

[DOE LETTERHEAD]

November 29, 1990

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, N.W.
Washington, D.C. 20004

Dear Mr. Conway:

In accordance with Section 315 of Public Law 100-456 and with Defense Nuclear Facilities Safety Board Recommendation 90-4, which I accepted in my June 20, 1990, letter to the Board, I am enclosing the Department of Energy's Implementation Plan for an operational readiness review at the Rocky Flats Plant. This review is to be conducted prior to resumption of plutonium production operations at the facility and will address the specific issues cited in Board Recommendation 90-4. The review will also address other issues required to evaluate plant, personnel, and procedural readiness.

A detailed schedule for the operational readiness review is not yet available. The enclosed Implementation Plan details the sequence of key review elements that will occur following the contractor's notification of readiness to the Department. I will provide you with more detailed scheduling information as soon as that information becomes available.

Sincerely,

James D. Watkins
Admiral, U.S. Navy (Retired)

Enclosure

IMPLEMENTATION PLAN
FOR AN
OPERATIONAL READINESS REVIEW
OF THE
SAFETY OF PLUTONIUM OPERATIONS
AT THE
ROCKY FLATS PLANT

1.0 BACKGROUND

This Implementation Plan has been prepared in response to the Defense Nuclear Facilities Safety Board's (DNFSB) recommendation to conduct an operational readiness review (ORR) for plutonium operations at the Rocky Flats Plant (RFP). This plan responds to the specific DNFSB recommendations concerning the nuclear safety of plutonium operations. This plan does not attempt to describe other related initiatives taken by the Department of Energy (DOE) in the areas of nuclear materials controls and accountability; facility security; a systematic evaluation program for the design of structures, systems, and components; and long-term waste management. DOE approval to resume plutonium operation at RFP will be based upon the results of the ORRs described in this Implementation Plan and the results of or plans for these other DOE initiatives.

EG&G assumed responsibility for the safety of RFP on January 1, 1990, as the management and operations contractor to DOE. At that time, RFP was shut down for a semiannual nuclear material inventory as required by DOE Order 5633.3. However, a wide range of criticisms and concerns, which were indicative of systematic deficiencies in the conduct of past operations, had been raised by oversight groups prior to shutdown. Reviews by EG&G management confirmed that there were deficiencies in operational control. It was concluded that troublesome incidents and events could continue to occur unless the underlying issues were identified and corrective actions were taken. Based on this assessment, EG&G recommended, and DOE agreed, that resumption of plutonium operations at RFP should be delayed to permit EG&G to undertake the following measures:

- (1) perform a thorough review of the status of facilities and personnel
- (2) implement selected measures to improve the margin of safety associated with plutonium operations in the near term
- (3) formulate a long-term program for improvement of RFP operations

EG&G identified specific actions as essential elements for resumption of plutonium operations. Central to the EG&G resumption strategy was the introduction of short-term measures for early and substantial improvements in the formality and discipline of operations at RFP. Further review of operations and related activities by DOE, the DNFSB, and the Advisory Committee on Nuclear Facility Safety (ACNFS) identified additional short-term measures that should be completed prior to the resumption of plutonium operations.

DOE's normal practice after an extended outage at a nuclear complex is to conduct a comprehensive operational readiness review (ORR) before resuming operations. In keeping with this practice, and consistent with a May 3, 1990, DNFSB recommendation, the Secretary of Energy notified the DNFSB on June 20, 1990, that DOE would perform an ORR at RFP prior to resumption of plutonium operations.

EG&G is currently proceeding with a phased program to resume plutonium operations at RFP. Each phase of EG&G's resumption program is intended to allow plutonium operations to be resumed in a specific building. EG&G's resumption program for each building consists of a readiness program to upgrade the safety of operations, followed by an EG&G readiness review to confirm the success of the readiness program for that building, followed by a start-up test program to confirm the capability to resume plutonium operations safely. Since the plutonium-handling buildings at RFP will be made ready for operations individually, rather than all at once, DOE will conduct a separate ORR for each building after the completion of EG&G's readiness review for that building.

2.0 PURPOSE

The purpose of this DOE ORR process is to verify the readiness of RFP to resume plutonium operations safely. As part of this process, DOE will conduct an ORR for each building in which plutonium operations are conducted to evaluate whether EG&G has satisfied DOE's safety objectives (contained in a document entitled "ORR Safety Objectives and Assignments" and discussed in Section 5.1, below). Each ORR conducted by DOE will include the following:

- o Assessment of the adequacy and correctness of operating procedures for process and utility systems.

- o Assessment of the adequacy of the level of knowledge achieved during operator requalification as evidenced by review of qualification and requalification documentation, including examination questions and results; selective oral examination of operators; and observation of operator performance by members of the ORR Team.
- o Examination of records of tests of safety systems and calibration of other instruments that monitor limiting conditions of operation or that satisfy operating safety requirements.
- o Verification that all plant changes, including modifications of vital safety systems and plutonium processing workstations, have been reviewed for potential impact on procedures, training and requalification and that training and requalification have been completed using the revised procedures.
- o Examination of each building's Final Safety Analysis Report (FSAR) to ensure that its description of the plant, procedures, and accident analyses is consistent with the as-built plant, including those modifications made during the outage period.

Other areas to be addressed in each ORR to assure that adequate safety is achieved and maintained include the following:

- o status of safety-related structures, systems, and components, including operational interfaces between separate buildings. Safety-related structures, systems, and components include all vital safety systems and all other items which support safety functions
- o management systems, organization, practices and policies
- o self-assessment capability
- o operating experience review program
- o adequacy of the graded startup test program, including planning for the plutonium handling tests to be included in the program

3.0 SCOPE

In order to provide the Secretary of Energy with a partial basis for determining whether to allow EG&G to resume plutonium operations in each building, DOE Headquarters will implement an ORR for each building in which plutonium operations are conducted.

The DOE ORR will address the following for each plutonium operations building:

- o the operational readiness review conducted by EG&G
- o implementation of DOE directives and resolution of recommendations and findings made by oversight groups and review teams
- o readiness of the plant, equipment, personnel, and administrative systems to resume plutonium processing operations
- o adequacy of operational support services in the areas of training, maintenance, waste management, environmental protection, industrial safety and hygiene, radiological protection and health physics, emergency preparedness, fire protection; quality assurance, criticality safety, and engineering

The DOE ORR process will also include briefing DOE senior management and the DNFSB on the result of each ORR, public hearings on the ORR results for Buildings 559 and 707 (i.e., the first two buildings evaluated), and input to the Secretary of Energy's determination to resume plutonium operations for each building.

The ORR process will include consideration of the results of a related DOE initiative to review RFP compliance with DOE orders. However, initiatives such as nuclear material control and accountability; facility security; a systematic evaluation program for the design of structures, systems, and components; and long-term waste management issues are not within the scope of the ORR Implementation plan.

4.0 OVERALL APPROACH

Each ORR will provide DOE senior management with independent, objective, building-by-building evidence of the adequacy of EG&G's preparations to resume plutonium operations safely.

The sequence of the ORR activities is discussed below.

- a. Readiness to Proceed Memorandum - After successful completion of the readiness program and readiness review of a specific building, EG&G will issue a to Proceed memorandum requesting DOE approval for resumption of plutonium operations for that building.
- b. Operational Readiness Review - After receiving the Readiness to Proceed memorandum from EG&G, DOE will initiate an ORR for the building. During each ORR, a team comprised of Technical Experts and Senior Nuclear Safety Experts will review EG&G's procedures and programs; inspect equipment, systems, and the building; audit records; interview personnel; and observe simulated operations. At the completion of each ORR, the Team Leader and the Senior Nuclear Safety Experts will prepare a report regarding the readiness to safely resume plutonium operations in the building.
- c. Operational Readiness Review Team Briefings - Briefings on the ORR report will be presented to DOE senior management, the ACNFS, and the DNFSB, as requested. A briefing will be presented to the DNFSB prior to the resumption of plutonium operations in each building.
- d. Approval to Proceed Memorandum - Once all resumption objectives have been met, the DOE-Headquarters Resumption Program Office will request the Secretary of Energy's approval for EG&G to resume plutonium operations associated with the Plutonium Startup Test Program by preparing an Approval to Proceed memorandum for each building. Each memorandum will be based, in part, upon the results of the ORR conducted by DOE for that building. Other DOE initiatives related to the approval to proceed are identified in Section 3.0, above.
- e. Plutonium Startup Test Program - Following the approval of resumption of plutonium operations, EG&G will conduct a plutonium startup test program in each building. Each plutonium operation in the building is to be performed in a supervised environment prior to final approval of operator qualifications. This startup test program will simultaneously confirm the operability of equipment, the viability of procedures, and the training of operators in a production setting. Successful completion of the startup test program will permit the building to resume normal production activities subject to DOE approval.

In addition to these activities, DOE will hold public hearings prior to making recommendations to the Secretary of Energy regarding the resumption of plutonium operations for Buildings 559 and 707. These buildings, an analytical laboratory and a manufacturing facility, respectively, are expected to be the first buildings EG&G makes ready for resumption of plutonium operations. The operations conducted in Buildings 559 and 707 represent many of the types of plutonium operations conducted at RFP. The public hearings will be held to provide the public with information concerning the DOE ORR and to address the public's questions and concerns. The general process described above will be repeated for each building in which plutonium operations are conducted. However, as ORRs are conducted on each building, the scope of each ORR will be modified to reflect the results of the previous ORRs. For example, site-wide quality assurance procedures previously found to be acceptable would not have to be reviewed again for acceptability during ORRs of other buildings, ut the implementation of these quality assurance procedures within each building would be reviewed in the subsequent ORRs. Consequently, the scope and the number of people assigned to ORR teams may decrease as the series of ORRs proceeds. The public will continue to be informed of the results of ORRs conducted for those buildings evaluated after Buildings 559 and 707.

5.0 DESCRIPTION

5.1 ORR Preparations

Each ORR will be conducted by a team of experts in engineering, science, nuclear facility safety, and plutonium processing operations. Team members will be individually chosen by the ORR Team Leader to ensure that collectively their backgrounds will include the important facets of operations to be reviewed at RFP. The experts will also be chosen to ensure that each ORR Team includes senior nuclear safety experts and technical specialists to cover the following functional areas, as appropriate, for each building:

- emergency preparedness
- facilities, process, and fabrication engineering
- environmental protection and waste management
- fire protection
- industrial safety and hygiene
- maintenance, testing, and surveillance
- management, organization, and staffing
- operations
- quality assurance
- radiological protection and health physics
- nuclear safety assessment
- training

The reviews conducted by each ORR Team will be guided by a specific DOE-approved ORR safety objectives and assignments document.¹ The safety objectives contained in this document will be grouped into the following three categories:

- plant and equipment (hardware) readiness
- management and personnel readiness
- management programs (procedures, plans, etc.) readiness

A set of safety objectives has been developed based on (1) essential actions to be completed prior to the phased resumption of operations, as identified by EG&G; (2) directives issued by DOE; (3) findings and recommendations of oversight groups; and (4) recommendations of review teams. These objectives are contained in the ORR safety objectives and assignments document that will be revised for each ORR and will identify the members of each ORR Team and their specific assignments.

The ORR Team will be led by a senior DOE manager and will be comprised of Senior Nuclear Safety Experts and Technical Experts. The Senior Nuclear Safety Experts will assist the Team Leader in defining the issues to be addressed by the Technical Experts, overseeing and reviewing the activities of the Technical Experts, and preparing a report regarding the safety of resuming plutonium operations based on the Team's findings.

Before arriving at RFP, each Technical Expert on the team will be given instructions on how to review and use the safety objectives and assignments document to develop criteria that they will use in performing their reviews. The Team Leader may request that Team Members visit RFP for a limited time prior to the start of a building's ORR in order to facilitate preparations for that ORR.

Criteria proposed by the Technical Experts will be based on their expertise in their assigned areas, their knowledge of DOE orders and other requirements, the operational history of RFP and other DOE facilities, the issue management system at the RFP, and past appraisals. The review approach proposed by the Technical Experts will identify the scope of their review and include plans for reviewing procedures and programs; inspecting equipment and facilities; auditing records; interviewing personnel; and observing operations during operational tests without plutonium. Some reviews may also recommend simulated operations by EG&G to test the response of operational and support personnel to normal and off-normal events.

The detailed criteria and the review approach prepared by each Technical Expert will be reviewed by the Team Leader,

the Senior Nuclear Safety Experts, and the other Technical Experts on the Team. Revisions will be made to the criteria and review approach as appropriate, After final approval by the Team

1 The initial version of this document is attached to this plan. Subsequent revisions will be provided to the DNFSB and DOE internal oversight groups as prepared.

Leader and the Senior Nuclear Safety Experts, the Technical Experts will use the revised criteria and review approach to perform their reviews.

A copy of the criteria and review approach for each building will be provided to the DNFSB and DOE internal oversight groups.

5.2 ORR Process

After receiving and accepting EG&G's Readiness to Proceed memorandum for each building, the onsite portion of the ORR will begin. During a nominal 3-week, onsite review, the ORR Team will use the inspection criteria and review approaches discussed above, and the ORR Technical Experts will assess whether the DOE safety objectives assigned to them for review have been met. The Senior Nuclear Safety Experts will actively participate in the reviews performed by the Technical Experts, and assist the Team Leader in providing oversight of the ORR.

Each ORR will consist of programmatic reviews of EG&G's readiness activities to assess whether plutonium operations could be conducted safely if allowed to resume. In addition, the ORR Team will evaluate EG&G's performance in conducting ongoing activities; such as equipment operability checks and dry runs, and the simulated plutonium operations requested by the Team Leader.

To facilitate Team coordination and the exchange of information, the Team will meet each evening during the onsite review period. The results of the reviews conducted by the Senior Nuclear Safety Experts and Technical Experts will be used by the Senior Nuclear Safety Experts and the Team Leader to refine and focus the future activities of the Technical Experts. For example, the Senior Nuclear Safety Experts may identify trends or patterns that indicate the need for additional investigation. An EG&G observer and a DOE-RFO observer will attend these meetings to aid in planning and coordinating upcoming activities and in validating the facts being relied upon by the ORR Team.

During the ORR, the documentation of review findings and the assembly of objective evidence of operational readiness will be the responsibility of individual Technical Experts in accordance with specific direction given by the Team Leader and the Senior Nuclear Safety Experts. Each Technical Expert's review findings will be documented on a standard worksheet.

At the end of the onsite portion of the ORR for each building, the Technical Experts will complete their evaluation of the operational readiness of the building, and their findings will be submitted to the Team Leader and the Senior Nuclear Safety Experts. The Senior Nuclear Safety Experts will review the Technical Experts' findings and assist the Team Leader in developing a recommendation regarding the readiness to safely resume plutonium operations in that building. A report will be prepared by the Senior Nuclear Safety Experts and the Team Leader to document the results of the ORR and provide justification for the Team's recommendation. The report will also identify any open items found in the review, including those that must be resolved prior to resumption of plutonium operations.

Team members will be asked to concur in the ORR report. Any dissenting opinions will be documented and attached to the report. The ORR report will be transmitted by the Team Leader to the Deputy Assistant Secretary for Facilities.

The Resumption Program Office in the Office of Defense Programs will prepare the Approval to Proceed memorandum for each building. The ORR report will become part of the basis for recommending to the Secretary the action that should be taken on EG&G's Readiness to Proceed memorandum. After the Secretary of Energy signs an Approval to Proceed memorandum, EG&G will be allowed to resume plutonium operations by initiating the graded plutonium startup test program for that building.

The Rocky Flats Operations Office (RFO) will verify closure, as necessary, of open items. In the event the open item requires action on the part of RFO, the closure of the item will be verified by DOE-Headquarters or an ORR Team member. The resources of the ORR Team will remain available to assist in determining the adequacy of closure.

6.0 ADMINISTRATION

6.1 Overall

This Implementation Plan is the top-level DOE document describing the activities necessary for safely resuming plutonium operations at each RFP building and serves the purpose of a management plan. The document hierarchy for the ORR is shown below.

- ORR Implementation Plan (top-level document for ORRs for all plutonium operations)
- ORR Safety Objectives and Assignments (mid-level document written for each building)
- Criteria and Review Approaches (bottom-level document controlling the work of each Technical Expert)

6.2 Quality Assurance and Document Control

The quality assurance (QA) and document control requirements for each ORR will be identified by the ORR Team Leader, with assistance by the Senior Nuclear Safety Experts, will be issued by the ORR Team Leader, and will be implemented by all ORR Team members. The QA requirements will include Team Leader approval of the qualifications of Technical Experts, daily onsite peer review of the findings of the Technical Experts, verification of facts relied upon in preparation of ORR reports, oversight of the activities of the Technical Experts by the Senior Nuclear Safety Experts, and specification of the form of reports and the retention of records on which the Team's conclusions are based.

6.3 Responsibilities

Deputy Assistant Secretary for Facilities, Defense Programs - The Deputy Assistant Secretary for Facilities has overall responsibility for conducting the Operational Readiness Reviews at the RFP in preparation for resumption of plutonium operations. The Deputy Assistant Secretary for Facilities has appointed the Director of the Office of Engineering and Operations Support as the Team Leader for the RFP Operational Readiness Reviews.

DOE Headquarters RFP Resumption Program Office - The DOE Headquarters RFP Resumption Program Office is responsible for coordinating DOE Headquarters resumption activities, concurring in resumption plans, and preparing the Approval to Proceed memorandum for each building. The Approval to Proceed memorandum will identify any unresolved issues and recommend actions for resolution and will address generic and specific issues. Issues raised by the Secretary, the ACNFS, or the DNFSB will be resolved or action plans to resolve the issues will be prepared, as appropriate, prior to forwarding each Approval to Proceed memorandum to the Secretary from the Assistant Secretary for Defense Programs.

EG&G - EG&G is responsible for ensuring that its phased resumption program sufficiently improves the safety of plutonium operations at the RFP Plant to allow the resumption of plutonium operations. In addition, EG&G is responsible for preparing a Readiness to Proceed memorandum for each building to notify DOE-RFO that EG&G's readiness review has been completed satisfactorily. EG&G is also responsible for supporting the activities of each DOE ORR Team. For example, EG&G shall conduct operations and tests requested by the Team Leader and ensure that EG&G is represented at daily meetings of each ORR Team and at other Team meetings, as requested.

ORR Team Leader - The Team Leader is responsible for the selection of ORR Team members; DOE direction and guidance to each ORR Team in accordance with this Implementation Plan; preparation of internal ORR Team correspondence; liaison with the Manager of the Rocky Flats Operations Office and the Director of the RFP Resumption Program Office; and submission of ORR reports to the Deputy Assistant Secretary for Facilities. The Team Leader is

also responsible for issuing the ORR safety objectives and assignments document at least 4 weeks before the start of each ORR.

ORR Senior Nuclear Safety Experts - The ORR Senior Nuclear Safety Experts are responsible for providing assistance to the Team Leader in the exercise of his responsibilities; providing guidance to the Technical Experts; identifying the issues to be addressed during the ORR; approving the criteria and review approaches to be used by the Technical Experts; and assisting the ORR Team Leader in writing the report for each ORR. The ORR reports will be signed by all Senior Nuclear Safety Experts and the Team Leader. Any differing opinions will be attached in writing.

ORR Technical Experts - The Technical Experts are responsible for assessing the adequacy of EG&G's readiness results by conducting reviews in selected areas important to the safe resumption of plutonium operations. The Technical Experts will assist the Team Leader and the Senior Nuclear Safety Experts in defining the scope of review in their assigned area; documenting the criteria and review approach for their assigned area, subject to approval by the Senior Nuclear Safety Experts and the Team Leader; attending Team meetings to coordinate activities with other Team members; documenting their own activities, findings and conclusions in a manner to be specified by the Team Leader and the Senior Nuclear Safety Experts; and concurring in final ORR reports written by the Team Leader and the Senior Nuclear Safety Experts (any differing opinions will be attached to the report in writing).

Rocky Flats Operations Office Manager - The Manager of the Rocky Flats Operations Office (RFO) is responsible for coordinating DOE-RFO resumption activities, approving the EG&G RFP resumption plans, and forwarding the Site Resumption Action Memorandum for each building to the Director, RFP Resumption Program Office, under a separate cover letter signed by the DOE-RFO Manager that includes any DOE-RFO recommendations. The Manager of the RFO is also responsible for ensuring that the DOE-RFO is represented at meetings of the ORR Team, as requested, and for verifying resolution of open items.

7.0 DELIVERABLES AND SCHEDULE

The ORR safety objectives and assignments document will be issued at least 4 weeks prior to the start of each ORR and will be modified as necessary for each building. A copy of each Technical Expert's criteria and review approach, which are developed from the ORR safety objectives and assignments document for each building, will be approved prior to the start of ORR onsite inspections.

A report documenting the results of each ORR will be issued within 2 weeks of completion of the onsite portion of the ORR and prior to any public hearing on that ORR. The report will contain the recommendation of the ORR Team regarding the safety of resuming plutonium operations for that building.

A schedule for performing ORRs at RFP will be made available after EG&G issues a resumption schedule. The DNFSB will be informed of the ORR start date for each building when these dates have been selected.

OPERATIONAL READINESS REVIEW SAFETY OBJECTIVES AND ASSIGNMENTS FOR THE ROCKY FLATS PLANT

1.0 PURPOSE

This document provides the initial safety objectives and team member assignments for conducting the Operational Readiness Review (ORR) at the Rocky Flats Plant (RFP). The approach for conducting the ORR is described in "Implementation Plan for an Operational Readiness Review of the Safety of Plutonium Operations at the Rocky Flats Plant." The specific assignments will be provided for each ORR by a revision of this document that is consistent with the Implementation Plan.

2.0 TEAM COMPOSITION

The individuals identified for participation in the initial ORRs are listed below. A statement of their credentials is provided in Appendix A. Additional skill areas may be identified before the initial ORRs are conducted.

Team Leader
James P. Knight

Senior Safety Experts
Roger J. Mattson, Coordinator
William Kerr
James P. O'Reilly
Lawrence J. Ybarrondo

Technical Experts
Lance E. Traver, Review Coordinator
Joseph F. Tinney, Issue Resolution
H. Michael Hawkins, Emergency Preparedness
Carl R. Forsberg, Engineering (Facilities, Process, Fabrication)
Gary J. Toman, Engineering (Facilities, Process, Fabrication)
Monique V. Helfrich, Environmental Protection and Waste Management
James A. Shurick, Fire Protection
Lawrence Blackwell, Industrial Safety
Charles R. Jones, Maintenance, Testing, and Surveillance
David M. Pinkston, Maintenance, Testing, and Surveillance

Management, Organization, and Staffing
Albert P. Baione, Management, Organization, and Staffing
Shirley J. Olinger, Management, Organization, and Staffing

1 Additional Technical Experts in this area are being sought.

Rowland E. Felt, Operations
Leonard W. Gray, Operations
Robert E. Hanvey, Operations
Matthew S. McCormick, Operations
Marvin P. Norin, Quality Assurance
Arthur J. Toy, Radiological Protection and Instrumentation
C. Leslie Brown, Safety Assessment
Elizabeth Conrad, Safety Assessment
Gilbert A., Nicholson, Safety Assessment

Training 1
John W. Robinson, Training
Eugene F. Redden, Training

3.0 SAFETY OBJECTIVES AND ASSIGNMENTS

Readiness to resume plutonium operations at Rocky Flats will be evaluated using the safety objectives set forth in Sections 3.1 to 3.3. The safety objectives were developed by the ORR Team Leader and the Senior Nuclear Safety Experts based on professional judgment and experience, input from the Technical Experts aided by a week-long meeting of the Team at the Plant in June 1990, and on information contained in references listed in Appendix C. Particular attention was given to the following references:

- an EG&G report, "Rocky Flats Plan for Phased Resumption of Plutonium Operations" (Reference 17)

- directives issued by DOE (References 8, 14, and 16)
- findings and recommendations of oversight groups (References 11, 12, and 13)
- recommendations of review teams (References 9, 10, and 15)

The information to be relied on by the ORR Team will be recorded and, where appropriate, references will be added to Appendix C. The safety objectives of Sections 3.1 through 3.3 were developed generically; they will be modified as necessary for each ORR based on the unique operating features of the building being evaluated.

Each Technical Expert will be assigned to evaluate a set of safety objectives based on their area of review. The Technical Experts will be responsible for determining whether their assigned objectives have been met in accordance with the process set forth in "Implementation Plan for an Operational Readiness Review of the Safety of Plutonium Operations at the Rocky Flats Plant." The assignments for each technical expert are listed in Appendix B.

3.1 Plant and Equipment (Hardware) Readiness

The hardware objectives to be achieved prior to resumption of plutonium operations are listed and numbered below. Each objective is given a unique identifier (H.1, H.2, etc.). Under each objective, supporting objectives are identified and given a number (H.1.1, H.1.2, etc.).

1 Additional Technical Experts in this area are being sought.

- H.1. The configuration of vital safety systems, including safety-related process systems and safety-related utility systems, is consistent with assumptions made about such systems in Safety Analysis Reports (SARs).
 - H.1.1 Vital safety systems have been correctly identified in the SARs.
 - H.1.2 Identification markers are installed on vital safety systems, including safety-related process systems, safety-related utility systems, and any other equipment and instrumentation used to demonstrate compliance with operational safety requirements.
 - H.1.3 The adequacy of labeling and drawings for vital safety systems has been verified.
 - H.1.4 The types, modes of operation, and locations of vital safety systems, including safety-related process systems and safety-related utility systems, identified in new procedures are physically verified.
- H.2 The condition and operability of vital safety systems, including safety-related process systems and safety-related utility systems, are confirmed.
 - H.2.1 Instruments, indicators, and alarms that monitor limiting conditions of operation or that satisfy operational safety requirements have been demonstrated to be capable of performing their intended functions in the required manner.
 - H.2.2 The maintenance backlog for vital safety systems, including safety-related process systems and safety-related utility systems, is acceptable for resumption of operations.
 - H.2.3 Good housekeeping is practiced in all buildings that are involved with plutonium operations.
 - H.2.4 Tools and equipment for proper operation and maintenance of vital safety systems, including safety-related process systems and safety-related utility systems, have been identified, calibrated, tested, and are available.
 - H.2.5 Ductwork is evaluated to identify and characterize plutonium buildup. There is high confidence that all lines of ductwork with more than 400 grams of plutonium have been identified.
 - H.2.6 Plutonium is removed, or ductwork is replaced, to the maximum extent practicable, for those lines of ductwork containing more than 400 grams of plutonium. In no case shall a residue exceeding 400 grams of plutonium remain in any one line of ductwork unless approved by the Secretary of Energy.
 - H.2.7 Improved prefilters have been installed in those glovebox exhaust lines identified as requiring this modification.
 - H.2.8 Prefilters have been installed on ventilation system bypass lines, and other changes to guard against plutonium buildup in ductwork have been made, for all gloveboxes identified as requiring these modifications.
 - H.2.9 Operability of vital safety systems, including safety-related process systems and safety-related utility systems, is physically verified.

- H.3 Facilities and equipment are available for operational support services, including training, maintenance, waste management, environmental protection, industrial safety and hygiene, radiological protection and health physics, emergency preparedness, fire protection, quality assurance, criticality safety, and engineering.
- H.3.1 Equipment and facilities needed for operational support services are available.
- H.3.2 Sampling and analysis capabilities exist to perform the monitoring and characterization activities needed for resumption of operations, including those for environmental protection and waste management.
- H.3.3 Approved storage facilities exist to receive wastes and residues generated from operations within a building.

3.2 Management and Personnel Readiness

The personnel objectives to be achieved prior to resumption of plutonium operations are listed and numbered below. Each objective is given a unique identifier (P.1, P.2, etc.). Under each objective, supporting objectives are identified and given a number (P.1.1, P.1.2, etc.).

- P.1 There are sufficient numbers of qualified plutonium operations personnel, supervisors, shift technical advisors, and managers to support the safe resumption of plutonium operations.
 - P.1.1 Plutonium operations personnel have an adequate understanding of technical fundamentals including chemistry, ionizing radiation, criticality, and plutonium pyrophorosity.
 - P.1.2 Plutonium operations personnel, supervisors, and shift technical advisors have been trained and qualified in accordance with the latest revision of approved procedures.
 - P.1.3 An adequate startup test program has been developed and will be used for final sign-off of operator qualification.
 - P.1.4 Plutonium operations personnel have been trained to adhere to procedures and operational safety requirements and to understand the importance of procedural compliance.
 - P.1.5 Qualification and staffing requirements have been established and met for plutonium operations personnel, supervisors, shift technical advisors, and managers.
 - P.1.6 The level of knowledge achieved during operator qualification is adequate to operate safely.
- P.2 As a minimum, one DOE person trained and qualified in plant operations will be stationed in each plutonium building during operations that involve plutonium.
 - P.2.1 Qualification requirements and staffing levels are established and met.
 - P.2.2 Training has been conducted.
 - P.2.3 Personnel are familiar with the buildings, equipment, operating procedures, and the identity of senior building managers.
- P.3 Sufficient numbers of qualified personnel are provided for operational support services, including training, maintenance, waste management, environmental protection, industrial safety and hygiene, radiological protection and health physics, emergency preparedness, fire protection, quality assurance, criticality safety, and engineering.
 - P.3.1 Operational support personnel have a requisite understanding of technical fundamentals.
 - P.3.2 Operational support personnel and supervisors have been trained and qualified in accordance with the latest revision of approved procedures.
 - P.3.3 Qualification and staffing requirements have been established and met for operational support personnel.
 - P.3.4 The level of knowledge achieved during qualification is adequate to support resumption of operations.
- P.4 Personnel exhibit an awareness of safety and environmental protection requirements and, through their actions, demonstrate a commitment to comply with those requirements.

3.3 Management Programs (Procedures, Plans, etc.) Readiness

The management systems objectives to be achieved prior to resumption of plutonium operations are listed and numbered

below. Each objective is given a unique identifier (M.1, M.2, etc.). Under each objective, supporting objectives are identified and given a number (M.1.1, M.1.2, etc.).

- M.1 There are adequate and correct procedures and safety limits for operating the process systems and the utility systems.
 - M.1.1 Procedures for operations, training, and maintenance reflect the current configuration (including changes made during the outage) of vital safety systems, including safety-related process systems and safety-related utility systems.
 - M.1.2 Operating and maintenance procedures for vital safety systems, including safety related process systems and safety-related utility systems, and building administrative procedures are consistent with approved operational safety requirements and deal with normal and abnormal events (e.g., spills).
 - M.1.3 Consistent with the contractor's operating philosophy, operating procedures for vital safety systems, including safety-related process systems and safety-related utility systems, contain sufficient detail to permit initiation of use of a "procedural compliance" concept at RFP.
 - M.1.4 Procedures produced or revised for the conduct of plutonium operations have undergone a joint walkdown verification by DOE and EG&G technical personnel.
 - M.1.5 The adequacy of operating procedures is demonstrated during equipment and system operability checks.
 - M.1.6 Operational safety requirements are established and measured to ensure that operations are conducted within the analyzed safety envelope.
 - M.1.7 Operational safety requirements have been developed by engineering and plutonium operations personnel.
 - M.1.8 A system has been established to ensure procedures are kept current and accurate, including temporary changes to procedures.
 - M.1.9 Safety limits are clearly stated and posted in appropriate locations.
- M.2 Training and qualification programs for plutonium operations personnel have been established, documented, and implemented.
 - M.2.1 Contents of training and qualification programs properly account for plant and procedural changes.
 - M.2.2 Primers covering technical fundamentals, including chemistry, ionizing radiation, criticality, and plutonium pyrophorosity, are available.
 - M.2.3 Training and qualification programs, including building-specific training, job-specific training, and general employee training are available.
 - M.2.4 Instructor guides, examinations, lesson material, and reference documents are available and adequate to support an effective training program.
 - M.2.5 The training department uses post-training feedback, internal evaluations, and operating experience to modify their programs as needed.
 - M.2.6 An adequate startup test program has been developed and will be used to evaluate the adequacy of the training program for plutonium operations personnel.
- M.3 Vital safety systems are defined, and a system to maintain control over the design and modification of plutonium facilities and vital safety systems, including safety-related process systems and safety-related utility systems, is established.
 - M.3.1 Administrative controls are provided to assure that modifications of plutonium facilities and vital safety systems, including safety-related process systems and safety-related utility systems, made during the outage have been analyzed, documented, and approved.
 - M.3.2 An adequate process has been established to assure that documentation for plutonium facilities and vital safety systems, including safety-related process systems and safety-related utility systems, is established and kept current.
 - M.3.3 Administrative controls are in place to assure that deactivation of alarms is accomplished in a controlled manner requiring formal review and approval.
 - M.3.4 One-line drawings and other documentation relied upon to demonstrate compliance with operational safety requirements are up-to-date with the current plant configuration.

- M.4 A system is in place to confirm and periodically reconfirm the condition and operability of vital safety systems, including safety-related process systems and safety-related utility systems.
 - M.4.1 Procedures are in place to verify the operability of alarms and instrumentation for vital safety systems, including safety-related process systems and safety-related utility systems.
 - M.4.2 Appropriate procedures, including monitoring requirements and operational constraints, are in place to assure that future operations will not allow the level of plutonium in any line of ductwork to exceed 400 grams.
 - M.4.3 Procedures are in place to assure that if the 400-gram limit for plutonium buildup in the ductwork is exceeded, or if the risks to personnel from accumulation of radioactive material in ductwork appear unacceptable, or if the level of accumulation of plutonium in ductwork presents an unreviewed public safety question, continued operation of such a ductwork system will require a full technical justification and Secretarial approval.
 - M.4.4 Surveillance requirements, procedures, and intervals are established and implemented.
- M.5 A process has been established to identify, evaluate, and resolve recommendations and findings made by oversight groups, official review teams, audit organizations, and the operating contractor.
 - M.5.1 A system for identifying, reviewing, and cataloging documents that describe deficiencies or recommendations is established and adequately implemented.
 - M.5.2 A system for prioritizing and tracking corrective actions and recommendations is established.
 - M.5.3 Criteria for identifying resumption issues have been developed.
 - M.5.4 Issues to be resolved prior to resumption of plutonium operations have been properly identified and corrective actions have been completed and verified.
- M.6 A baseline compliance status review of the nine Category 1 DOE Orders has been performed and non-complying items have been addressed.
 - M.6.1 A process has been implemented to identify and evaluate noncompliance issues associated with the nine Category I DOE Orders and to determine which specific issues must be resolved prior to resumption of plutonium processing operations.
 - M.6.2 Noncompliance issues have been corrected or appropriately justified for use as is.
- M.7 Management systems are established to assure operational support services (e.g., training, maintenance, waste management, environmental protection, industrial safety and hygiene, radiological protection, and health physics, emergency preparedness, fire protection, quality assurance, criticality safety, and engineering) are adequate for the resumption of plutonium processing.
 - M.7.1 Organizational responsibilities for and interfaces with operational support services have been formally identified and implemented.
 - M.7.2 Readiness for the resumption of plutonium operations has the concurrence of cognizant operational support services organizations.
 - M.7.3 An effective public information program is established including provision for comment by the public, oversight groups, and Federal, State and local agencies.
 - M.7.4 An emergency preparedness program has been established and drills and exercises are conducted at appropriate intervals. Drills and exercises have demonstrated the capability to perform emergency preparedness activities.
 - M.7.5 An adequate maintenance program has been established.
 - M.7.6 An adequate quality assurance program has been established, including processes for tracking, trending, and correcting significant conditions adverse to quality.
 - M.7.7 Necessary environmental permits have been obtained and necessary environmental compliance agreements are in place.
 - M.7.8 Safety programs have been established that ensure that plant personnel are trained and can respond correctly to safety hazards.
 - M.7.9 Adequate reviews are conducted by operational support organizations with qualified personnel at suitable intervals to monitor safety performance.
 - M.7.10 A program for adequate oversight of unresolved safety question determinations has been implemented.

- M.7.11 Operational support organizations have the appropriate administrative controls (e.g schedules, plans, policies, surveillances, procedures) to ensure compliance with appropriate Federal and State regulations and good practices.
- M.8 A formal program is established to develop a site-wide culture that places the highest priority on safety and protection of the environment.
 - M.8.1 Policies, plans, and procedures are established that can reasonably be expected to support the desired cultural changes such as placing the highest priority on safety and protection of the environment, formality and discipline of operations, and inquisitive employee attitudes.
 - M.8.2 A self-assessment process is in place to provide a mechanism to measure safety performance and to determine and correct the root causes of unusual occurrences.
 - M.8.3 Facility management personnel are made aware of safety issues and occurrences that could affect their operations, and lessons learned are applied.
 - M.8.4 The philosophy of openness on matters affecting safety, health, and environment is supported by an effective public information program and line management practices.
 - M.8.5 Management commitment to the safe operation of the facility is evident from personal involvement, interest, and knowledge.
- M.9 The results of the EG&G corporate review verify the readiness of hardware, personnel, and management systems to resume plutonium operations.
- M.10 An adequate startup test program has been developed and the non-plutonium handling portion has been adequately implemented to confirm the operability of equipment, the viability of procedures and the training of operators. The startup test program shall also include adequate plans for graded plutonium testing to simultaneously confirm operability of equipment, the viability of procedures, and the training of operators.
- M.11 Functions, assignments, responsibilities, and reporting relationships of individuals are clearly defined, understood, and effectively implemented with line management responsibility for control of safety.
 - M.11.1 Responsibility, authority, and accountability of each element of line management, from top-level management through shift supervisors, is clearly defined by policy and evident by practice.
 - M.11.2 Effective coordination and communication exist among the line organizations.
- M.12 The DOE Rocky Flats Operations Office (DOE/RFO) has established oversight programs to support the resumption of plutonium processing operations.
 - M.12.1 The DOE/RFO organization is committed to the safe operation of the facility as evidenced by its day-to-day involvement with operations activities and its level of knowledge of plant operations.
 - M.12.2 DOE/RFO has the capability to verify the adequacy of EG&G's operations at RFP prior to and following resumption of operations.
 - M.12.3 DOE/RFO has established a formal program to foster a safety culture that places the highest priority on safety and protection of the

APPENDIX A. STATEMENTS OF CREDENTIALS

Albert P. Baione is a nuclear engineer with 11 years experience. Mr. Baione worked in the DOE Division of Naval

Reactors for 10 years in nuclear facility operations and safety. The majority of this work involved the development and evaluation of refueling and radiological control programs, including evaluations of management and organizational performance. Mr. Baione led Naval Reactors Headquarters inspection teams that appraised the performance of nuclear-powered ships and nuclear ship repair facilities in their implementation of Headquarters radiological control requirements. He serves as Engineering Group Manager in SCIENTECH's Rockville, Maryland, office and participates in various safety and regulatory projects related to nuclear engineering for the NRC and DOE.

Lawrence Blackwell is a Ph.D. physicist with 32 years of management experience. He provides consulting services in nuclear facility safety, personnel reliability programs, emergency management, specialized training, and industrial safety. In his 12 years of employment at Los Alamos National Laboratory (LANL), Dr. Blackwell held assignments in the Health, Safety, and Environment Division including Safety Director, Associate Division Leader, Fire Protection Program Manager, and Construction Project Manager, giving him a broad background in industrial safety. He was responsible for the complete revision and documentation of the LANL industrial safety program and developed the necessary training and evaluation systems to ensure implementation and compliance. Dr. Blackwell also designed and operated the LANL Emergency Operations Center and directed the Emergency Management Program.

C. Leslie Brown has 30 years experience in nuclear criticality safety. He is a Fellow Scientist with the Westinghouse Hanford Company and is currently serving as a criticality safety representative at the plutonium finishing plant. Mr. Brown has conducted criticality experiments with fast reactor fuel and performed criticality safety analyses for commercial nuclear power plants. He has served as a process engineer at the plutonium fabrication plant and was trained in criticality safety at the Hanford Critical Mass Laboratory. He was elected a Fellow of the American Nuclear Society (ANS) in 1980 and received the Bronze George Westinghouse Signature Award for Excellence in 1988 and the ANS Criticality Safety Division Achievement Award in 1978. He has published 76 documents, 14 ANS transaction papers, and 11 journal articles on the subject of criticality safety.

Elizabeth A. Conrad is a chemical engineer with 9 years experience in nuclear chemical processing operations at Westinghouse Hanford Company (WHC). As a process engineer in the PUREX Plant, she provided technical shift support during the 1983 restart of the plant and served as lead engineer for neptunium recovery startup in 1985. In 1987, she was chosen as the technical team leader for the criticality safety review of chemical process operations. As a senior process engineer at the plutonium finishing plant (PFP), Ms. Conrad contributed to the successful restart of plutonium metal production after the plant was shut down for safety reasons. In 1988, she established and managed the PFP Operations Training Group instituting formal criteria for the evaluation of operator and shift management qualifications. Ms. Conrad is currently assigned as the WHC technical advisor on plutonium processing to the DOE Office of Nuclear Materials.

Rowland E. Felt is a Ph.D. chemical engineer with 26 years experience in plutonium and uranium processing at the DOE Hanford Site. His experience includes development of aqueous and pyrochemical processes for plutonium conversion and scrap recovery. Dr. Felt served as the Process Engineering Manager for the 234-5 Z Plant and served as the Separation Process Engineering Manager for the 200 Area at Hanford. His safety experience includes participating in the fire investigation at Rocky Flats in 1969, conducting plutonium fire experiments, and follow-on evaluation of plutonium release fractions associated with accident analyses. Dr. Felt's recent assignment with Westinghouse Idaho Nuclear Company included the development of a flowsheet and supporting process analysis for dose reduction, waste minimization, and plant support operations for the Special Isotope Separation Program. He is currently serving as the Idaho National Engineering Laboratory representative to the Planning Support Group at the Savannah River Site.

Carl R. Forsberg has been involved in the design and construction of high explosive and nuclear material processing facilities for the past 34 years. He served in the Plant Engineering Department at the Lawrence Livermore National Laboratory for 17 years and served the Atomic Energy Commission and DOE Office of Military Applications for 12 years. Mr. Forsberg was the construction project manager during the design of the Lawrence Livermore National Laboratory plutonium facility and was the DOE Headquarters project manager for the Office of Military Applications during the latter half of construction of the Rocky Flats Plutonium Recovery and Waste Treatment Facility, Building 371/374. He retired from DOE in 1985; since then he has been providing consulting services primarily related to construction project management and facility design.

Leonard W. Gray has a Ph.D. in inorganic chemistry, and is an internationally recognized expert in actinide processing. He has 20 years experience at the Savannah River Site and 2 years experience at Lawrence Livermore National Laboratory (LLNL). Dr. Gray has authored or coauthored more than 50 publications and presentations, the majority having been written as a result of new plutonium feedstocks or problems resulting from process upsets. As a process troubleshooter, he dealt with the following unit operations in plutonium processing: dissolution, feed clarification, purification (solvent extraction, cation exchange, anion exchange, and selective precipitation), isolation, and conversion to either metal or oxide. Dr. Gray is the Section Leader for the Plutonium Processing Technology Section of the Special Isotope Separation Program at LLNL. He provides technical leadership in all areas of plutonium processing (aqueous and molten salt-based chemistries), equipment engineering, process automation, and process control.

Robert E. Hanvey has 35 years experience in nuclear chemical processing at the Savannah River Site (SRS) where he worked in both plutonium finishing and residue recovery operations. He has prepared safety analysis reports for plutonium processing at SRS, was a member of the DOE Operational Readiness Review team at Lawrence Livermore National Laboratory, and participated in special studies for DOE Headquarters for plutonium residue recovery. Since 1987, Mr. Hanvey has been a production planner for Westinghouse Savannah River Company at SRS. He works with representatives from other DOE Nuclear Weapons Complex Sites regarding the transfer and processing of plutonium-239. Mr. Hanvey also provides input on the future direction for process improvements and production schedules for the entire DOE Nuclear Weapons Complex.

H. Michael Hawkins has a Graduate Certificate in National Security and Emergency Mobilization; he has 18 years experience in emergency preparedness and safeguards and security with the Atomic Energy Commission, NRC, DOE, and in the commercial nuclear industry. Mr. Hawkins has recently been involved in DOE's NMP contract as an SAIC senior scientist in support of the review and evaluation of the Emergency Management Program. These efforts include involvement with rewriting DOE Order 5000.3A, participation in the Occurrence Reporting Pilot Program at the Savannah River Site and Rocky Flats Plant, assistance to the DOE Office of Defense Programs in the order compliance review of Westinghouse and EG&G, and various activities in direct support of the DOE Office of Emergency Operations. For 8 years, Mr. Hawkins was actively involved in the NRC's Emergency Preparedness Program and was instrumental in the design, construction, and operation of the NRC Operations Center. Mr. Hawkins was the Manager of the Seabrook Nuclear Power Plant Emergency Plans and Procedures organization and was an active participant in Seabrook's Initial Federal Emergency Preparedness Exercise. His field assignment at the Comanche Peak Steam Electric Station included overall coordination and scenario development of the initial Emergency Preparedness exercise among Texas Utilities (TU) Electric, Federal (NRC and FEMA), State of Texas, and various local governments. Monique V. Helfrich is a Senior Environmental Engineer at SAIC; she has 9 years experience in safety and environmental issues at various DOE facilities. Ms. Helfrich has an M.S. in Systems Engineering and is currently providing technical support on environment, safety, and health issues to the Assistant Secretary for Defense Programs. Ms. Helfrich was a senior environmental and systems engineer and on-site project manager for a technical support contract to the Rocky Flats Office Waste Management Branch. This support included analysis of the responsibilities and schedules inherent in compliance agreements entered into by DOE, the Environmental Protection Agency, and the Colorado Department of Health; and evaluation of waste disposal efforts in the Pondcrete Pad Clearance and Solar Evaporation Ponds Cleanup projects.

Charles R. Jones has an M.S. in Mechanical Engineering with 24 years of experience including a 20-year career in nuclear reactor and nuclear weapon technology with the United States Navy. In the Navy, he served as a senior nuclear engineer and operator on several nuclear-powered surface ships, qualified as Chief Engineer of the USS Nimitz, CVN 68, conducted a training program for nuclear plant Chief Engineers, and participated in team inspections of nuclear power plants for the Pacific Fleet. He is an experienced engineering troubleshooter for technical problems associated with power plant machinery, procedures, operator training, plant system operations, and qualification of maintenance personnel. From 1981 to 1986, he worked in the Navy advanced weapons program on nuclear weapons safety, security, and control matters. Since his retirement from the Navy in 1986, he has assisted in safety system inspections and system operational reliability studies for various commercial nuclear power plants. As an employee of SCIENTECH, Inc., Mr. Jones participated in the September 1989 and June 1990 Criticality Safety Assessments at Rocky Flats, the December 1989 Rocky Flats Facility Observation Team, and two Technical Safety Appraisals in the area of maintenance. He is currently providing assistance to DOE Headquarters on monitoring the progress of the Savannah River Site Reactor Safety Improvement Program (RSIP).

William Kerr is a Ph.D. electrical engineer with 47 years of experience. He has been a professor at the University of Michigan since 1953, where he served as Chairman of Nuclear Engineering for 13 years and director of Michigan Memorial-Phoenix Project from 1961 to the present time. He has been a member of the Advisory Committee on Reactor Safeguards (ACRS) of the Nuclear Regulatory Commission since 1972, having served three years as ACRS Chairman, most recently in 1987 and 1988. Dr. Kerr has consulted with Atomic Power Development Associates, Oak Ridge National Laboratory, and the Department of State and was a member of the Michigan Governor's Task Force on Nuclear Waste Disposal. He has received the Compton Award of the American Nuclear Society, Outstanding Educator in America Award, and the NRC's Meritorious Service Award. James P. Knight has 30 years experience in mechanical and nuclear engineering. He worked for 8 years as a design engineer and analyst for spacecraft, biochemical process, and reactor equipment components. In the later part of this period, he was Chief of the Engineering Services Section for the National Bureau of Standards Reactor (NBSR) and Vice Chairman of the NBSR Hazards Committee. For 17 years, Mr. Knight served on the staff of the Atomic Energy Commission and the Nuclear Regulatory Commission in the regulation of nuclear facility safety. He managed the safety review and evaluation efforts on the mechanical, structural, materials, and geosciences areas for over 85 nuclear power plants as well as other regulated nuclear facilities. He also led numerous special evaluation teams dealing with nuclear safety issues requiring resolution at the Commission level. For the past 5 years, Mr. Knight has managed the Department of Energy headquarters programs for licensing, quality assurance, and safety appraisals. Mr. Knight is presently Director, Office of Engineering and Operations Support, Office of Defense Programs.

Matthew S. McCormick has 8 years experience in nuclear facility safety analysis, reactor operation, radiological controls, environmental compliance, procedures, and nuclear systems. He currently is a supervisory nuclear engineer at DOE Rocky Flats Operations Office. Previously, he was a Senior Nuclear Engineer with the Savannah River Restart Office and was a Nuclear Engineer with the Office of Environment, Safety, and Health. Mr. McCormick also served as a DOE Headquarters site representative at the Savannah River Site. He was a supervisory nuclear engineer at Mare Island Naval Shipyard.

Roger J. Mattson is a Ph.D. mechanical engineer with 26 years of experience. He worked in nuclear facility design for 3 years at Sandia Laboratory, served the Atomic Energy Commission and the NRC for 17 years in the regulation of nuclear facility safety, managed radiation surveillance and emergency preparedness at the Environmental Protection Agency, assisted the U.S. Government in responding to accidents at Three Mile Island and Chernobyl, and assisted the International Atomic Energy Agency with siting standards and safety principles. For 7 years at NRC, Dr. Mattson directed the technical review of applications for construction permits and operating licenses for nuclear power plants. He has received NRC Meritorious and Distinguished Service Awards. Since 1987, he has been Vice President of SCIENTECH, Inc., where he manages offices in Rockville, Maryland, Washington, D.C., and Dallas, Texas, and consults in the areas of nuclear safety, waste management, and environmental protection. Dr. Mattson was the Team Leader for the September 1989 and June 1990 Criticality Safety Assessments at the Rocky Flats Plant.

Ailbert A. Nicholson has an M.S. in chemical engineering and 28 years experience in the radiochemical processing field. His process engineering responsibilities have ranged from shift process control engineer to team leader and coordinator for process engineering and safety support functions at the Hanford PUREX Plant. His management experience includes process engineering and control management at the PUREX Plant, and management of the Hanford Plutonium Finishing Plant. His Hanford Site safety support experience includes development of the draft Operational Safety Requirements document and Final Safety Analysis Report (FSAR) for the PUREX Plant. With SAIC, Mr. Nicholson has provided extensive technical support to the DuPont-Savannah River Site (SRS) in the preparation of a major revision to the SRS F-Canyon Safety Analysis Report and to Westinghouse Hanford Company in the preparation of major revisions to the FSAR's for the Aging Waste Facility and the B-Plant Waste Processing Facility.

Marvin P. Norin has an M.S. in mechanical engineering and 37 years of experience. He is a Senior Scientist at SAIC and has participated in various readiness inspections and safety reviews at numerous DOE facilities, including the DOE Quality Verification at Oak Ridge and a quality inspection of the High Flux Isotope Reactor. He assisted the DOE Office of Materials Production in the development of an Action Plan responding to the Tiger Team Assessment of the Feed Materials Production Center in Fernald, Ohio. Prior to joining SAIC, he worked for DOE and its predecessor agencies as Director of Regulatory Development and as Deputy Director of Safety, Quality Assurance, and Safeguards in the Nuclear Energy Program; Chief of Codes and Standards Branch; and was a systems engineer for the Fast Flux Test Facility and breeder demonstration plant design studies. He serves on the Nuclear Standards Board of the American

National Standards Institute and is a former member of the Institute's Executive Standards Council. He is a member of the American Society of Mechanical Engineers.

Shirley J. Olinger has 8 years experience in nuclear facility safety analysis, technical specification and operational safety requirements, reactor operations, operational readiness reviews, radiological controls, procedures, and nuclear systems. She is a supervisory nuclear engineer at the DOE Rocky Flats Office. She was also the supervisory nuclear engineer at the Savannah River Restart Office. In these two positions, she has evaluated management and organizational performance in implementing DOE safety requirements. Prior to these positions she served as a DOE Headquarters site representative at Savannah River and as a nuclear engineer for various DOE offices. Ms. Olinger also was a supervisory nuclear engineer at the Pearl Harbor Naval Shipyard.

James P. O'Reilly is a nuclear operations management expert with 32 years of experience. Mr. O'Reilly served in the U.S. Navy nuclear power program, served in the Atomic Energy Commission and the NRC for 23 years as the Chief Reactor Inspector and Regional Administrator for Regions I and II, and managed the nuclear operations program for the Georgia Power Company as Senior Vice President. Mr. O'Reilly directly participated in the response to the Three Mile Island accident and many of the abnormal operational occurrences that have occurred at commercial nuclear power plants. He received the NRC Meritorious and Distinguished Service Awards and the Presidential Meritorious Service Award. Since early 1988, Mr. O'Reilly has been a full-time nuclear management consultant. He has provided services to problem nuclear plants, law firms, consulting firms, and the U.S. Government.

David M. Pinkston is a chemical engineer with more than 7 years experience in nuclear power plant operations and safety. He served for 5 years in the U.S. Naval Nuclear Propulsion Program where he qualified as Chief Engineer for nuclear cruiser propulsion plants and gained experience in supervising reactor plant operations and maintenance. Mr. Pinkston was an operations liaison engineer at the Savannah River Site plutonium production facility, where he coordinated the design, management, and technical support needed for major projects and upgrades in the areas of plutonium processing and waste handling. Since October 1989, he has worked as a consulting engineer for SAIC providing technical support and programmatic analysis for DOE. Specific activities include review and development of operational safety requirements for various DOE facilities and development of detailed reporting criteria for a new DOE incident reporting system.

Eugene F. Redden has an M.S. in engineering management, and is a nuclear engineer with over 32 years experience with the Air Force, DOE and predecessor organizations, and the commercial nuclear power industry. His analytical, management, and consulting services have covered a broad spectrum of activities, including nuclear power plant operations, tritium processing and handling, packaging and transport of nuclear materials, disposal of nuclear waste, conduct of Operational Readiness Reviews, and the review and critique of Safety Analysis Reports. Mr. Redden has participated in Operational Readiness Reviews as a technical expert in training and operations for the Remote Mechanical C Line at Richland, the Neptunium Processing Line at Savannah River, the Fluorine Dissolution Facility at Idaho, the Enriched Uranium Conversion Facility at Oak Ridge, the Engineered Demonstration System at Livermore, the High Flux Isotope Reactor, and the High Flux Beam Reactor. He has also participated in several DOE training initiatives, including Training Resource and Data Exchange (TRADE).

John W. Robinson has 10 years experience in performance-based training for nuclear operations, radiation protection, and industrial safety. As Manager, Fuel Dissolution Processing and Nuclear Safety Training at Westinghouse Idaho Nuclear Company, Mr. Robinson is responsible for coordination, development, and implementation of operations training for fuel processing, fuel handling, waste processing, and radiological and nuclear safety training courses for all levels of company personnel. Mr. Robinson has been involved in several DOE training initiatives, including the development of the Training Resource and Data Exchange (TRADE) Special Interest Group on Radiation Protection Training, served as coordinator and principal author of the DOE Guide to Good Practice in Radiation Protection Training; and functioned as a lead developer of the DOE Training Accreditation Program. He currently serves on the DOE TRADE Executive Committee. In October 1988, Mr. Robinson received the "Jack M. Brewer" award from DOE for individual excellence in human resource development, primarily for his efforts in training.

James A. Shurick is a fire protection and safety engineer with 41 years of experience. He worked for 20 years with Factory Insurance Association (now Insurers Risk Insurance) as a Field Inspector and Chief Engineer. Mr. Shurick served the Atomic Energy Commission and the DOE for 19 years as a fire protection design engineer and was

responsible for fire protection requirements in the construction of new facilities and the modification of existing facilities. Engineering efforts included improvement to water supplies, sprinkler protection, heat and smoke detection, special protection and construction, exit requirements, and emergency lighting.

Joseph F. Tinney has a Ph.D. in Engineering Sciences and 25 years of Defense Programs experience, the last 8 years as the Program Manager for SAIC's technical support services in DOE's Office of Defense Programs. Since joining SAIC, Dr. Tinney has been the Principal Investigator on projects for the Defense Nuclear Agency, the Nuclear Regulatory Commission, and the Federal Emergency Management Administration. Dr. Tinney has served on, and provided technical support for, the Plutonium Special Isotope Separation (SIS) Program Peer Review (1982), the SIS Process Readiness Review Team (1986), the New Production Reactor (NPR) Site Evaluation Team (1988), and the Technical Support Team for the Energy Research Advisory Board's NPR Technology Assessment Panel (1987-1988). Dr. Tinney worked for 12 years at the Lawrence Livermore National Laboratory. He served as the Head of the Hazards Control Department supervising 200 health, safety, and environmental personnel; served as Safety Review Team Leader for the design and construction of a new plutonium facility; served as a Senior Scientific Advisor on the Nuclear Weapons Accident Response Group and Nuclear Emergency Search Team; and served as Division Director for the Special Projects Division.

Gary J. Toman is an electrical engineer with 20 years of experience. He has 10 years experience in commercial nuclear power plant operations and a total of 14 years experience in commercial nuclear power plant licensing, maintenance, equipment qualification, quality assurance, component failure evaluation, and safety-system functional inspections. Most recently, Mr. Toman led a functional assessment of the electric power distribution system for Palo Verde Nuclear Generating Station. He has broad experience with verification of equipment operability and has developed a nondestructive test methodology for evaluating aging of installed electrical cable insulation. Mr. Toman has also contributed to the NRC's Nuclear Plant Aging Research Program in the areas of relays, circuit breakers, solenoid valves, and pressure transmitters. He evaluated reactor trip circuit breaker failures for the U.S. Nuclear Regulatory Commission at the Salem Nuclear Generating Station and the San Onofre, cGuire, North Anna, and D.C. Cook plants. He is a Principal Engineer with ERC Environmental and Energy Services Company.

Arthur J. Toy has a Ph.D. in Radiation Biophysics and has worked at Lawrence Livermore National Laboratory for 27 years. He is the Facility Manager of LLNL's Plutonium Facility, where he is responsible for assuring environmental and personnel safety for all operations in the Facility. In a previous position, as the Hazards Control Department Head/Safety Program Leader, Dr. Toy was responsible for assuring implementation of the LLNL's Safety Program. Dr. Toy also managed environmental monitoring of LLNL and local environs, environmental assessments of Laboratory construction, and Laboratory compliance with all Federal, State and local environmental regulations. He has written safety analysis reports for nuclear facilities and was the editor of the LLNL Environmental Impact Statement. Lance E. Traver is a nuclear engineer with 7 years experience. Mr. Traver served in the U.S. Naval Nuclear Propulsion Program for 5 years where he developed an understanding of reactor operations and safety principles. He qualified as Chief Engineer and Senior Supervisor of Naval Nuclear Propulsion Plants. As an employee of SCIENTECH, Inc., he has participated in evaluating the reactor restart program for the Savannah River Site Production Reactors and has conducted root cause analyses of safety issues at both the Savannah River Site and the Rocky Flats Plant. Mr. Traver provided technical support to the September 1989 and June 1990 Criticality Safety Assessments at the Rocky Flats Plant.

Lawrence J. Ybarrondo is a Ph.D. mechanical engineer with 30 years experience. Dr. Ybarrondo worked in nuclear facility design, construction, analysis, testing, and operations at the Idaho National Engineering Laboratory. He held the position of Associate General Manager of EG&G, Idaho, and was in charge of the operations of four nuclear reactor facilities. He has served on the Board of Directors of the American Nuclear Society and on its executive committee on nuclear reactor safety. Dr. Ybarrondo assisted the U.S. Government in responding to the accidents at Three Mile Island and Chernobyl. He was the Deputy Team Leader for the September 1989 and June 1990 Criticality Safety Assessments at the Rocky Flats Plant.

APPENDIX B. ASSIGNMENTS

To be provided at a later date.

APPENDIX C. REFERENCES

1. "Guidelines for Application of Readiness Reviews to Department of Energy Activities," January 1987.
2. "Process Operational Readiness and Operational Readiness Follow-On," DOE-76-45/39, SSDC-39, February 1987.
3. "Occupancy-Use Readiness Manual, "Safety Considerations," ERDA-76-45-1, SSDC-1, September 1976.
4. "Events and Causal Factors Charting" (regarding management oversight and risk tree development and use), DOE-76-45/14, SSDC-14, Rev. 1, August 1978.
5. "Mort User's Manual (for use with management oversight and risk tree analytical logic diagram), DOE-76-45/4, SSDC-4, Rev. 2, May 1983.
6. "Operational Readiness Assessment Team Inspections," NRC Inspection Procedure 93806, August 21, 1989.
7. Guidelines for the Conduct of Operations at Nuclear Power Stations, Guideline INPO 85-017, Rev. 01, April 1988.
8. Memorandum from Victor Stello, Jr., to R. Nelson, "Order Compliance Verification at the Rocky Flats Plant," May 3, 1990.
9. "Technical Safety Appraisal of the Rocky Flats Plant," DOE/EH-0081, January 1989.
10. "Assessment of Criticality Safety at the Department of Energy Rocky Flats Plant," SCIE-DOE-201-89, July-September 1989.
11. Defense Nuclear Facilities Safety Board, "Recommendation to the Secretary of Energy" (regarding resumption of plutonium processing operations at the Rocky Flats Plant), May 4, 1990.
12. Defense Nuclear Facilities Safety Board, "Recommendation to the Secretary of Energy" (regarding criticality safety and resumption of plutonium processing operations at the Rocky Flats Plant), June 5, 1990.
13. Advisory Committee on Nuclear Facility Safety, letters to the Secretary of Energy regarding resumption of plutonium processing operations at Rocky Flats, dated November 30, 1989, March 28, 1990, and June 4, 1990.
14. Memorandum to Acting Assistant Secretary for Defense Programs from Secretary of Energy regarding "Resumption of Plutonium Processing at the Rocky Flats Plant," June 5, 1990.
15. "Environmental Tiger Team Assessment of the Rocky Flats Plant," June 6 to July 21, 1989.
16. Letter from Secretary of Energy to the Defense Nuclear Facilities Safety Board, "Response to May 4, 1990, Recommendation," June 20, 1990.
17. "Rocky Flats Plan for Phased Resumption of Plutonium Operations," EG&G Rocky Flats, March 5, 1990 (including the April 19, and May 25, 1990 updates).