed lesson plans and trained new instructors.

1972 - 1974 U.S. Air Force

Avionics Component Repair Specialist. Operated electronic test equipment to perform repairs, calibrations, and diagnostic tests on malfunctioning avionics instruments.

1972 - 1976 Silver State Glass & Mirror

Apprentice Glazier. Assisted with the fabrication and installation of glass, mirror, and aluminum storefront systems.

ADDENDUM B

TapRooT© CAUSE CODE CORRELATION

ADDENDUM B

TapRooT® Cause Code Correlation

Root Cause	TapRooT® Code
1. Ineffective Configuration Management	3M – Management System 3P – Procedures
2. Expectations and Accountability	3M – Management System
3. Ineffective Program Management	3M – Management System
4 Low Expectations for an Effective Issues Management Process	3M – Management System\ 3Q – Quality Control

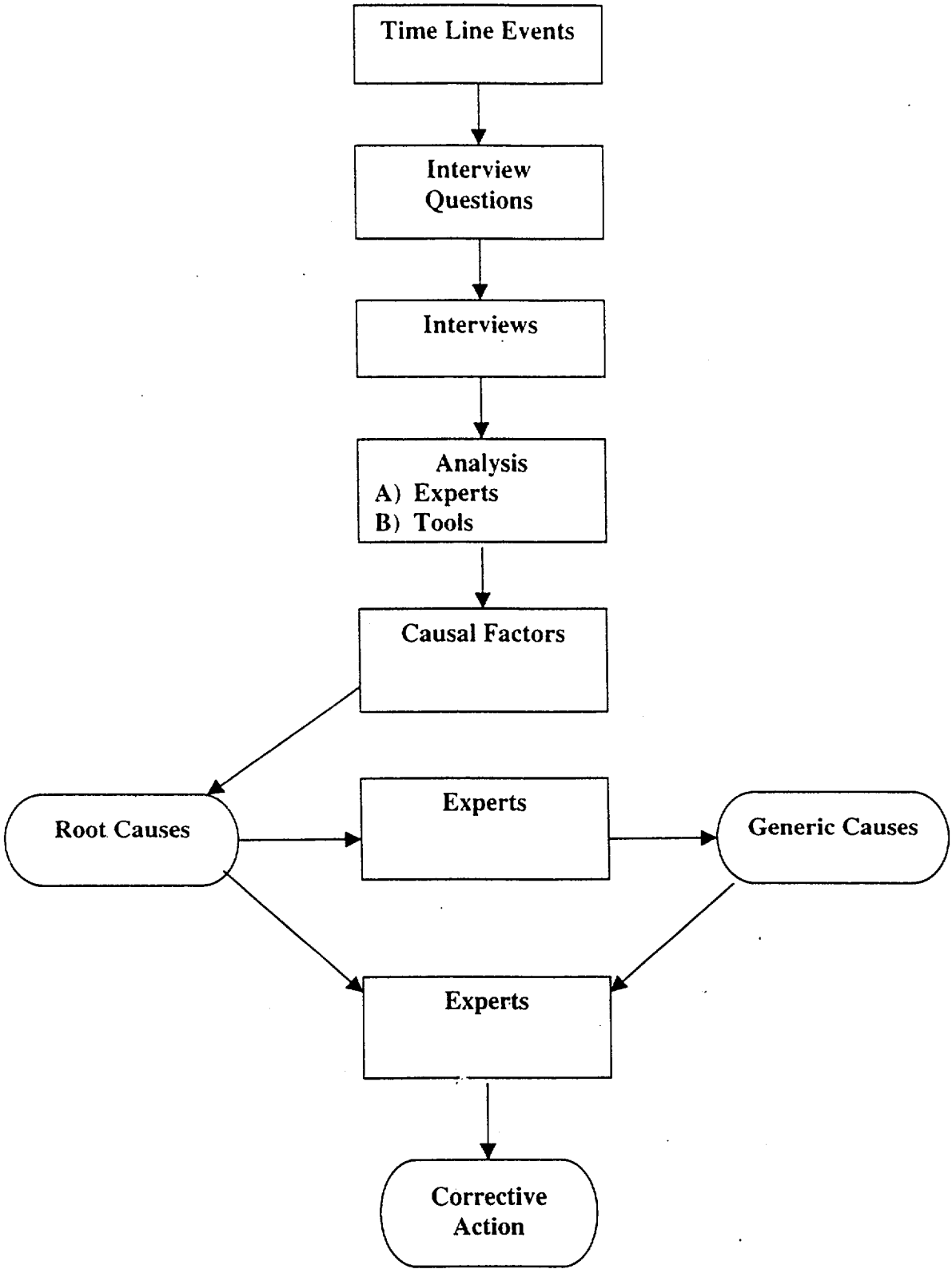
Generic Cause	TapRooT® Code
1. Leadership	3M – Management System

ADDENDUM C

ROOT CAUSE PROCESS FLOWCHART

ADDENDUM C

ROOT CAUSE PROCESS FLOWCHART



ADDENDUM D

INTERVIEWEE LIST

ADDENDUM D

INTERVIEWEE LIST

NO.	NAME	AREA of RESPONSIBILITY	ORGANIZATION
1)	Abernathy, Larry	Quality Engineering Support - Reviewer of SSPA	BSC
2)	Anderson, Mike	Waste Package Design	BSC
3)	Andrews, Bob	Manager Science and Analysis	BSC
4)	Bailey, Jack	Manager of Projects staff	B&A
5)	Barrett, Lake	RW-1 Acting Director	DOE
6)	Beckman, Don	NRC Regulatory Coordination	B&A
7)	Blink, Jim	Requirements and Tech Integration Dept.	LLNL
8)	Brocoum, Steve	Licensing and Compliance Assistant Mgr	DOE
9)	Devonec, Eve	TSPA Model	DESI
10)	Dobson, Dave	Lead author on the S&ER	ISSI
11)	Dove, Harvey	Tech specialist on the last two TSPA audits	NQS/Navarro
12)	Flaherty, Jim	Reviewed TSPA-SR for DOE	DOE
13)	Hardin, Ernie	Was a 2.14 reviewer on SSPA	BSC
14)	Howard, Rob	Manager of SSPA Report	BSC
15)	Hunt, Bill	TSPA Product Checking Group	DESI
16)	Jolley, Darren	Self-assessment DEIS	DESI
17)	Kalinich, Donald	TSPA-SR model and document author	DESI
18)	Kelly, Valerie	Manager Production Support	BSC
19)	King, Jerry	Manager, Site Recommendation	BSC
20)	Kopelic, Steve	Document Production	XWST
21)	Loch, Amy	Contributing author for SSPA	DESI
22)	McNeish, Jerry	Owner of the TSPA Technical report	DESI
23)	Mon, Kevin	Author of Waste Package Model	DESI
24)	Nutt, Mark	MTS Performance Assessment	MTS/Golder/DOE
25)	Peters, John	Head of Product Checking Group	LBNL
26)	Sevougian, Dave	Accountable for TSPA computer model	DESI
27)	Stroupe, Woody	Manager Program Integration	BSC
28)	Swenning, Steve	Reviewer on TSPA report and model - QE	BSC

ADDENDUM D

INTERVIEWEE LIST

29)	Thomas, Dan	Section Mgr for Waste Package Criticality	BSC
30)	Turner, Paul	Manager Training	BSC
31)	Vallely, Robert	Training Development	BSC
32)	Van Luik, Abe	PM/Senior Policy Advisor	DOE
33)	Whitcraft, Jim	Head of Engineering Group	BSC
34)	Younker, Jean	Principal Technical Staff	BSC
35)	Zimmerman, Robert	Product Checking	BSC

ADDENDUM E

DOCUMENTS REVIEW LIST

ADDENDUM E

DOCUMENTS REVIEWED LIST

- TSPA-SR MDL-WIS-PA-000002, Rev. 0, December 2000
- TSPA-SR TDR-WIS-PA-000001, Rev. 00 ICN 01, December 2000 (with CD Rom)
- Supplemental Science and Performance Analyses, Volume 1 - TDR-MGR-MD-000007 and Volume 2 - TDR-MGR-PA-000001
- Memo from Los Alamos National Laboratory, "Working in parallel", by Roger Eckhardt to Clevoes Martinez, dated May 1, 2001
- NRC May 17, 2001 Letter on TSPA-SR Quality Concerns
- Results of the Initial Investigation into the TSPA-SR Discrepancies (June 28, 2001)
- BSC Proposed Response dated July 6, 2001 including Rev. 2 of the Mgmt Plan and responses to the NRC specific questions
- Memo: Quality Stand Down, from Robert Andrews, to Peter Hastings, dated 11/19/98, 11:55am
- AP-3-10Q, All revisions & ICNs
- AP-3.15Q, Rev 3, ICN 0 (July 13, 2000) and Rev. 1, ICN 2, (November 10, 2000 Managing Technical Product Inputs
- AP-2.14Q, Rev. 0, ICN 1 (April 7, 2000) Review of Technical Products
- AP-3-11Q, Revision 2, ICN 0
- AP-3.11Q, Technical Reports, Work Shop Exercise Manual, LPTEC00-009 Revision 4, Training Handout
- AP-3.11Q, Technical Reports, Summary of Technical Report Check, Review, and Approval Process, LPTEC00-009 Revision 4, Training Handout (yes, same training code number as previous item)
- AP-SI.1Q, Rev 2, ICN 4 (February 24, 2000) Software Management
- Self-Assessment Report of the Documentation of the PA Analyses and Models (June 29, 2000)
- Self-Assessment Report – Number SA-PA/PC&CM-2000-001 Rev 00 – Title: Waste Management & Repository Facilities Training Self Assessment, approval dated 04/24/00
- Self-Assessment Report, SA-CIO/IRM/DD&P/DMS&RC/2001-01, Self-Assessment of the process to Submit Technical Information to the Office of Scientific and Technical Information, 5/2001
- Self-Assessment Report, SA-OPE-2000-004, Self-Assessment of OPE Implementation of the Deliverable Review and Acceptance Process, 10/2000
- Self-Assessment Report, SA-OLRC-2000-001, Lessons Learned program, approval date, 10/12/00
- Self-Assessment Report, SA-PA-2000-005, Self-Assessment of the documentation of PA Analyses and Models, approval date 6/29/00
- Self-Assessment Report, SA-ARTP-2000-012, Self Assessment Data Verification of TBV Resolution Packages, approval date 05/26/00
- Self-Assessment Report, SA-ENG-2001-001, Effectiveness of Checker Training Programs, 3/2001
- Self-Assessment Report, SA-ENG-2001-002, Effectiveness of the Product Checklists, May 14, 2001

ADDENDUM E

DOCUMENTS REVIEWED LIST

- Self Assessment Report, SA-Com-2000-001, Development of DEIS fact sheets, dated May 5, 2000
- Audit Report M&O-ARP-00-13 (23 pages), prepared by Kristi A. Hodges, Approved by Robert W. Clark, July 10-19, 2000
- DR-LVMO-98-D-141, Controlling document: TSPA-VA Technical Basis Document B00000000-01717-4301-00001 through 00011, Rev 00, QAP-3-5, Development of Technical Documents, Revision 7
- DR-BSC-01-D-077 Never Issued, Controlling Document: AP-3.10Q, Revision 2 ICN 3, "Analysis and Models"
- DR-EM-00-D-143, Controlling Document: Quality Assurance Requirements and Description (QARD) Document, DOE-RW-0003P, Rev. 10, PMP 18.01, Revision 2 "Planning and Scheduling Assessments"
- DR-BSC-01-D-078, AP-3.10Q, Revision 2.ICN 3, "Analysis and Models"
- DR-BSC-01-D-080, Controlling Document: AP 16.1Q, Rev. 4, ICN 1 "Management of Conditions Adverse to quality"
- Technical Work Plan for: Environmental Impact Statement Support Activities, TWP-CRW-EV-000001 Rev 00, WBS 1.2.21
- Technical Work Plan for: FY01 Supplemental Science and performance Analyses: Volume 1 – Scientific Bases and Analysis, Volume 2 – Performance Analyses, DI Number: TWP-MGR-MD-000014, Rev 01
- Technical Work Plan for: Total System Performance Assessment, TWP-MGR-PA-00001 REV 00, November, 2000 – initialed date of 02/26/01
- TSPA-SR Methods & Assumptions, TDR-MGR-MD-000001 Rev 00 ICN 02
- CIRS Record Report, OQA PE Team Evaluation AMR (ANL-NBS-HS-000030, R0) – Software Codes
- CIRS Record Report, OQA PE Team Evaluation AMR (ANL-NBS-HS-000030, R0) – Models/DTNs
- CIRS Record Report, OQA PE Team Evaluation AMR (ANL-NBS-HS-000030, R0) – Models
- CIRS Record Report, OQA PE Team Evaluation AMR (ANL-NBS-HS-000030, R0) – References
- CIRS Record Report, Self-Assessment (SA_PA-2000-005) Recommendation – PA is having problems uniformly, completely and transparently documenting the importance of models and analysis, listing models used as inputs in Section 3, model validation and documenting assumptions.
- Training Management Manual, MIS-ADS-AD-000001 REV 00, September 2000
- Technical Work Control Process, LPTEC00-011 Rev. 4, Training Handout
- Checker Training
- Checker Training workshop-LPTEC00-005, Rev. 4
- Checker Training (Green Cover), Summary of Technical Product Check, Review, and Approval Process - LPTEC00-005, Rev. 4 – Handout, and Notebook Handout
- Checker Training for Mgrs/Supvrs, Summary of Technical Product Check, Review, and Approval Process – PPTEC00-008, Rev. 3

ADDENDUM E

DOCUMENTS REVIEWED LIST

- Product Checking Training Material
- Technical Product Guidance Manual (MIS-MGP-MD-P00002-Rev. 05, ICN 1, November 2000

NOTE: In many cases, subsequent revision histories are included with procedures. Where it appears that different revisions or ICNs of procedures may have been applicable, each version is included.

ADDENDUM F

EVENTS AND CAUSAL FACTORS CHART

ADDENDUM F

EVENTS AND CAUSAL FACTORS CHART

A fundamental root cause analysis tool used by both MORT and TapRooT® is the events and causal factors chart. Specific dated occurrences ("events") appear in rectangles along a timeline reading from left to right. At the end of the timeline is the undesired "terminal event," in this case NRC's notification that the TSPA-SR contained errors.

"Conditions," i.e., factors that influenced or shaped events, appear in ovals adjacent to particular events. Using other processes, e.g., Kepner-Tregoe analysis, it is possible to validate the conditions that actually represent root causes.

Below is the events and causal factors chart for the TSPA-SR event. Note that it begins with TSPA-VA delivery in 1998. The technical basis document for VA also was checked, approved, and signed with numerous errors (LVMO-98-D-141). Proceeding along the timeline, the reader can see that many of the same causes prevailed in the two years after the TSPA-VA was issued leading to a similar outcome in the TSPA-SR.

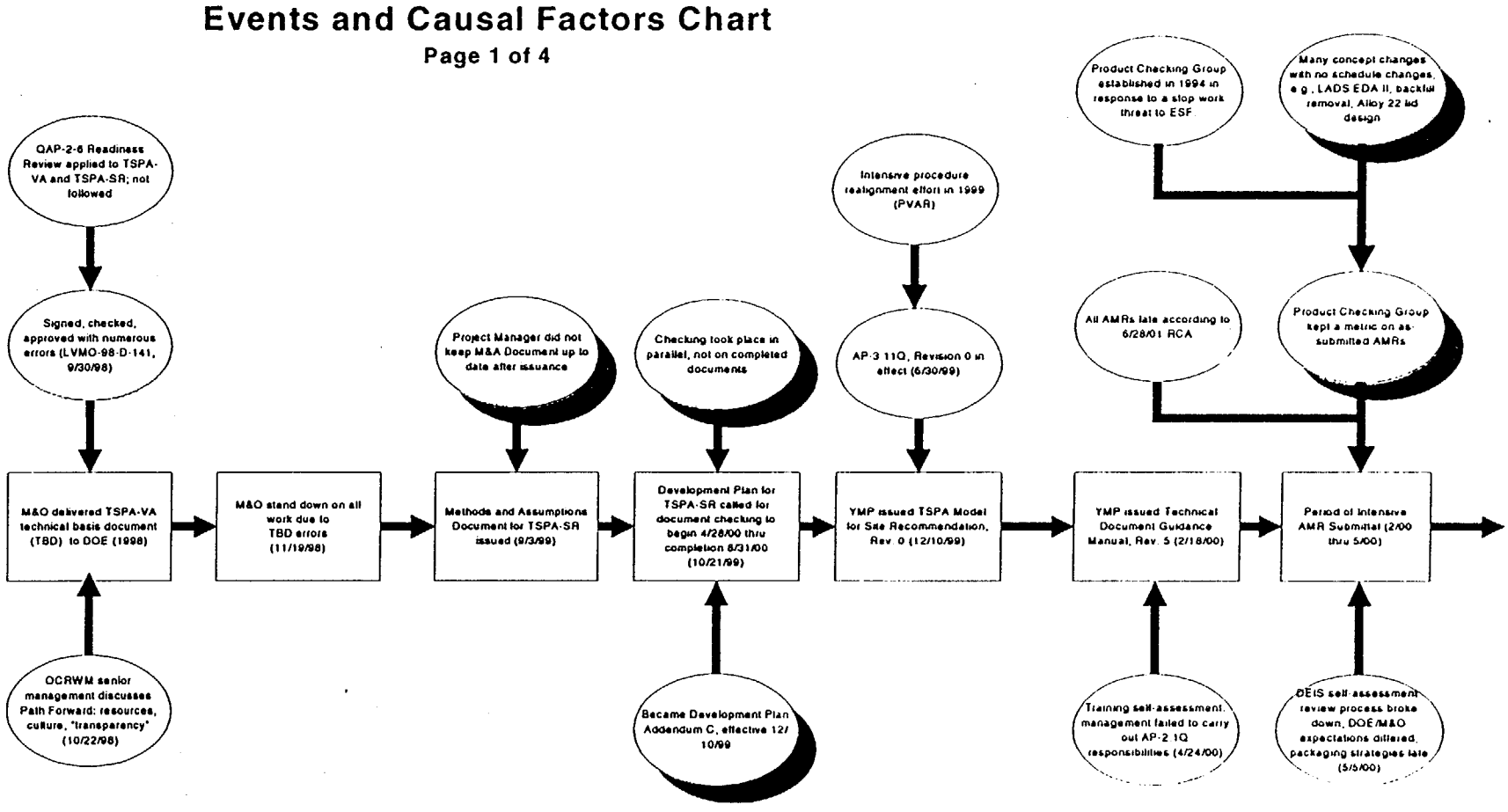
Note that entries in this E&CF have color-coded shading that shows their relationship to the four root causes and the one generic cause determined by the team.

- **Magenta** – Ineffective Configuration Management *(Root Cause No. 1)*
- **Blue** – Expectations and Accountability *(Root Cause No. 2)*
- **Red** – Ineffective Program Management *(Root Cause No. 3)*
- **Yellow** – Low Expectations For An Effective Issues Management Process *(Root Cause No. 4)*
- **Gray** – Leadership (*Generic Cause)*

YMP must correct all four root causes as well as the generic cause in order to ensure future project success.

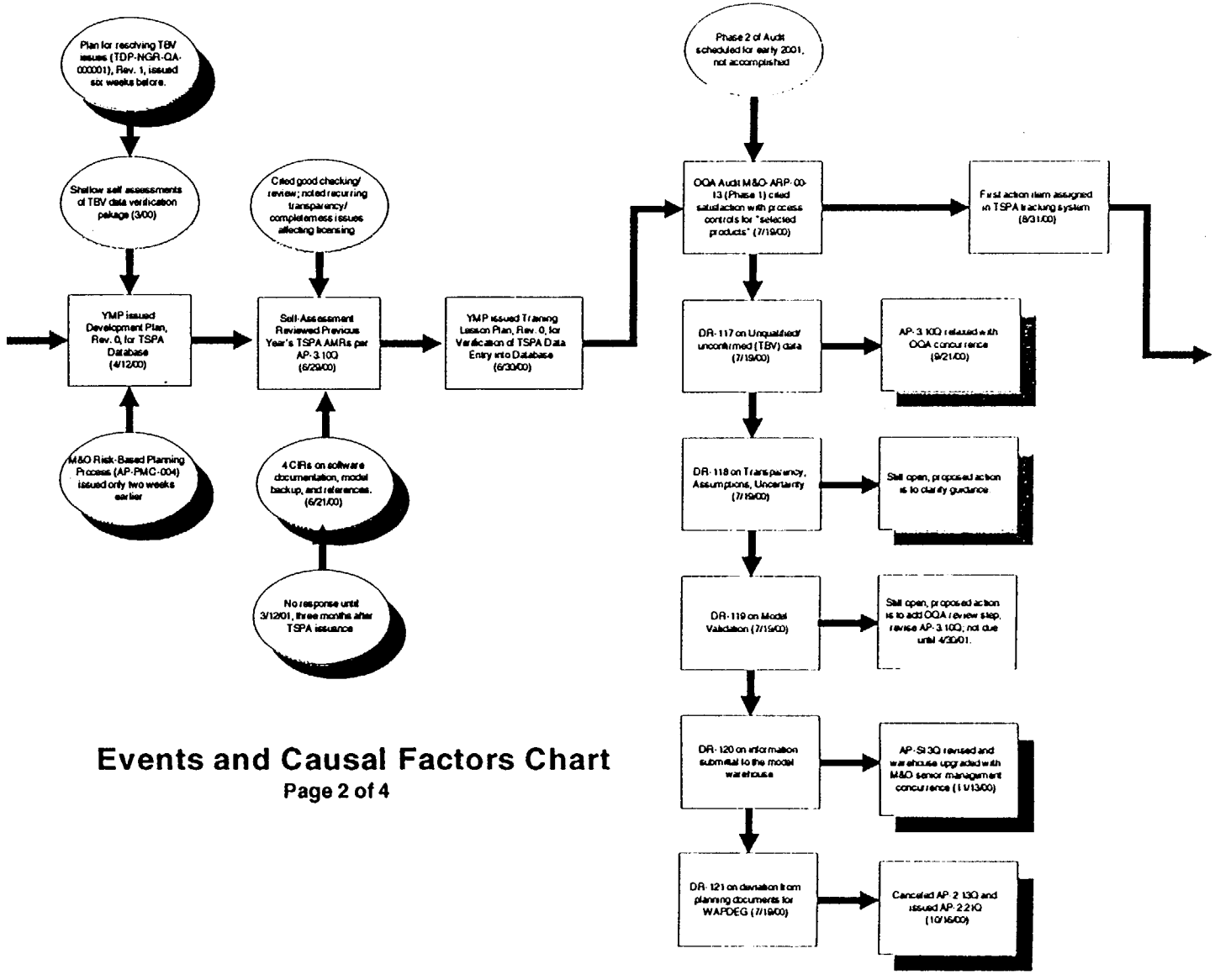
ADDENDUM F

EVENTS AND CAUSAL FACTORS CHART



ADDENDUM F

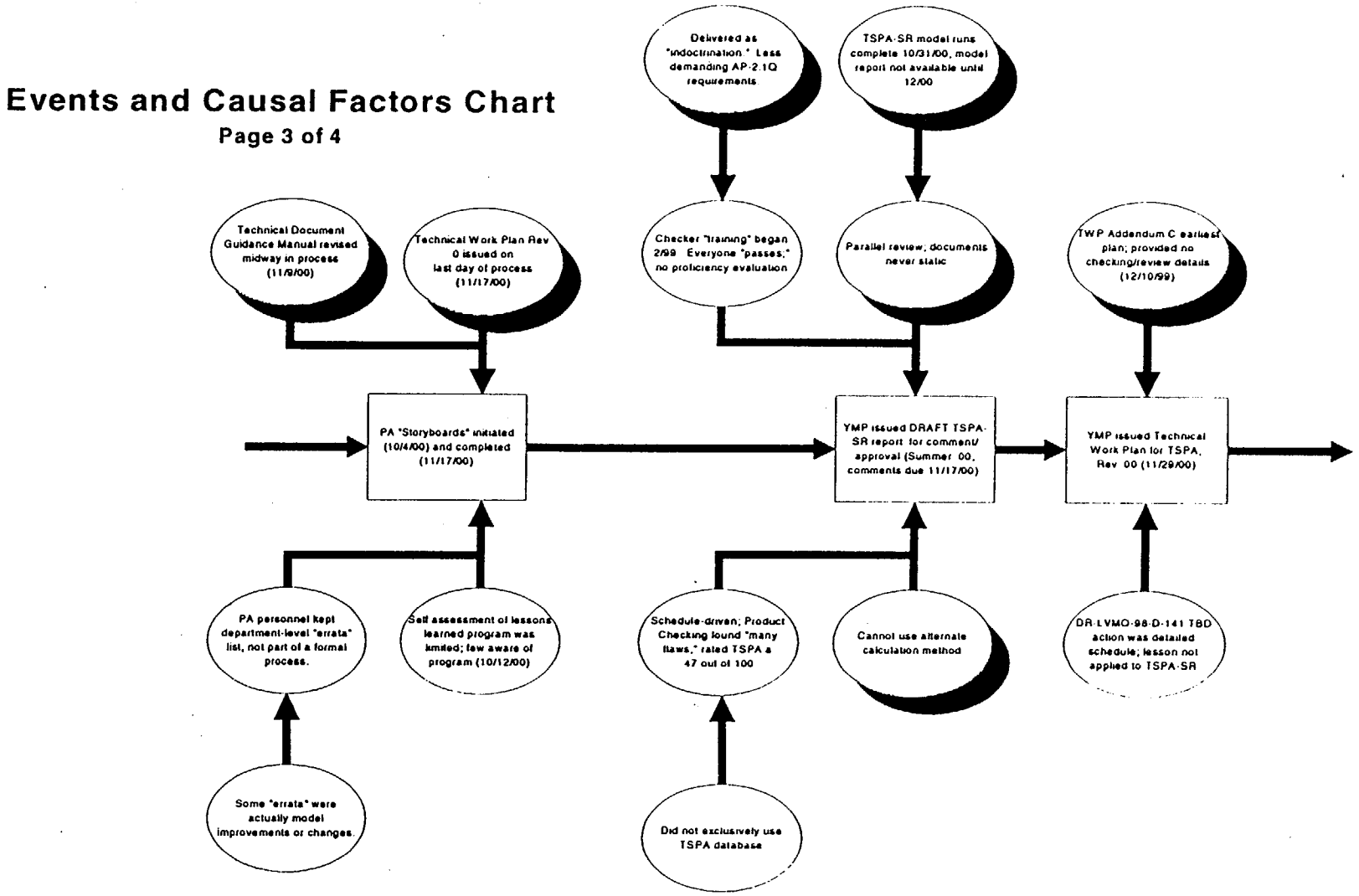
EVENTS AND CAUSAL FACTORS CHART



Events and Causal Factors Chart
Page 2 of 4

ADDENDUM F

EVENTS AND CAUSAL FACTORS CHART

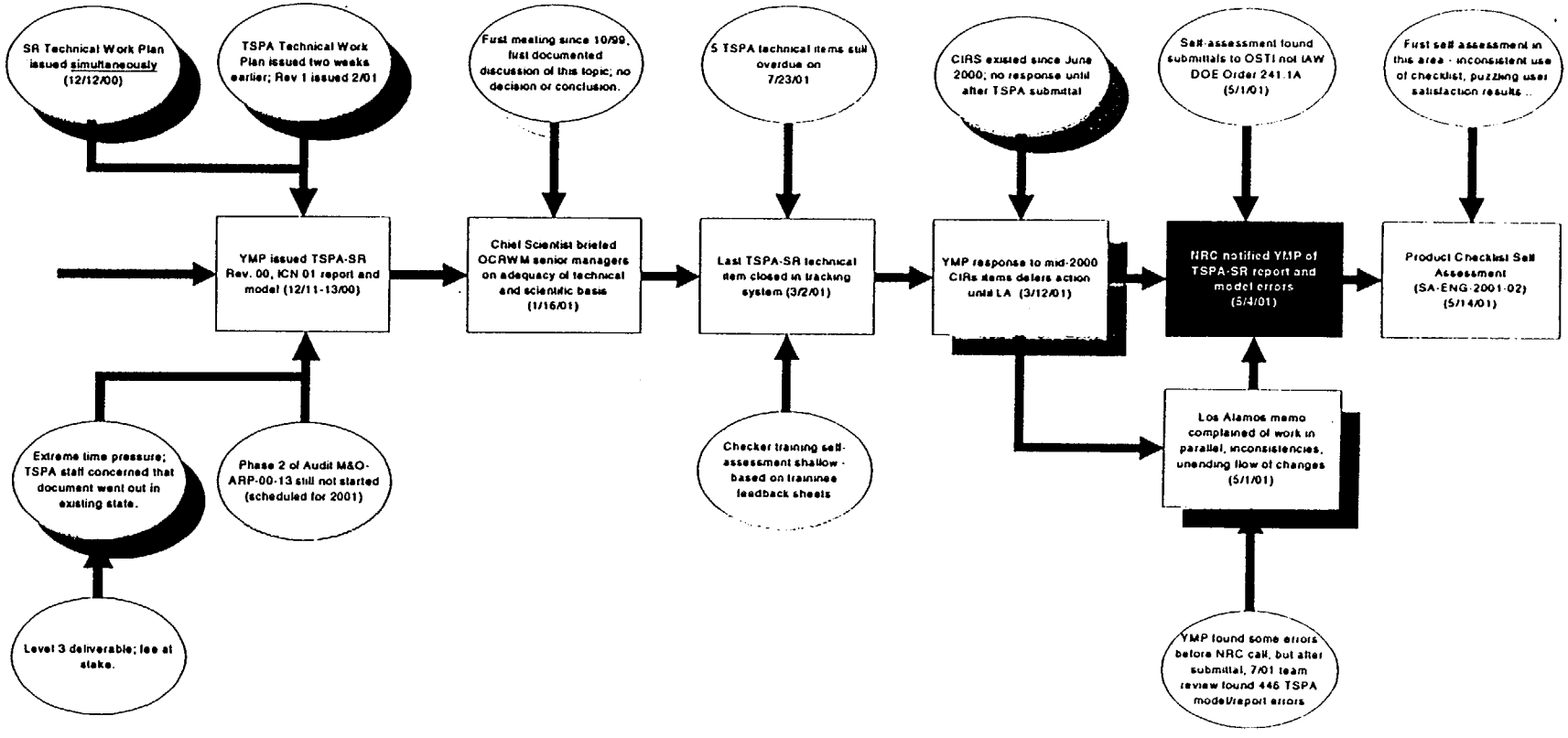


ADDENDUM F

EVENTS AND CAUSAL FACTORS CHART

Events and Causal Factors Chart

Page 4 of 4



ADDENDUM G

TSPA-SR PARETO ANALYSIS

ADDENDUM G

TSPA-SR PARETO ANALYSIS

In its May 17, 2001 letter, NRC cited eight "apparent technical errors and/or inconsistencies" in the Total System Performance Assessment for Site Recommendation (TSPA-SR) report and model. In response, the Yucca Mountain Project performed detailed vertical and horizontal reviews of not only the TSPA-SR, but also the Supplemental Science and Performance Analyses (SSPA) Volumes 1 and 2, the Draft Environmental Impact Statement (DEIS), and the Yucca Mountain Science and Engineering Report (S&ER).

Using data from this effort, the root cause analysis team developed a simple Pareto analysis of a sample of the technical review team's data. The root cause team's goal was to determine if there were any obvious error concentrations, e.g. in one document or subject area, or if there were any obvious biases toward a particular error type, e.g., document-to-document discrepancies.

The technical review team had grouped its findings into four categories:

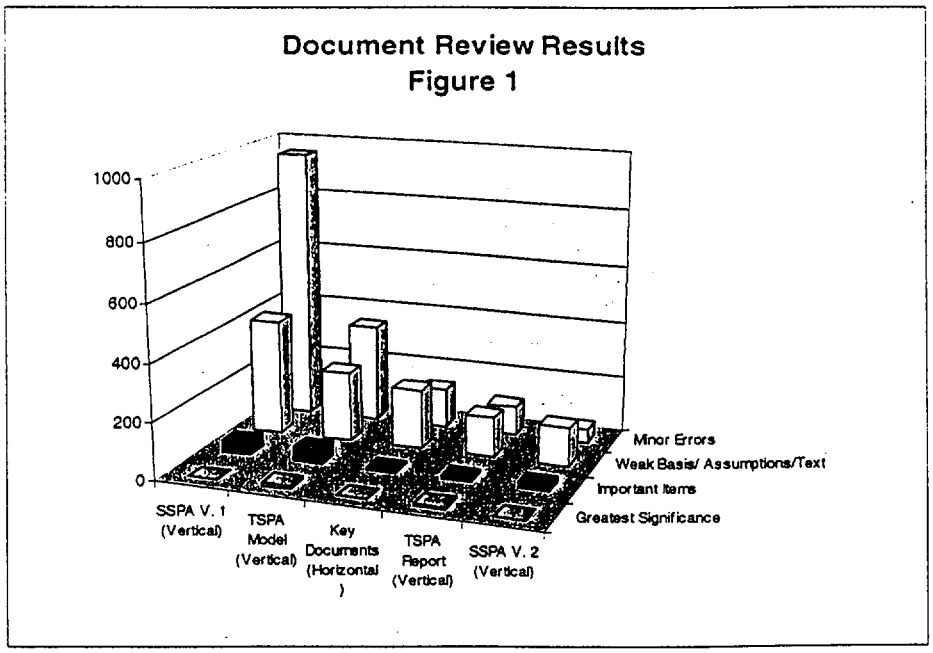
Category 1 - Greatest significance (may require model reruns or model calculations)

Category 2 - Important items (may require calculation or significant rewrite)

Category 3 - Weak basis/assumptions or text

Category 4 - Minor errors

The root cause team took these results directly from the technical review team and displayed them in a composite graph (Figure 1):



ADDENDUM G

TSPA-SR PARETO ANALYSIS

Figure 1 shows that the SSPA Volume 1 contained significantly more "minor errors" and "weak basis/assumptions/text" than any other document, especially SSPA Volume 2. SSPA Volume 1 is much larger than Volume 2, and it underwent multiple-version reviews with continual incorporation of new information by its authors. Both SSPA volumes received their detailed technical team review as in-process documents. The TSPA-SR, DEIS, and S&ER were completed documents.

The root cause team then sampled the raw comments from the technical team's TSPA model and report vertical reviews. The scope included all of that team's Category 1 and Category 2 entries, as well the Category 3 report entries for the TSPA-SR report only. Figure 2 depicts these data. Because the root cause team did not include TSPA subject matter experts, it took the identified discrepancies at face value and binned them into four groupings:

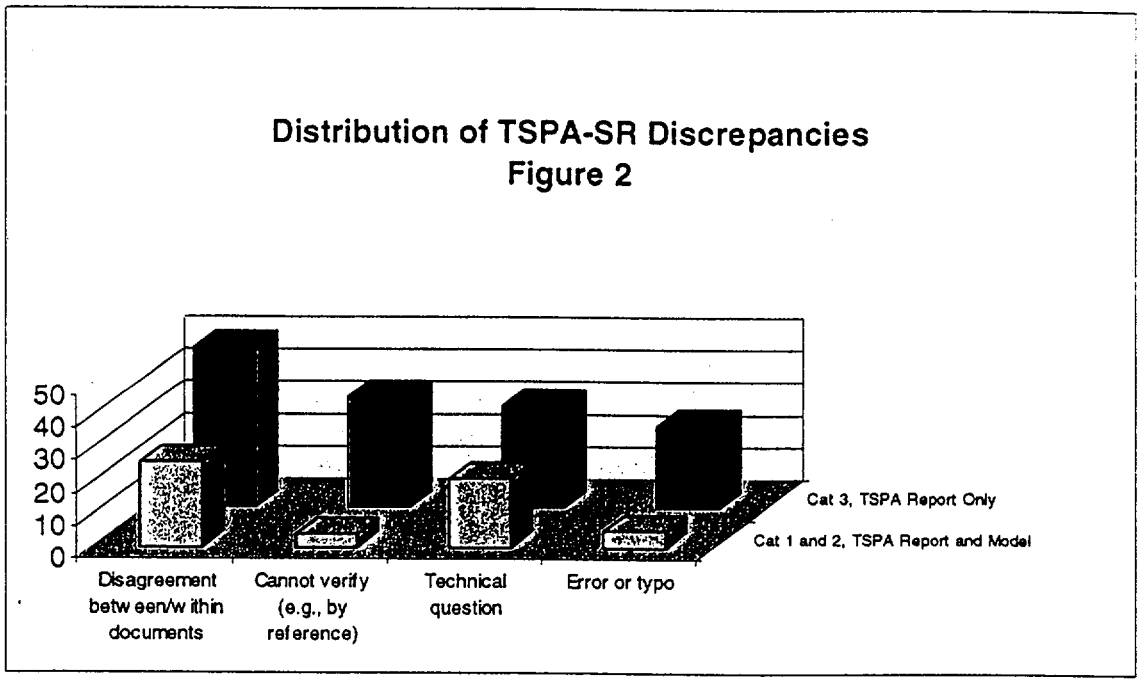
A. Document disagreement (within and between documents)

B. Technical question

C. Error/typo

D. Cannot verify reference or results

Figure 2 summarizes the results of this analysis.



The root cause team noted no topical areas where problems appeared to be concentrated. Disagreement between and within documents and inability to verify references or results were the two most prevalent error types. This supports the root cause team's conclusion that YMP relied excessively on parallel reviews and draft materials during TSPA-SR preparation. The "technical questions" cited under Category 3, did not appear to challenge TSPA-SR conclusions.